DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

NURSES' KNOWLEDGE, ATTITUDES AND EXPERIENCES ON THE IMPLEMENTATION OF TUBERCULOSIS PREVENTIVE THERAPY AMONG HIV POSITIVE PATIENTS IN NORTH SUB-DISTRICT, ETHEKWINI

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DECLARATION

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Durban University of Technology or to any other institution for assessment or for any other purpose.

10 January 2023

Signature of student Date

Approved for final submission

5 January 2023

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08 January 2023

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DEDICATION

I dedicate this dissertation to my only daughter Asipesona. Thank you for being a 49 blessing in my life. I am more grateful to you than words can express. I am truly 50 blessed to have you.

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Matthew 19: 26 says “For nothing is impossible with God”. I would like to thank God Almighty for granting me the opportunity to realise my dream as well as giving me the strength to embark on this journey.

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ABSTRACT

Introduction

Tuberculosis (TB) is a common opportunistic infection that occurs more often in people living with human immunodeficiency virus (HIV) because of their weakened immune system, thus increasing their risk of contracting tuberculosis. In the year 2010 isoniazid was introduced by the World Health Organisation for people living with HIV who had no presumptive TB symptoms to prevent TB incidence. The recommended regimen is a daily dose of 5mg/kg 300mg isoniazid for at least six months extended to nine months if there is interruption of treatment. However, tuberculosis continues to affect people living with HIV.

Purpose of the study

The purpose of the study was to explore knowledge, attitudes and experiences of professional nurses on the implementation of tuberculosis preventive therapy (TPT) among HIV positive patients who are found to have not contracted TB, in selected primary health care facilities.

Methodology

A descriptive quantitative cross-sectional survey design was used to determine the factors that influence implementation of tuberculosis preventive therapy by professional nurses to HIV positive patients without presumptive TB features. Census sampling of respondents was used to gather a sample of 120 professional nurses.

Results of the study

The results indicated that the majority of respondents had knowledge about TPT and a positive attitude towards its implementation. Some respondents had no experience of TPT implementation. A few respondents reported not implementing TPT for various reasons, including fear of side effects in patients.

Conclusion

This study found that knowledge and experience are critical in changing attitudes of professional nurses as well as encouraging them to implement TPT among HIV positive patients to prevent TB incidence.

Key words: Attitudes and experiences, normalisation process theory, nurses' knowledge, tuberculosis, tuberculosis preventive therapy.

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LIST OF ACRONYMS

Acronym	Full term
ART	Antiretroviral therapy
DoH	Department of Health
KZN	KwaZulu-Natal
HIV	Human immunodeficiency virus
IPT	Isoniazid Preventive Therapy
INH	Isoniazid
NSM	Nursing services manager
PHC	Primary Health Care
PLHIV	People living with HIV
PN	Professional Nurse
TB	Tuberculosis
TPT	Tuberculosis Preventive Therapy
USA	United States of America
WHO	World Health Organisation

CHAPTER 1: OVERVIEW OF THE STUDY

1.1 INTRODUCTION

Worldwide tuberculosis (TB) cases were predicted to have reached 10.6 million in 2022, with 5.8 million men, 3.5 million women, and 1.3 million children affected. Every age group and nation have some form of tuberculosis. TB can be prevented and treated (World Health Organization 2022). TB is an airborne bacterial infection caused by the bacteria *Mycobacterium tuberculosis* (MTB) that primarily affects the lungs (WHO 2023). Although RSA has made notable progress in reducing TB prevalence and deaths as well as improvement of treatment outcomes for new smear positives TB cases, TB remains a burden and the leading cause of death among people living with HIV (PLHIV) worldwide (Absossie and Yohanes 2017: 361-366). According to the
Joint United Nations Programme on TB, the world's HIV prevalence is estimated at 35.3 million and most PLHIV are in the low to middle income countries especially in the sub-Saharan Africa (UNAIDS 2013: 6).

In 2016, 9.6 million people had TB and 1.6 million of them died and thus making TB the leading cause of death among PLHIV globally (WHO 2020). Furthermore, in 2017, 60% of people that had TB were also HIV positive. Moreover, out of the 193 000 people living with HIV were diagnosed with active TB, 56 000 of them died. However, in 2018, 10 million people contracted TB and 1.6 million died from the disease. Yet, 30 countries with a high TB burden account for 87% of all new cases, with India leading, followed by China, Indonesia, Philippines, Pakistan, Nigeria, Bangladesh and, lastly, South Africa (WHO 2020). The above statistics confirm that TB is a burden of disease even more so in the underdeveloped countries. It was of out of this concern that the WHO established a strategy that was believed to be a solution and was going to reduce this burden.

In the year 1998, the WHO introduced the use of isoniazid preventive therapy (IPT) for the period of six months to prevent TB for persons who were in contact with TB

infected persons (WHO 1998: 4). This was offered to both adults and children. Then in the year 2010, the provision of IPT was extended to PLHIV with no presumptive TB symptoms (WHO 2010), which South Africa adopted as TB was seen as a major cause of illness and death in PLHIV, even those on antiretroviral therapy (ART) (South Africa, Department of Health (DoH 2010). The recommended regimen is a daily dose of 5mg/kg of isoniazid (INH) 300mg for at least six months extended to nine months if there is interruption of treatment. This protocol has resulted in a reduction of TB incidence, however, its benefits lasted only for 6-18 months after completion. These findings prompted the extension of IPT to 12 months.

South Africa has adopted the WHO's recommendation on the use of TPT in PLHIV without presumptive TB symptoms. South Africa utilises INH as a drug of choice to prevent TB infection. In response to the HIV burden in SA, the National Strategic Plan (NSP) on HIV, sexually transmitted infections and TB 2012-2016 was launched by the South African president in December 2011 (Nsengiyumva 2018: 1). The NSP outlines South Africa's response to HIV/TB and is aligned with the negotiated service delivery agreements of all government departments and formed the strategic direction for the national response for the following five years. Through the NSP, the government invited all sectors of society to come together and take part in the fight against the TB/HIV epidemic. The primary goal of the NSP is the reduction of new TB/HIV infections by at least 50%. Other goals include initiation of ART to at least 80% of eligible patients and reduction of stigma and discrimination related to HIV and TB by 50% in PLHIV.

The social, economic, and environmental conditions created by the past apartheid system included overcrowded, poorly ventilated squatter settlements and single gender hostels, migrant labour and underdeveloped health services for black people. All of these factors provided favourable environments for efficient transmission of HIV and TB as the men's hostel dwellers were often served by sex workers (Ramaliba *et al.* 2017: 182).

Furthermore, the migration lifestyle of living temporarily in the cities with regular visits to wives and families in the rural areas, was one of the main reasons for the spread of HIV. TB has always been a challenge over the course human history.

As much as the country has a high burden of TB and HIV, out of nine provinces, KwaZulu-Natal (KZN) is the leading province carrying the largest burden of TB/HIV, with the co-infection rate of approximately 70% (Kalonji, Mahomed 2019: 5). KZN is the second largest province in South Africa with an estimated population of 10 694 400 and the highest HIV incidence in the country (Strauss and George 2015: 1). In addition, KZN is heavily burdened with both HIV/TB prevalence and incidence, which is 24.7% and 2.3% respectively. Despite the availability of free TPT for eligible PLHIV, the recommended TPT coverage is not yet met.

1.2 PROBLEM STATEMENT

South Africa is one of the countries with the highest burden of tuberculosis among 30 countries (RSA 2018). Although South Africa has made notable progress in reducing TB prevalence and deaths as well as improvement in TB treatment outcomes, TB remains a burden to the country. One of the interventions by the South African Department of Health that brought about notable progress was the introduction of tuberculosis preventive therapy using isoniazid tablets. This TPT is taken for the duration of 12 months by PLHIV who have been screened and found not to have TB. Currently, the number of TB cases and notification rates are high in KZN (Kalonji 2019: 1) and the highest numbers are confirmed to be in the eThekwini district, with a treatment outcome of 65%, which is an indication of failure to meet the required target of 85% for each district.

TB/HIV co-infection rates remain high even though case detection for TB and routine HIV testing are offered to all patients with presumptive signs or diagnosed with TB for early detection of HIV. Routine screening for TB symptoms is conducted on all people who are HIV positive for early detection of TB. In 2020, six clinics in the north subdistrict of eThekwini Municipality reported 69.6% TPT coverage which

reflected that only 3 665 HIV positive registered patients were enrolled on TPT out of 5 261 registered PLHIV. Therefore, the researcher decided to conduct a study to find out why so many patients were denied this life saving intervention that is freely available to them.

1.3 AIM OF THE STUDY

The aim of the study was to explore knowledge, attitudes, and experiences of professional nurses (PNs) on the implementation of TPT among HIV positive patients who are found to have not contracted TB, in selected primary health care facilities.

1.4 OBJECTIVES OF THE STUDY

The objectives of the study were to:

- Determine professional nurses' knowledge of the TPT policy.
- Determine professional nurses' attitude towards the implementation of the TPT policy.
- Identify factors that influence professional nurses' implementation of TPT policy for eligible HIV-positive patients.

1.5 RESEARCH QUESTIONS

- What are professional nurses' knowledge of TPT policy?
- What are professional nurses' attitude towards the implementation of TPT policy in HIV positive patients?
- What are factors that influence are related to professional nurses' implementation of TPT policy to eligible HIV positive patients?

1.6 SIGNIFICANCE OF THE STUDY

Nurses

The results of the study might make PNs aware of the seriousness and consequences of not implementing TPT in PLHIV and can encourage managers to do regular training

of PNs who are new and may not be comfortable with implementing TPT. The results of the study might assist the managers to monitor the screening of TB on PLHIV and initiation of TPT in persons with no presumptive signs and symptoms of disease.

Nurse Education

Prevention of TB is included in the curriculum in nurse training, however, guidelines change often. Professional nurses can benefit from regular in-service education on current guidelines to keep abreast with new information to enhance their practice.

Community

Patients would benefit from being initiated on IPT thus reducing the incidence of TB.

1.7 CHAPTER SUMMARY

TB and HIV have been the most challenging diseases worldwide for decades, with the largest number of PLHIV in sub-Saharan Africa. South Africa has the largest TB/HIV epidemic in the world while KZN accounts for the highest TB/HIV incidence in South Africa. However, despite availability of TPT implementation policy to prevent TB incidences, the implementation thereof is still a challenge.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses literature reviewed by the researcher to gain an understanding of what has been already done by other researchers on the topic. A literature review is a systematic, explicit and productive method for identifying and evaluating and synthesising the existing body of completed and recorded work produced by researchers, scholars and practitioners (Fink 2019: 253). The purpose of a literature review is to bring clarity and focus on the research problem and to give credit to other researchers (Baker 2016: 265). The theoretical framework that guided the study is also discussed in this chapter. The focus of the review was to gather information on knowledge, attitudes, and experiences on the implementation of TPT among HIV positive patients to reduce TB incidence.

2.2 STRATEGIES USED TO SEARCH FOR LITERATURE

The university library was the first point of contact to search for journal articles relating to TB and related content. The researcher was assisted by the university subject librarian to search for online literature. The researcher used search engines such as Google scholar, Pro Quest, Open Access, PubMed, and Plos ONE, Pub Med Central and SAGE. In order to obtain literate relevant to the question at hand, specific search terms were used to narrow the literature to what was most relevant for the study.

Search terms used included “factors influencing use of TPT” and “INH use to prevent TB in HIV patients”.

2.3 TB AS AN EPIDEMIC

Tuberculosis is an airborne bacterial infection caused by the organism *Mycobacterium tuberculosis* that primarily affects the lungs (Rangaka *et al.* 2014:

23). According to the WHO (2018: 1), TB is one of the top 10 causes of death worldwide. In 2018, 10 million people fell ill with TB and 1.6 million died from the disease. Thirty countries with high TB burdens account for 87% of new cases, with India leading followed by China, Indonesia, Philippines, Pakistan, Nigeria, Bangladesh and, lastly, South Africa. Rangaka *et al.* (2014: 23) state that TB is curable and preventable. It is spread from person to person through the air via sneezing or spitting; the person inhaling the bacteria can become infected. Furthermore, about one quarter of the world population has latent TB meaning they have been infected by TB bacteria but are not yet ill with the disease and cannot transmit it.

2.4 TB AND HIV

People living with HIV are 20 to 30 times more likely to develop active TB disease than people without HIV, according to Absossie and Yohanes (2017: 361-366). Kaplan *et al.* (2018: 356) concur that PLHIV are most likely to develop TB. TB is the leading cause of death among PLHIV. Kaplan *et al.* (2018:356) state that someone who is HIV positive with a CD 4 count of less than 200 copies is likely to develop TB due to vulnerability to opportunistic infections. The WHO (2018: 1) recommended a 12component approach to collaborative TB/HIV activities including actions for prevention and treatment of TB to reduce death. The WHO advises the use of INH as an antibiotic that fights bacteria, and which can treat and prevent TB. The guidelines strongly recommend systematic testing and treatment of latent TB in PLHIV, adult and child contacts of pulmonary TB cases.

