

**THE PRACTICE OF NURSES IN THE PREVENTION OF  
MULTIDRUG-RESISTANT TUBERCULOSIS AT KING  
CETSHWAYO DISTRICT**

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Technology

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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is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources).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.

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Signature of student

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## **Abstract**

### **Background**

Tuberculosis (TB) is South Africa's greatest community health problem. Nurses have a critical role in supporting patients in the TB treatment process. An estimated 480 000 new cases of Multidrug-Resistant Tuberculosis (MDR-TB) and 190 000 people died in 2014. An estimated 43 million lives were saved between 2000 and 2014 with effective diagnosis and treatment of TB. Despite these measures TB remains one of the world's biggest threats. In an attempt to improve the practice of nurses in the prevention of MDR-TB, the knowledge of nurses with regards to the prevention of MDR-TB is essential.

### **Aim of the study**

The aim of the study was to describe the practice of the nurses in the prevention of MDR-TB and to determine whether the practice was effective in the prevention of MDR-TB.

### **Methodology**

Quantitative, descriptive survey was used to conduct the study. Purposive sampling method was employed to select six primary health care clinics at uThungulu District. The target population consisted of professional nurses and enrolled nurses working in these clinics. The sample size was 122. The questionnaire was used to collect data. Descriptive statistics was used to describe the data graphically. In order to test for significant trends in the data, inferential statistics were applied.

### **Results**

The findings of the study revealed that nurses were implementing measures of preventing MDR-TB like tracing of patients who interrupted TB treatment although

there were inconsistencies with implementation of other measures. There were gaps related to attendance of TB courses by TB staff. Nurses were working in an overcrowded environment where it was difficult to implement measures for preventing MDR-TB. There was an increase in the workload due to the high number of patients having TB.

## **Conclusion**

In this study, the majority of nurses working in primary health care clinics scored well in infection control measures with regard to practicing cough hygiene, placing patients in a well-ventilated area, collection of sputum from patients suspected of having TB and giving of health education to patients with TB and relatives but there are areas that need improvement. The findings indicate a knowledge gap with regard to TB. There is a need for attendance of short courses in TB, increase of staff attending to TB patients so as to cope with the workload and efficient allocation of resources.

## **Dedication**

The study is dedicated to all nurses working at primary health care clinics attending to TB patients.

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## **Glossary of terms**

**Enrolled:** is a person educated to practise basic nursing in the manner and to the level prescribed (Republic of South Africa 2005).

**Multidrug-resistant tuberculosis:** It is the resistant to rifampicin and isoniazid. MDR-TB develops when treatment for TB is inadequate or when patients do not comply with treatment for various reason (van Dyk 2012: 85).

**Nurse:** is a person registered in a category under section 31(1) in order to practise nursing or midwifery (Republic of South Africa 2005).

**Enrolled nurse:** is a person enrolled as a nurse under Section 16 of the Nursing Act (Republic of South Africa 1978: 4).

**Practice:** is the function or position that has or is expected to have in an organization, in society or in a relationship (Hornby 2010: 1282).

**Primary health care:** is the essential care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and the country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination (Clarke 2014: 17).

**Professional nurse:** Is a person who is qualified and competent to independently practise comprehensive nursing in the manner and to the level prescribed and who is capable, is registered with the South African of assuming responsibility and accountability for such practice (Republic of South Africa 2005).

**Tuberculosis:** is a chronic potentially fatal disease that commonly affects the lungs but can affect other parts of the body. It is caused by bacterium or tubercle bacillus (Kortenbout *et al.* 2013: 278).

## Acronyms

<b>Acronym</b>	<b>Full word/sentence</b>
BCG	Bacilli Calmette and Guerin
CCG	Community care givers
CDC	Communicable Disease Control
CEO	Chief Executive Officer
CHW	Community health worker
DENOSA	Democratic Nurses Organization of South Africa
DOTS	Directly Observe Treatment Strategy
HCW	Health care worker
HIV	Human Immune Deficiency Virus
ICN	International Council of Nurses
IHN	Isoniazid
IPT	Infection Preventive Therapy
KZN	KwaZulu-Natal
LTBI	Latent Tuberculosis Infection
MDR-TB	Multidrug-Resistant Tuberculosis
NGO	Non-Governmental Organization
PHC	Primary health care
SANTP	South African National Tuberculosis Control Programme
SMS	Short message service
TB	Tuberculosis
USAID	United States Agency for International Development
XDR-TB	Extremely drug resistant tuberculosis
WHO	World Health Organization

# CHAPTER 1

## OVERVIEW OF THE STUDY

### 1.1 INTRODUCTION AND BACKGROUND OF THE STUDY

Tuberculosis (TB) is South Africa's greatest community health problem and affects all ages. It is caused by mycobacterium TB. Bacteria are spread in airborne droplets when people cough. According to Carlsson *et al.* (2014: 1), poor treatment adherence is a major cause of relapse and drug resistance. Nurses have a critical role in supporting patients in the TB treatment process. Directly Observed Treatment Strategy (DOTS) is recommended by the World Health Organization (WHO) where treatment supporters observe patients as they swallow their drugs (WHO 2014: 1). The development and implementation of DOTS has been found to be successful in expanding effective TB treatment, but in some areas, its success was threatened by the emergence of Multi Drug Resistant-TB (MDR-TB). According to van Dyk (2012: 85), MDR-TB occurs when the patient has resistance to both rifampicin and isoniazid.

From 2016, the goal of the WHO was to end the global TB epidemic by implementing the End TB Strategy, which was adopted by the World Health Assembly in May 2014 (WHO 2015a:1). This strategy serves as a blue print for countries to reduce the number of TB deaths by 90% by 2030, cut new cases by 80% and ensure no family is burdened with costs due to TB. (WHO 2015b: 1). According to the Department of Health (2015: 2b), in 2014, an estimated 480 000 new cases of MDR-TB and an estimated 190 000 people died of MDR-TB. More TB patients were tested for drug resistance than ever before (worldwide 58% of previously treated patients and 12% of new patients). A total of 111 000 people started MDR-TB treatment in 2014, an increase of 14% compared with 2013. Globally, only 50% of MDR-TB patients were successfully treated and to ensure that no family is burdened with costs due to TB.

Anowar, Petpitchetchian, Isaramalai and Klainin-Yoba (2013: 82) and Loddenkemper, Sagebil and Brendel (2002: 67) agreed that MDR-TB is more likely to be a disease of adults. Risk factors have been identified, for example prior treatment was found to be the major risk factor in the occurrence of MDR-TB. In adults, the risk increases with non-compliance with treatment, positive sputum smear and hospitalization. Some other risk factors were alcohol abuse, being young adults, having lung cavities, prisoners or ex-prisoners, poor socioeconomic conditions and patients with high labour intensive occupations.

Anowar *et al.* (2013: 82) reveals that the Nursing Practice Guidelines for MDR-TB were developed based on knowledge regarding the prevention of TB and MDR-TB. Two concepts were integrated: the level of prevention and clinical risk management. MDR-TB has three levels of prevention approaches: health promotion, primary prevention and secondary prevention. These levels were based on the presence of risk factors for the development, recurrence of cardiovascular diseases, and on the conceptualization of these three levels of prevention. The hospitalized adult patient in the study of Anowar were classified into three groups (a) patients without any TB, (b) patients with TB but without MDR-TB and patients with MDR-TB. A systematic approach was needed to generate the prevention strategies of MDR-TB among hospitalized adult patients. A four-step clinical risk management process which included establishing context, risk identification, risk assessment and risk treatment were used in each group to guide the process of the prevention of MDR-TB.

MDR-TB may affect patients admitted with other conditions and health workers. There is a high incidence of hospital admission for MDR-TB among health care workers (HCWs) in KwaZulu-Natal (KZN) (O'Donnell *et al.* 2010: 5). The Democratic Nursing Organization of South Africa [DENOSA] admitted that South Africa has one of the highest rates of TB and TB /HIV co-infection in the world. Denosa has initiated a TB project to build the knowledge, skills and capacity of

nurses and allied health workers to prevent MDR-TB through provision of good quality TB care (Mdolo 2015: 1).

According to Sissolak, Marais and Mehtar (2011: 263), nurses in developed countries play a central role in prevention and control of TB by detecting the disease, providing and coordinating appropriate treatment and assuring emotional support. These authors further state that there is lack of information concerning the realities faced by nurses in developing countries in implementing measures to prevent and control TB. The absence of nurses' voices constraints the quality for TB control and care.

The nurse is part of the team that is involved in the prevention of MDR-TB. The nurse must adhere to policies, procedures and standards of practice to avoid compromising patient care. For example, problems occur when there is a high rate of absenteeism among certain team members because other members will have to carry the workload of the absent member. The nurse must be skilled in interpersonal relationships, open communication, problem solving and conflict resolution, so that when problems arise, intervention will be easy (New Jersey Medical School 2012: 10).

Lilly MDR-TB partnership is a public private partnership of 20 global partners working in over 80 countries on five continents. It was initially launched in 2003 to supply the WHO with MDR-TB drugs and later to transfer drug manufacturing to the countries with a high number of TB patients. The aim of Lilly International Aid Unit is the development of local partnerships whereby nurses, doctors, community health workers (CHWs), working together with local health authorities and patient advocate groups, ensure that patients not only receive proper treatment, but also companionship in the journey to conquer the disease (Carlevaro 2009: 401).

According to the Department of Health (2013: 22), the role of the nurse is to support and supervise DOTS supporters, conduct six monthly contact tracing on all household contacts and provide on-going education on adherence, side effects and infection control. The nurse should record adherence, side effects and where applicable refer complications to management. The nurse should be able to identify barriers to adherence, for example if the patient is unable to control alcohol intake. The nurse should intervene by reinforcing the education given, determine unmet educational needs of the patient and educate the patient about TB disease process (Washington State Department of Health 2012: 8).

Enablers are those things that make it possible or easier for the patients to receive treatment by overcoming barriers such as transportation difficulties. Incentives and enablers are widely used in facilities providing TB services. Incentives and enablers should be chosen according to the patient's special needs and interests, or the patients may not care if they receive them. For example, if the health worker knows that transportation is a problem, he or she could offer bus tokens, bus fare or taxi fare as an enabler. Learning as much as possible about patients will help identify their needs and interests and that motivate them to complete treatment. The best time to begin using incentives is after a good relationship has been developed with a patient. Enablers may be vital to the initiation of treatment and should be provided as soon as treatment starts (Center for Disease Control [CDC] 2012: 1).

In South Africa, adherence is promoted through the following methods: community caregivers visit homes of patients daily to ensure taking of TB treatment. Community care workers are involved in the fight against HIV and TB. Community caregivers play a role in TB prevention, case finding and care thus prevent new infections (Uwimana 2012: 488).

According to the Department of Health (2013: 28), home infection control should be encouraged and monitored through the use of surgical mask during waking hours by the patient, maximizing time in open-air environment (receiving visitors outside), minimizing contact with known HIV positive patients. Advise the household members to undergo HIV testing and ensure that household members are screened for TB and DR-TB every six months.

## **1.2 PROBLEM STATEMENT**

Nurses are expected to prevent MDR-TB by applying preventive measures such as cough hygiene and teach patients to prevent transmission when producing sputum. According to Department of Health (2015a: 1), some nurses have poor knowledge of MDR-TB. A study found that many nurses had not been trained to manage this deadly disease. The research presented in South African TB conference found that 19 percent of the 16<sup>th</sup> health facilities surveyed in rural and urban areas of Limpopo and KZN provinces had nurses with formal training in MDR-TB management. This led to poorly recorded patient histories and failure to follow up on people who had been in close contact with MDR-TB patient. According to the WHO (2015a: 2), more patients were tested for drug resistance in 2014 than the previous years. Worldwide there were 58% of previously treated patients and 12% of new cases. South Africa is one of the countries with the highest burden of TB with the WHO statistics showing 500 000 cases of active TB in 2011, with 50 000 developing active TB. This is the world's 3<sup>rd</sup> incidence after India and China. In 2010, there were 7386 laboratory confirmed cases of MDR TB and 741 confirmed cases of extensively drug resistant TB (XDR TB) WHO (2012: 3). Department of Health (2015: 27b) confirmed that South Africa is among the WHO's 22 high burden countries for TB. TB is estimated to be responsible for approximately 80% of global TB cases. The country has the highest incidence of TB (993 per 100 000 in the world).



It is estimated that the TB notification rate per 100 000 population in uThungulu district was 1005 in 2013 and indicated that confirmed cases of MDR-TB were 455 in 2013 in the same district (Department of Health 2015b: 28). Furthermore, the Department of Health (2013: 7a) stated that, nurses should monitor the patients during the intensive phase of TB treatment during which the bacterial load is being reduced and is crucial in the prevention of MDR-TB.

### **1.3 AIM OF THE STUDY**

The aim of the study was to describe the practice of the nurses in the prevention of MDR-TB and to determine whether the practice was effective in the prevention of MDR-TB.

### **1.4 OBJECTIVES**

The objectives of the study were to:

- Describe the practice of nurses in the prevention of MDR-TB.
- Determine how effective nurse practice is in preventing MDR.TB.

### **1.5 SIGNIFICANCE OF THE STUDY**

MDR-TB is a global threat, the nurse's responsibility is to prevent and control its occurrence. The nurses will have more knowledge and skills in the prevention of MDR-TB. The management of health facilities will be involved in the capacity building and empowerment of nurses in this regard. Prevention is better than cure. In nursing education, the students on training will be taught current information about the prevention MDR-TB. The nurses working in PHC will have more knowledge with regard to early detection of signs and symptoms of MDR-TB. The main priority for the control and elimination of MDR-TB is prevention of its emergence. Once MDR-TB has emerged, urgent measures are required to curb its effects. According to global TB report (2016: 1), the crisis of MDR-TB detection

and treatment continues. In 2015, about 580 000 people newly eligible for MDR-TB treatment, only 125 000 (20%) were enrolled.

According to Nathanson *et al.* (2010: 1053), in countries with limited resources, patients with MDR or XDR TB must complete two unsuccessful courses of treatment with first-line anti-TB drugs before being eligible for treatment with second-line drugs. First line TB drugs are used for the treatment of new patients, diagnosed with TB for the first time and second line TB drugs are for the treatment of drug resistant TB (TB Facts 2017). Moreover, in many countries, treatment of MDR-TB is started only after the diagnosis has been confirmed, a process that takes months when conventional methods are used. As a result, persons with infectious MDR-TB or XDR-TB remain in the community for long periods of time. Prompt diagnosis and treatment of tuberculosis and MDR-TB can lower the number of MDR-TB strains below their replacement rate and perhaps even below that of non-MDR-TB strains.

Prioritizing control of TB infection is important, because there is continuous transmission of MDR TB and XDR-TB in health care facilities and congregate settings for example in prison. To date, virtually no country with a high burden of TB has implemented systematic measures to reduce the risk of TB transmission in health facilities. HCWs especially those working in TB hospitals and in resource-limited settings, are at substantially higher risk of contracting TB and MDR-TB than the general population (Nathanson *et al.* 2010: 1055). The National Strategic Plan suggest the key control of the HIV and TB epidemics by 2030. Key populations identified for HIV and TB 90/90/90 targeting for HIV and TB in district implementation plan. The target is young women and girls. It is important to teach them about STI, prevention and treatment because if it is not treated it can lead to the development of HIV. Identify, acknowledge and build on the successes, for example rollout of antiretroviral (ART) treatment, multi-stakeholder engagement and multi-government response. The aim is to reach the 2030 National

Development Plan Goals and Targets, for example AIDS free generation and concomitant decrease in TB incidence and mortality. (Department of Health 2016a: 1-2).

## **1.6 STRUCTURE OF THE DISSERTATION**

1.6.1 Chapter 1: Orientation to the study.

1.6.2 Chapter 2: Literature review.

1.6.3 Chapter 3: Theoretical framework.

1.6.4 Chapter 4: Research design and methodology.

1.6.5 Chapter 5: Presentation of results.

1.6.6 Chapter 6: Discussion of results.

1.6.7 Chapter 7: Conclusion, limitations and recommendations

## **1.7 SUMMARY OF THE CHAPTER**

This chapter introduced the study and provided background to research. The objectives were highlighted. Significance of the study was clarified. The problem statement was elaborated and concepts were defined. Chapter 2 will focus on the relevant literature relating to the study.

## **CHAPTER 2**

### **LITETRATURE REVIEW**

#### **2.1 INTRODUCTION**

The previous chapter focused on the background of the study, problem statement, and objectives of the study and significance of the study. Chapter 2 contains the literature review on TB, MDR-TB and the practice of nurses in the prevention of MDR-TB. The process of reviewing the literature was undertaken to search for and identify pertinent literature that would add knowledge and improve the understanding of the phenomenon under study.

#### **2.2 DEFINITION OF TB**

Korteinbout (2013: 1) defines TB as an infectious chronic, potentially fatal disease that often affects the lungs but can affect other parts of the body. It is caused by a tubercle bacillus called mycobacterium tuberculosis. According to Nzimande (2014: 153), TB is an infectious, chronic, acute or sub-acute notifiable disease, characterized by lesion formation in tissues and organs in the body, by far the most common being the lungs, which is the only source of communal spread.

#### **2.3 PREVALENCE OF TB WORLD WIDE**

According to Global TB Report, in 2014, an estimation of 190 000 people died of MDR-TB (WHO 2015b: 2). Many more patients were tested for drug resistance in 2014 than ever before i.e. Worldwide 58% of previously treated patients and 12% of new cases. Arshad *et al.* (2014: 1) estimated that 8.6 million people developed active TB and 1.3 million died from the disease.