2.5 THE GLOBAL USE OF TUBERCULOSIS PREVENTIVE THERAPY

In 2018 the WHO recommended TPT to be initiated for HIV positive patients who have been screened for TB and do not yet display presumptive signs and symptoms of the TB disease (WHO 2018). The WHO pointed out that individuals who are infected with HIV are most likely to develop TB due to their immunocompromised

state. INH is recommended to individuals who are HIV positive and have a negative tuberculin skin test (TST) to reduce the risk of developing active TB.
In Brazil the use of INH for six months reduced the burden of TB in PLHIV by 40% (Swaminathan 2014: 646). INH is recommended for PLHIV who are TB asymptomatic based on algorithm for TB screening and use of tuberculin. Dowdy (2014: 291) agreed that TB screening and the use of INH alone as a drug of choice delivers substantial reduction of TB incidence and mortality among PLHIV. In addition, TB screening is a prerequisite, but a positive TST is not a requirement for initiation and use of only INH for six months. Maciel *et al*. (2018: 23) agree that INH is beneficial in individuals on ART. These researchers further state that coverage of ART delivers a substantial reduction of TB incidence and mortality among people living with HIV. At the end of five years of INH therapy, TB incidence has been reduced by 3.0% in Rio de Janeiro, Brazil.

Studies in the United States of America (USA) found that weekly rifepidine and INH had a greater effectivity for a short course regimen to scale up prevention and treatment of TB. This dual therapy administered once weekly for three months was shown to be effective in the prevention of TB (Doan *et al.* 2019: 227; Haung *et al.* 2019: 26; Pease *et al.* 2018: 566). However, Briggs *et al.* (2015: 305), in a study conducted in Atlanta USA, found that there was little evidence to demonstrate that INH reduces mortality in PLHIV to reduce TB incidence. Researchers further state that there is a greater benefit of INH in PLHIV with a positive TST. Nevertheless, INH should be provided in the absence of TST provided that there are no presumptive TB symptoms. Haung *et al.* (2019: 26), in their study in the USA, found that it was cost effective to take rifapentine and INH for three months among contacts, and treatment completion was high. Doan *et al.* (2019: 218-227) also conducted a study in the USA and reached similar conclusions, that three months of weekly rifepidine and INH was a beneficial short course regimen to scale up prevention and treatment completion.

In Malaysia, INH taken for six months was found to be safe among PLHIV with coadministration of ART (Wong *et al.* 2016: 2). Moreover, INH with co-

administration of ART had significant results in preventing TB incidence and a completion rate of 81.1%. Similarly, Danyuttapolchai *et al.* (2017: 1) in Thailand found that INH reduced the risk of TB disease by 88.5% among PLHIV that had positive TST and completed their treatment in nine months. In the meantime, in Canada, Pease *et al.* (2018: 566) found that treatment completion was high in patients on a combination of rifapentine and INH for three months to reduce the risk of active TB.

2.6 TPT IN THE AFRICAN CONTEXT

In Ethiopia, INH was found to be effective in reducing TB incidence, independently and with concomitant ART, in PLHIV (Yirdam *et al.* 2014: 9; Assebe 2015: 12). Another Ethiopian study by Absossie and Yohanes (2017: 366) found that INH is recommended for the benefit of HIV/AIDS infected individuals to prevent TB infection. Tiruneh, Getahum and Adeba (2019: 8) found that in Western Ethiopia, INH reduced the risk of TB incidence by 55% in PLHIV. Moreover, initiation was based on systematic screening to rule out the presence of active TB.

According to Teklay *et al.* (2016: 35), healthcare providers in Ethiopia were hindering the implementation of INH due to frequent interruption of isoniazid supply. This shortage resulted in patients developing resistance to the drug. Healthcare providers further stated that there was a lack of commitment among healthcare managers to scale up the INH implementation to eligible PLHIV, therefore not supporting the programme nor developing quality improvement plans. This could have been because of clinicians perceiving that patients were negatively affected by the side effects of INH. Lai *et al.* (2019: 371-377) stated that clinicians had difficulty ruling out active TB among PLHIV and required improved support and training in implementation of INH.

In Addis Ababa TB patients who were co-infected with HIV constituted a large proportion of patients. INH was the recommended treatment in the form of INH taken for 6-12 months (Berhe, Demisse and Gazehegn 2014:6). In Malawi, INH

provision at the time of initial HIV diagnosis in patients with no presumptive TB features is highly acceptable and those initiated on INH complete therapy in six months (Little *et al.* 2018: 377). Makanjuola and Taddesse (2014: 12) concur that utilisation of INH in PLHIV is safe, acceptable and reduces the morbidity and mortality associated with
TB/HIV co-infection. However, patient care cards and registers in Nigeria indicated low INH implementation and completion due to poor documentation. The government and health programmers in Nigeria then applied quality improvement approaches to solve health service delivery of INH implementation and the findings showed improvement of INH implementation and completion (Ogunsola *et al.* 2019: 34). Furthermore, Olajide *et al.* (2018: 47) identified that physicians in government facilities had fear of INH resistance hence failure to implement TPT.

Kenyan healthcare providers have reported a lack of commitment and support for INH programme by management and policy makers and this led to non-implementation of INH to eligible patients (Wambiya, Atela and Ibisom 2018: 12). In Tanzania, INH has been effective in reducing TB incidence in PLHIV with no presumptive signs of TB (Sabasaba, Mwambi and Mahambe 2019: 62).

According to Johnson (2018: 1072) following a study in Uganda, a three month short course regimen of weekly rifapentine and INH as recommended by the WHO as an alternative for six months INH had a significant completion rate to reduce TB incidence on patients taking ART.

Nyati *et al.* (2019: 10) conducted a study in Zimbabwe and found that clinicians had positive attitudes towards implementation of INH to eligible patients and no resistance was identified in patients that were initiated on INH. This meant that patients who were eligible were going to be initiated on INH by the clinicians.

2.7 TPT IN THE SOUTH AFRICAN CONTEXT

Churchyard *et al.* (2014: 244-248) state that INH is safe and reduces the risk of TB among PLHIV, particularly those without evidence of TB infection.

In South Africa, the current TPT options include: 3HP: three months of INH and rifapentine given once weekly, 3RH: three months of daily rifampicin and INH, 6H: six months of daily INH and 12H: 12 months of daily INH (Republic of South Africa 2023). The 3HP regimen is the most safe and effective, achieves significantly higher treatment completion rates and has a significantly lower risk of hepatotoxicity than 6H (Sterling *et al.* 2011).

Maharaj (2017: 537-543) articulated that INH reduced acquisition of TB in PLHIV by 97.6% in Durban. Furthermore, in Gauteng Abdulrazaak, Govender and Nzaumvila (2018: 18) concluded that 51 doctors needed formal training on the implementation of TPT to increase their confidence as practitioners to safely implement it. The findings stipulated that there were 51 respondents and 43.1% had excellent knowledge of IPT, 54.9% had positive attitude towards IPT provision and on average 35.3% had good practices regarding IPT provision to eligible patients. In conclusion, the doctors needed formal training on the implementation of INH.

2.8 THEORETICAL FRAMEWORK

In the current study the normalisation process theory (NPT) was used to guide the study. The NPT was used because it is effective in evaluating and understanding the process of complex healthcare interventions (Murray *et al.* 2010: 2). This framework describes how factors such as personal or environmental factors affect the use and implementation of a new strategy (Murray *et al*. 2010: 21).

NPT is an implementation theory, which emanates from a sociological theory in the field of science and technology founded by the British sociologist Carl May in 2006 (Murray *et al*. 2010: 21). It has four constructs, namely: coherence, cognitive participation, collective action, and reflexive monitoring (Gillespie *et al.* 2018: 12). These constructs do not follow one another logically but depend on the context in which they are applied such as organisational culture, social context, and group

dynamics. Coherence is a planning phase to promote implementation of TPT by PNs, followed by cognitive participation which is a working phase where PNs are engaged in the implementation of TPT, followed by a collective action or doing phase where PNs implement TPT to eligible HIV positive, and lastly reflexive monitoring which is an appraisal phase. The appraisal phase involves monitoring the improvement of TPT coverage. Figure 2.1 shows the descriptive pathway of the NPT.

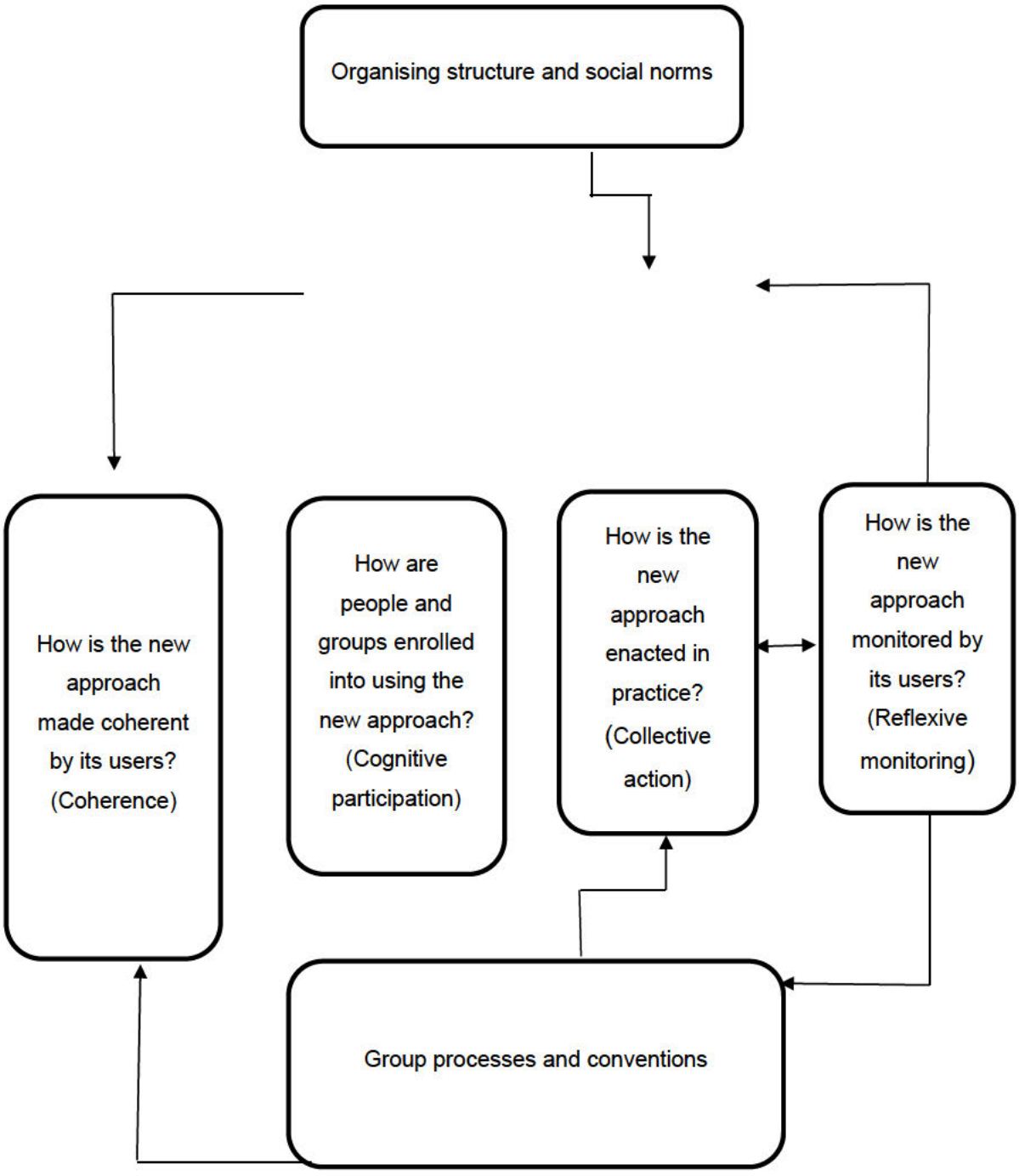

Figure 2.1: **Description of Normalisation Process Theory**

Coherence refers to healthcare workers' awareness and understanding of a new strategy (Murray *et al*. 2010: 21). In this study, the PNs may know that if the HIV positive patient is on ART with no presumptive TB symptoms, patients should be offered TPT to prevent them from developing TB; to do this well PNs need to understand the TPT policy.

Cognitive participation refers to the level of the healthcare workers' willingness and preparedness to engage and implement the new strategy (Murray *et al.* 2010: 21). In this study, PNs may know that even if the HIV positive patient is on ART, they may develop TB if they do not implement TPT. Some PNs may be willing to implement TPT but may lack the understanding or ability to use TB screening to assess for TB symptoms in order to implement TPT to eligible HIV positive. For this reason, in-service training should be conducted.

Collective action refers to the responsibility of healthcare workers in relation to the success of implementing the new strategy (Murray *et al*. 2010: 22). In this study, the PNs who are receiving post in-service training on TPT policy may need guidance, coaching and mentoring until they are comfortable and confident to implement TPT to eligible HIV positive patients.

Reflexive monitoring refers to the evaluation of the progress and success of the strategy by healthcare workers with recommendations for improvement (Murray *et al*. 2010: 22). The nursing services manager (NSM) at this phase may conduct an audit of patient medical files to monitor implementation of TPT and note any increased TPT coverage.

Gillespie *et al.* (2018: 19) used NPT in a study conducted in Australia and found that in the coherence phase, respondents agreed that TPT is valuable to their work. Respondents indicated in the cognitive participation phase that they would support TPT in future and in the collective action phase they agreed that TPT could easily

be integrated into existing work. Regarding reflexive monitoring, the respondents agreed that their feedback could improve TPT in the future.

2.9 APPLICATION FOR THE THEORETICAL FRAMEWORK

NPT provides a flexible framework for the development and evaluation of complex healthcare intervention in Primary health care (PHC) settings (Huddlestone *et al.* 2020: 1). The use of NPT and its application is suitable in supporting patients with chronic conditions (HIV) and co-morbidities (TB). In terms of the current study, NPT provided a framework to understand how interventions can be implemented by PNs in a South African healthcare setting to reduce TB incidence among PLHIV. The elements of the theoretical framework are useful in guiding the discussion of the results of the study.

2.10 CHAPTER SUMMARY

In conclusion, offering INH implementation for eligible HIV positive patients to prevent TB incidences is mandatory for the relevant healthcare personnel. The interruption of INH supply is a cause for concern to healthcare providers because of creating drug resistance. Moreover, the non-commitment of healthcare managers affects the healthcare providers negatively in the implementation of INH.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter presents the research methodology that was used in the study, the methods of sampling, and the data collection method used to find answers to the research questions. This chapter includes research design, study setting, study population, recruitment of respondents, sampling, data collection method, data collection, data analysis, validity, reliability, sampling, and ethical considerations.

3.2 RESEARCH DESIGN

A research design is a plan for addressing a research question, including specifications for enhancing the study's integrity (Polit and Beck 2021: 18). The research design helps the researcher to select the population for data collection and analysis (Grove, Burns, and Gray 2013: 43). A descriptive cross-sectional quantitative design was employed to guide this study.

3.2.1 Quantitative research

Quantitative research is a formal, objective systematic process in which numerical data are used to obtain information about the world, usually under controlled conditions (Grove, Burns and Gray 2013 :57). Quantitative research incorporates logical, deductive reasoning as the researcher examines particulars to make generalisations about the phenomenon (Polit and Beck 2021: 18). Quantitative research was deemed suitable for this study because it determines the effects of interventions and can provide strong evidence for nursing practice in the implementation of TPT to eligible patients by PNs.

3.2.2 Descriptive research

A descriptive research approach develops a complex picture of the problem which

involves reporting multiple perspectives, identifying the many factors involved in a situation, and generally sketching the larger picture of the phenomenon (Polit and Beck 2017: 763). Descriptive design is a method that provides an accurate portrayal of the characteristics of the target group. A descriptive design in this study was appropriate since the researcher was interested in identifying and describing the knowledge, attitudes and experiences of nurses regarding TPT implementation by PNs among PLHIV.

3.2.3 Cross-sectional design

A cross-sectional design involves collecting data at one point in time as opposed to a longitudinal design which collects data over a period of time (Polit and Beck 2017: 162). The researcher collected quantitative data from respondents who completed a questionnaire to explore their knowledge, attitudes, and experiences regarding the implementation of TPT among PLHIV to prevent TB incidences.

3.3 RESEARCH PARADIGM

Quantitative research is underpinned by the positivist paradigm. Positivists believe that reality is objective, orderly, and fixed and the researcher is independent from those being researched. The positivist paradigm is deductive in nature and knowledge of human behaviour is gained from observation and reason as well as making sense of the answers to research questions (Polit and Beck 2017: 7). Based on a positivist paradigm, the researcher used a questionnaire to obtain data on knowledge, attitudes, and experiences of PNs to the implementation of TPT among HIV positive to prevent TB incidence.

3.4 STUDY SETTING

The study was conducted in six PHC clinics located in north 6 sub-districts of eThekwini in the small town of Verulam that is 27 kilometres north of Durban, in

KZN. The eThekwini Municipality is a metropolitan area that was formed in the year 2000 and includes the city of Durban and surrounding towns, with a population of 3 176 254. The selected clinics are primary healthcare facilities, which operate for eight hours a day from Monday to Friday. The total number of PLHIV registered in the six clinics is 5261 while 3665 are currently on TPT. The TB/HIV programme is integrated into the general primary care stream where patients are consulted by a total of 120 professional nurses allocated in all sampled clinics. These clinics were chosen as study sites because of the diversity of the population of patients due to the fact that they draw from urban, semi-urban as well as semi-rural and rural areas. In addition, these clinics have a high TB and HIV burden.

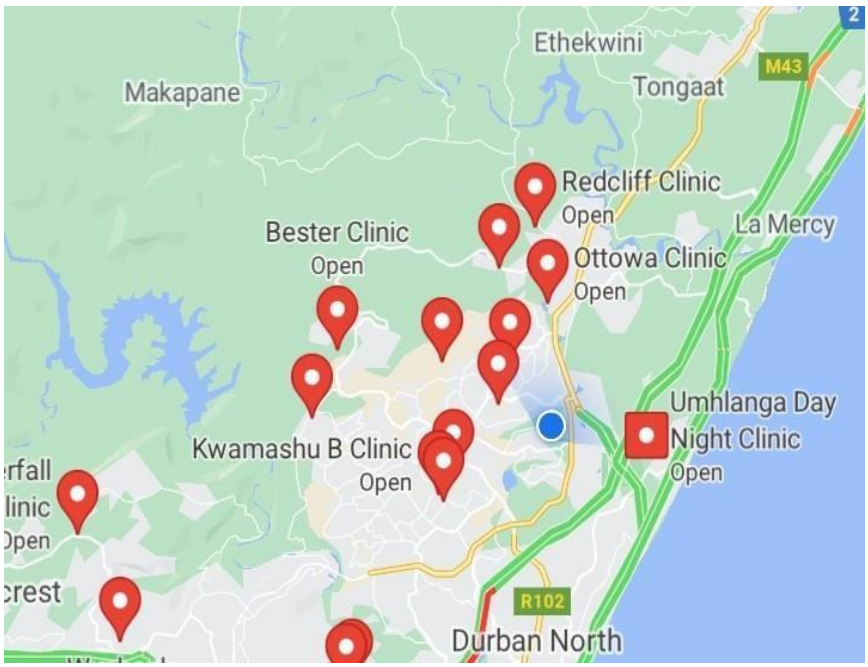

Figure 3.1: Distribution of clinics in North sub-district

3.5 STUDY POPULATION

The population of the study are all PNs employed in the six PHC clinics and the target population are PNs who are allocated to render services in all three streams namely acute, chronic and mother, and child and women's health, in their clinics.

PNs are PHC trained and diagnose and treat patients independently in the clinic without the assistance of a doctor. The target population consisted of 120 PNs from the six PHC clinics in north 6 sub-districts.

3.6 RECRUITMENT OF RESPONDENTS

The researcher requested permission from the clinic managers to present the information about the study on the days that they have their staff meetings. The researcher then requested about ten minutes to discuss the purpose of the study and how PNs were expected to participate. Potential respondents were handed information letters (Appendix F) to read at their leisure for more understanding. The researcher answered questions and gave clarity where required. They were informed that participation is voluntary and that they can withdraw for the study at any time without any compromise to them. The significance of the study was discussed, and they were encouraged to participate. Respondents were given consent forms to sign indicating agreement to participate in the study on the day of the data collection. Respondents were informed that their names would not be used on the questionnaire, instead codes would be used to maintain confidentiality.

3.7 SAMPLING

Sampling refers to selection of a group of people or elements in which to conduct a study (Gray, Grove, and Sutherland 2017: 344).

3.7.1 Sampling technique

Sampling technique is the process of selecting a sufficient number of elements from the population (Gray, Grove, and Sutherland 2017: 345). Census sampling was used to recruit respondents to form part of the study. All six PHC clinics in north 6 subdistricts were used as study sites. Therefore, the total of 120 PNs employed in those sites were eligible to participate in the study.

In order to ensure confidentiality and anonymity, the six PHC clinics were coded as follows.

- PHC clinic number 1 was referred to as P1
- PHC clinic number 2 was referred to as P2
- PHC clinic number 3 was referred to as P3
- PHC clinic number 4 was referred to as P4
- PHC clinic number 5 was referred to as P5
- PHC clinic number 6 was referred to as P6

3.7.2 Sample size

Census sampling comprising all professional nurses (n=120), both males and females working in North 6 PHC clinics was desired. However, according to an alpha value of .05 and a margin of error of .05, the minimum sample required was 92. To this 10% was added in case some questions were left out by some respondents. This was then rounded off to the sample of n=100, which was adequate to satisfy the minimum sample requirement in order to be able to project results onto the population of 120 PNs. The sample size ended up being 100 because 20 PNs did not participate in the study; some were on sick leave, some were attending meetings away from the clinics, and others declined participation.

Table 3.1: The sample size of PNs working in the six selected PHC clinics

Name of clinic	Number of PNs
P1	45
P2	15
P3	15
P4	15
P5	15
P6	15
Total	**120**

3.7.3 Inclusion criteria

- All PNs working in the six north sub-district PHC clinics in eThekwini.
- All six north sub-district PHC clinics.

3.7.4 Exclusion criteria

- All other categories of nursing staff as they do not prescribe treatment to patients.
- PNs who will be away from the facility at the time of data collection.

3.8 DATA COLLECTION

Data collection is the process of gathering and measuring information on the selected variables (Gray, Grove, and Sutherlands 2017: 55). In this study, a questionnaire was used to collect data.

3.8.1 Data collection tool

Data collection tool refers to the instrument used to collect data such as a questionnaire or a checklist (Gray, Grove, and Sutherlands 2017: 55). An adapted questionnaire that was previously used by Abdulrazaak, Govender and Nzaumvila (2018: 18) was used in the current study. The tool was found on an open access platform, so no permission was required. The questionnaire was adapted using the South African TPT policy on assessment of TB symptoms and implementation of TPT. Section A of the questionnaire comprised demographic data of respondents and section B contained closed-ended questions on knowledge of TPT, attitudes, and experiences of TPT. A five-point Likert type scale was used to rate responses, using the following response categories: strongly agree (5), agree (4), neutral (3), disagree (2) and strongly disagree (1). The data collection tool was in English and took 15 to 25 minutes to complete.

3.9 PILOTING OF DATA COLLECTION TOOL

Before the study was conducted, the researcher pre-tested the data collection tool. Pre-testing is the stage in research when a questionnaire is evaluated by members of target population to evaluate the reliability and validity of the instrument prior to

final distribution (Gray, Grove, and Sutherlands 2017: 367). In November 2021, the Institutional Research Committee (IREC) of the Durban University of Technology granted provisional ethics approval (Appendix A) in order to pre-test the data collection tool. Permission was granted by the Head of Health, eThekwini Municipality (Appendix B). On obtaining permission form the Head of Health, the NSM from a clinic that was not part of the study was asked for permission to collect data. The researcher requested for permission for 10 PNs to participate in answering the questionnaire.

The researcher met potential respondents in a morning meeting and verbally explained the purpose of the study and what was expected of respondents. They were issued an information letter (appendix F) to read, and the researcher was present to answer any questions that the potential respondents had. In January 2022, the researcher went back on the day that was agreed to begin with data collection and 10 informed consent forms (Appendix G) were obtained in which the respondents agreed to take part in the pre-testing of the data collection tool. Consent forms were collected before questionnaires were handed out and placed in a sealed envelope. Questionnaires (Appendix H) were presented to individual respondents who completed them in the nursing managers' office which was empty and offered privacy. The questionnaires were then collected by the researcher, checked for completeness, and placed in sealed box soon after they were filled to ensure that they were all returned.

The results of the pre-test of the data collection yielded positive results. Respondents understood the statements and questions in the questionnaire and responded accordingly. The average time in which questionnaires were completed was 18 minutes. No alterations were required in the questionnaire.

3.10 DATA COLLECTION PROCESS

Data collection commenced after IREC issued ethical clearance REC 219/21 (Appendix D), and formal approval from eThekwini Health Unit Research

Committee was obtained to conduct the study in the clinics (Appendix E). The clinics were visited after an approved scheduled appointment was communicated with the respective NSMs. Data were collected from 100 PNs in six PHC clinics from April to May 2022.

The selected clinics were visited to meet the respondents during their lunch breaks, and they were briefly reminded of the presentation during the recruitment phase. Respondents who agreed to participate in the study were given a consent form (Appendix G) to sign. These were collected and placed in a sealed envelope. The questionnaire (Appendix H) was issued to respondents who had signed the consent form. Respondents sat comfortably is an unused consulting room with good lighting and ventilation to provide privacy and confidentiality. COVID-19 protocols were adhered to, namely, social distancing, wearing of masks, and sanitising of hands during exchange of forms and after touching of surfaces. The questionnaires were then collected by the researcher, checked for completeness, and placed in a sealed box straight away.