## **2.4 PREVALENCE OF TB IN SOUTH AFRICA**

According to the WHO (2016:1), TB is one of the top ten causes of death globally. In 2015, 10.4 million suffered from TB and 1.8 million died from the disease, including 0.4 million who were diagnosed with HIV. Six countries account for 60% of the total with India leading the count, followed by Indonesia, China, Nigeria, Pakistan and lastly South Africa. South Africa is one of the countries with the highest burden of TB. The WHO statistics estimated the incidence of 450 000 cases of active TB. It means about 1% of the population of about 50 million people develop active TB each year. This is the third highest incidence of any country after India and China. Out of the 450 000 incident cases in South Africa, it is estimated that about 270 000 (60%) people have both HIV and TB infection (Department of Health 2015b: 1).

## **2.5 PREVALENCE OF TB IN KZN**

KZN has the highest TB disease burden in South Africa with an estimated HIV/TB co-infection rate of 70%. Drug resistant TB is increasing with a current incidence of 26.8 per 100 000 population. The mortality rate among MDR-TB/HIV co-infected patients is high (71% one-year mortality). The Department of Health estimated that TB notification rate per 100 000 population in uThungulu district was 1005 in 2013. The Department of Health further confirms that in 2013, there were 455 cases of MDR-TB in uThungulu district (Department of Health 2015: 24b).

## **2.6 TRANSMISSION OF TB**

According to the CDC, mycobacterium TB is carried in airborne particles, called droplet nuclei, of 1-5 microns in diameter (CDC (2013: 21). Infectious droplet nuclei are generated when persons who have pulmonary or laryngeal TB disease cough, sneeze, shout, or sing. Depending on the environment, these tiny particles can remain suspended in the air for several hours. Mycobacterium TB is transmitted through the air, not by surface contact. Transmission occurs when a

person inhales droplet nuclei containing Mycobacterium TB and the droplet nuclei gain entry through the mouth or nasal passages, upper respiratory tract, and bronchi to reach the alveoli of the lungs.

## **2.7 PATHOGENESIS OF TB**

Infection occurs when a person inhales droplet nuclei containing tubercle bacilli that reach the alveoli of the lungs. These tubercle bacilli are ingested by alveolar macrophages; the majority of these bacilli are destroyed or inhibited. A small number may multiply intracellularly and are released when the macrophages die. If alive, these bacilli may spread by way of lymphatic channels or through the bloodstream to more distant tissues and organs (including areas of the body in which TB disease is most likely to develop: regional lymph nodes, apex of the lung, kidneys, brain, and bone). This process of dissemination challenges the immune system for a systemic response (CDC 2013: 26).

### **2.7.1 Latent TB infection**

Exposure to and inhalation of droplets containing mycobacterium TB, a proportion of individuals will be infected and the majority of these develop an immune response that contains infection. These individuals are asymptomatic but infected with latent TB Infection (LTBI) and mycobacterium bacilli cannot be identified. It is estimated that 5-10% of people with LTBI will develop TB disease during their life time. Infection reservoirs represented by LTBI hinders efforts to eliminate TB globally. People with LTBI usually have positive tuberculin skin tests (European Centre for Disease Prevention and Control 2012: 5).

### **2.7.2 Active TB**

Active TB disease can develop when a person is first exposed to the TB bacteria, especially if an individual's immune system is low. A person with active TB will feel sick and can transmit the disease to other persons when she coughing, sneezing and singing (Public Health Agency of Canada 2014: 1).

### **2.7.3 Chronic TB**

Arjun (2011: 22) maintains that TB can become chronic when dormant tubercle bacillus persists in tissues after primary infection and multiply weakening the immune system. Unless the process is arrested, it spreads downwards to the hilum of the lungs. The process may be prolonged and is characterized by long remissions when the disease is arrested.

Clinical manifestations are classified according to the type of TB. Primary TB is the first infection by mycobacterium TB, typically seen in children but also occurs in adults, characterized in the lungs by the formation of a primary complex consisting of small peripheral pulmonary foci with spread to hilar or paratracheal lymph nodes and may proceed to cavitate or heal with scarring (CDC 2014: 1).

Diagnosis of TB is done by collection of sputum by the HCW. The other test is the mauntoux skin test which is the injection of Purified Protein Derivative intradermally. The reaction to test is measured from 48 to 72 hours later (Maria 2016: 28). Tine or Mono tests use instruments which are impregnated with Purified Protein Derivative and need to be pressed into the skin of the forearm. The area of induration is measured 72 hours later.

## **2.8 LEGAL FRAMEWORK FOR THE STUDY**

The department of health is legally responsible for the control of TB, and MDR-TB as a public health issue and is required to operate within the context of the Bill of rights enshrined in the constitution of the Republic of South Africa 1996. The bill of rights affords individual rights:

Freedom and security of the person: Violations of this right arise from enforced isolation or treatment.

Life: The right to receive treatment and the right of the uninfected to be protected from infection.

Health care: The right to health care services and emergency medical treatment.

Just administrative action: The right to be heard before a decision is made, which adversely affects individual rights.

Human dignity: The effects of detention and treatment on an individual's dignity.

Privacy: disclosure of a patient's health status to others.

Equality: Discriminating between those who will receive treatment or be detained and those who will not.

Freedom of movement and residence: The effect of enforced detention and conditions of release.

Freedom of trade, occupation and profession: The effect of enforced detention and conditions of release.



Social security: The right to social security, including, if they are unable to support themselves and their dependents, appropriate social (Department of Health 2013:9).

## **2.9 PUBLIC PREVENTION OF TB**

Since 1921, Calmette-Guerin (BCG) has been given worldwide to all infants at birth to reduce the risk of TB except during one-year period when BCG vaccine was not routinely given (Favorov *et al.* 2012: 1). A single dose of BCG vaccine should be given to all infants. All children attending school are tuberculin tested annually, and those showing reaction are given Isoniazid. This weakens the infection in such that the chances of the individual developing active disease are reduced by 80%. Individuals who have developed active disease in the community are admitted to hospital and isolated. Health education in the community is given about the understanding of the disease and early recognition of the signs and symptoms. Such information will motivate those who are at risk to participate in TB screening programs. Education include principles of nutrition, balanced meals, breastfeeding and school feeding scheme and encouragement of the community to initiate the planting of communal vegetable gardens. Improved in housing and family limitation, reduce overcrowding because poor housing has an impact on the transmission of TB (Nzimande 2014: 158).

Good nutrition increases general resistance of a person, but malnutrition can contribute to the impact of TB in various ways. Firstly, malnutrition can influence progression of TB infection to primary disease, and it can increase the risk of reactivation of the disease in the long term. Nutritional deficiencies can influence how the TB treatment works and can decrease the protection that is offered by the BCG vaccine (Clarke 2014: 108).

Arjun (2011: 27) suggests that the general standard of living must be improved by creating more jobs for people. People living in formal settlements have to be assisted in building their houses. The community should be educated about avoiding stress and to limit alcohol because these factors lead to lowered immunity. The provision of emotional support to patients may promote adherence to therapy. Support could be organized in the form of support groups or one to one counselling by trained providers. Inspection of dairies, safe milk supplies and pasteurization of milk is important to prevent transmission (Nzimande 2014: 158).

## **2.10 EXTENT OF MDR-TB**

MDR-TB is defined as a disease caused by strains of mycobacterium TB that are at least resistant to treatment with isoniazid and rifampicin (Nathanson *et al.* 2010: 1050; American Lung Association (2013: 3). MDR-TB is the number one cause of death in South Africa. It is a vicious cycle as people living with HIV have a greater risk of developing resistant TB because of their weakened immune system. In 2010, the WHO estimated that, there were globally 290 000 cases of MDR TB among those cases of pulmonary TB that were reported to them (WHO 2014: 1). It was also estimated that in total there were 650,000 cases of MDR TB among the world's one million prevalent cases of TB. There are 27 high burden countries for MDR TB in these countries, there are at least 4000 cases of MDR-TB each year.

South Africa is one of the countries with the highest burden of TB with the WHO statistics showing 500,000 cases of active TB in 2011 with 50,000 developing active TB. This is the world's third incidence after India and China. In 2010, there were 7386 laboratory confirmed cases of MDR TB and 741 confirmed cases of extremely drug resistant TB [XDR TB] (WHO 2012: 3).

According to the TB Guidelines, the following factors contribute to MDR-TB:

- Management of drug supply is imperative to ensure constant supply of TB drugs to prevent treatment interruption
- Patient management (if the patient is having alcohol problem, the patient needs to be counselled before giving of TB treatment).
- Poor relationships between patients and health care personnel due to uncaring staff attitudes and showing little empathy for patients,
- Lack of support for directly observed therapy,
- Poor record keeping and lack of follow up of patients and referral,
- Staffing issues including frequent staff changes, poor staff morale, lack of regular support and supervision and low accountability of staff for programme outcomes (Department of Health 2014: 74).

van Den Berg (2009: 27) concludes that nurses have four fundamental responsibilities namely to promote health, to prevent illness, to restore health and to alleviate suffering. The need for nursing is universal in relation to TB, nurses prevent illness by reducing transmission of TB in the community by finding and treating active cases, they restore health by ensuring that, patients receive treatment they need and they alleviate suffering by organizing support for patients specific to their needs. Stigma still remains attached to the disease. Even though TB is common among vulnerable groups. It is important for patients to discuss their concerns. Nurses are placed within communities, working closely with patients and their families, to play a crucial role in providing a caring environment for all patients suffering from TB. This is essential for the success of the TB control programme. The roles that nurses play in TB management and control vary according to their work setting. Some will be involved in all of the activities. Nurses working in primary health care (PHC) setting are often the first to see patients who present with symptoms and are crucial to the early identification and management of TB suspects and MDR-TB cases. To ensure a high level of case detection,

nurses are the cornerstone of TB control, nurses need to understand their role in controlling this disease.

Anowar *et al.* (2013:1) maintains that the newly developed guidelines for the prevention of MDR-TB were disseminated and evaluated among 64 nurses by assessing nursing practice for the prevention of MDR-TB during pre-and post-implementation of guidelines. In Bangladesh the findings of this study revealed that the nursing practice guidelines for MDR-TB were developed based on knowledge regarding the prevention of TB and MDR-TB. Two concepts were integrated, namely the level of prevention and clinical risk management. MDR-TB has three levels of prevention approaches: health promotion, primary prevention and secondary prevention, based on the presence of risk factors for the development and recurrence of cardiovascular diseases.

In South Africa, despite the challenges, nurses working in TB units and clinics are implementing nursing practice guidelines for the prevention of MDR-TB problems. There are outreach teams involved in follow-ups, home visits to patients with TB, ensuring that patients are taking TB treatment. Community care givers (CCGs) have been trained to do follow-up and to educate the community about the prevention and treatment of TB. Non-governmental organizations (NGOs) for example United State Agency for International Development offer assistance by training CCGs (Relief web 2012: 1).

According to Menon (2013: 203), a high rate of HIV co-infection is one of the major reasons for high mortality among drug-susceptible TB patients in sub-Saharan Africa, it may happen that new TB patients hospitalized are at an advanced immunosuppression stage of HIV. This would make them prone to circulating MDR-TB strains. Loddenkemper (2002: 67) reveals that the risk factors for MDR-TB are previous treatment or relapse, originating from history of imprisonment, homelessness and immunosuppressive diseases such as HIV and diabetes

mellitus. Gonzalez (2014: 1) maintains that about 60% of MDR-TB patients had never had TB before, which means they were infected with drug resistant strain. In KZN, the first nurse was trained to initiate MDR-TB treatment in 2012. She learned about MDR-TB treatment, side-effects and how to refer cases of MDR-TB with diabetes.

## **2.11 DEVELOPMENT OF MDR-TB**

The ability of the TB bacterium to undergo a slow and constant mutation is a natural phenomenon that results in resistant organisms developing. In order for MDR-TB to develop, a high bacterial load is required (Singh 2014: 18). These mutations occur in the chromosomes of the TB bacterium. When resistant organisms develop, they result in a decrease in the organism's susceptibility to specific drugs. This development of MDR-TB is not a recent occurrence but has evolved over a period of time and is an expected result due to the use of antibacterial agents. Inadequate treatment, such as direct or indirect monotherapy, or non-adherence to the medication exacerbates the problem (Singh 2014: 18).

## **2.12 MANAGEMENT OF MDR-TB CONTACTS**

Close contacts are defined as people from the same household sharing common habitation rooms. This can include individuals with prolonged and frequent exposure at, for example, the workplace, school, prison, and hospital ward (European Centre for Disease Prevention and Control 2012: 6). With the available evidence in three systematic reviews on the benefit of preventive therapy and adverse effects it is not possible to either support or reject preventive therapy at this stage. Because of the lack of evidence on the topic, there is a range of recommendations provided in national and international guidelines and policy documents. For children there are indications of the positive effects of preventive therapy. The purpose of preventive therapy is to prevent progression of LTBI to TB disease in an individual who has been exposed. Preventive therapy has been

shown to be effective for LTBI after contact with drug-susceptible TB (European Centre for Disease Prevention and Control 2012: 13).

The European Centre for Disease Prevention and Control (2012:13) reveals that there are ongoing studies to collect evidence in support of the use of preventive therapy in contacts of MDR-TB cases. One of these studies involves the provision of second-line preventive therapy. The feasibility of preventive therapy will depend on the number of drugs available for the specific infecting strain of mycobacterium tuberculosis. The efficacy of the regimen will depend on treatment adherence and completion by the contact, which could be influenced by adverse events during the specific drug regimen. Follow-up with careful clinical observations for MDR-TB contacts is important in order to detect signs of TB disease so that prompt treatment can be provided to cure the patient and to stop further transmission of MDR-TB.

Singh (2014: 24) maintains that two of the categories of close contacts that are at high risk of contracting MDR-TB are those patients who are immunocompromised with HIV, and children. Children who are contacts of MDR-TB patients are at a higher risk of developing active MDR-TB soon after infection.

The Department of Health of South Africa suggests that symptomatic contacts of MDR-TB should be investigated using Xpert or Lipo protein A test to check whether they have RR-TB or MDR-TB. Symptomatic children are to be referred to hospital for evaluation (Department of Health 2014: 77). All symptomatic contacts of MDR-TB patients should be screened at six monthly intervals for up to two years. HIV positive contacts should be followed up three monthly and if MDR-TB develops, referred immediately for treatment. Child contacts under five years of age should be given isoniazid preventive therapy, irrespective of tuberculin response. HIV-infected children of any age should be given isoniazid preventive therapy. Singh (2014: 25) maintains that management of symptomatic contacts of MDR-TB who

do not have TB includes treatment with a broad spectrum antibiotic that is not against TB such as Trimethoprim/Sulphurmethoxazole.

According to the European Centre for Disease Control (2012: 14), in the study conducted in South Africa between 1994 and 2000, all infected and non-infected children below five years of age who had received no previous treatment or preventive therapy for TB were offered preventive therapy. This is the only study that recommends that, preventive therapy may prevent TB disease in children who are in contact with MDR-TB patients. The risk of developing a disease was lower in the treated group.

### **2.13 PRACTICE OF NURSES IN THE PREVENTION OF MDR-TB**

According to Olin (2011: 1), a shortage of physicians and an over-abundance of patients led to South African nurses stepping into the role of primary care providers. According to International Council of Nurses (ICN) (2008: 42), many patients are shocked when they are told they have TB, some refuse to accept it and others simply take it in their stride. The reaction depends on many factors including cultural beliefs and values, previous experience and knowledge of the disease (ICN 2008: 42).

Gizaw, Alemu and Kibret (2015: 2) states that MDR-TB is a growing global problem and is more difficult and expensive to treat and cure. There is often a delay in recognizing drug-resistant TB that can lead to prolonged exposure, which increases TB transmissions. Patients with MDR-TB remain infectious for a longer period, even if treatment is initiated. To prevent TB transmission in health care facilities, infection prevention control measures such as, use of protective masks by HCWs, administrative controls and environmental measures like natural and mechanical ventilation systems must be implemented. The infection control preventive measures need to promote early identification of cases, adherence to treatment and implementation of proper TB infection control measures at home

and health facility. Nurses have to educate TB patients and the community about adequate ventilation (Gizaw *et al.* 2015: 2).

The current approach to TB control is based at the first level of care, but this poses a problem for community nurses as it increases their workload and responsibility. If the incidence of TB increases, this will have an influence in the role played by nurses in the community. Nurses have to realize that they are the pillars of TB prevention and management. Community nurses have the opportunity to assess, diagnose, treat and refer patients with TB (Mnisi, Mmapheko, and Meyer 2012: 2). In South Africa, nurses are working with community volunteers and NGOs to train DOT supporters in order to improve adherence, reduce treatment failures and prevent the development of MDR-TB (Ghebrehiwet 2006: 401). Carlevaro (2009: 401) is of the opinion that the diagnosing and care of TB patients relies on nurses (the frontline HCWs around the world). The role of nurses in treating MDR-TB becomes particularly important because of the complex and long treatment process as well as the potential for a TB patient to become further drug resistant.

The role of the nurses is the early identification of the patient with TB to ensure that public health reporting regulations are followed. The nurse should communicate with other health care providers (communication, education and networking with hospital infection control practitioners and doctors are important to ensure early notification of those suspected or diagnosed with TB to develop a system to track patients with TB, who are hospitalized). Their status should be monitored to prevent interruption of treatment after discharge. Essential TB control activities include TB interview and contact investigation to prevent transmission and treatment of infection (New Jersey Medical School 2012: 7-8).

According to Situmbeko, Katanekwa and Dahlback (2016: 13), other strategies that limit the spread of TB in health facilities include, in-service education to improve awareness of basic precautions of practices to prevent the spread of TB in nursing



practice, risk of transmission and availability of prophylaxis and treatment. Toth *et al.* (2004: 29) concur with Karim (2011: 1130) that nurses need to advocate for the prompt diagnosis and isolation of suspected and confirmed TB patients. Prevention of TB has been a neglected aspect of TB control. TB prevention strategies include treatment of LTBI among high-risk persons, reducing the duration of infectiousness and transmission and early administration of anti-retroviral therapy for people living with HIV.