3.11 DATA ANALYSIS

Data analysis occurred in June 2022. Data were captured, organised, coded, and entered onto an Excel spreadsheet after data from all six PHC clinics were collected. After this the data was loaded into SPSS version 28 and analysed. Descriptive statistics in the form of tables and graphs were used to describe data graphically. In order to assess for significant trends in the data, inferential statistics were applied. These included one sample t-test, promax rotation, and factor loadings. A *p*-value of
0.01 was used to indicate significance of statistics.

3.12 VALIDITY

According to Middleton (2019: 1), validity measures the concepts that the tool claims to measure. Validity was enhanced by involving the statistician from the initial stage

of adapting the questionnaire with research objectives as a point of departure. Validity concerns the degree to which an instrument has an appropriate sample of items for the construct being measured and adequately covers the construct domain (Polit and Beck 2017: 377). This was measured by checking the items in the data collection tool against research objectives to ascertain whether they measured all components of the study. Furthermore, the study's supervisor assisted in evaluating, reviewing, and approving the questionnaire.

3.13 RELIABILITY

Reliability refers to the consistency, constancy or dependability, accuracy, and precision with which an instrument measures an attribute/s (Middleton 2019: 1). Reliability was enhanced by pre-testing the questionnaire.

3.14 ETHICAL CONSIDERATIONS

There were four important ethical principles used in the study, namely, beneficence, non-maleficence, autonomy, and respect for dignity.

Non-maleficence

The study was approved by the Faculty Research Committee of DUT and the Institutional Research Committee gave ethical clearance (REC 219/21) prior the commencement of data collection. Permission to conduct the study was requested and obtained from eThekwini Municipality Health Unit.

Beneficence

Beneficence relates to mitigation of harm and having positive regard for the welfare of the respondents. In research, it means ensuring that no harm is caused to the respondents and that the benefits will be maximised (Polit and Beck 2017 152). In this study, respondents were protected from harm by keeping their information confidential. The researcher spoke to the respondents and created a rapport so that

they did not feel threatened. The nature of the research did not pose any risk of harm or injury during data collection to the respondents.

Autonomy

Respondents were given information about the study, and they had an opportunity to ask questions. They were also given an information letter to read and if willing to participate, signed a consent form. Respondents were told that participation was voluntary, and they could withdraw from participating at any stage without any untoward consequences.

Respect for human dignity

The right to privacy was maintained by identifying respondents with codes instead of their names. Collected data was kept confidentially; soft copies in a password locked computer with the password known only to the researcher, and hard copies under lock and key with only the researcher having access. These will be destroyed after five years. The researcher treated the respondents with respect and dignity.

3.15 CHAPTER SUMMARY

This chapter provided detailed account of study's research methodology. A descriptive research approach was used to report on the methodology used to collect data and methods used to ensure ethical principles. The sample consisted of 100 PNs who met the inclusion criteria and completed the questionnaire. The next chapter presents the results of the study.

CHAPTER 4: PRESENTATION OF RESULTS

4.1 INTRODUCTION

This chapter presents the results from the data that was gathered from respondents using a questionnaire. The aim of the study was to explore knowledge, attitudes and experiences of PNs on the implementation of TPT among HIV positive patients who have not contracted TB, in selected PHC facilities.

4.2 SAMPLE REALISATION

The desired sample size was 120 respondents; however, the minimum acceptable sample size was 100. In the current study, 20 PNs did not participate for various reasons such as absence from work, attending meetings away from the clinic, being on leave, and declining to participate. There were 100 questionnaires distributed to respondents within all six selected PHC clinics and there were no spoils.

4.3 PRESENTATION OF RESULTS

4.3.1 Demographic data

Demographic data consisted of the following: gender, age, years of experience TB/HIV and training on TB/HIV collaboration activities.

4.3.1.1 Gender

The population in this study comprised 14% (n = 14) males and 86% (n = 86) females from six PHC clinics (Figure 4.1).

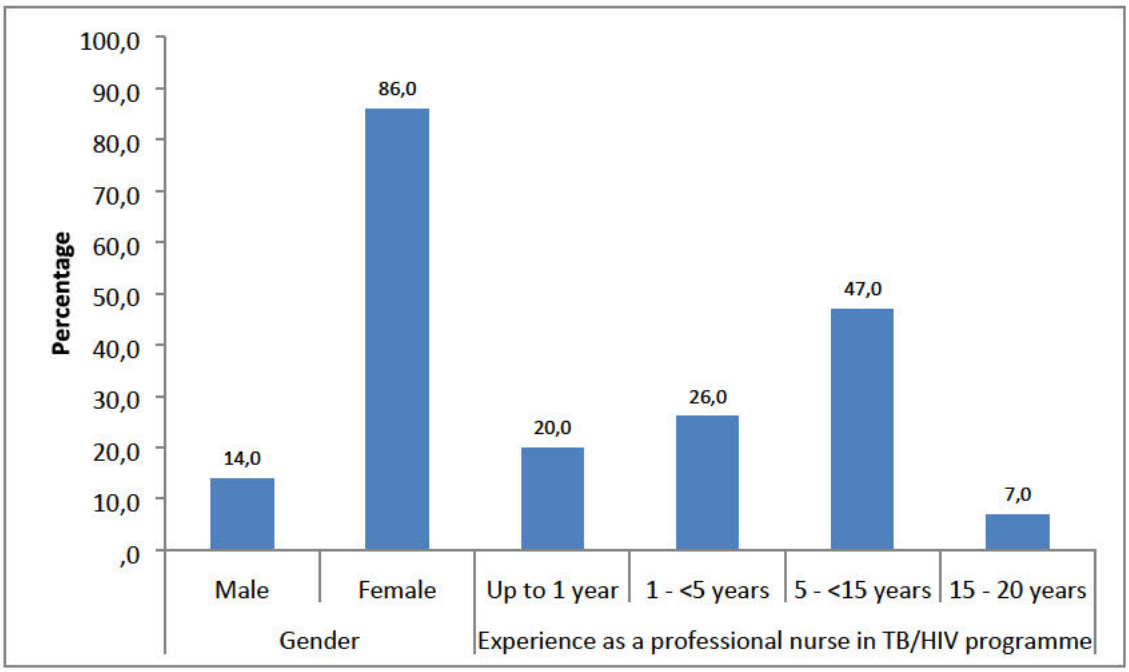

Figure 4.1: Demographic data

4.3.1.2 Experience as a professional nurse in TB/HIV

The majority of the respondents (47%; n = 47) had 5-15 years of experience while 26% (n = 26) had 1-5 years of experience, and 20% (n = 20) had up to a year of experience. Some 7% (n = 7) had 15-20 years of experience (Figure 4.1).

4.3.1.3 Age in years

The minimum age of respondents was 27 and the maximum was 60 years. The mean age was 41.9 with a standard deviation of 7.724 (Table 4.1).

Table 4.1: Age in years

N	**100**
Mean	41.90
Std. Deviation	7.724
Minimum	27
Maximum	60

4.3.1.4 Training in TB/HIV collaboration activities

The majority of respondents (73%; n = 73) were trained in TB/HIV collaboration (Figure 4.2).

4.3.1.5 Trained specifically on TPT

Figure 4.2 indicates that the majority of the respondents (63%; n = 63) were trained specifically on TPT provision.

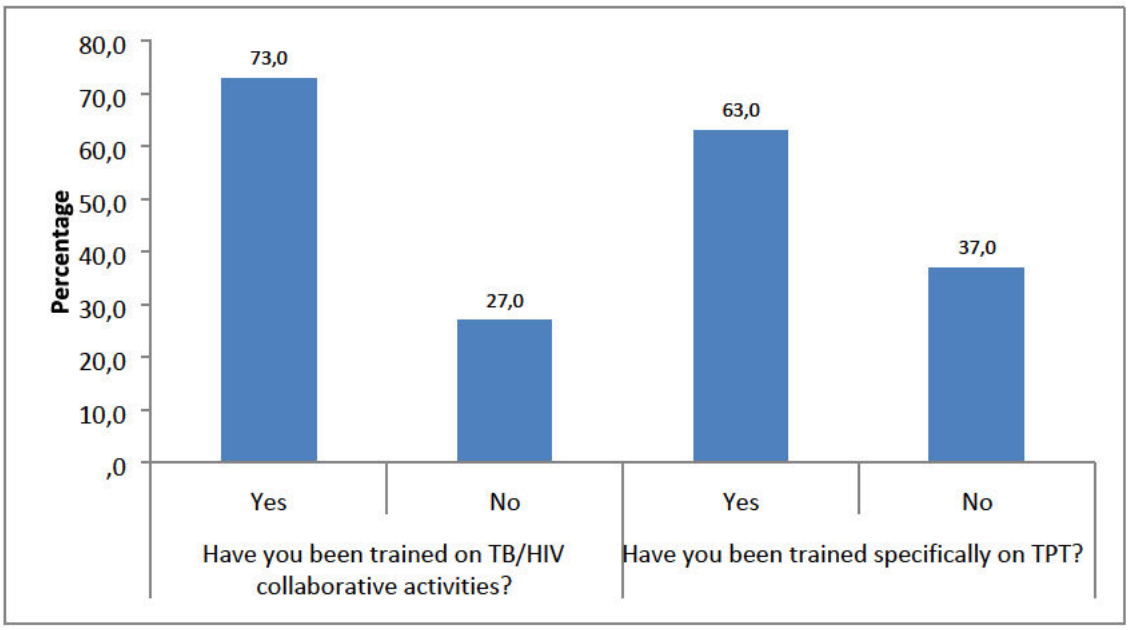

Figure 4.2: Training on TB/HIV collaboration and specifically on TPT

4.4 PRESENTATION OF RESULTS REGARDING KNOWLEDGE ABOUT TPT

In this section the researcher aimed to seek knowledge of respondents about TPT implementation among HIV positive patients with no TB symptoms. Respondents were asked to choose the correct answers from 13 items (Table 4.2).

Table 4.2: Knowledge questions

Knowledge question	Correct answers	Incorrect answers	p Value
The duration of TPT in HIV children on ART	63	37	
The duration of TPT in HIV positive adults on ART	88	12	
Which combination of screening is used to identify whether PLHIV are eligible for IPT	100	0	p < .001
What is the isoniazid drug dose used for chemotherapy to prevent TB in adults living with HIV	100	0	p < .001
How is isoniazid taken	100	0	p < .001
Which of the following is not a possible side effect of isoniazid?	100	0	p < .001
Who is eligible for TPT	100	0	p < .001
IPT reduces the risk of TB infection in HIV positive patients	100	0	p < .001
Chest radiography is a requirement for screening PLHIV for IPT eligibility	68	32	
Current pregnancy is contraindication for starting IPT	99	1	
IPT can be used as a secondary prophylaxis for people with past history of TB	100	0	p < .001
Rifampicin is considered the best drug to prevent TB among PLHIV	100	0	p < .001
People with TB cannot take isoniazid	100	0	p < .001

4.4.1 Regarding the duration of TPT in children

Respondents were expected to respond by choosing whether the duration of TPT in children is 6, 12, 18 or 24. The correct answer was 12 months. The majority of respondents (63%; n = 63) knew the correct duration of treatment for children.

4.4.2 Regarding the duration of TPT in adults

Respondents were asked about TPT duration in adults, whether it was 6, 12, 18 or 24 months. Many respondents (88%; n = 88) had knowledge that the duration of TPT in adults is 12 months.

4.4.3 Combination of screening used to identify eligibility for TPT

All respondents (100%; n = 100 $p < .001$) knew the combination used for screening PLHIV to identify eligibility criteria for TPT.

4.4.4 Isoniazid drug dose used as prophylaxis to prevent TB in adults

Respondents were asked if they knew the dosage of isoniazid used as chemotherapy to prevent TB in adults. All respondents (100%; n = 100 $p < .001$) indicated that they knew that isoniazid 300mg is used to prevent TB incidents in adults.

4.4.5 Knowledge of how isoniazid is taken

The results indicated that all respondents (100%; n = 100 $p < .001$) knew that isoniazid is taken orally and not as an injectable.

4.4.6 The side effects of isoniazid

Respondents were provided with two possible side effects, and they were expected to choose the incorrect one. In this statement all respondents (100%: n = 100 $p < .001$) knew that acne was not a side effect of isoniazid.

4.4.7 Who is eligible for TPT

Respondents were given three statements to choose from regarding eligibility for TPT and all respondents (100%; n = 100 $p < .001$) knew that all HIV positive patients with no TB symptoms are eligible for TPT implementation.

4.4.8 TPT reduces the risk of TB in HIV positive patients

For this statement respondents were expected to answer true or false and the majority of respondents (97%: n = 97) responded correctly that TPT reduces TB infection among HIV positive patients.

4.4.9 Radiography is a requirement for screening PLHIV for TPT eligibility

Respondents were expected to answer whether the statement in this sub-heading is true or false and most of the respondents (68%; n = 68) answered correctly; it is true that chest radiography is not a requirement for screening eligibility for TPT implementation.

4.4.10 Current pregnancy is a contradiction for starting TPT

Respondents were expected to answer whether the statement is true or false. The majority (99%; n = 99) knew that it is true that current pregnancy is contrary for starting TPT, and 1% (n = 1) did not respond.

4.4.11 TPT can be used as secondary prophylaxis for people with a history of TB

Respondents were expected to answer whether this statement is true or false and all of them (100%; n = 100 $p < .001$) knew that it is true, that TPT is used for people with the past history of TB as long as they do not present with current TB symptoms.

4.4.12 Rifampicin is considered the best drug to prevent TB among PLHIV

Respondents were expected to indicate whether the statement is true or false and all of them (100%; n = 100 $p < .001$) did not know that rifampicin is not the best drug used to prevent TB among PLHIV in RSA.

4.4.13 People with TB cannot take isoniazid

For this statement respondents were expected to answer whether it is true or false and all of them (100%; n = 100 $p < .001$) responded incorrectly and did not know that isoniazid alone cannot be taken by people with TB.

4.5 PRESENTATION OF RESULTS REGARDING ATTITUDES OF PNs ABOUT TPT

In this section of the questionnaire, respondents were asked to use a Likert scale rating to rate their attitudes on the implementation of TPT. The results are indicated in Table 4.3.

Table 4.3: One sample test on attitude of PNs towards TPT

Item	Responses as Frequency (%)					n	Mean (SD)	t	df	pvalue
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted] agree					
TPT is important to administer in order to reduce TB incidence among people living with HIV	1 (1.0)	-	1 (1.0)	78	20 (20.0)	100	4.16 (0.526)	22.034	99	<.001*
TPT should be given to all eligible people living with HIV (PLHIV) irrespective of their immune status	2 (2.0)	-	4 (4.0)	77	17 (17.0)	100	4.07(0.624)	17.156	99	<.001*
It is important that people without TB who are HIV positive and on ARTs receive TPT therapy	1 (1.0)	-	3 (3.0)	77	17 (17.0)	100	4.13 (0.544)	20.768	99	<.001*
TPT is effective in reducing TB incidence and mortality among PLHIV	1 (1.0)	1	-	78	19 (19.0)	100	4.13 (0.562)	20.093	98	<.001*
After excluding active TB, TPT won't significantly increase the risk of developing isoniazid resistance	1 (1.0)	3	6 (6.0)	74	15 (15.0)	100	4.00 (0.655)	15.199	99	<.001*
The longer a patient has TPT, the longer he/she will stay free from TB	4	3	6 (6.0)	77	10 (10.0)	100	3.86 (0.792)	10.864	99	<.001*
PLHIV should be encouraged to start TPT once they are eligible	-	-	4 (4.0)	78	18 (18.0)		4.14 (0.450)	25.338		<.001*

4.5.1 Importance of TPT administration

The majority of respondents (98%; n = 98) agreed that TPT is important to administer to reduce TB incidence among PLHIV.

4.5.2 Eligible criteria for TPT

Most respondents **(**94%; n = 94) agreed that TPT must be implemented in PLHIV irrespective of their immune status.

4.5.3 PLHIV on ART should receive TPT

Respondents (96%; n = 96) agreed that PLHIV on ART without TB should receive TPT.

4.5.4 TPT is effective in reducing TB incidence

Most respondents (97%; n = 97) agreed that TPT is effective in reducing TB incidence and mortality among PLHIV.

4.5.5 TPT reduces TB

All respondents (100%; n = 100) agreed that TPT reduces TB among PLHIV.

4.5.6 PLHIV are encouraged to take TPT

All respondents (100%; n = 100) agreed that PLHIV must be encouraged to take TPT.

4.5.7 PLHIV should be encouraged to start TPT once eligible

The majority of respondents (99%; n = 99) agreed that PLHIV must be encouraged to start taking TPT as soon as they are eligible.

4.5.8 One sample test

One sample test is a statistical hypothesis test used to determine whether an unknown population mean is different from a specific value score (Ross and Wilson 2017: 912).

This test is testing if the average agreement score is significantly different from the central score. There is significant agreement to all these items which indicates that there is a positive attitude among PNs regarding TPT implementation for HIV positive people.

4.5.9 Factor analysis of attitudes

Factor analysis with promax rotation was applied to these 7 items. Item 6 was dropped 1194 because it did not load. One factor was extracted which accounts for 61.48% of the variance in the data. A Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) of .836 and a significant Bartlett's test indicates that the data was adequate for successful and reliable extraction. Six iterations were required to complete the factor extraction process. The factor loadings and details of the factor are summarised in (Table 4.4).

Table 4.4: Factor loadings

STATEMENTS	Factor
	1
C3. It is important that people without TB who are HIV positive and on ARTs receive TPT therapy.	.978
C4. TPT is effective in reducing TB incidence and mortality among PLHIV	.941
C1. TPT is important to administer in order to reduce TB incidence among people living with HIV.	.832
C2. TPT should be given to all eligible people living with HIV (PLHIV) irrespective of their immune status.	.730
C5. After excluding active TB, TPT won't significantly increase the risk of developing isoniazid resistance	.600
C7. PLHIV should be encouraged to start TPT once they are eligible	.512

A composite variable attitude (ATT) is formed by calculating the average of the agreement scores for all items included in the factor. This composite variable is tested for reliability using Cronbach's alpha. The resulting value for alpha of .890 indicates that this composite variable is reliable (Table 4.5).

Table 4.5: Detail of the factor: Attitudes of PNs

Factor	Construct	Label	Items included	Variance Extracted	Cronbach's alpha
1	Attitude	ATT	1, 2, 3, 4, 5, 7	61.48	.890

4.6 PRESENTATION OF RESULTS REGARDING THE EXPERIENCE OF TPT IMPLEMENTATION

In this section of the questionnaire, respondents were asked to use Likert scale rating from 1-5 to rate experience of the implementation of TPT and scores range from 1 to 5, 1 strongly disagree and 5 strongly agree. The results are indicated in Table 4.6.

Table 4.6: Experience of TPT implementation

Experience implementation question	Correct answers	Incorrect answers	Percentage	Mean	Standard Deviation
I know and understand what is in the TPT guideline document	66	34	66%	3.68	.815
I have received adequate training on tuberculosis preventive therapy	61	0	100%	3.48	.990
There are adequate human resources in my clinic to administer TPT	84	0	100%	3.87	.734
TPT guidelines are available for me to refer to whenever I need them	88	0	100%	3.98	.666
My manager is committed to using TPT at our facility	91	0	100%	4.03	.577
My manager supports me in the use of TPT	93	0	100%	4.06	.565
Quality improvement approaches are in place for the implementation of TPT	93	32	68%	4.04	.585
There is a regular supply of isoniazid in the clinic	97	1	99%	4.04	.585
Adult doses of isoniazid are always available and adequate	97	3	97%	4.08	.526
Child doses of isoniazid are always available and adequate	93	7	93%	4.11	.447
I am confident that I am able to administer TPT to patients	80	20	80%	4.05	.520
I have been trained on TB/HIV collaboration	64	36	64%	3.81	.813
I find counselling patients about TPT difficult to do	**35**	65	**35%**	2.58	1.121
I find counselling patients about TPT time consuming	22	88	22%	2.46	1.075
I find documentation of TPT activities difficult to do	17	83	17%	2.34	.981
I find documentation of TPT activities time consuming	27	73	27%	2.57	.1.130
I have adequate experience with prescribing TPT	73	27	73%	3.59	1.026
TPT is routinely practised in our facility	89	11	89%	4.04	.680
I use the TB screening tool (algorithm) to identify PLHIV eligible for TPT	90	10	90%	4.07	.624
I advise patients on TPT to adhere to their treatment	96	4	96%	4.17	.514

4.6.1 TPT guidelines

Some of the respondents (66%; n = 66) agreed that they understood what is contained in the TPT guidelines and therefore had experience implementing it. The mean score was 3.68 and standard deviation was .815.

4.6.2 Adequate training on TPT

Some of the respondents (61%; n = 61) agreed that they received adequate training on TPT which allowed them to implement it on PLHIV without TB symptoms.

4.6.3 Adequate human resource to administer TPT

Most respondents (84%; n = 84) agreed that there were adequate human resources to administer TPT. That means that those clinics were well staffed with PNs.

4.6.4 TPT guidelines are available

Most respondents (88%; n= 88) agreed that there was availability of guidelines to refer when the need arose. These respondents were able to refer to the guidelines when implementing TPT.

4.6.5 Manager is committed to TPT

Most respondents (91%; n = 91) agreed that the manager was committed to usage of TPT. Managers in these clinics understood the need for implementation of TPT among PLHIV thus enabling respondents to implement it.

4.6.6 Manager supports the use of TPT

Most respondents (93%; n = 93) agreed that the manager supports usage of TPT. This indicates mentoring and training of respondents.

4.6.7 Quality improvement approaches are in place

The majority of respondents (93%; n = 93) agreed that there are quality improvement approaches in place for TPT implementation. These would ensure that TPT is implemented correctly.

4.6.8 Regular supply of isoniazid

Most respondents (97%; n = 97) agreed that there was a regular supply of isoniazid in the clinic. This enabled them to implement TPT to all eligible patients.

4.6.9 Adult doses of isoniazid are always available

The majority of respondents (97%; n = 97) agreed that there were always adequate adult doses of isoniazid in the clinic and eligible patients always received it.

4.6.10 Child doses of isoniazid are always available

The majority of respondents (93%; n = 93) agreed that there were always adequate children's doses of isoniazid in the clinic, and they were always issued when required.

4.6.11 I am confident to administer TPT to patients

Most of respondents (80%; n = 80) agreed that they were confident to administer TPT to patients. The confidence was beneficial to PLHIV who were eligible to receive TPT.

4.6.12 TB/HIV collaboration trained

Some of the respondents (64%; n = 64) agreed that they were trained on TB/HIV collaboration. This enabled them to implement TPT.

4.6.13 Difficult to counsel about TPT

A few of the respondents (35%; n = 35) agreed that they found counselling patients about TPT difficult.

4.6.14 Counselling patients on TPT is time consuming

Very few respondents (22%; n = 22) agreed that they found counselling patients about TPT time consuming. This might make them forego counselling patients and thus might not implement TPT.

4.6.15 Documenting TPT activities is difficult

A small proportion of respondents (15%; n = 15) agreed that they found documentation of TPT activities difficult to do. It might not have been difficult but time consuming, and therefore not done.

4.6.16 TPT activities are time consuming

Some of respondents (27%; n = 27) agreed that they found TPT activities time consuming. This might lead to these activities being skipped.

4.6.17 Adequate experience with prescribing TPT

Most respondents (73%; n = 73) agreed that they had adequate experience of prescribing TPT and would therefore prescribe it for eligible patients.

4.6.18 TPT is routinely practised

The majority of respondents (89%; n = 89) agreed that they routinely practice TPT, which means they issued treatment to eligible PLHIV without TB symptoms.

4.6.19 Use of TB screening tool

The majority of respondents (90%; n = 90) agreed that they used the TB screening tool to identify PLHIV who were eligible for TPT.

4.6.20 TPT treatment adherence

The majority of respondents (96%; n = 96) agreed that patients on TPT adhered to treatment. They will have monitored this on patient visits.

4.6.21 Factor analysis

Factor analysis with promax rotation was applied to the above 20 items. Item 10 was dropped because it did not load strongly enough onto any factor. Five factors were extracted which account for 70.20% of the variance in the data. A Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) of .775 and a significant Bartlett's test indicates that the data was adequate for successful and reliable extraction. Rotation converged in six iterations. The factor loadings and details of the factor are summarised in Table 4.7.

Table 4.7: **Factor loadings: Experience of TPT implementation**

	Factor				
	1	2	3	4	5
D5. My manager is committed to using TPT at our facility	1.005				
D6. My manager supports me in the use of TPT	.970				
D7. Quality improvement approaches are in place for the implementation of TPT	.771				
D3. There are adequate human resources in my clinic to administer TPT	.658				
D4. TPT guidelines are available for me to refer to whenever I need them	.595				
D14. I find counselling patients about TPT time consuming		.934			
D15. I find documentation of TPT activities difficult to do		.933			
D16. I find documentation of TPT activities time consuming		.777			
D13. I find counselling patients about TPT difficult to do		.763			
D12. I have been trained on TB/HIV collaboration			.815		
D11. I am confident that I am able to administer TPT to patients			.762		
D17. I have adequate experience with prescribing TPT			.728		
D1. I know and understand what is in the TPT guideline document			.711		
D2. I have received adequate training on tuberculosis preventive therapy			.628		
D19. I use the TB screening tool (algorithm) to identify PLHIV eligible for TPT				.938	
D20. I advise patients on TPT to adhere to their treatment				.791	
D18. TPT is routinely practiced in our facility				.765	

These composite variables were tested for reliability using Cronbach's alpha. The resulting values for alpha range from .679 to .905 which indicates that reliability is adequate (Table 4.8).