Arjun (2011: 19) indicates that very young children and the elderly are prone to communicable diseases than adults. Children are prone due to the immaturity of the immunological system which negatively influences the ability of the lymphoid system to react to foreign antigens. The activity of the immune system in the elderly person slows down. Gathering of data that will form the basis for TB treatment and care is of vital importance. The nurse treats the patient with respect and establishes rapport, takes full medical history, duration of symptoms, other medical conditions, previous health-seeking behaviour and previous treatment for or exposure to TB or MDR-TB. Explanation of the tests to be done and the reason for doing them for example sputum testing and x-ray if available, informs the patient when to expect test results, registers the person as a TB patient and starts treatment if more than one of the sputum tests positive.

Patients who are diagnosed during hospitalization will require discharge planning to prevent transmission in the community and interruption of treatment. Prior to the patient's first visit to the doctor/clinic after discharge, the nurse should ensure that a copy of the patient's hospital record, chest x-ray and sputum results if available, to be given to the treating physician. Without the hospital records, the physician may not be able to make the correct judgments in medical management. If the patient is not hospitalized, the initial assessment should take place at the first clinic visit or during a home visit. During the visit, the following should be assessed nutritional status, vital signs (temperature, pulse and respiration), weight

assessment to see whether the patient is gaining or losing weight. Weight is a useful indicator of clinical improvement. If there is poor response to treatment, alternative diagnosis and possibility of drug resistant must be considered (Department of Health 2014: 48). It should be monitored monthly. Singh (2014: 17) states that among other reasons why controlling TB is failing is the presence of HIV in settings with high prevalence. Development of TB among patients with HIV co-infection complicates TB therapy and is associated with delays in diagnosis and poor treatment outcomes. According to the New Jersey Medical School (2012: 11), it is important for patients to understand the correlation between TB and HIV. Counselling and testing are done at the beginning of TB treatment if the HIV status is not known. The nurse ensures that the patient completes treatment according to doctor's plan. It is also important to ensure that the plan is specific for the individual. Monitoring of side effects of the treatment is important.

According to the Department of Health (2013: 7), nurses should monitor the patients during the intensive phase of TB treatment during which the total bacterial load is being reduced and that is crucial in the prevention of MDR-TB. The Department of Health recommends that nurses should prevent nosocomial infection by applying the following measures: identify patients with active TB disease and use symptomatic screening tools (Department of Health 2013: 119).

Arjun (2011: 28) suggests that the hospital management have a great impact in preventing TB transmission by applying the following measures:

- The Chief Executive Officer (CEO) of the hospital should assign Infection Control Officer who will be responsible for developing and evaluating infection control plans.
- Establish a multidisciplinary infection control committee comprising of an infection control officer, microbiologist, medical practitioner, pharmacist, housekeeping supervisor/food service manager, laundry service manager, maintenance manager and CEO.

- Conduct risk assessments to evaluate the risk for transmission in each area and occupational group within the facility. These must be repeated annually to evaluate the effectiveness of the infection control interventions.
- Occupational groups should be based on the profile of TB in the community.
- Promptly initiate and maintain TB isolation for patients having MDR-TB.
- Plan install and evaluate ventilation and other engineering controls to reduce the risk of exposure to mycobacterium TB, plan implement, maintain and evaluate a respiratory protection programme, educate and train HCWs about TB.
- Effective methods for preventing transmission of infection and the benefits of medical surveillance programmes.
- Develop and implement a programme for periodic counselling and screening for HCWs for latent infection and active disease
- Offer alternative employment to HCWs who have a health condition that comprises cell mediated immunity when placed in high risk areas.
- Ensure prompt evaluation of nosocomial transmission, including Purified Protein Derivative (PPD) test conversions or active TB in HCWs.

According to the Department of Health (2013: 121), the prevention of MDR-TB focuses on both the infectious patient and the health worker. All patients should be instructed to cover their mouths and nose with a handkerchief, surgical mask or tissue when coughing and other forms of forced expiration. Nurses should wear particulate respirators which are impermeable to droplet nuclei when nursing patients or collecting sputum. Collection of sputum specimens should take place in the open area or cough booths. Privacy should be maintained during sputum collection. When collecting sputum, the HCW should stand behind the patient so as to prevent droplet infection. The patient should be advised to close the container immediately after expectoration. All sputum jars must be labelled prior to collection. Nurses must wear gloves when handling specimens and must wash hands with disinfectant if hands have contacted sputum without gloves.

The most widely used respirator are certified in the United States as N95 and in Europe as FFP2. The disposable model consists of a filtering face piece in various configurations and sizes, with two elastic bands to achieve a tight seal and malleable nose clip to prevent leaks around the nose. There are barriers to the effective use of respirators in resource limited settings. Respirators are uncomfortable and cannot be worn continuously, but the risk from known or unsuspected infectious patient may be ever-present. For optimal protection, each worker should be fit-tested using a commercial fit-testing kit (Nardell and Dharmadhikari 2010: 9).

According to the ICN (2008: 27), during the course of TB treatment, sputum smears must be taken at least three times for monitoring purposes: the initial specimen is collected at the first patient interview under the nurse's supervision if the nurse suspect that the patient is having TB:

- First time-at the end of the 2<sup>nd</sup> month of treatment when 75-85% of initially sputum-smear positive patients should be sputum-smear negative (sputum conversion).
- 2<sup>nd</sup> time-at the end of the 5<sup>th</sup> month of treatment in order to confirm TB cure.
- 3<sup>rd</sup> time-at the end of the 6<sup>th</sup> month of treatment in order to confirm TB cure.

One of the elements of DOTS is the standardized recording and reporting system, allowing monitoring and evaluation of treatment results.

The patient should avoid alcohol and paracetamol at all times when on TB medication to reduce hepatic symptoms (Maria 2016: 28). Patient treatment cards contain patient details and clinical information, including the medication, dosage and dates prescribed for each patient. The card has a calendar grid for recording each dose, allowing the nurse and the patient to see the treatment status, collect sputum timely and ensure adequate medication supplies. The treatment card is an important indicator of treatment completion and is important if the patient is

unable to produce a sputum at the end of the treatment. Nurses must ensure that all patients having TB are listed in TB patient register, including patients under treatment at a particular facility. The register is maintained locally and allows the facility to monitor its own performance. This register feeds into a district registry. Quarterly cohort analysis includes data on all TB patients registered during a three-month period. This report enables health facilities to monitor their performance, identify and address local problems and order appropriate quantities of drugs (ICN 2008: 29).

## **2.14 CONTACT INVESTIGATION**

The investigation of people exposed to patients with infectious TB is one of the priorities of the TB control programme (Department of Health 2014: 37). The patient provides a list of those closest to him/her. These people are then invited for screening: nurse's role is to assess the patient for signs and symptom of TB, perform tuberculin testing, collection of sputum and initiation of TB treatment if the sputum is positive. All children under the age of five living in the patient's household are examined. This is a distressing process since the patient may not want others to know that he/she has TB. Contact tracing offers the opportunity to address the stigma. Close contacts of people with active pulmonary TB are at increased risk of acquiring infection, developing active disease and spreading it. Early identification and adequate treatment of those with active pulmonary TB reduces the risk of exposure of community members (ICN 2008: 33). The objectives of contact investigation are as follows:

- To reduce morbidity and fatality due to TB by early identification and adequate treatment of further cases of active TB among contacts of index cases.
- To arrest further transmission by early detection of possible secondary cases.

- To prevent future cases of TB in the population by detection and giving preventive therapy to contacts of high risk patients (children, immune compromised individuals) with active disease.

The aims of contact tracing in the context of a single index patient of drug susceptible TB are:

- To identify contacts with active TB disease and initiate treatment early.
- To identify those at high risk of developing active TB namely young children and immunocompromised persons to prevent the development of TB by providing Isoniazid Prevention Therapy.
- To identify all close household contacts of MDR-TB/XDR-TB, without active disease for monitoring for two years after disease onset in index patient.
- To provide individual/family education on infection control and counselling (Department of Health 2014: 37).

## **2.15 MANAGING PATIENT TRANSFER**

TB treatment is continuous and appropriate arrangements are made if the patient needs to transfer his or her care to another provider. Treatment gaps increase the risk of relapse and the development of MDR-TB. During a course of TB treatment, the patient may be transferred one or more times between health care providers. This may be from hospital to community as the patient becomes better, from one location to another if the patient moves home or return to work. The nurse ensures that the patient has been well supported throughout his or her treatment and understand the importance of finishing the TB treatment. Before the patient leave he or she is given a supply of medication to cover the time he or she is likely to be in transit before he or she can register elsewhere for ongoing treatment. The nurse ensures that the TB treatment is continued the new treatment unit. The unit that start the treatment is responsible for recording the outcome, no matter where the patient has gone. The nurse completes the TB Transfer Form in triplicate:

- Gives one copy to the patient to take along to the new treatment unit.
- Sends another copy to the referral unit.
- Gives the third copy to the District TB Co-coordinator (ICN 2008: 76).

## **2.16 SUPPORT GROUPS**

Nurses in the clinics are responsible for organizing support group. A central element of the patient support groups is empowering and involving TB patients in the management of their disease. TB patients need information about TB. The aim of the support group is to identify the existing problems and barriers that TB patient can face during their treatment and ways to solving these problems. Currently monthly support group meetings are organized at primary level for TB and MDR-TB patients on continuation phase of treatment. Family members are also invited. TB patients are invited to share their experiences. Community leaders provide support by sharing information and inviting newly diagnosed patients to the support group meeting. This motivates patient to be committed to their treatment (WHO 2013: 72-73). According to Maria (2016: 28), ongoing support can help the patients deal with stigma associated with TB. The stigma of TB remains an issue for some who prefer not to disclose their diagnosis to others.

## **2.17 ADHERENCE TO TB TREATMENT**

Adherence to TB treatment is a major factor in the successful outcome of TB treatment, reduces the risk for the development of MDR-TB and is the main reason the DOTS was developed. Adherence is the extent to which a person's behaviour i.e. taking medication, following a diet and executing life style changes follows agreed health care recommendations. Adherence is complex with a number of factors that can adversely impact treatment completion, including socio-economic factors and issues related to organization of TB treatment in the community: patient variables, treatment variables, treatment adverse effects and disease variables. The nurse must eliminate the barriers for adherence to treatment. A patient

centred-approach which includes deciding with the patient the convenient time and place for DOTS. Best adherence indicators include: smear conversion from positive to negative, improvement in symptoms and clinical improvement (van Den Berg 2009: 29).

Although DOTS has been well documented to improve patient's adherence to TB treatment and increase treatment outcomes, studies have reported that DOT coverage remains low in many countries including South Africa. A study conducted in North West Province of South Africa revealed that the number of TB patients receiving DOT was estimated to be 56% with coverage lowest among TB retreatment patients. In spite of the fact that DOTS have been implemented, individual nurses may not be aware or fully informed about the strategy (Ershova *et al.* 2016: 363). Hovell *et al.* (2003: 3) suggested that in order to promote adherence, clients should use adherence cues, for example taking treatment when brushing their teeth, clients to be assisted in keeping clinic appointments and with transport. Adherence to MDR-TB treatment is vital as MDR-TB treatment can take as long as 24 months. During the course of treatment patients require continuous education and counselling in order for them to remain adherent to their treatment. Some patients develop adverse effects which can lead to non-adherence. Other factors that affect adherence to MDR-TB include loss of salary as patients are often unemployed, substance abuse and psychiatric disorders (Singh 2014: 25).

According to Nglazi *et al.* (2013: 2), other strategies that promote adherence to TB treatment include reminder systems and late patient tracers to help patients keep appointment, contracts to return for appointment. These interventions can be employed by nurses. The number of mobile phone users has increased and is spreading to the remote areas in the world. Mobile phone text messaging may enable nurses to convey information to patients or engage them in brief conversations. Text messaging can be sent daily or weekly to patients to remind them to take their medication. Bridges.org evaluated patient satisfaction with the



SMS intervention among 26 participants using structured questionnaires. The studies done found that most patients were satisfied with short message service (SMS) reminders.

Home visits and community outreach are employed as methods to optimize treatment adherence among TB patients. Previous research has demonstrated the effectiveness of these methods in promoting adherence (Nglazi *et al.* 2013:5). There is improvement in final treatment outcomes. However, the ability to conduct these services may be hindered by limitations in human and logistic resources especially in resource-limited settings with high TB burden (Bristow *et al.* 2013: 2).

According to New Jersey Medical School (2012: 10-11) one of the nurses' role is to ensure that TB treatment progresses according to the physician's plan and the plan should be specific for the individual patient to promote adherence to treatment and to prevent occurrence of MDR-TB. The nurse should ensure that the patient is informed about the consequences of non-adherence. Episodes of non-adherence should be identified as soon as possible and discussed with patient and team members. Policies and procedures must be in place to establish monthly rate of DOTS adherence. An assessment of adherence, need to occur daily in order to monitor non adherence. If the nurse is not directly involved in providing the care, a notification system should alert him/her if the patient misses more than two consecutive days of DOTS. Behavioural measures are frequently used to assess adherence. The methods that are commonly used to assess adherence are:

- Pill counts.
- Observation of patient behaviours.
- Keeping clinical appointments.

New Jersey Medical School (2012: 6) reveals that organizational barriers cause the patient to become uncooperative with healthcare providers, making delivery of care difficult. Patient satisfaction with the health care system is important for improved adherence. Difficulties that patients encounter in the clinic or with providers should be identified and addressed by the manager. Basic guidelines are:

- The clinic should be physically safe and comfortable.
- Clinic staff should be courteous, respectful and culturally sensitive
- Interpreters must be available.
- All staff involved with patient care must hold patient information in strict confidence.
- Clinic services must be efficient and accessible to minimize waiting time.

## **2.18 INVOLVEMENT OF NURSES IN MDR-TB**

Meressa *et al.* (2015: 1185) indicated that one of the barriers to successful treatment to patients with MDR-TB globally is high rates of patients lost to follow up. A recent study done in Ethiopia revealed a mean loss to follow-up rate of 14.8%. The study identified the use of CHWs and DOTS throughout treatment as strategies associated with lower loss to follow-up rates. During this study 79 outpatients were initiated on MDR-TB therapy at home using roving nurses to provide injections and to supervise DOTS. This group had lower rates of death or treatment failure compared with patients who started treatment as in patients. Robinson (2006: 241) concur with Meressa *et al.* (2015: 1185) that nurses are involved in MDR-TB as they administer combined courses of streptomycin to patients. The nurses were concerned not only with physical health but also emotional and mental health needs of the patients. Nurses assisted patients deal with problems such as stigma, domestic violence, poverty and other barriers that had an impact on health outcomes and treatment.

The fundamental aspect of the programme was the implementation of adherence strategies successfully, including monthly home visits and monthly patient visits to the initiation sites, identification of a patient supporter to assist with DOTS, psychosocial support, monthly food baskets and social support for the most destitute patients. Nurses monitored patients for adverse drug effect and these effects were encountered in most patients with gastrointestinal toxicity and arthritis. Hypokalaemia occurred three times among individuals receiving capreomycin and it was associated with mortality (Meressa *et al.* 2015: 1185).

According to the study conducted, cough officer nurses in a general medical clinic successfully detect drug-susceptible resistant TB. The nurses were involved in intensive case finding for TB. They identified clinic attendees with cough for more than two weeks and collected sputum for evaluation at hospital and provincial referral laboratories. According to hospital protocol a staff nurse interviewed all patients attending outpatient department (Shenoi *et al.* 2013: 46).

Nurses are involved in MDR-TB in different ways. The findings of a study conducted in Gauteng revealed that a number of MDR-TB patients who were not commenced on treatment was high for those diagnosed in hospital as compared to those diagnosed in clinic. In this study, loss to follow up was the largest reason for failure of referral of MDR-TB, though laboratories have a record but the nurses at TB focal points clinics do not have a record of patients. When patients are discharged from the hospital, they are not given a date to come back for results. Some of the patients died before the results were communicated. It is better now because some nurses are authorized to initiate MDR-TB treatment. It is the system of work that needs to be organized so that all patients who have MDR-TB are aware of the results early (Nkosi *et al.* 2013: 3).

## **2.19 ADMISSION OF PATIENTS WITH MDR-TB IN DECENTRALISED MDR-TB UNITS**

There are a number of decentralized MDR-TB units in each province, depending on the need, but at least one unit is needed per district. These units are responsible for the initiation of and management of MDR-TB patients. Patients diagnosed with MDR-TB who are smear microscopy positive are hospitalized at decentralized MDR-TB units for up to eight weeks or until they become smear negative on two consecutive tests. Once the sputum smear microscopy is negative, the patient meets the criteria for outpatient treatment (Department of Health 2013: 15).

The following are the functions of professional and enrolled nurse in a decentralized MDR-TB Units: Tracing confirmed drug-resistant TB patients and referring them to the drug-resistant TB hospital. Providing DOTS to all drug-resistant TB patients attending the unit daily. Providing social support, rehabilitation, educational and skills building programmes for patients. Preparing a discharge plan for all patients and ensuring down referrals. Monitoring drug-resistant TB patients post discharge until completion of treatment and two years post treatment completion. Ensuring availability of drugs and monitoring rational usage of second-line drugs. Establishing and maintaining functional clinical management teams. Recording and reporting to the provincial department of Health. Compiling monthly, quarterly, six monthly and annual reports of drug-resistant TB patients started on treatment, culture conversion and outcomes. Providing technical assistance and capacity building to satellite MDR-TB units and feeder clinics on management of DR-TB (Department of Health 2013: 16).