Table 4.8: Details of the factors: Implementation of TPT

Factor	Construct	Label	Items included	Variance extracted	Cronbach's alpha
1	Organisational support	ORGSUP	3, 4, 5, 6, 7	38.03	.905
2	Challenges	CHAL	13, 14, 15, 16	11.82	.894
3	Self-efficacy	SELF	1, 2, 11, 12, 17	1.88	.857
4	Usage	USE	18, 19, 20	1.29	.843
5	Availability of doses	AVAIL	8, 9	0.70	.679

4.7 PRESENTATION OF RESULTS REGARDING THE USAGE OF TPT

In this section of the questionnaire, the respondents were asked to respond by either saying never, rarely, sometimes, often, or nearly always regarding how often they give TPT to patients who are eligible. The results are indicated in Figure 4.3.

4.7.1 Indicate how often you give TPT therapy to patients who are eligible

Only 13% (n = 13) of respondents indicated that they did not implement TPT to eligible patients. Out of these, 1% (n = 1) gave TPT sometimes and 12% (n = 12) gave it often. This is of concern that PNs did not always give TPT to eligible patients (Figure 4.3).

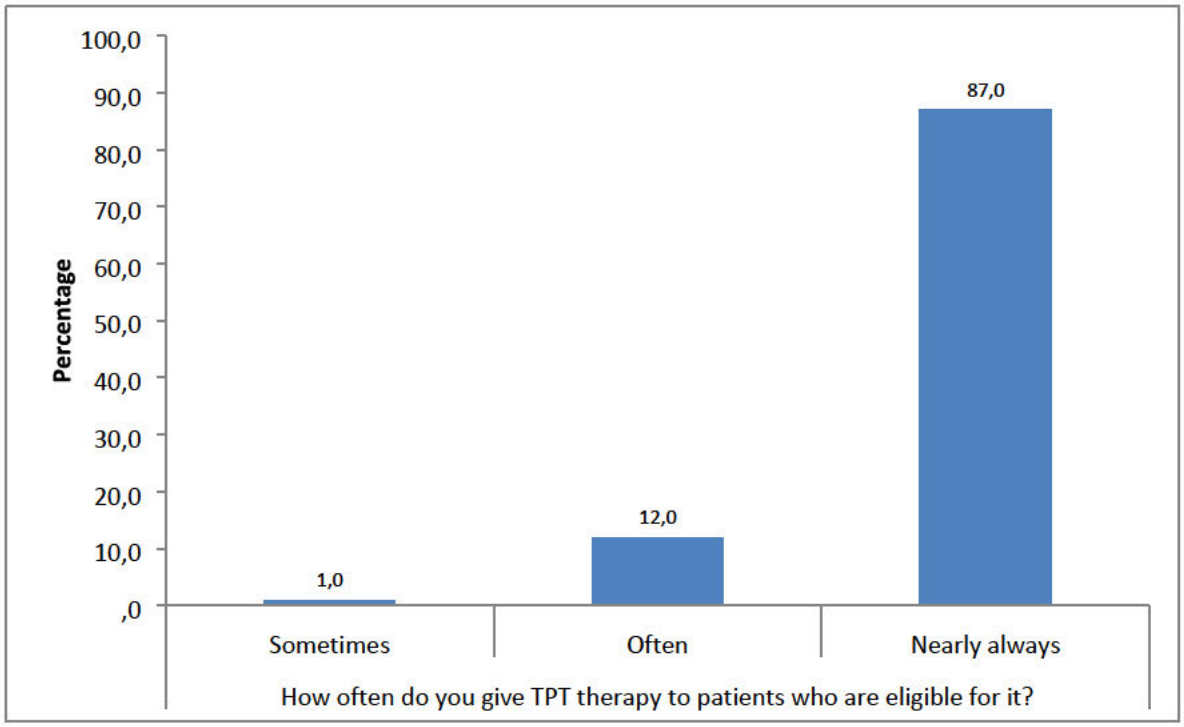

Figure 4.3: Usage of TPT

4.7.2 Reasons for not giving TPT

This section was answered by the 13 respondents who did not always give TPT. The questionnaire asked respondents to use a Likert scale rating from 1-5 to agree or disagree with the stated reasons of not giving TPT. Responses for strongly agree and 1362 agree were added together and reported as agree, and same was done for disagree 1363 and strongly disagree which was reported as disagree. The mean is reported as (M) 1364 and standard deviation as (SD). The results are indicated in Table 4.9.

Table 4.9: Reasons for not giving treatment

Item	Responses as Frequency (%)					n	Mean (SD)	t	df	p-value
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted] agree					
I am afraid that he/she will develop isoniazid resistance	1 (7.7)	1 (7.7)	-	11 (84.6)	-	13	3.62 (0.961)	2.309	12	.040*
I am afraid that the patient will develop side effects	1 (7.7)	1 (7.7)	-	11 (84.6)	-	13	3.62	2.309	12	.040*
It is difficult to exclude active TB	1 (7.7)	3 (23.1)	-	9 (69.2)	-	13	3.46	1.000	12	.337
I am not sure there are benefits in using isoniazid	1 (7.7)	1 (7.7)	2 (15.4.)	9 (69.2)	-	13	3.31	1.720	12	.111
I do not have adequate knowledge of isoniazid	1 (7.7)	3 (23.1)	1 (7.7)	8 (61.5)	-	13	3.31	.762	12	.461
The patient refuses to take isoniazid	2 (15.4)	2 (15.4)	2 (15.4)	7 (53.8)	-	13	3.23	.234	12	.819
Patient's poor adherence to taking drugs	1 (7.7)	2 (15.4)	2(15.4)	8 (61.5)	-	13	3.15	1.075	12	.303
Isoniazid is unavailable	2 15.4)	4 (30.8)	-	7 (53.8)	-	13	3.08	.221	12	.829
A chest x-ray is unavailable	1 (7.7)	5 (38.5)	-	7 (53.8)	-	13	3.00	.000	12	1.000
The patient already has many pills to take, and this would be an extra burden to them	1 (7.7)	4 (30.8)	-	8 (61.5)	-	13	2.92	.485	12	.636

4.7.2.1 I am afraid that he/she will develop isoniazid resistance

Most respondents (84.6%; n = 11) agreed that they were afraid that patients will develop INH resistance if TPT is implemented, and 15.4% (n = 2) disagreed (M 3.62; SD .961.3).

4.7.2.2 I am afraid that patients will develop side effects

Many respondents (84.6%; n = 11) agreed that they were afraid that patients will develop side effects when TPT is implemented (M 3.62; SD .961).

4.7.2.3 It is difficult to exclude active TB

The majority of respondents (69%; n = 9) agreed that it was difficult to exclude TB among PLHIV for TPT implementation while 30.8% (n = 4) disagreed (M 3.31; SD 1.109).

4.7.2.4 I am not sure if there are benefits in using isoniazid

The majority of respondents (69.2%; n = 9) agreed that they were not sure of the benefits of using INH among PLHIV to reduce TB incidences (M 3.46; SD .967).

4.7.2.5 I do not have adequate knowledge of isoniazid

Most respondents (61.5%; n = 8) agreed that they did not have adequate knowledge of isoniazid implementation to PLHIV to reduce TB incidence, 30.8% (n = 4) disagreed, and 7.1% (n = 1) were neutral on this statement (M 3.23; SD 1.092).

4.7.2.6 The patient refuses to take isoniazid

Some of the respondents (53.8%; n = 7) agreed that patients refused to take INH to reduce TB incidence, 30.8% (n = 4) disagreed, and 15.4% (n = 2) were neutral (M 3.08; SD 1.188).

4.7.2.7 Patients' poor adherence to taking drugs

Many respondents (61.5%; n = 8) agreed that patients had poor adherence in taking INH to reduce TB incidence, 23.1% (n = 3) disagreed, and 15.4% (n = 2) were neutral (M 3.31; SD 1.032).

4.7.2.8 Isoniazid is unavailable

Some respondents (53.8%; n = 7) agreed that they did not give eligible PLHIV because it was not available, and 46.2% (n = 6) disagreed (M 2.92; SD 1.256).

4.7.2.9 A chest X-ray is unavailable

Just over half of respondents (53.8%; n = 7) agreed that there was no chest X-ray available and that was their reason for not giving TPT to eligible patients while 46.2% (n = 6) disagreed (M 3.00; SD 1.155).

4.7.2.10 The patient already has many pills to take, and this would be an extra burden to them

Most respondents (61.5%; n = 8) agreed that patients had many pills to take and were thus afraid to cause a pill burden, and 38.5% (n = 5) disagreed (M 3.15; SD 1.144).

4.7.2.11 Mean agreement t-score

The mean agreement t-score was calculated to check the most or fewest reasons indicated by respondents for not implementing TPT to eligible patients. The results with the most cited reasons were "I am afraid that he/she will develop isoniazid resistance" and "I am afraid that the patient will develop side effects" with a score of 3.62. The reason with the least agreement cited by respondents was "Isoniazid is unavailable" with the score of 2.92 (Table 4.10).

Table 4.10: Reason for not always using TPT

Statements	Results
I am afraid that he/she will develop isoniazid resistance	3.62
I am afraid that the patient will develop isoniazid side effects	3.62
I am not sure there are benefits in using isoniazid	3.46
It is difficult to exclude active TB	3.31
Patient's poor adherence to taking drugs	3.31
I do not have adequate knowledge of isoniazid	3.23
The patient already has many pills to take, and this would be an extra burden to them	3.15
The patient refuses to take isoniazid	3.08
A chest x-ray is unavailable	3.00
Isoniazid is unavailable	2.92

4.8 Chapter summary

The results of this study indicated that respondents were knowledgeable about TPT, and their attitude was good towards its implementation. However, a small percentage of respondents did not always implement TPT to eligible TPT. Patients under the care of these PNs were therefore not given TPT to reduce TB incidence. These respondents provided various reasons for not giving TPT to eligible patients. The next chapter discusses the results of the study.

CHAPTER 5: DISCUSSION OF THE RESULTS

5.1 INTRODUCTION

This chapter concludes and provides a brief overview of the study that focuses on implementation of TPT to HIV positive patients. The results are discussed in relation to the research objectives and the theoretical framework. Recommendations for the study and for further research are presented.

5.2 OVERVIEW OF THE RESEARCH

5.2.1 Aim of the study

The aim of the study was to explore the knowledge, attitudes, and experiences of PNs on the implementation of TPT among HIV positive patients who are found to have not contracted TB, in selected primary health care facilities.

5.2.2 Objectives of the study were to:

- Determine professional nurses' knowledge of the TPT policy.
- Determine professional nurses' attitude towards the implementation of the TPT policy.
- Identify factors that are related to professional nurses regarding implementation of TPT policy for eligible HIV-positive patients.

5.3 DISCUSSION OF THE RESULTS

5.3.1 Demographic characteristics

In this study, there were more female than male respondents, which can possibly an indication that the nursing profession is dominated by females. This is corroborated by Mark *et al.* (2022: 1), who assert that in many developing countries the number of male nurses is low. The respondents knew that PLHIV with no TB symptoms should be enrolled

on TPT, and most respondents were trained on TB/HIV collaboration and on TPT. This means that there is a need to train PNs when there is a new programme to be implemented. This is supported by Chaghari (2017: 1), who states that in-service training of nurses on new developments plays an important role in improving quality care of patients. Nensengani *et al.* (2021:1 concur that training programmes help to address gaps in healthcare in order to render quality care to patients.

5.3.2 Knowledge of TPT

According to the NPT, factors such as personal or environmental aspects affect the use and implementation of a new strategy (May *et al*. 2011: 2). 'Coherence' refers to awareness and understanding of a new strategy (Murray *et al*. 2010: 21). In this study it was apparent that respondents showed coherence in relation to the TPT guideline. The majority of respondents knew the eligibility criteria for TPT implementation. These are listed by the WHO (2020: 1) and are used by healthcare providers to screen for symptoms to identify eligibility criteria for TPT implementation, namely, night sweats and weight loss. All respondents knew that isoniazid is used to prevent TB incidence in adults. These results concur with those of Beshaw, Balcha and Lakew (2021:1) who conducted a study in Addis Ababa and found that INH is effective to preventing activation of latent TB infection. Possible side effects of INH were known by all respondents, and this meant that nurses will be able to educate patients about side effects of INH and this will not hinder them from taking treatment. The side effects of INH are numbness or burning pain in hands and feet, nausea and vomiting (South Africa, DoH 2010). Respondents were asked if they knew the dosage of isoniazid used to prevent TB in adults and they all knew the dosage of INH used as prophylaxis to prevent TB incidence in adults. The recommended dosage is INH 300mg taken orally for 6-12 months on PLHIV without active TB to prevent development of TB (South Africa, DoH 2010).

There is significant agreement indicating that PNs had knowledge of TPT implementation. However, not all respondents knew that rifampicin is not the best drug used to prevent TB among PLHIV in South Africa. The drug used for TPT is INH. The WHO (2018: 1) recommended INH as a drug of choice for TPT, which is the drug used in South Africa.