## **2.20 SATELLITE MDR-TB UNITS**

The Department of Health (2013: 17) suggests that satellite units may be used at district or psychiatric hospitals, community health centres (CHCs) or correctional services facilities. Satellite MDR-Units should exist to admit and follow up MDR-TB patients initiated on treatment at decentralized sites and serve patients who refuse to start treatment unless they are closer at home. After the assessment and initiation of MDR-TB therapy by a centralized or decentralized MDR-TB unit, patient may be referred to a satellite MDR-TB unit where they will receive treatment and monitored daily. When the patient no longer presents with fever, cough and smear is negative and the patient has gained weight, the patient can be discharged to the community and continue receiving treatment either from the mobile team or from the nearest PHC. The following are the functions of professional and enrolled nurses working in satellite MDR-TB unit:

- Providing DOTS to all MDR-TB patients attending daily,
- Educating and counselling all patients admitted to hospital,
- Monitoring treatment and side effects (Department of Health 2013: 17).

## **2.21 PHC FACILITY**

The following are the functions of the professional and enrolled nurse working in PHC facilities:

- Identifying high risk groups,
- Screening and testing symptomatic high risk groups,
- Tracing patients with a confirmed diagnosis of DR-TB notifying the district TB coordinator,
- Providing initial counselling and education of the patient and family,
- Preparing patients for hospital admission when indicated,
- Conducting contact screening of close contact,
- Coordinating follow-up visits in hospital,

- Tracing treatment interrupters and collecting monthly sputum and other tests (Department of Health 2013: 18).

Nardell and Dharmadhikari (2010: 2) argue that long-term control of MDR-TB will require not only massive of complex, effective treatment programmes, but also a simultaneous shift in efforts to control transmission in congregate settings as well as in communities. Nurses, multidisciplinary team and patients who are HIV-co-infected in high-burden settings are at risk of infection and re-infection. HCWs disabled by MDR-TB reduce the critical workforce to effectively treat TB and HIV patients. Most institutional guidelines on TB transmission control focus on the known or suspected TB patient on therapy, but it has long been known that the greater risk in hospitals is from unsuspected and untreated cases (Nardell and Dharmadhikari 2013: 3).

## **2.22 A BASIC TRIAGE AND SEPARATION STRATEGY-AN EXAMPLE IN HAITI**

Conventional administrative strategies focus on identifying coughing patients for acid-fast smear testing and prompt separation of TB suspects into environments that protect workers and other patients. Depending on existing conditions, building renovations may be effective for airborne infection control (Nardell and Dharmadhikari 2010: 5). The following example from rural Haiti illustrate the integration of community-based treatment, building design, and the role of rapid diagnostic tests in a simple triage separation strategy. Because most patients with TB are treated in the community, hospitalization is reserved for patients with complications that require in- patient care. Patients who need hospitalization with cough and other symptoms of respiratory infection are admitted to the general medical ward if AFB sputum smear is negative, regardless of HIV status. TB patients admitted in different units in order to separate patients in respective cubicles (Nardell and Dharmadhikari 2010: 5).

Farley *et al.* 2012:85 confirmed in a study conducted in South Africa in 24 facilities, about prevention of MDR-TB that, the use of ultraviolet germicidal irradiation was noted in 14 facilities. A cleaning, monitoring and maintenance plan for these environmental intervention was noted in two facilities.

The study conducted in KZN province of South Africa about evaluation of infection control measures revealed that, over 80% of facilities complied with environmental control measures. These facilities ensured unrestricted airflow in the working areas, the existence of ceiling that were 3 meters high and a designated area for sputum production by patients. Half of these facilities had vents in addition to windows for air circulation. Ultraviolet radiation was used in high-risk areas only in 20% of facilities (Malangu and Mngomezulu 2015: 3).

The British Thoracic Society Guidelines (2000: 890-891) and Karim (2011: 1130) confirmed that patients with smear positive disease not known or suspected to have MDR-TB become non-infectious after two weeks of the initiation of treatment and remain so if regular chemotherapy is continued even though bacilli might still be seen in sputum smears. Infectious patients or those known to have MDR-TB should be admitted to a negative pressure ventilation room. If facilities are not available, the patient must be transferred to a hospital where the facilities are available. The patient should remain in isolation in a negative pressure room until assessed to be non-infectious.

The hospital and clinic design plays a role in MDR-TB transmission control in resource-limited settings. It is believed but unproven that most transmission takes place in doors because of the protection afforded by the infinite dilution available outdoors. Overcrowded hospitals increase the risk of TB transmission. The hospital with large room volumes also had very high ceilings to accommodate tall windows that permitted copious natural ventilation. The hospital with the smaller

room volumes had lower ceilings, fewer and smaller windows and ineffective mechanical ventilation system (Nardell and Dharmadhikari 2010: 6).

## **2.23 SUMMARY OF THE CHAPTER**

This chapter presents the definition of TB, signs and symptoms of TB, the extent of MDR-TB, development of MDR-TB, transmission, pathogenesis, diagnosis, public prevention of MDR-TB, management of MDR-TB contacts, TB contact investigation, the practice of nurses in the prevention of MDR-TB, adherence to TB treatment, involvement of nurses in MDR-TB and admission of patients with MDR-TB in decentralized MDR-TB sites. The next chapter will present theoretical framework of the study.



## **CHAPTER 3**

### **THEORETICAL FRAMEWORK**

#### **3.1 INTRODUCTION**

The previous chapter presented a literature review. This chapter will present theoretical framework, which was used to guide the study. A framework is an abstract, logical structure of meaning. It guides the development and organization of the study (Burns and Grove 2009: 126). Theoretical frameworks guide the researcher in the interpretation of results and therefore, direct the entire research process. They are therefore, a frame of reference that forms the basis for observations, definition of concepts, research designs, interpretations and generalizations (LoBiondo-Wood and Haber 2013: 141).

#### **3.2 HEALTH PROMOTION MODEL**

The researcher based the study on Pender's Theory (Health Promotion Model). The first version of theory appeared in literature in 1982. It was revised in 1996 based on changing theoretical perspectives and research findings (Joseph 2016: 72). Grove, Burns and Gray (2013:117) defines theory as a set of integrated concepts, existence statements, and relational statements that can to describe, explain, predict or control the phenomenon being discussed.

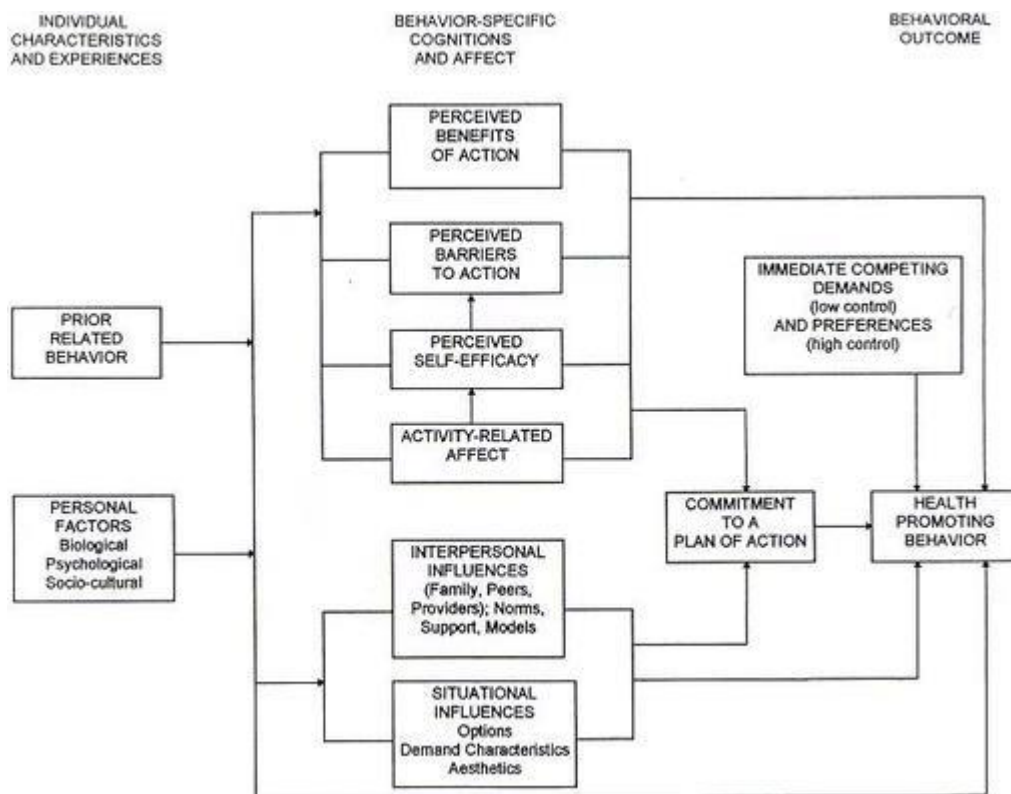
One of the roles of nurses is to help patients learn to care for themselves and make healthy choices. By participating in their own self-care, patients can prevent illnesses and diseases to help ensure they have better overall health. One theory that helps patients prevent illnesses through their behaviour and choices is the Health Promotion Model, which was developed by nursing theorist Nola Pender. Nola Pender developed her Health Promotion model, after seeing professionals intervening only after patients developed acute or chronic health problems. She became convinced that patients' quality of life could be improved by the prevention of diseases and illnesses, and the governments' money could be saved by the promotion of healthy lifestyles since

MDR-TB treatment is expensive. After researching current models and discovering that most focused on negative motivation, she developed a model that focused on positive motivation (Petiprin 2016: 1).

Pender's model focuses on three areas as outlined in Figure 3.1:

- Individual characteristics and experiences
- Behaviour-specific cognitions and affect
- Behavioural outcomes

All these areas are important for health promotion and prevention of diseases.



**Figure 3.1: The Health Promotion Model (Pender 2011:1)**

### **3.2.1 Individual characteristics and experiences**

Individual characteristics which include prior related behaviour, personal factors and bio psychosocial factors have a direct effect on the desired health promotion behaviour which in the case of MDR-TB will influence whether the clients on TB treatment are complying with TB treatment. The researcher considered that in order for MDR-TB prevention to be effective the provider and the receiver of health education are equally important. The experiences of nurses who are responsible for monitoring TB clients are important.

### **3.2.2 Behaviour-specific cognitions and affect**

The individual characteristics and experiences have an indirect effect on behaviour-specific cognitions and affect or the perceptions and feelings that the nurse have regarding the practices about the prevention of MDR-TB. The researcher assessed the specific behaviour cognitions and effects of the nurses based on their knowledge in the prevention of MDR-TB. Knowledge items included measures to be taken to prevent MDR-TB, when is the treatment started in confirmed cases of TB and tracing process if the patient has interrupted treatment or has not returned for treatment.

### **3.2.3 Behavioural outcomes**

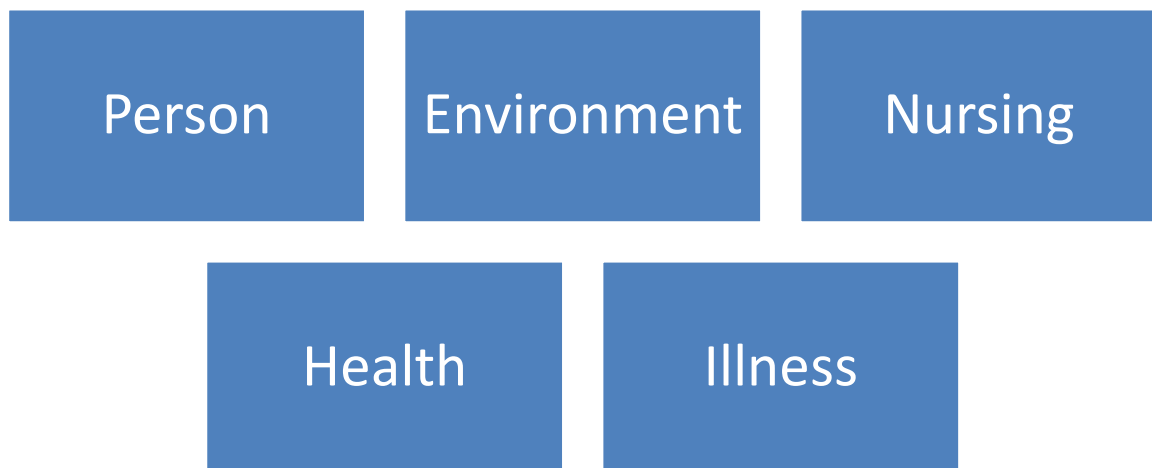
Individual characteristics, experiences and behaviour-specific cognitions and affect combined directly affects the individual's commitment to a plan of action. The practices in the current study would include whether nurses are preventing MDR-TB by preventing transmission of infection, health-educating patients to continue taking TB treatment. The purpose of the model is to assist nurses in understanding the major determinants of health behaviours as a basis for behavioural counselling to promote healthy lifestyles. Pender's Theory encourages scholars to look at variables that have been shown to impact health behaviour. It uses research findings from nursing, psychology, and public health into a model of health behaviour. The model can be used as a foundation to structure nursing protocols and interventions. In practices, nurses should focus

on understanding and addressing the variables most predictive of given health behaviours. One of the objectives of this study is to describe the practice of nurses in the prevention of MDR-TB. In this study, nurses should play a role in the prevention of MDR-TB by giving relevant information to patients, caring for patients already suffering from normal TB and adhering to infection control principles.

Nurse' role is to assist clients having TB to engage in healthy behaviours in order to prevent deterioration of the condition thus leading to MDR-TB. Through education and development of healthy habits and life style, nurses can in still empowerment and self-care responsibilities to individuals with TB moving them towards larger capacity for self-care and productive living.

### **3.3 KEY CONCEPTS OF THE HEALTH PROMOTION MODEL**

Pender (2011:3) identifies five key concepts in the Health Promotion Model: person, environment, nursing, health, and illness as indicated below in Figure 3.2.



**Figure 3.2: Key concepts of the health promotion model**

**Person** is a biophysical organism shaped by the environment, but also seeks to create an environment in which human potential can be fully expressed. Because of this, the relationship between person and environment is reciprocal. Individual characteristics and life experiences shape behaviours.

**Environment** is described as the social, cultural, and physical context in which life unfolds. It can be manipulated by the individual to create a positive context of cues and facilitators for health-enhancing behaviours. Nurses and family should create conducive environment for patients on TB treatment to prevent treatment interruption.

**Nursing** is a collaboration among patients, families, and communities to create the best conditions for the expression of optimal health and high-level well-being.

**Health** is defined as the actualization of human potential through goal-directed behaviour, self-care, and relationships with others with necessary adjustments made to maintain relevant environments.

**Illnesses** are discrete events in the life that can hinder or facilitate the patient's continuing quest for health.

Health Promotion Model theory suggests that good health is not just the absence of any health ailment or disease, it is much beyond that. Good health implies a general and holistic state of well-being, healthy actions of an individual and a balanced, fulfilling way of life. As per the Health Promotion Model, every individual interacts in a unique way within their environment. All such actions and reactions collide with the natural health of the individual and either goes on to attain a positive dynamic state of health or poor health, often noted as ailing health.

### **3.4 ASSUMPTIONS OF THE MODEL**

The model is based on the following assumptions:

- People try to create conditions of living through which they can express their unique human potential.
- People have the capacity for reflective self-awareness, including assessment of their own competencies.
- People value positive growth, and strive to find a balance between stability and change.
- People seek to actively regulate their own behaviour.
- People interact with their environment, transforming it and themselves over time.
- Nurses and other health professionals make up a part of the interpersonal environment, which exerts influence on people throughout their lifespan.
- Self-initiated reconfiguration of the interactive patterns between people and their environments is necessary for a change in behaviour (Pender 2011: 5).

### **3.5 THEORETICAL PROPOSITIONS OF THE MODEL**

The model is based on the following theoretical propositions:

- Behaviour and characteristics influence beliefs, affect, and enactment of health-promoting behaviour.
- People commit to engaging in behaviours from which they anticipate deriving personally valued benefits.
- Barriers can constrain commitment to action.
- Competence to execute a given behaviour increases the likelihood of commitment to action and actual performance of the behaviour.
- Greater perceived self-efficacy results in fewer barriers to a specific health behaviour.
- Positive affect toward a behaviour results in greater perceived self-efficacy.

- When positive emotions are associated with a behaviour, the probability of commitment and action is increased.
- People are more likely to commit to health-promoting behaviours when others model the behaviour, expect it to occur, and provide support to enable it.
- Families, peers, and health care providers are important sources of interpersonal influence that can increase or decrease commitment to health-promoting behaviour.
- Situational influences in the external environment can increase or decrease commitment to or participation in health-promoting behaviour.
- The greater the commitment to a specific plan of action, the more likely health-promoting behaviours are to be maintained over time.
- Commitment to a plan of action is less likely to result in the desired behaviour when competing demands over which persons have little control require immediate attention.
- Commitment to a plan of action is less likely to result in the desired behaviour when other actions are more attractive and thus preferred over the target behaviour.
- People can modify cognitions, affect, interpersonal influences, and situational influences to create incentives for health-promoting behaviour (Petiprin 2016: 2).

According to the WHO (2009: 16), involvement and empowerment of patients and communities in TB control is important. The community may not have access to information about TB and related services. The community may have misconceptions about the disease that influence their health related behaviour. Nurses have a duty to create awareness in the community about the importance of preventing MDR-TB. Prevention of MDR-TB is important in all ages. Nurses should ensure that patients are getting treatment for TB and that interruption of treatment is prevented. Nurses should accept clients and show positive attitude even if the clients have interrupted treatment, give health education and assist the clients to solve problems so that the patient may continue to take treatment.

In South Africa, it was found that negative attitudes of nurses contributed to the spread of TB. (Human, Smith and Tshabalala 2010: 50).

### **3.6 SUMMARY OF THE CHAPTER**

This chapter presented theoretical framework based on Health Promotion Model by Nola Pender and five concepts of theory. The next chapter presents the research design and methodology.



## **CHAPTER 4**

### **RESEARCH DESIGN AND METHODOLOGY**

#### **4.1 INTRODUCTION**

The previous chapter focused on the framework of the study. This chapter focuses on research design, population and sampling, data collection process, data analysis and ethical consideration.

#### **4.2 PARADIGM**

A paradigm is a worldview, a general perspective on the complexities of the real world (Polit and Beck 2010: 14). According to Grove, Burns and Gray (2013: 702), paradigm refers to a particular way of viewing a phenomenon that encompasses a set of philosophical assumptions and guides one's approach to enquiry. This study adapted positivist paradigm to determine the practice of the nurses in the prevention of MDR-TB and to determine whether the practice is effective and that nurses have necessary knowledge in the prevention of MDR-TB. In positivist paradigm, positivists believe that reality is objective. The positivist paradigm is based on knowledge gained from 'positive' verification of observable experience rather than on introspection or intuition (Cohen and Crabtree 2010). The positivist position is grounded in the theoretical belief that there is a reality that can be objectively known to the researcher (Cohen and Crabtree 2010). Statistics can objectively be used to verify the reality. The study seeks to be as objective as possible in the pursuit of knowledge by using a quantitative research design. Personal beliefs and biases are separated from the objective facts on the phenomenon under study that would lead to the objective truth by using quantitative research design (Cohen and Crabtree 2010).

### **4.3 RESEARCH DESIGN**

Research design is a detailed plan according to which the research is conducted (Grove, Burns and Gray (2013: 195). This was a quantitative, descriptive survey design.

#### **4.3.1 Quantitative design**

According to Grove, Burns and Gray (2013: 23), quantitative research is a formal, objective, systematic process implemented to obtain numerical data for understanding aspects of the world. This research method examines relationships among variables, and determine cause and effect interactions between variables. Evidence for a study in the positivist paradigm is gathered according to an established plan using structured methods to collect required information. The information gathered is numeric information that is obtained from a formal measurement and is analysed statistically (Polit and Beck 2012: 14). The term survey is used in two ways in a broad sense it means descriptive or correlational study. In a narrow sense, the term is used to describe a data collection technique in which the researcher uses questionnaires or personal interviews to collect data about a population (Grove, Burns and Gray 2013: 224).

#### **4.3.2 Descriptive study**

Polit and Beck (2012: 226) state that the purpose of descriptive research is to observe, describe and document aspects of a situation as it naturally occurs and sometimes serve as a starting point for hypothesis generation. The design is chosen to identify patterns of variables and to compare and contrast groups on selected variables (Polit and Beck 2012: 87). A descriptive design may be used to develop theory, identify problems with current practice and determine what others in similar situation are doing. Variables are not manipulated and there is no treatment or intervention (Grove, Burns and Gray 2013: 215). According to Polit and Beck (2012: 229), descriptive studies are valuable in

documenting the prevalence, nature and intensity of health related conditions and behaviours and are critical in the development of effective interventions.

#### 4.4 RESEARCH SETTING

According to Polit and Beck (2012: 743), the research setting is the physical location and conditions in which data collection takes place. The study was conducted in five primary health care (PHC) clinics and one CHC under King Cetshwayo Health District (Figure 4.1). The District has one regional hospital and one combined regional-tertiary hospital, six district hospitals, 57 fixed clinics, one CHC and 14 mobile clinics with 66 mobile stopping points (KZN Department of Health 2015: 1).



4.1: King Cetshwayo District map (Department of Health 2017).

The non-probability purposive sampling method was used to select the six PHC clinics. According to Polit and Beck (2012: 763), purposive sampling is a non-probability sampling method where participants are selected based on which ones will be most informative. Purposive sampling, sometimes referred to as purposeful, judgmental, or selective sampling, the researcher selects certain participants, elements, events, or incidents to include in the study Grove, Burns and Gray (2013: 365). These clinics were purposively selected due to the high number of TB patients who attend these facilities (Table 1). Other clinics were not selected because of the small number of patients attending those clinics.

**Table 4.1: Statistics for the selected clinics**

<b>Clinic</b>	<b>Number of TB patients</b>
Clinic 1	105
Clinic 2	100
Clinic 3	40
Clinic 4	60
Clinic 5	110
Clinic 6	400

#### **4.5 STUDY POPULATION**

Grove, Burns and Gray (2013: 44) define a population as all elements, for example individuals, objects or substances that meet certain criteria for inclusion in a given universe. According to Polit and Beck (2012: 274), the accessible population is the aggregate of cases that conform to designated criteria and that are accessible for a study while the target population is the aggregate of cases about which the researcher would like to generalize. The target population in this study comprised professional and enrolled nurses working in clinics.

## 4.6 SAMPLING OF THE STUDY PARTICIPANTS

Polit and Beck (2012: 275) define sampling as a process of selecting cases to represent an entire population so that inferences can be made about the population. Sample denotes the selected group of people or elements included in the study. Sampling decisions have a major impact and generalizability of the findings (Grove, Burns and Gray 2013: 351).

Population consisted of professional nurses and enrolled nurses who are allocated in different clinics because they attended to clients with TB, suspected TB and MDR-TB. According to the Nursing Act 33 of 2005, a professional nurse is a person who is qualified and competent to independently practise comprehensive nursing in the manner and to the level prescribed and who is capable of assuming responsibility and accountability for such practise. The enrolled nurse is a person educated to practise basic nursing in the manner and to the level prescribed (Republic of South Africa 2005: 34). The sample size was 173 which was calculated as the minimum sample required. The total number of respondents who were able to bring back the questionnaires was 122. All professional nurses and enrolled nurses working in these clinics were selected in a study. Table 4.2 below shows the total number of professional and enrolled nurses who were employed at the selected clinics.

**Table 4.2: Nurses allocated in the clinics**

Clinic	Professional nurses	Enrolled nurses	Total
Clinic 1	14	8	<b>22</b>
Clinic 2	13	7	<b>20</b>
Clinic 3	5	5	<b>10</b>
Clinic 4	14	8	<b>22</b>
Clinic 5	14	8	<b>22</b>
Clinic 6	48	29	<b>77</b>
<b>Total</b>	<b>108</b>	<b>65</b>	<b>173</b>

### **Inclusion criteria**

- Professional and enrolled nurses who are allocated in the PHC clinics and CHC.

### **Exclusion criteria**

- Enrolled Nursing Auxiliaries working in PHC clinics and hospitals, professional and enrolled nurses working in hospitals.

## **4.7 DATA COLLECTION TOOL**

The researcher carried out a survey. According to Grove, Burns and Gray (2013: 224), a survey study in a narrower sense is described as a data collection technique in which the researcher uses questionnaires or personal interviews to gather data about an identified population. When developing the questionnaire, the researcher was guided by the available literature on MDR-TB. The questionnaire consisted of three sections:

- The first section pertains to the demographic data (Questions required demographic information of participants' race, age, staff category, highest qualification, gender and years of experience).
- The second section pertains to the factors which affect the performance of nurses in the control of TB (Questions required the participants to indicate if they had attended short courses in TB, the staff to indicate the category of patients admitted if they are admitted, the staff to indicate the maximum number of patients the unit can accommodate. The other questions covered the knowledge of measures to prevent transmission of infection. The Likert scale options of choice included strongly agree, agree, neutral, disagree and strongly disagree).
- The third section pertains to the factors influencing the prevention of MDR-TB (Questions covered tracing of patients who interrupted TB treatment, giving of prophylactic treatment and giving of health education to patients).

The researcher together from recommendations and advice from the statistician drew up the Likert scale to best answer the research question.

Data collection tool was developed in consultation with the statistician.

**Table 4.3 Relationship between objectives, questions and aspects of theoretical framework**

Objective	Questions	Aspects of theoretical framework
Describe the practice of nurses in the prevention of MDR-TB	<p>1.Indicate frequency with which you practice the following measures:</p> <ul style="list-style-type: none"> <li>• Wearing a surgical mask, which covers mouth and nose.</li> <li>• Practicing cough hygiene, i.e. covering my mouth and nose by flexing my arm.</li> <li>• Placing patients in a well-ventilated area.</li> <li>• Using Hibitane spray after attending to each patient.</li> <li>• Collecting sputum from patients who have been coughing for two weeks.</li> </ul> <p>2.Indicate the frequency of the following actions:</p> <ul style="list-style-type: none"> <li>• I give health education to patients suffering from T.B. about the importance of taking T.B. treatment at home</li> <li>• I give prophylactic treatment to patients exposed to MDR-TB</li> <li>• I take history from patients with T.B. about T.B. contacts at home</li> <li>• I give health education about safe coughing practices at home</li> </ul>	Individual characteristics and experiences.
Determine how effective the practice in preventing MDR-TB	<p>1.Have you attended short courses in TB</p> <p>2.Indicate the staff allocation in each category for this unit</p> <p>3. Indicate your agreement with the following statements:</p> <ul style="list-style-type: none"> <li>• Generally, I am able to cope with the workload in this unit.</li> </ul>	Behaviour-specific cognitions and affect.

	<ul style="list-style-type: none"> <li>• There are enough resources with regard to the prevention of infection in T.B. ward.</li> <li>• I take measures to prevent transmission of infection in between patients.</li> <li>• The unit is overcrowded.</li> <li>• T.B. drugs are consistently available</li> <li>• HCWs take measures to check for signs of T.B. in patients suffering from chronic illnesses like diabetes</li> </ul>	
	<ul style="list-style-type: none"> <li>• What is the turnaround time for T.B. smears? (Select ONE option only).</li> <li>• When do you start giving treatment to confirmed cases of TB? (Select <b>one</b> option only).</li> </ul> <p>4. Indicate your agreement with the following statements.</p> <ul style="list-style-type: none"> <li>• If possible: Trace the patient, if they have not returned for treatment, and address the problem with counselling and continue treatment.</li> <li>• If possible: Educate the patient on the necessity of continuing treatment.</li> </ul> <p>5. Indicate your agreement with the following statements:</p> <ul style="list-style-type: none"> <li>• I think TB training is important in the management of TB.</li> <li>• I give health education to patients about healthy eating.</li> <li>• I give health education to patients about avoiding smoking.</li> <li>• Health education to the community is important for the prevention of MDR-TB.</li> </ul>	



#### **4.8 DATA COLLECTION PROCESS**

Data collection commenced from May to June 2016. It occurred in two phases. Firstly, the researcher visited the clinics and requested appointments with operational managers. After explaining the purpose of the study and obtaining consent from participants, data was collected. Data was collected by means of conducting a survey where self-administered questionnaires were handed to the staff (Appendix 5). The researcher handed out 173 questionnaires to the participants. Out of 173 questionnaires, 122 were returned. The participants were requested to complete the questionnaires within one week. After one week, questionnaires were collected. The questionnaires were placed in a sealed box, in the office of the operational manager. The operational manager opened the box with questionnaires.

#### **4.9 PRETESTING OF DATA COLLECTION TOOL**

A pre-test was conducted before the actual commencement of data collection. Pretesting of the questionnaire was done to determine if the questionnaire was understood by the participants. Pre-testing, sometimes referred to as a 'preliminary study' is a small scale study conducted prior to the main study on a limited number of participants from the population at hand (Brink, Van der Walt and Van Rensburg 2006: 166). According to Maree (2007: 150), ensuring validity through pre-testing is important. Pre-testing ensures content validity (Marshall and Rossman 2006: 201). According to Babbie and Mouton (2001: 186), in order to pre-test a questionnaire for validity, a researcher should use participants for whom the study is relevant. The sample of the pre-test consisted of two professional nurses employed in a clinic where the main study was not going to be conducted. These nurses were not included the main study. Questions were clear, there was no ambiguity, therefore there were no changes made in the questionnaires.

#### **4.10 DATA ANALYSIS**

Data analysis is the manner that decreases, organises and gives meaning to data (Polit and Beck 2010). Descriptive statistics, in the form of tables and graphs, was used to describe the data graphically. In order to test for significant trends in the data, inferential statistics were applied. These included Pearson's correlation, t-tests, ANOVA and chi-square tests. Where the conditions did not meet the application of these tests, non-parametric equivalent tests or exact tests, where applicable, were used. Throughout a p-value of 0.05 was used to note significance. The analysis was carried out using the latest version of SPSS 23.0.

#### **4.11 VALIDITY**

The validity of an instrument determines the extent to which it actually reflects or is able to measure the construct being examined Grove, Burns and Gray (2013: 393). The authors define validity as the ability of the instrument to measure the truthfulness of the construct under scrutiny. The four aspects of internal validity are presented below.

##### **4.11.1 Face validity**

According to Grove, Burns and Gray (2013: 394), face validity refers to whether the instrument looked like it is valid or give the appearance of measuring the construct it is supposed to measure. It is a subjective assessment made by researchers or potential subjects with no clear guidelines for making judgement therefore, it is considered the weakest form of validity, however it is still an important aspect of the usefulness of the instrument. Face validity was ensured through submission of the questionnaire to expert for evaluation by the statistician and supervisors. The researcher ensured that the questionnaire that was used had all the relevant information pertaining to the practice of nurses in the prevention of MDR-TB. The questionnaire was pre-tested before research was conducted.

#### **4.11.2 Content validity**

Content validity examines the extent to which the measurement method includes all the major elements relevant to the construct being measured (Grove, Burns and Gray 2013: 394). Content validity was ensured by conducting a literature review prior to the design of a questionnaire. The researcher developed a structured questionnaire with the help of the statistician to ensure that it measured the desired variables. The questionnaire was then submitted to the supervisors to ensure that the information included is based on the practices of nurses in the prevention of MDR-TB. Validity was tested during the pre-test conducted prior to the actual research data collection process. This ensured that all questions asked would be understood, and that the researcher was satisfied with responses to questions. Therefore, the pre-test improved the internal validity of the questionnaire. The results from the pre-test were not included in the final data analysed. All data was cross-checked and proof-read by the researcher under the guidance of the expert supervisors to ensure accuracy.

#### **4.11.3 Criterion validity**

An instrument is said to have criterion-related validity if its scores correlate highly with scores on an external criterion or correlating what an instrument measures with another measure accepted as being valid (Polit and Beck 2012: 338). For this study, the researcher designed the instrument, after a literature review, as no other instrument that addressed the questions could be found. The instrument designed could not be compared with other questionnaires.

#### **4.11.4 Construct validity**

Construct validity refers to whether an instrument actually measures the theoretical construct it purports to measure. It examines the correlation between conceptual definitions and operational definitions of variables (Grove, Burns and Gray (2013: 200)). The researcher fostered construct validity by

ensuring that the population and sample was targeting the professional and enrolled nurses working at the PHC clinics in uThungulu District.

#### **4.12 RELIABILITY**

Reliability refers to the consistency of the measures obtained of an attribute, item or situation in a study or clinical practice (Grove, Burns and Gray 2013: 389). According to Polit and Beck (2012: 331), reliability of a quantitative instrument is a major criterion for assessing its quality. It also concerns accuracy. An instrument is reliable to the extent that its measures reflect true scores. Reliability exists in degrees and is expressed as a form of correlation coefficient, with 1.00 indicating perfect reliability and 0.00 indicating no reliability. There are three common types of reliability used in health care studies namely: a) stability reliability, b) equivalence reliability and c) internal consistency (Grove, Burns and Gray 2013: 389).

**Stability reliability** is concerned with the consistency of the repeated measures of the same attribute with the use of the same scale or instrument over time. This measure of reliability is commonly used with physical measures, technological measures and paper and pencil scales. The technique requires and assumption that the factor to be measured remains the same after two testing time and that any change in the score is a result of random error (Grove, Burns and Gray 2013: 389). Stability reliability was ensured by pretesting of the tool in order to refine questions so that participants extracted the information expected without being misunderstood.

**Equivalence reliability** compares two versions of the same paper and pencil instrument or two observers measuring the same event. Collation of two observers is referred to as inter-rater reliability (Grove, Burns and Gray 2013: 390). Comparison of two paper and pencil instruments is referred to as alternate forms reliability or parallel forms reliability. Alternate forms of instruments are imperative in the development of normative knowledge testing. However, when repeated measures are part of the design, alternative forms of

measurement would improve the design. The procedure for developing parallel forms involves using the same objectives and procedures to two same instruments. These two instruments when completed by the same group of participants. Participants on the same occasion or two different occasions should have approximately equal means and standard deviations. These two instruments should correlate equally with another variable (Grove, Burns and Gray 2013: 390). Equivalence reliability was not applied in this study; hence this is a quantitative research. Equivalence reliability is commonly used in qualitative research.

**Internal consistency** sometimes referred to as homogeneity. It is primarily used with paper and pencil tests or scales, address the correlation of various items within the instrument. The approach in determining internal consistency was split-half reliability. The instrument items were split in odd-even or first-last half and a correlational procedure was performed between the two halves. The problem with this procedure was that although items were usually split into odd-even items, it was possible to split them in a variety of ways. Each approach to splitting the items would yield a different reliability coefficient. Recently internal consistency testing examines the extent to which all the items in the instrument consistently measure a concept, for example Cronbach's alpha coefficient is the statistical procedure used for calculating internal consistency for interval and ratio level data. This reliability coefficient is essentially the mean of the inter-item correlations and can be calculated using version 23 of the SPSS (Grove, Burns and Gray 2013: 391).

#### **4.13 ETHICAL CONSIDERATIONS**

The research proposal was reviewed by the Faculty of Health Sciences Research and Higher Degrees Committee and received ethical clearance from Durban University of Technology Institutional Research Ethics Committee, ethical clearance number (17/16) DUT (Appendix 1). Permission was obtained from the KZN Department of Health (Appendix 3b) and from the King Cetshwayo District Office (Appendix 2b) prior to the study being conducted.