5.3.3 Attitudes of PNs towards TPT

One of the constructs of the NPT is cognitive participation, which refers to the level of the healthcare workers' willingness and preparedness to engage with and implement a new strategy (Murray *et al.* 2010: 21). This speaks directly to attitudes of PNs regarding TPT implementation. The majority of respondents understood that TPT is important to administer to reduce TB incidence among PLHIV and this understanding resulted in a positive attitude towards implementation of TPT. A positive attitude means that respondents saw the importance of implementing TPT to eligible PLHIV to reduce TB incidence. Similarly, Nyati *et al.* (2019:10) found that in Zimbabwe, clinicians had positive attitudes towards implementation of INH to eligible patients and no resistance was identified in patients that were initiated on INH. In the current study, most of the respondents agreed that TPT must be implemented to PLHIV irrespective of their immune status. This is supported by Assebe (2015: 12) who states that in Ethiopia, implementation of INH had the potential to reduce TB infection rate among PLHIV. It was important that people without TB who are HIV positive and on ART receive TPT. This is supported by results of an Ethiopian study by Tiruneh, Getahum and Adeba (2019: 8) who found that INH reduced the risk of TB incidence by 55% in patients on antiretroviral therapy. In addition, initiation of treatment is based on systematic screening to rule out the presence of active TB.

The current study found that most respondents knew that TPT is effective in reducing TB incidence and mortality among PLHIV. Maharaj (2017: 543) agrees that INH reduces acquiring of TB in PLHIV by 97.6%, arising from research conducted in Durban. Results found that all respondents were aware that TPT will not significantly increase the risk of developing INH resistance in people without TB symptoms. Contrary to the results of this study, Olajide *et al.* (2018: 47) found that physicians who worked in government facilities in Nigeria feared INH resistance therefore failed to implement IPT. In the current study, the majority of respondents agreed that the longer the patient is on TPT the longer they will stay free from TB. This is supported by Maciel *et al*. (2018: 23) who found that PLHIV receiving IPT had long-term protection from TB. In addition, the majority of respondents agreed that PLHIV should be encouraged to start TPT once eligible. Ticha *et al.* (2022: 4) concurs that nurses can create a friendly and conducive environment for patients to be commenced on TPT.

5.3.4 TPT implementation by PNs

Most of the respondents agreed that they knew and understood what was contained in the TPT guideline. This meant that TPT will be implemented to eligible patients. Abdulrazaak, Govender and Nzaumvila (2018: 18) had a contrary finding in their study of doctors in Gauteng – they did not understand TPT guidelines. The majority of the respondents in the current study agreed that they had received adequate training on TPT. Abdulrazaak, Govender and Nzaumvila (2018: 18) found in their study that doctors needed formal training on the implementation of INH among PLHIV to increase their confidence as practitioners to safely implement IPT. Therefore, there is a need for training on the TPT guidelines. Most respondents agreed that TPT guidelines are available to refer to whenever they are needed.

Managers were found to be committed to usage of TPT and this helped with the implementation of the TPT programme as the manager has an influence on PNs as an overseer. However, in a study conducted in Kenya, researchers had a different outcome, finding that there was a lack of commitment of healthcare managers to scale up the INH implementation to eligible PLHIV (Wambiya, Atela and Ibisom 2018: 12). Lack of commitment by managers might affect TPT implementation as managers have influence. Because of manager commitment as shown in the current study, the implication is that quality improvement approaches are in place to facilitate TPT implementation in the clinics involved. This result is supported by Ogunsola *et al.* (2019: 34) who assert that the government and health programmers in Nigeria applied quality improvement approaches to solve health service delivery regarding INH implementation. Teklay *et al.* (2016: 35) found in their study that managers did not support the programme, nor did they develop quality improvement plans for TPT implementation. If quality improvement approaches are not in place, identifying and correcting reasons for non-implementation of TPT are likely to not be done.

Respondents agreed that there was regular supply of INH, therefore, eligible patients were issued with TPT because supply was always available. This is different to Teklay *et al.* (2016: 35) who found that there was an interruption of INH supply in Ethiopia hindering the implementation of INH prophylaxis.

The current study found that respondents were able to administer TPT to patients without symptomatic TB. This is similar to the findings of Nyati *et al.* (2019: 10) in Zimbabwe, that clinicians were able to administer TPT to eligible patients and had positive attitudes about this. Abdulrazaak, Govender and Nzaumvila (2018: 18) found that doctors did not administer TPT to eligible patients due to lack of knowledge on implementation criteria. Such a result can mean that eligible patients may miss the opportunity of being initiated on TPT.

The TB screening tool was used by respondents to identify PLHIV eligible for TPT in the current study. There is availability of TB screening that enabled respondents to carry out their duties. However, Lai *et al.* (2019: 371-377) found that clinicians had difficulty ruling out active TB among PLHIV as they were not trained on how to screen for TB.

Respondents found it difficult to do the documentation associated with TPT activities. Makanjuola and Taddesse (2014: 12) found that in Nigeria there was low INH implementation and completion due to poor documentation of INH implementation on the patients' care cards and registers. This means that there is a need to conduct training on how to document the TPT activities.

5.3.5 Usage of TPT

Collective action is the NPT construct of NPT that refers to the responsibility of healthcare workers to implement new strategies (Murray *et al*. 2010: 22). Unfortunately, in this study there were respondents who did not take the responsibility of implementing TPT. The few respondents (13) who agreed that they did not always implement TPT to eligible PLHIV with no TB symptoms are a great concern to the researcher. Missed patients might develop TB whereas TPT is freely available to prevent TB incidence among PLHIV. These respondents could be the cause for the district not reaching the set target. Similarly, Little *et al*. (2018: 377) concur that INH provision at the time of initial HIV diagnosis with no TB presumptive features is highly acceptable. The implementation of TPT to eligible patients thus reduces TB incidence.

5.3.6 Reasons for not giving TPT

The major reason for not giving TPT among respondents was that they anticipated that patients were most likely to develop INH resistance. In Nigeria, Olajide *et al.* (2018: 47) concur that physicians in government were afraid of INH resistance as a side effect, hence did not implement IPT. Respondents who answered that they did not prescribe TPT because of INH resistance do not have the appropriate knowledge on TPT.

Some respondents agreed that it was difficult to exclude active TB. Lai *et al* (2019: 371-377) found that it was difficult to exclude active TB as training was not conducted.

A few of the respondents agreed that they did not have adequate knowledge of isoniazid. Abdulrazaak, Govender and Nzaumvila (2018: 18) had a similar finding in their study, that doctors needed formal training on the implementation of INH among PLHIV to increase their confidence as practitioners to safely implement IPT. This means that TPT cannot be implemented to eligible patients without adequate training.

5.4 LIMITATIONS OF THE STUDY

The study used a quantitative method with a descriptive design. A qualitative method might have provided more information where participants would have been able to express their views about the phenomenon being studied, thus providing the researcher with an in-depth understanding of the problem. Another limitation of the study was that it was conducted in one sub-district only of the three sub-districts in eThekwini. This was due to the fact that this sub-district was identified as not reaching TPT implementation targets. Furthermore, the study did not collect data from patients; such results would yield extra information on the topic.

5.5 RECOMMENDATIONS FROM THE STUDY

Based on the results of the study, particularly on the reasons cited by respondents for not implementing TPT, the study makes the following recommendations regarding training of PNs:

- The training unit of the institution should implement strategies to improve and strengthen training of newly employed healthcare providers on TPT implementation to minimise TB incidence among PLHIV. The operational manager of the clinic should arrange for in-service training of healthcare providers during non-busy times or days in the facility. In addition, peer education can be applied where a PN who understands the policy well teaches their peers; this might be more effective and will allow peers to open up and ask questions which they might have been scared to ask if training was provided by their manager or the training unit. One of the reasons for not implementing TPT was that respondents anticipated that patients would develop isoniazid resistance. This means that after training PNs need to be mentored by peers with experience and coached by operational managers until they feel comfortable with isoniazid implementation and are confident that it does not cause resistance.
- Professional nurses need to be specifically trained on TB and HIV and on TB/HIV and TPT guidelines, emphasising the importance of adhering to these guidelines for achieving the implementation of TPT to eligible patients.
- It is also important for PNs to know and be confident about the duration of TPT of both children and adults through training in order to eliminate barriers to the implementation of TPT to eligible patients.
- The operational manager together with the quality assurance section should identify a TPT champion within each clinic who has been trained and is experienced in the implementation of TPT to assist with mentoring fellow colleagues and to monitor implementation.

5.6 Monitoring and evaluation

- The NPT postulates that reflexive monitoring is evaluating progress and success of the strategy by healthcare workers and the recommendations for improvement (Murray *et al*. 2010: 22). For this reason, there should be regular audits to check which staff have not been trained so that if there are new staff that have not been trained, arrangements can made as soon as possible to train them.

- Audit of patients records to identify implementation patterns of TPT so as to identify challenges early before more patients go without TPT and are at risk of contracting TB.

- Incentives such as recognition certificates for PNs who are found to comply with the policy and are screening and implementing TPT for eligible patients. This could be done by the operational manager in the clinic and by the institution for clinics who score 100% for TPT implementation. This might encourage PNs and the ones who are not trained or not confident in giving TPT and will help to dismiss the misinformation and misconceptions that PNs have about TPT.

5.7 CONCLUSION

This was a quantitative descriptive study conducted in north 6 sub-district PHC clinics in eThekwini Municipality in KZN, South Africa. The study aim was to assess the knowledge, attitudes, and experience of PNs regarding TPT implementation with HIV positive patients. Most respondents were knowledgeable about TPT. However, the substantial proportion (39%) of respondents need extensive and adequate training on TPT implementation. Descriptive results were presented in tables and figures. The majority of respondents were knowledgeable about TPT implementation but not adequately trained. Most respondents had positive attitudes towards the implementation of TPT to eligible patients. However, some of the respondents were not confident to administer TPT due to insufficient experience and inadequate training on implementation of TPT to eligible HIV positive patients with no TB symptoms to prevent TB incidence.

TPT implementation can reduce TB incidence and thus reduce the burden of TB among PLHIV. Professional nurses play a very important role in making this possible, however, they have to be knowledgeable and committed to continue learning and to reducing the burden of chronic disease in the country.

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APPENDICES

Appendix A: Request for permission to conduct a study

354 Redberry Park
79 Ruston Place
Phoenix
4068
28 October 2021

The Chairperson
eThekwini Health Unit Research Committee

Request for Permission to Conduct Research

Dear Sir/Madam

My name is Xoliswa Nomvungu, currently a master's student at the Durban University of Technology, faculty of Health. The research I wish to conduct for my master's dissertation involves, "Nurses' knowledge, attitudes and experiences on the implementation of tuberculosis preventive therapy among HIV positive patients".

I am hereby asking for permission to conduct research on professional nurses in six facilities in the North Sub-district PHC clinics which includes Hambanathi, Ottawa, Redcliffe, Trenance Park, Verulam and Waterloo.

I will provide you with a copy of my proposal which includes copies of the data collection tools and consent and/ or assent forms which will be used in the research process as well as a copy of the approval letter which I receive from the Institutional Research Ethics Committee (IREC).

If you require any further information, please do not hesitate to contact me (0735022003 or xoliswanomvungu1@gmail.com).

Thank you for your time and consideration in this matter.

Yours sincerely

Xoliswa Nomvungu
Durban University of Technology

Appendix B: Provisional ethical approval

Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology
P O Box 13 34, Durban, South Africa, 4001 Tel: 031 373 2375 Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

5 November 2021

Ms X Nomvungu
354 Redberry Park
79 Ruston Place

Rockford
4680

Dear Ms Nomvungu

Nurses' knowledge, attitudes, and experiences on the implementation of tuberculosis preventive therapy among HIV positive patients in North Sub-district, eThekwini

I am pleased to inform you that **PROVISIONAL APPROVAL** has been granted to your proposal subject to: I am pleased to inform you that **PROVISIONAL APPROVAL** has been granted to your proposal subject to:

Piloting of the data collection tool. *Please note that should there be any changes to the data collection tool, in a letter signed by the researcher and supervisor, list the changes to the documents and submit to IREC with the final data collection tool. Even when there are no changes to the data collection tool, IREC has to be notified.*

Obtaining and submitting the necessary gatekeeper permission/s to Institutional Research Ethics Committee (IREC).

PLEASE NOTE THAT THIS IS NOT A FINAL APPROVAL LETTER. KINDLY SUBMIT THE ABOVE-MENTIONED **DOCUMENTS WITHIN THREE MONTHS TO THE IREC OFFICE. DATA COLLECTION CAN ONLY COMMENCE WHEN IREC ISSUES FULL APPROVAL**

The Proposal has been allocated the following Ethical Clearance number **IREC 219/21**. Please use this number in all communication with this office.

Approval has been granted for a period of **ONE YEAR**, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures

[SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for thestudy expires.