The research proposal and a letter requesting permission was forwarded to the Department of Health (Appendix 3a). The researcher through the use of letter of information, explained the research process to the participants (Appendix 4a) and written consents were obtained from the participants (Appendix 4b). Participants were informed that participation in the study is voluntary. In order to ensure anonymity and confidentiality of the participants, codes instead of names were used. Participants were informed that they have a right to withdraw from the study at any time without any penalty and to ask for clarification about the purpose of the study.

#### **4.13.1 Respect**

The right to self-determination is based on the ethical principle of respect for persons. This principle holds that humans are autonomous and are able to control their own destiny. They should be treated as autonomous agents who have the freedom to conduct their lives as they choose without external controls. The researcher treated the participants as autonomous agents by informing them about the proposed study and allowing them to participate voluntarily (Grove, Burns and Gray 2013: 164). In addition, participants had a right to withdraw from the study at any time without penalty. A participant's right to self-determination can be violated through the use of coercion. Coercion occurs when one intentionally presents another with an overt threat or harm or the lure of excessive reward to obtain his or her compliance (Grove, Burns and Gray 2013: 164). There was no coercion in this study. In order to avoid coercion, all participants were required to sign an informed consent form (Appendix 4b). The letter of information (Appendix 4a) was handed to the participants in order for them to understand the nature of the study. The participants could not be linked to the questionnaires because they were requested not to write their names on them.

#### **4.13.2 Beneficence**

Beneficence refers to the fact that researchers are required to do good and above all do no harm Grove, Burns and Gray (2013: 162). Researchers have an obligation to avoid, prevent, or minimize harm in studies with humans. Participants must not be subjected to unnecessary risks of harm or discomfort, and their participation must be essential to achieving scientifically and societally important aims. Research should be conducted by qualified people, especially if potentially dangerous equipment is used.

Ethical researchers must be prepared to terminate a study if they suspect that continuation would result in injury or undue stress to subjects. When a new medical procedure or drug is being tested. It is advisable to experiment with animals to avoid risks (Polit and Beck 2012: 152-153). According to Grove, Burns and Gray (2013:174), minimal-risk is referred to as a temporary discomfort which is the discomfort the subject would experience in his or her daily life and ceases with the termination of the study. The emotional or social risks might entail the anxiety or embarrassment associated with responding to sensitive questions. The participants were told that there was no foreseeable risk or discomfort as a result of participating in the study. The possible risk of participants feeling that they were incompetent when answering the questionnaire was overcome by ensuring that the questions on knowledge about prevention of MDR-TB were formulated using a Likert scale.

Protecting human rights from physical harm may be straight forward but, the psychological consequences of the study may be difficult to understand and require close monitoring and sensitivity. The example is that participants may be asked questions about their personal views and weaknesses. Such questions may lead people to reveal sensitive personal information. The need for sensitivity may be greater in qualitative studies, which often involve in-depth exploration on highly personal topics (Polit and Beck 2012: 153). Participants need to be assured that their participation or information they might provide, will not be used against them, for example if employees mention that, at work they

are oppressed, employees divulging that should not fear exposure to authorities (Polit and Beck 2012: 153).

#### **4.13.3 Justice**

Justice means that participants have a right to be treated fairly and their right to privacy (Polit and Beck 2012:155). Participant's selection should be based on study requirements and not on group's vulnerability. Some researchers selected groups with lower social standing for example prisoners as participants because the researcher is aware that, the prisoner is unable to protect himself or herself. The principle of justice imposes particular obligations towards persons who are unable to protect their own interests to ensure that they are not exploited (Polit and Beck 2012: 155). According to Polit and Beck (2012: 155-156), fair treatment principle means that researchers must treat people who decline to participate in a non-judgemental manner. Researchers must honour all agreements made with participants, that they demonstrate respect for the beliefs, habits and life style of people in diverse culture. Researchers should also ensure that their research is not more intrusive and that participant's privacy is maintained continuously.

The subjects have a right to anonymity and the right to assume that the data collected will be kept confidential. The researchers are unable to contact the subjects for additional information without special approval (Grove, Burns and Gray 2013:172). In this study the researcher kept all appointments and arrived on time. The participants showed enthusiasm in participating in this research study and were just glad to be included in this study. Participants felt so important. No promises of compensation were made.



## **4.14 ETHICAL PRINCIPLES AND RESEARCH FOR MULTINATIONAL CLINICAL RESEARCH**

The following are ethical principles and benchmarks for multinational clinical research used in developing countries.

### **4.14.1 Collaborative partnership**

A collaborative partnership between researchers and sponsors in developed countries and policy makers and communities in developing countries helps to minimize exploitation by ensuring that, a developing country decides for to itself whether the research is acceptable to the community's health problems. Six benchmarks are essential:

- Development of partnerships with researchers, makers of health policies and the community.
- Involvement of partners in sharing responsibilities for determining the importance of health problem.
- Respect for community's values, culture, traditions and social practices
- Develop the capacity for researchers, makers of health policies and the community to become full and equal partners in the research enterprise.
- Ensure that the recruited respondents and communities receive benefits from the conduct and results of research.
- Share fairly financial and other rewards of research.

### **4.14.2 Social value**

Ethical clinical research must have social value through generation of knowledge that can lead to improvements in health, without social value, research exposes participants to risks for no good reason and waste resources. Four benchmarks ensure social value:

- Specify the beneficiaries of research.
- Assess the importance of the health problems being investigated

- Enhance the value of the research for each of the beneficiaries through dissemination of knowledge, product development, long-term research collaboration and health system improvements.
- Prevent supplanting the extent health system infrastructure and services.

#### **4.14.3 Scientific validity**

Science and ethics do not conflict. Valid science is an ethical requirement. The three following benchmarks should be fulfilled:

The results should be useful in the context of the health problem in a developing country. Interventions should be selected to ensure that the design is useful in identifying effective interventions, implementing socially, culturally and economically appropriate changes in the health care system.

- The study design must realize the research objectives while neither denying health care services that respondents are entitled to nor requiring services that are not practical to deliver in the context of the country.
- The study must be feasible within the social, political and cultural environment, with sustainable improvements in the local health care and physical infrastructure.

#### **4.14.4 Fair respondents' selection**

Previously populations that were poor, illiterate were selected, for high risk research, whereas promising research was offered to more privileged individuals. Three benchmarks should be fulfilled:

- The study population should be selected to ensure valid science
- Selection of study population to minimize the risks of research, for example selecting a population for an HIV vaccine study, a community that does not discriminate against HIV infected individuals.
- Identification and protection of vulnerable populations.

#### **4.14.5 Favourable risk-benefit ratio**

All clinical research should offer respondents a favourable risk- benefit ratio.

Two benchmarks specific to developing countries apply:

- The risk-benefit ratio for individuals must be favourable in the environment in which they live. When respondents confront a higher risk of disease, greater potential benefits may justify greater risks in research design.
- The risk-benefit ratio for the community should be favourable. The risks and potential benefits for the community, such as increased antibiotic resistance or collection of sensitive information must be specified.

#### **4.14.6 Independent reviews**

- In multinational research, there is a special need for transparency. Transparency enhances accountability by assuring the public that the research is not exploitative.
- Ensure independence and competence of the reviews.

#### **4.14.7 Informed consent**

- Involvement of the community in establishing recruitment procedures and incentives that are consistent with cultural, political, and social practice.
- Disclosure of information should be sensitive to the local context. It should be done using the local language.
- Obtain consent in culturally and linguistically appropriate formats.

#### **4.14.8 Respect for recruited respondents**

- Provide respondents with information that arises in the course of research study.
- Monitor and develop interventions, for medical conditions, including research related injuries.

- Inform respondents and the study community about the results of research.

#### **4.15 SUMMARY OF THE CHAPTER**

This chapter deliberated on the research methodology and ethical considerations and. The following chapter will present the results of the study.

## **CHAPTER 5**

### **PRESENTATION OF RESULTS**

#### **5.1 INTRODUCTION**

The previous chapter outlined the methodology adopted in conducting the study. The data collection instrument was based on the practice of nurses in the prevention of MDR-TB. This chapter will present the findings that were gathered from data analysis. The data was analyzed and organized in alignment with the research objectives.

#### **5.2 RESEARCH INSTRUMENT**

The research instrument consisted of three sections:

- The first section entails the demographic data (Questions required demographic information of respondents' age, staff category, highest qualification, gender and years of experience).
- The second section addresses the factors which affect the performance of nurses in the control of TB (Questions required the respondents to indicate if they had attended short courses in TB, the staff to indicate the category of patients admitted if they are admitted, the staff to indicate the maximum number of patients the unit can accommodate. The other questions covered the knowledge of measures to prevent transmission of infection. The Likert scale options of choice included strongly agree, agree, neutral, disagree and strongly disagree).
- The third section pertains to the factors influencing the prevention of MDR-TB (Questions covered tracing of patients who interrupted TB treatment, giving of prophylactic treatment and giving of health education to patients).

### **5.3 PRESENTATION OF THE RESULTS**

The following statistical tests were used to analyze data:

- Descriptive statistics including means and standard deviations, where applicable. Frequencies are represented in tables or graphs (Grove, Burns and Gray 2013: 538).
- Chi-square goodness-of-fit-test: A univariate test, used on a categorical variable to test whether any of the response options are selected significantly more/less often than the others. Under the null hypothesis, it is assumed that all responses are equally selected (Grove, Burns and Gray 2013: 587-588).
- Chi-square test of independence: It is used on cross-tabulations to determine whether a significant relationship exists between the two variables represented in the cross-tabulation. When conditions are not met Fisher's exact test is used (Grove, Burns and Gray 2013: 587-588).
- Spearman's correlation: This measures how variables or rank orders are related (Grove, Burns and Gray 2013: 564).
- One sample t-test: It tests whether a mean score is significantly different from a scalar value.
- Independent samples t-test: A test that compares two independent groups of cases (Grove, Burns and Gray 2013: 586).

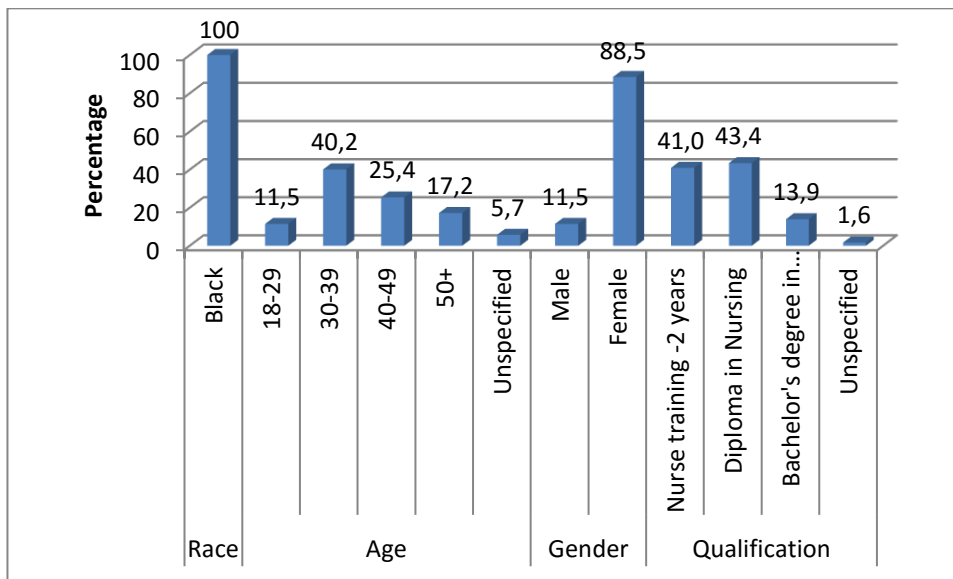
### **SECTION A**

This section deals with the participant's demographic data. The sections that follow present findings with regards to this.

## 5.4 DEMOGRAPHICS

### 5.4.1 Race, Age, gender and qualification

Figure 5.1 shows that the sample consisted of one race. Age of respondents ranged from 18-50 and above. Both males and females were part of the study sample, which consisted of 88.5% (n=108) and 11.5% (n=14) males. The age groups of respondents were as follows, 11.5% (n=14) were in the 18-29 years, 40.2% (n=49) were in the 30-39 years' age group, 25.4% (n=31) were in the 40-49 years' age group and 17.2% (n=21) were in 50+ years of age group. The qualifications of respondents in the study were as follows: 41.0% (n=50) had a nurse training for 2 years, 43.4% (n=53) had a Diploma in Nursing and 13.9% (n=17) had Bachelor's Degree in Nursing. Nobody had an Honours' Degree.



**Figure 5.1: Race, age, gender, and qualification (n=122)**

### 5.4.2 Nursing category and experience

Figure 5.2 indicates that 45.9% (n=56) of the sample had less than 5 years' experience followed by 43.4% (n=53) having 5-10 years' experience, 6.6% (n=8) having 11-15 years' experience, 1.6% (n=2) having 16-20 years' experience and .8% (n=1) having above 25 years' experience. The table shows that 57.4% (n=70) are professional nurses and 42.6% (n=52) are enrolled nurses.

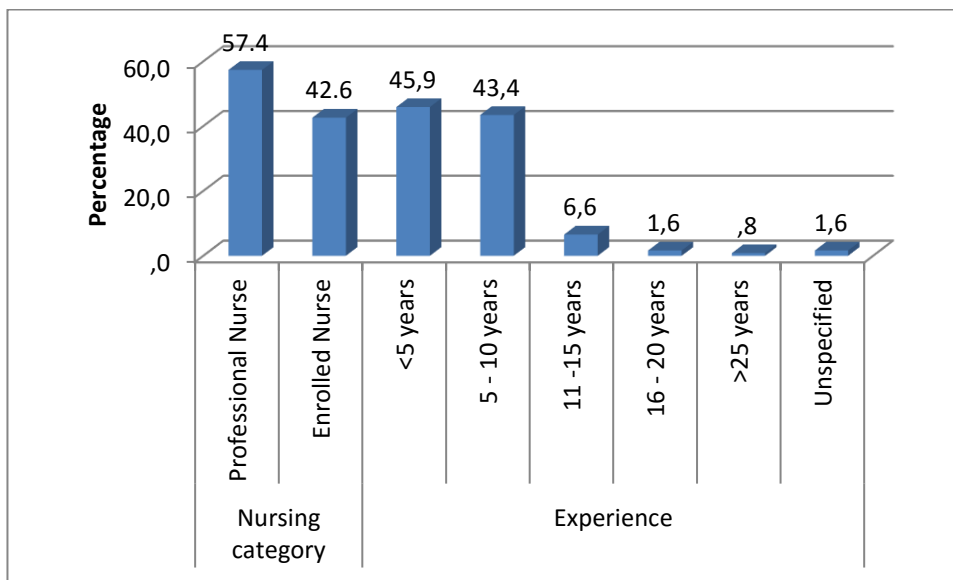


Figure 5.2: Nursing category and experience (n=122)

## SECTION B: FACTORS WHICH AFFECT THE PERFORMANCE OF NURSES IN THE CONTROL OF TB

The second section pertains to the factors which affect the performance of nurses in the control of TB (Questions required the respondents to indicate if they had attended short courses in TB, the staff to indicate the category of patients admitted if they are admitted, the staff to indicate the maximum number of patients the unit can accommodate. The other questions covered the knowledge of measures to prevent transmission of infection.



## 5.5 ATTENDANCE OF SHORT COURSES IN TB

Table 5.1 outlines that of 122 respondents, 66.4% (n=81) answered 'Yes' that they attended short courses in TB, 32.8% (n=40) answered 'No' that they did not attend short courses in TB and .8% (n=1) did not answer the question. Analysis (chi-square goodness of fit test) outlines that, a significant number indicated that they have attended short courses in TB ( $\chi^2(1)=13.893$ ,  $p=0.0005$ ).

**Table 5.1: Attendance of short courses in TB (n=122)**

		Frequency	Percent
Valid	Yes	81	66.9
	No	40	32.8
	Total	121	99.2
Missing	System	1	.8
<b>Total</b>		<b>122</b>	<b>100.0</b>

## 5.6 CATEGORY OF PATIENTS ADMITTED IN THIS UNIT

Table 5.2 specifies that of 120 respondents 82% (n=100) selected the option that they attended to both confirmed and unconfirmed TB patients, 13.1% (n=16) attended to only confirmed TB patients, 3.3% (n=4) attended to only unconfirmed TB patients and 1.6% (n=2) did not answer this question. Analysis (chi-square goodness of fit test) show that a significant number indicated that they attended to both confirmed and unconfirmed TB patients ( $\chi^2(1)=136.800$ ,  $p<0.0005$ ).

**Table 5.2: Category of patients admitted in this unit (n=122)**

		<b>Frequency</b>	<b>Percent</b>
Valid	Only confirmed TB patients	16	13.1
	Only unconfirmed TB patients	4	3.3
	Both confirmed and unconfirmed TB patients	100	82.0
	Total	120	98.4
Missing	System	2	1.6
Total		122	100.0

## 5.7 MAXIMUM NUMBER THE UNIT CAN ACCOMMODATE

Table 5.3 outlines that of 122 respondents 17.2% (n=21) chose option 1, 14.8% (n=18) chose option 2, 15.6% (n=19) chose option 3, 29.5% (n=36) chose option 4 and 16.4% (n=20) chose option 5. Analysis (chi-square goodness of fit test) show that a significant number indicated that unit can take between 26 and 40 patients ( $\chi^2 (1) = 9.772^a$ ,  $p = .044$ ).

**Table 5.3: Maximum number the unit can accommodate (n=122)**

		<b>Frequency</b>	<b>Percent</b>
Valid	Up to 15	21	17.2%
	16-20	18	14.8%
	21-25	19	15.6%
	26-40	36	29.5%
	Greater 40	20	16.4%
	Total	114	93.4%
Missing	System	8	6.6%
<b>Total</b>		<b>122</b>	<b>100.0</b>

## 5.8 DESCRIPTIVE STATISTICS

Table 5.4 shows that nurse patient ratio had a minimum of 1.0 and a maximum of 90.0, mean which was 19.534 and standard deviation was 28.5034.

**Table: 5.4 Descriptive statistics**

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Nurse: patient	87	1.0	90.0	19.534	28.5034

## SECTION C

The third section pertains to the factors influencing the prevention of MDR-TB (Questions covered tracing of patients who interrupted TB treatment, giving prophylactic treatment and giving of health education to patients).

### 5.9 MEASURES TO PREVENT TRANSMISSION IN-BETWEEN PATIENTS

Figure 5.3 indicates that 48.4% (n=59) of the respondents agreed that they were able to cope with the workload in the unit, whilst 11.5% (n=14) strongly agreed, 13.9% (n=17) were neutral, 16.4% (n=20) disagreed and 7.4% (n=9) strongly disagreed that they were able to cope with the work load in the unit. Analysis using one sample-t-test shows that there is significant agreement ( $M=3.41\%$ ) that respondents were able to cope with the workload ( $t(118)=3.973, p<.0005$ ).

The results further outlines that 35.2% (n=43) of respondents agreed that there were enough resources with regard to the prevention of infection in TB ward, whilst 14.8 (n=18) strongly agreed, 8.2% (n=10) were neutral 34.4% (n=42) disagreed, 6.6% (n=8) strongly disagreed. Analysis using a one sample-t-test shows that, resources for preventing infection were not enough ( $t(120)=1.536, p .127$ ).

The results further indicated that 45.9% (n=60) of respondents agreed, 1.6% (n=2) disagreed .8% (n=1) strongly disagreed and 2.5% (n=3) missing. Analysis using a one sample-t-test shows that there is significant agreement ( $M=4.41\%$ ) that measures were taken to prevent transmission of infection between patients ( $t(118)=23.018, p<.0005$ ).

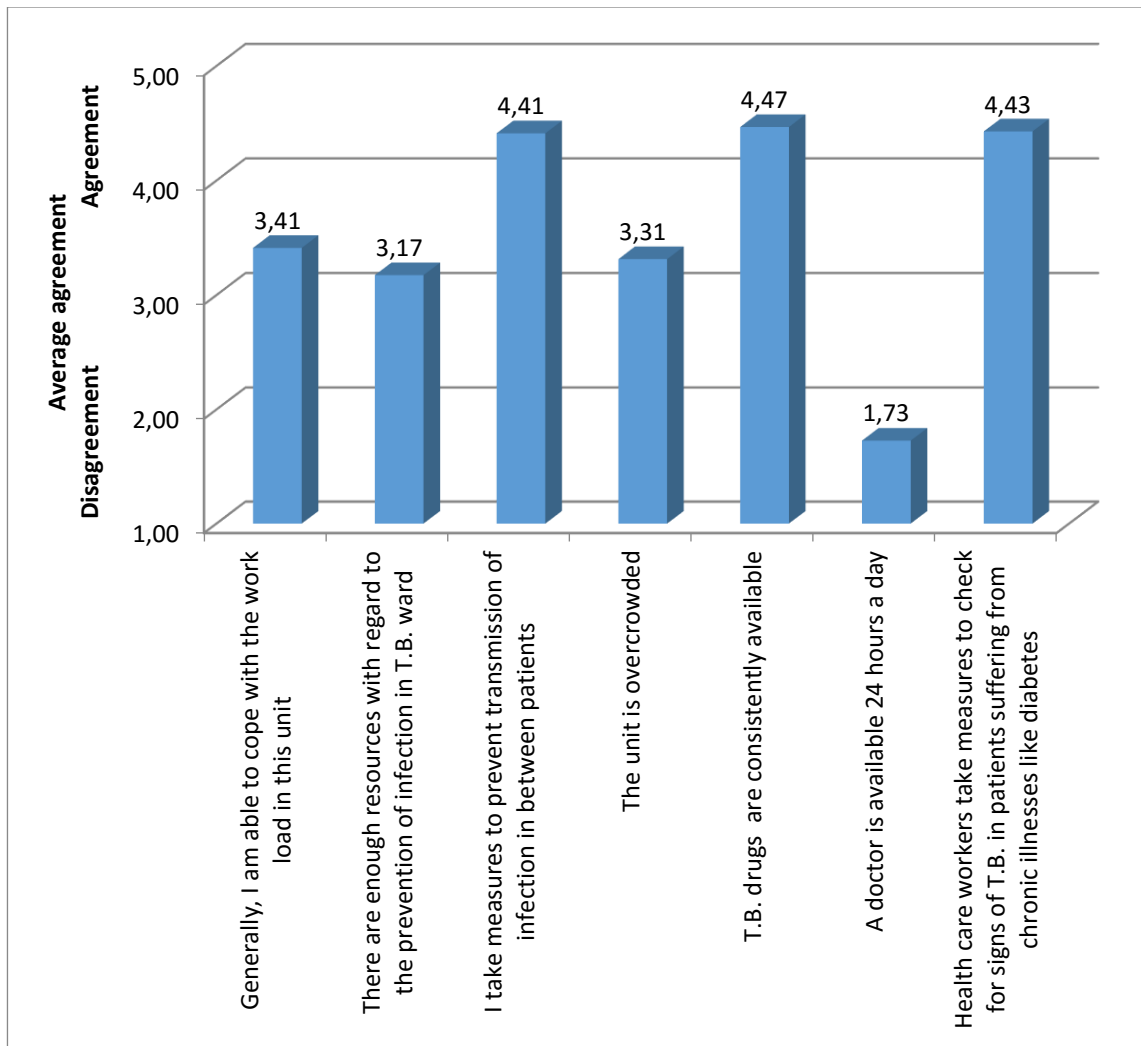
The results of the study further specify that 37.7% (n=21) of respondents strongly agreed that the unit was overcrowded, 9.0 (n=11) were neutral, 23.8% (n=29) disagreed, 9.0% (n=11) strongly disagreed and 3.3% (n=4) were missing. Analysis

using a one sample-t-test shows that there is significant agreement ( $M=3.31\%$ ) that the unit was overcrowded ( **$t(117)=2.663, p<.009$** ).

The results of the study outlines that, 51.6% ( $n=63$ ) of respondents strongly agree that drugs were consistently available, 44.3% ( $n=54$ ) agree, .8 ( $n=1$ ) neutral, 1.6 ( $n=2$ ) strongly agree and 1.6% ( $n=2$ ) missing. Analysis using one sample-t-test shows that there is significant agreement ( $M=4.47$ ) that the drugs were consistently available ( **$t(119)=23.449, p<.0005$** ).

The results of the study indicated that 62.3 ( $n=76$ ) strongly disagree that the doctor was available 24 hours a day, whilst 18.0 ( $n=22$ ) disagree, 6.6 ( $n=8$ ) were neutral, 8.2 ( $n=10$ ) agree, 4.1 ( $n=5$ ) strongly agree and .8 ( $n=1$ ) missing. Disagreement because mean is less than 3. Analysis using one sample-t-test shows that there is disagreement (Mean=1.73%) that the doctor was not available 24 hours a day ( **$t(120)=-12.124, p<.0005$** ).

The results describe that 54.1% ( $n=66$ ) strongly agreed that, HCWs took measures to check for signs of TB in patients suffering from chronic illnesses like diabetes, whilst 36.9% ( $n=45$ ) agree, 2.5% ( $n=3$ ) were neutral, 1.6% ( $n=2$ ) strongly disagree and 2.5% ( $n=3$ ) missing. Analysis using a one sample-t-test shows that there is significant agreement ( $M=4.43$ ) that HCWs took measures to check for signs of TB in patients suffering from chronic illnesses like diabetes ( **$t(118)=19.276, p<.0005$** ).



**Figure 5.3 Measures to prevent transmission in-between patients**

## **5.10 PREVENTIVE MEASURES**

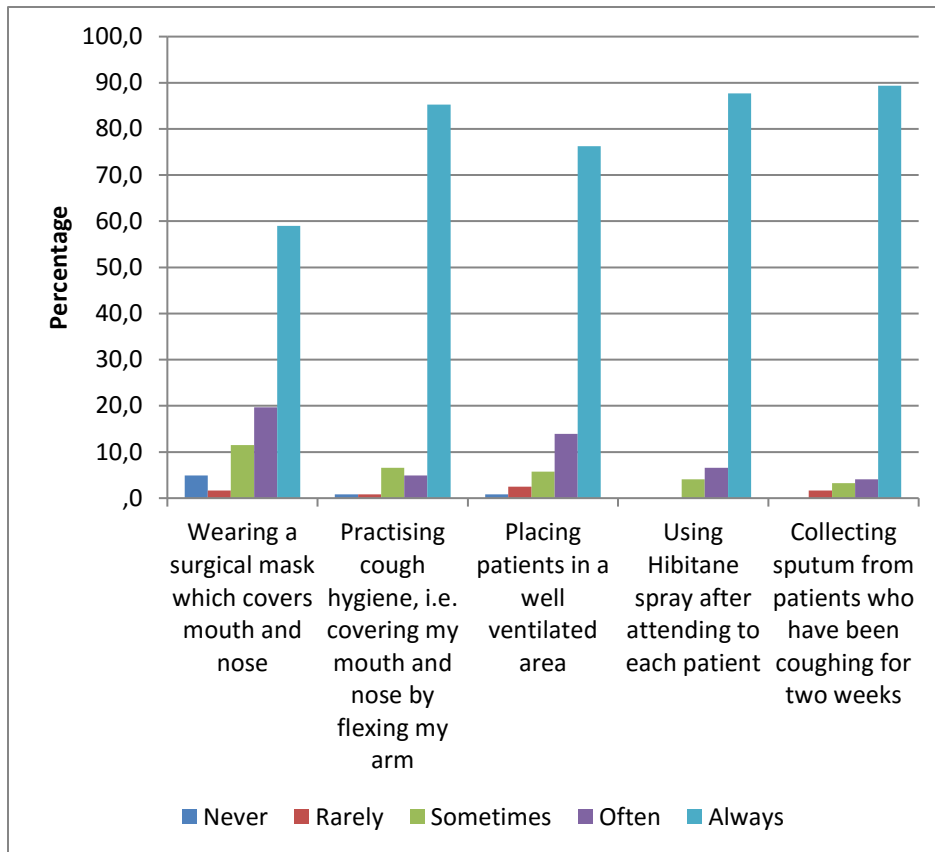
Figure 5.4 specifies that 59.0% (n=72) of the respondents chose 'always' that they were wearing N95 mask that covers mouth and nose to prevent infection, whilst 19.7%% (n=24) chose often, 11.5% (n=14) chose sometimes, 1.6% (n=2) chose rarely, 4.9% (n=6) chose never and 3.3% (n=4) missing. Test chi-square goodness of fit, test shows that, a significant number responded 'always' to this question (**n=122**) (**x<sup>2</sup> (4)=136.068a, p<.0005**).

Figure 5.6 indicated that 85.2% (n=104) of respondents chose 'always' that they were practicing cough hygiene i.e. covering mouth and nose by flexing the arm, whilst 4.9% (n=6) chose often, 6.6% (n=8) chose sometimes, .8% (n=1) chose rarely, .8% (n=1) chose never and 1.6% (n=2) missing. Test chi-square goodness-of-fit, test shows that, a significant number responded 'always' to this question **(n=118) (x2 (4)=334.917b,p<.0005).**

Figure 5.6 specifies that 76.2% (n=93) of the respondents chose 'always' that they were placing patients in a well-ventilated area. 13.9% (n=17) chose often, 5.7% (n=7) chose sometimes, 2.5 % (n=3) chose rarely, .8% (n=1) chose never and .8% (n=1) missing. Test chi-square goodness-of-fit, test shows that, a significant number responded 'always' to this question **(n=120) (x2 (4)=250.777c,p<.0005).**

Figure 5.6 describes that, 98.4% (n=120) of respondents chose 'always' that they were using hibitane spray after attending to each patient, whilst 6.6% (n=8) chose often, 4.1% (n=5) chose sometimes and 1.6% (n=2) missing. Test chi-square-goodness-of-fit shows that a significant number responded 'always' to this question **(n=122) (x2 (4)=360.750b,p<.0005).**

Figure 5.6 shows that 89.3% (n=109) of respondents chose 'always' that they were collecting sputum from patients who have been coughing for two weeks, whilst 4.1% (n=5) chose often, 3.3% (n=4) chose sometimes, 1.6% (n=2) chose rarely and 1.6 % (n=2) missing. Test chi-square-goodness-of-fit shows that, a significant number responded 'always' to this question **(n=122) (x2 (4)=376.917b,p<.0005).**

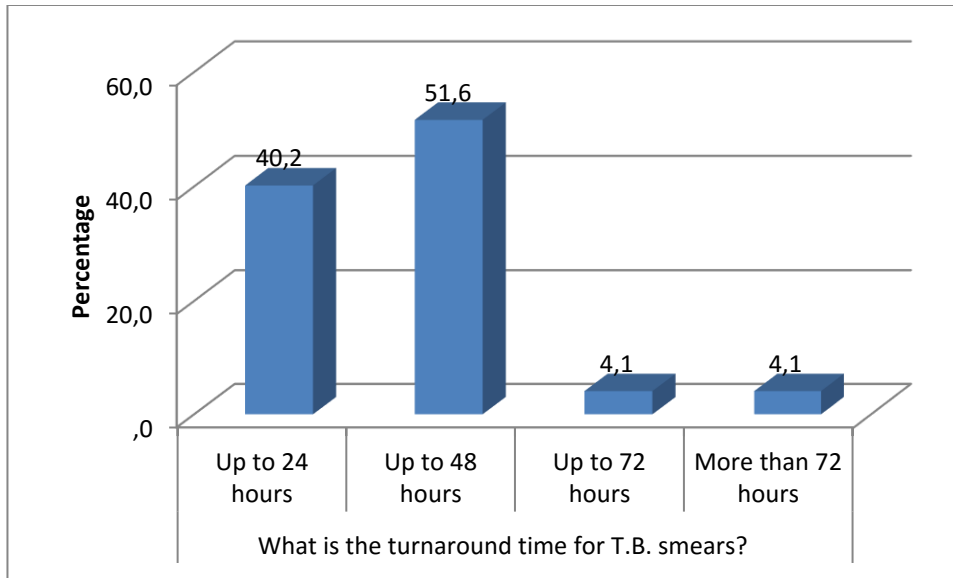


**Figure 5.4 Preventive measures**

### 5.11 TURNAROUND TIME FOR TB SMEARS

Figure 5.5 indicated that 51.6% (n=63) of participants chose up to 48 hours, answering the turnaround time for TB smears, whilst 40.2% (n=49) chose up to 24 hours, 4.1% (n=5) chose up to 72 hours and 4.1% (n=5) chose more than 72 hours. Test-chi-square goodness of fit specifies that there is significant agreement ( $n=122$ )=88.492<sup>a</sup> $p<.0005$ ).

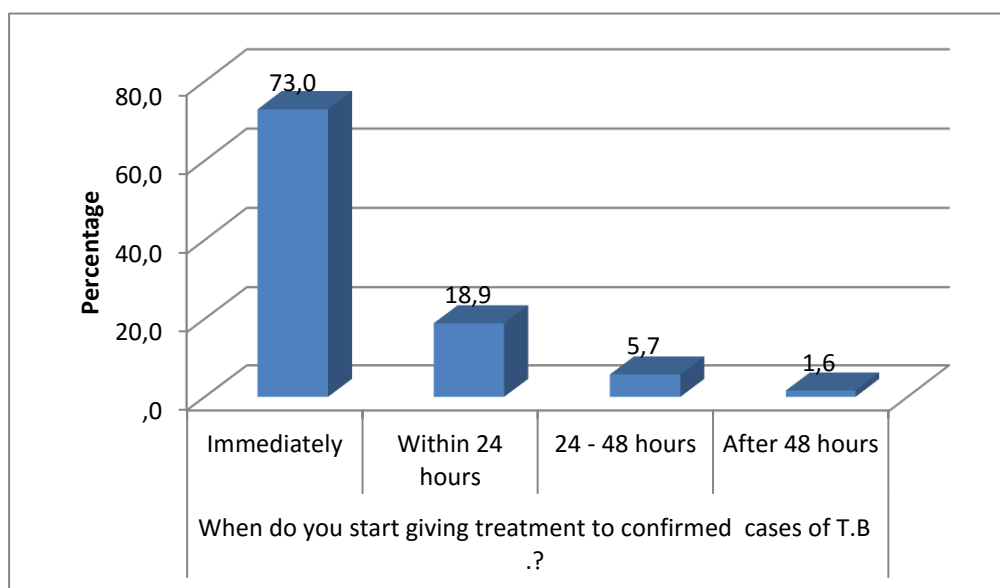




**Figure 5.5: Turnaround time for TB smears**

## **5.12 STARTING TIME FOR GIVING TB TREATMENT**

Figure 4.8 indicated that 73.0% (n=89) of respondents chose immediately indicating the time for starting medication to confirmed cases of TB whilst 18.9 % (n=23) chose within 24 hours, 5.7% (n=7) chose 24-48 hours, 1.6% (n=2) chose after 48 hours and .8% (n=1) missing. Test-chi-square goodness of fit shows that there was significant agreement that medication is commenced within 48 hours (n=122)=160.091<sup>a</sup>, p<.0005).