Yours sincerely

Appendix C: Letter of support from eThekwini Municipality

ETHEKWINI MUNICIPALITY
Community & Emergency Services Cluster
Health Unit

9 Archie Gumede Place
Durban 4001
P O Box 2443
Durban 4000
Tel: (031) 311 3505
Fax: (031) 311 3710
Website:
http://www.durban.org.za

Ref. No. 30/1/1 / 6/3/1

To: Xoliswa Nomvungo

25 November 2021

Dear Researcher,

This letter serves to confirm that the Research Committee of the eThekwini Municipality Health Unit has received your proposed protocol titled: **Nurses' knowledge, Factors influencing the implementation of tuberculosis preventive therapy among HIV positive patients in North Sub-district clinics, eThekwini Municipality.**

We have reviewed your protocol and are supportive of this study. We will however only be able to provide you with full gatekeeper approval once you have received ethical approval from your academic institution.

So, this letter will serve as a letter of acknowledgment of your study and a letter of support for your study. Full gatekeeper approval will follow once the ethical approval has been obtained.

Yours Sincerely

Mrs. Rose Van Heerden
Head: Health Unit

ETHEKWINI MUNICIPALITY
HEALTH UNIT
TELEPHONE NO: 031-3113505/6/8

Appendix D: Full ethical clearance

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwin Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

17 January 2022

Ms X Nomvungo
354 Redberry Park
79 Ruston Place
Rockford
4680

Dear Ms Nomvungo

Nurses' knowledge, attitudes and experiences on the implementation of tuberculosis preventive therapy among HIV positive patients in North Sub-district, eThekwini
Ethical Clearance number IREC 219/21

The Institutional Research Ethics Committee acknowledges receipt of your notification regarding the piloting of your data collection tool.

Kindly ensure that participants used for the pilot study are not part of the main study.

In addition, the IREC acknowledges receipt of your gatekeeper permission letter.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely

Professor J K Adam
Chairperson: IREC

Appendix E: Permission for eThekwini Municipality

ETHEKWINI MUNICIPALITY
Community & Emergency Services Cluster
Health Unit

9 Archie Gumede Place
Durban 4001
P O Box 2443
Durban 4000
Tel: (031) 311 3505
Fax: (031) 311 3710
Website:
http://www.durban.org.za

Ref. No. 30/1/1/6/3/1

To. Xoliswa Nomvungo

27 January 2022

Dear Researcher,

Subject: Approval of a Research Proposal

The Research Proposal Titled: **"Nurses' knowledge, Factors influencing the implementation of tuberculosis preventive therapy among HIV positive patients in North Sub-district clinics, eThekwini Municipality."** was reviewed by the eThekwini Municipal Health Department Research Committee. The study is hereby approved to be conducted at **Verulam, Waterloo, Reddiffe, Trenance Park, Ottawa and Hambanathi Primary Health Care (PHC) Clinics** and is **valid from 17 January 2022 to January 2023.**

The following conditions need to be noted:

- Submission of the indemnity form obtainable from the eThekwini Municipality Health Unit before commencement of the study.
- Prior arrangements to be made with the facility and an assurance that clinic services will not be disrupted.
- No staff member should be used for collecting data for the researchers.
- **Progress reports to be provided and the final report of the study to the eThekwini Municipality Health Unit or emailed to: Bongi.Ntombela@durban.gov.za**
- Obtain permission from the eThekwini municipality health department for press releases and release of results to communities/stakeholders.
- The department has to receive recognition for the assistance given.
- Any amendment to the study must be communicated with the eThekwini Municipality Health Unit and the relevant amendment form obtainable from the unit to be submitted.
- Withdrawal of permission to conduct research will be left to the discretion of the eThekwini Municipality Health Unit.
- **Please take note of the duration of the study approval.**
- **An extension may be applied for if required. The Committee will review such a request and provide feedback accordingly.**

Yours sincerely

Mrs. Rose Van Heerden:
Head of Health

ETHEKWINI MUNICIPALITY
HEALTH UNIT
TELEPHONE NO: 031 311 3505/6/8

Appendix F: Letter of Information

Title of the Research Study: Nurses' knowledge, attitudes, and experiences on the implementation of tuberculosis preventive therapy among HIV positive patients in North Sub-District, eThekwini.

Principal investigator/s/researcher: Xoliswa Nomvungu: B Tech Nursing: Primary Health Care

Co-investigator/s/Researchers: DG. Sokhela D Nursing and TJ. Bhengu Master of Health Sciences in Nursing

Brief introduction and Purpose of the study: The purpose of the study will be to explore knowledge, attitudes, and experiences of PNs on the implementation of tuberculosis preventive therapy among HIV positive patients in eThekwini municipality clinics in the North sub-district.

Greeting and introduction of researcher: I greet and thank you for participating in this study. I am Xoliswa Nomvungu, currently a master's student at the Durban University of Technology, faculty of Health.
I would like you to participate in research study of the topic, "Nurses' knowledge, attitudes and experiences on the implementation of tuberculosis preventive therapy among HIV positive patients".
Research is the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions. Prior partaking in the study, a letter of information will be given to you to read about the study. Moreover, a consent form will be required to be signed. Any questions that you might have will be answered by me.

Outline of the Procedures: You are kindly requested to answer all the questions in the questionnaire. It should take approximately 20-30 minutes to complete.

Risks or discomforts to the participant: There is no expected risk or discomfort when participating in this study.

Benefits: Recommendations from this study might assist you to understand the importance and benefits of implementing tuberculosis preventive therapy amongst eligible HIV positive patients. This will in turn prevent these patients from contracting the TB disease.

Reasons why the participant may be withdrawn from the study: You can withdraw from the study at any time if you wish to do so. There will be no penalty for withdrawal from the study.
Remuneration: There will be no remuneration or financial benefits for participating in this study.

Storage of data: Collected data will be kept confidentially, soft copies in a password locked computer known only to the researcher and hard copies under lock and key with only the researcher having access. These will be destroyed after five years.
Costs of the Study: There are no cost implications for the respondents for participating in the study.

Confidentiality: Your name will not be used on questionnaires; codes will be assigned instead. The consent form with your name will be kept separately from the questionnaires by the researcher. **Research-related Injury:** The nature of the study does not pose any risk of injury to you.
Persons to Contact in the Event of Any Problems or Queries: Please contact the researcher: Ms Xoliswa Nomvungu, contact number 0735022003 and the supervisor's Dr D. Sokhela 0722644670 or the Institutional Research Ethics administrator on 031 373 2900. **Complaints can be reported to** the Director: Research and Postgraduate Support Dr L. Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

Appendix G: Consent to participate in the study

CONSENT TO PARTICIPATE IN THE STUDY

Statement of agreement to participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Ms. Xoliswa Nomvungu, about the nature, conduct, benefits, and risks of the study. Research Clearance Number: 219/21.
- I have also received, read and understood the above written information regarding the study.
- I am aware that the results of the study, including personal details regarding my age, gender, date of birth, initials will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

---------- ---------- ---------- ----------

Full name of participant **Date** **Time** **Signature**

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

Xoliswa Nomvungu 28/10/2021 08h00

---------- ---------- ---------- ----------

Full name of researcher **Date** **Time** **Signature**

---------- ---------- ---------- ----------

Full name of witness **Date** **Time** **Signature**

Appendix H: Questionnaire

SECTION A: DEMOGRAPHIC CHARACTERISTICS

1. Gender

Male	Female

2. Age in years

3. Have you been trained on TB/HIV collaborative activities?

Yes	No

4. Have you been trained specifically on TPT?

Yes	No

5. Years of working experience as a professional nurse in TB/HIV programme

Up to 1 year	1 - <5 years	5 - <15 years	15 – 20 years	>20 years

SECTION B Knowledge of the Professional Nurse on TPT among HIV positive patients

For each question below select the **ONE** option that you think is correct:

1 The duration of TPT in HIV children on ART is:

6 months	12 months	18 months	24 months

2 The duration of TPT in HIV positive adults on ART is:

6 months	12 months	18 months	24 months

3 Which combination of screening is used to identify whether PLHIV are eligible for IPT

Current cough, rash, fever, weight loss	Fever, current cough, rash, night sweats	Current cough, fever, night sweats, weight loss	Weight loss, nausea, fever, rash

4 What is the Isoniazid drug dose used for chemotherapy to prevent TB in adults living with HIV?

100 mg/day	200 mg/day	300 mg/day	150 mg/day

5 How is isoniazid taken?

Orally	Injected

6 Which of the following is not a possible side effect of isoniazid?

Loss of appetite	Acne	Peripheral neuropathy	General body malaise

7 Who is eligible for TPT?

All HIV positive with TB symptoms	HIV positive patients with no TB symptoms	All HIV positive pregnant women	HIV patients with history of liver disease/alcohol abuse

8 Select ‘True’, ‘False’ or ‘Unsure’ for each of the following:

	TRUE	FALSE	UNSURE
8.1 IPT reduces the risk of TB infection in HIV positive patients			
8.2 Chest radiography is a requirement for screening PLHIV for IPT eligibility			

8.3 Current pregnancy is a contraindication for starting IPT			
8.4 IPT can be used as a secondary prophylaxis for people with past history of TB			
8.5 Rifampicin is considered the best drug to prevent TB among HIV positive			
8.6 People with TB cannot take Isoniazid			

SECTION C Attitudes of professional nurses on TPT among HIV positive patients

Indicate your agreement with the following statements:

Statement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted] agree
1. TPT is important to administer in order to reduce TB incidence among people living with HIV.					
2. TPT should be given to all eligible people living with HIV (PLHIV) irrespective of their immune status.					
3. It is important that people without TB who are HIV positive and on ARTs receive TPT therapy.					
4. TPT is effective in reducing TB incidence and mortality among PLHIV					
5. After excluding active TB, TPT won't significantly increase the risk of developing isoniazid resistance					
6. The longer a patient has TPT, the longer he/she will stay free from TB					
7. PLHIV should be encouraged to start TPT once they are eligible					

SECTION D Experience in the implementation of TPT Indicate our agreement with the following statements:

Statement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted] agree
1 I know and understand what is in the TPT guideline document					
2 I have received adequate training on tuberculosis preventive therapy					
3 There are adequate human resources in my clinic to administer TPT					
4 TPT guidelines are available for me to refer to whenever I need them					
5 My manager is committed to using TPT at our facility					
6 My manager supports me in the use of TPT					
7 Quality improvement approaches are in place for the implementation of TPT					
8 There is a regular supply of isoniazid in the clinic					
9 Adult doses of isoniazid are always available and adequate					
10 Child doses of isoniazid are always available and adequate					
11 I am confident that I am able to administer TPT to patients					
12 I have been trained on TB/HIV collaboration					
13 I find counselling patients about TPT difficult to do					
14 I find counselling patients about TPT time consuming					
15 I find documentation of TPT activities difficult to do					
16 I find documentation of TPT activities time consuming					
17 I have adequate experience with prescribing TPT					
18 TPT is routinely practiced in our facility					

19 I use the TB screening tool (algorithm) to identify PLHIV eligible for TPT					
20 I advise patients on TPT to adhere to their treatment					

Section E Usage of TPT

1. Indicate how often you give TPT therapy to patients who are eligible for it

Never	Rarely	Sometimes	Often	Nearly always

IF YOU ALWAYS (ROUTINELY) GIVE ELIGIBLE PATIENTS TPT, PLEASE SKIP SECTION F. Thank you for your time – you are finished answering the questionnaire.

Section F Reasons for not giving isoniazid

Indicate your agreement that the following are **reasons why you (personally) do not put an eligible HIV positive patient on isoniazid**

Statement	[redacted]	[redacted]	[redacted]	Agree	[redacted]agree
1 I am afraid that he/she will develop isoniazid resistance					
2 I am afraid that the patient will develop side effects					
3 It is difficult to exclude active TB					
4 I am not sure there are benefits in using isoniazid					
5 I do not have adequate knowledge of isoniazid					
6 The patient refuses to take isoniazid					
7 Patient's poor adherence to taking drugs					
8 Isoniazid is unavailable					
9 A chest x-ray is unavailable					

10 TPT is unavailable					
11 The patient already has many pills to take, and this would be an extra burden to them					

THANK YOU FOR YOUR TIME

Appendix I: Ethics Training certificate

Appendix J: Editing certificate

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

154 Magenta Plac
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Eastern Cap

082-928-620
rsteele@vodamail.co.z

EDITING CERTIFICATE

Re: **XOLISWA NOMVUNGU**
DUT Master's dissertation: **NURSES' KNOWLEDGE, ATTITUDES AND EXPERIENCES ON THE IMPLEMENTATION OF TUBERCULOSIS PREVENTIVE THERAPY AMONG HIV POSITIVE PATIENTS IN NORTH SUB-DISTRICT, ETHEKWINI**

I confirm that I have edited this dissertation and the references for clari and language. I returned the document to the author with track changes s correct implementation of the changes and clarifications requested in th text and references is the responsibility of the author. I am a freelance edit specialising in proofreading and editing academic documents. My origin tertiary degree which I obtained at the University of Cape Town was a B.A with English as a major and I went on to complete an H.D.E. (P.G.) Se with English as my teaching subject. I was a part-time lecturer in th Department of Homoeopathy at the Durban University of Technology fo 13 years and supervised many master's degree dissertations during th period.

Dr Richard Steele
06 December 2022
per email

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