**Figure 5.6 Starting time for giving T.B. treatment**

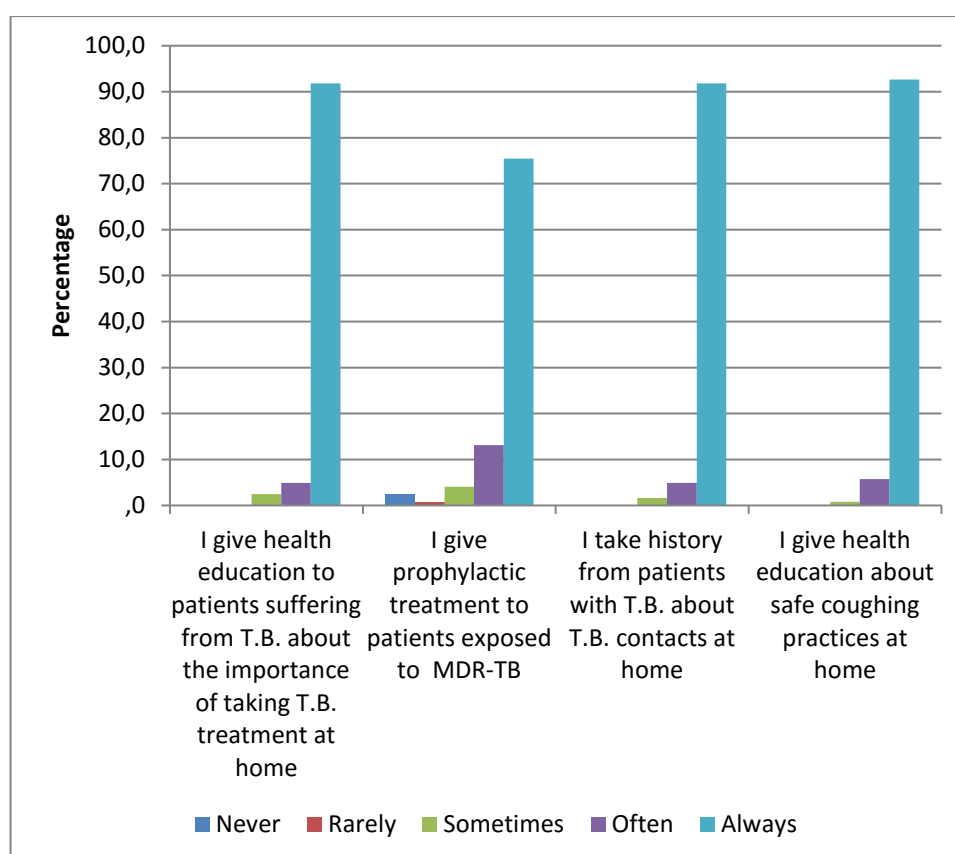
### **5.13 FACTORS INFLUENCING PREVENTION OF MDR-TB**

Figure 5.7 indicates that 91.8% (n=112) of the respondents chose 'always' that they were giving health education to patients suffering from T.B. about the importance of taking T.B. treatment at home, whilst 4.9% (n=6) chose often, 2.5% (n=3) chose sometimes and .8% (n=1) missing. Test chi-square-goodness-of-fit shows that a significant number responded always **399.207<sup>a</sup>.p<.0005**).

Figure 5.7 shows that 75.4% (n=92) of the respondents chose 'always' that they were giving prophylactic treatment to patients exposed to MDR-TB, whilst 13.1% (n=16) chose often, 4.1% (n=5) chose sometimes, .8% (n=1) chose rarely, 2.5% (n=3) chose never and 4.1% (n=5) missing. Test chi-square-goodness-of-fit shows a significant number responded always that nurses were giving prophylactic treatment to patients exposed to MDR-TB. **257<sup>a</sup>.145.p<.0005**).

Figure 5.7 depicts that 91%. (n=112) of respondents chose 'always' that they were taking history from patients with TB about TB contacts at home, whilst 4.9% (n=6) chose often, 1.6% (n=2) chose sometimes and 1.6% (n=2) missing. Test chi-square-goodness-of-fit shows a significant number responded always that respondents were taking history from patients with TB about TB contacts at home **404.333<sup>a</sup>.p<.0005**).

Figure 5.7 depicts that 92.6% (n=113) of the respondents chose 'always' that they were giving health education about safe coughing practice at home, whilst 5.7% (n=7) chose often, .8% (n=1) chose sometimes and .8% (n=1) missing. Chi-square-goodness of fit shows a significant number responded always that respondents were giving health education about safe coughing practices at home **408.711<sup>a</sup>.p<.0005**).

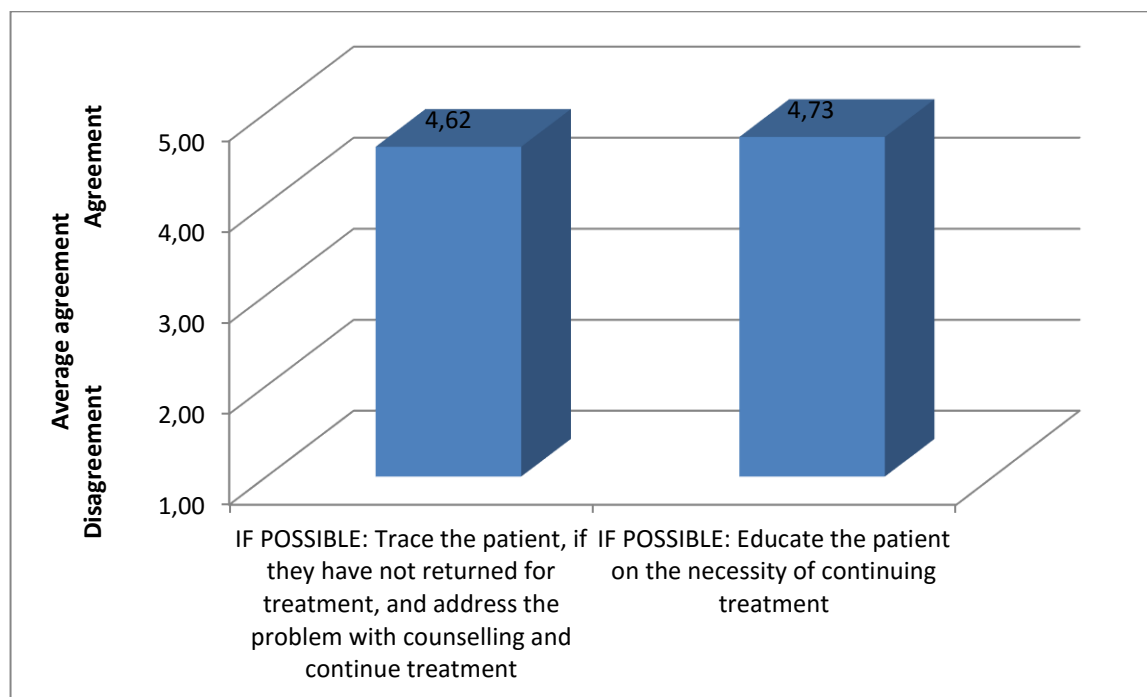


**Figure 5.7: Factors influencing prevention of MDR-TB**

## 5.14 MEASURES TAKEN WHEN PATIENT INTERRUPTS TREATMENT

Figure 5.8 shows that 67.2% (n=82) of the respondents strongly agree that they were tracing the patients, if they have not returned for treatment, and address the problem with counselling and continue treatment, whilst 27.9% (n=34) agree, .8% (n=1) were neutral, 2.5% (n=3) and 1.6% (n=2) missing. Analysis using one sample-t-test shows that there is a significant agreement (M=4.63%) that are traced who have not returned for treatment ( $t(119)=27.992.p<.0005$ ).

Figure 5.8 shows that 73.8% (n=90) of the respondents strongly agree that they educate patients on the necessity of continuing treatment, whilst 23.8% (n=29) agree, .8% (n=1) disagree and 1.6% (n=2) missing. Analysis using one sample-t-test shows that there is significant agreement (M=4.73%) that respondents educated patients on the necessity of continuing treatment. ( $t(119)=38.158.p<.0005$ ).



**Figure 5.8: Measures taken when patient interrupts treatment**

## 5.15 BENEFITS OF CONTACT TRACING

Table 5.5 represents different responses from respondents

- Category1: (38.5%) respondents stated that, early diagnosis of TB and identification of suspects were important in order to achieve successful treatment outcomes.
- Category 2: (70.1%) respondents highlighted the importance of preventing the spread of TB and infection control in hospital and at home.
- Category 3: (35.4%) respondents indicated the importance of early initiation of treatment in patients diagnosed with TB.
- Category 4: (33.6%) respondents stated the importance of promoting adherence to treatment.
- Category 5: (15.8%) respondents suggested giving of prophylactic treatment to contacts of TB patients.
- Category 6: (15.3%) respondents indicated the importance of preventing MDR-TB
- Category 7: (4.8%) respondents suggested the patient's residence should be known by the nurses so that it will be easy to locate patients

**Table 5.5: Benefits of contact tracing**

Category 1	Category 2	Category 3	Category 4	Category 5	Category 6	Category 7
Early Diagnosis of TB and identification of suspects	Importance of preventing the spread of TB and infection control	Early initiation of treatment in patients diagnosed with TB	Promoting adherence to treatment	Prophylactic treatment	Prevention of MDR-TB	Patient's where about.
<b>Total=3</b>	<b>66</b>	<b>34</b>	<b>31</b>	<b>18</b>	<b>14</b>	<b>5</b>

## 5.16 Benefit contact tracing

Table 5.6 represents different responses from participants

- Category 8: (4.8%) respondents indicated the importance of supporting the patient and family during the treatment process.
- Category 9: (4%) respondents stated the importance of increasing the treatment outcomes.
- Category 10: (12.1%) respondents highlighted it is important to prevent death in patients suffering from TB.
- Category 11: (4.8%) respondents suggested the importance of reducing the number of TB cases.
- Category 12: (5.6%) of respondents mentioned the benefit of giving health education to patients and community.
- Category 13: (2.4%) of respondents suggested the benefit of monitoring the patients closely when on treatment.
- Category 14: (1.6%) of respondents supported the importance of encouraging the patients to keep appointments.
- Category 15: (2.4%) of participants indicated the importance of tracing of contacts.

**TOTAL=251.2%**

**Table 5.6: Benefits of contact tracing**

Cat 8	Cat 9	Cat 10	Cat 11	Cat 12	Cat 13	Cat 14	Cat 15
Prevent death	Support the patient and family	Increase in treatment outcomes	Reduce TB cases	Give health education	Monitor the patient closely	Keeping of appointment	Tracing of patients
<b>Total=5</b>	<b>Total=5</b>	<b>Total=5</b>	<b>Total=4</b>	<b>Total=7</b>	<b>Total=3</b>	<b>Total=2</b>	<b>Total=2</b>

Cat=Category

### 5.17 ONE-SAMPLE TEST

Figure 5.10 indicates that 93.4% (n=114) of the respondents strongly agreed that T.B. training was important in the management of T.B., whilst 4.9 % (n=6) agreed, .8% (n=1) were neutral and .8% (n=1) disagreed. Mean=4.91% which is significant agreement because it is above 3 (**t(122=54.681.p<.0005)**).

The results further revealed that 82.8% (n=101) of the respondents strongly agreed that they were giving health education about healthy eating, whilst 15.6% (n=19) agreed, 1.6% (n=2) were neutral. Mean=4.81% which is significant agreement because it is above 3 (**t(122=46.231.p<.0005)**).

The results of the study further showed that 82%. (n=101) of the respondents strongly agreed that they were giving health education about avoiding smoking, whilst 15.6% (n=19) agreed, .8% (n=1) were neutral and .8% (n=1) missing. Mean= 4.83% which is significant agreement because it is above 3 (**t(121=49.396.p<.0005)**).

The results revealed that 82.8% (n=101) of respondents strongly agreed that they were giving health education about avoiding alcohol, whilst 16.4% (n=20) agree and .8 (n=1) were neutral. Mean=4.8% which is significant agreement because it is above 3 (**t(122=49.396.p<.0005)**).

The results indicated that 73.8% (n=90) of participants strongly agreed that they were giving health education to family members accompanying a relative with TB whilst 23.8% (n=29) agreed, .8% (n=1) were neutral, .8% (n=1) disagreed and .8% (n=1) missing. Mean=4.72 which is significant agreement because it is above 3 (**t(121=36.365.p<.0005)**).

The results specified that 86.9% (n=106) of respondents strongly agreed that, health education to the community is important for the prevention of MDR-TB, whilst 12.3% (n=15) agreed and .8% (n=1) missing. Mean=4.88 which is significant agreement because it is above 3 (**t(120=62.362.p<.0005)**).

**Table 5.7: One-sample test**

	<b>T</b>	<b>Df</b>	<b>Sig. (2-tailed)</b>	<b>Mean difference</b>
I think T.B. training is important in the management of TB.	54.681	121	.000	1.910
I give health education to patients about healthy eating.	46.231	121	.000	1.811
I give health education to patients about avoiding smoking.	50.025	120	.000	1.826
I give health education to patients about avoiding alcohol.	49.396	121	.000	1.820
I give health education to family members accompanying a relative with TB.	36.365	120	.000	1.719
Health education to the community is important for the prevention of MDR-TB.	62.362	120	.000	1.876

**5.18 CHI-SQUARE TEST**

The results further show that, 63.4% (n=45) of professional nurses attended short courses in TB and 70.6% (n=36) of enrolled nurses attended short courses in TB. 35.7% (n=25) of professional nurses and 29.4% (n=15) of enrolled nurses did not attend short courses. There is a significant relationship between professional nurses and enrolled nurses. Professional nurses have higher level of qualification than enrolled nurses, more than expected, more professional nurses attended courses in TB than enrolled nurses.



**Table 5.8: Attendance of short courses**

			2.1 Have you attended any short courses in TB?		Total
			Yes	No	
Category	Professional Nurse	Count	45	25	70
		% within Category	64.3%	35.7%	100.0%
	Enrolled Nurse	Count	36	15	51
		% within Category	70.6%	29.4%	100.0%
Total	Count	81	40	121	
	% within Category	66.9%	33.1%	100.0%	

### 5.19 CHI-SQUARE TESTS

The results showed that 37% (n=30) of respondents with less than 5 years' experience had attended short courses in T.B., 49.4% (n=40) of participants between 5-10 years' experience attended short courses, 9.9% (n=8) of participants between 11-15 years' experience had attended short courses, .5% (n=2) of respondents between 16-20 years' experience have attended short courses and .4% (n=1) of respondents have attended short courses. There is a significant relationship between experience and attending courses, Chi-Square test of independence is applied (Pearson=12.450, p=007).

The results show that 68.4% (n=26) of respondents less than 5 years' experience, have not attended short courses in TB and 31.6% (n=12) of participants between 5-10 years' experience, had not attended courses. There is a significant relationship between years of experience and having attended short courses (**Fisher's = 11.790, p=.007**). More than expected of those with less than 5 years' experience had not attended short courses.

**Table 5.9: Chi-Square**

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	15.555 <sup>a</sup>	3	.001	.001		
Likelihood Ratio	15.937	3	.001	.002		
Fisher's Exact Test	14.998			.002		
Linear-by-Linear Association	13.505 <sup>b</sup>	1	.000	.000	.000	.000
N of Valid Cases	114					

## 5.20 CHI-SQUARE TESTS

The results showed that 5.2% (n=4) of respondents aged between 18-29 years had attended short courses in TB., 40.3% (n=31) of participants aged between 30-39 years had attended courses, 29.9% (n=23) of participants between the ages 40-49 years had attended short courses and 24.7% (n=19) of participants above age 50 had attended short courses in TB.

The results further revealed that 27.0% (n=10) of respondents between the ages 18-29 had not attended short courses, 45.9% (n=17) of participants between ages 30-39 had not attended short courses in TB, 21.6% (n=8) of respondents between the ages 40-49 had not attended short courses in TB and 5.4% (n=2) of respondents above age 50 had not attended short courses in TB.

There is a significant relationship between age and having attended short courses ( $\chi^2 (3) = 15.555, p=.001$ ). More than expected of the 18-29 year olds had not attended short courses, while more than expected of the 50+ age group had attended short courses.

## 5.21 CHI-SQUARE TESTS

The results showed that 4.9% (n=4) of male respondents had attended short courses in T.B. and 95.1% (n=77) of female had attended short courses in TB, 22.5% (n=9) of male respondents had not attended short courses in TB and 77.5% (n=31) of female respondents had not attended short courses in T.B. Analysis (chi-square goodness-fit) shows that this is a significant result ( $\chi^2$  (n=121)=8.612<sup>a</sup>, p=.005).

**Table 5.10**

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	8.612 <sup>a</sup>	1	.003	.005	.005	
Continuity Correction <sup>b</sup>	6.878	1	.009			
Likelihood Ratio	8.035	1	.005	.009	.005	
Fisher's Exact Test				.009	.005	
Linear-by-Linear Association	8.541 <sup>c</sup>	1	.003	.005	.005	.005
N of Valid Cases	121					

## 5.22 CHI-SQUARE TESTS

The results showed that 48.5% (n=33) of professional nurses chose 'always' that they always wear N95 mask which covers the mouth and nose, whilst 27.9% (n=19) chose 'often' 14.7% (n=10) chose 'sometimes', 1.5% (n=1) chose 'rarely' and 7.4% (n=5) chose 'never'.

The results showed that 78.0% (n=39) of enrolled nurses chose 'always' that they always wear a surgical mask which covers mouth and nose, 10.0% (n=5) chose 'often', 8.0% (n=4) chose 'sometimes', 2.0% (n=1) chose 'rarely' and 2.0% (n=1) chose 'never'. Analysis (chi-square goodness-of-fit) shows that this is significant results ( $\chi^2$  (n=118)=11.425<sup>a</sup>, p=.015).

**Table 5.11: Chi-Square Tests**

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	11.425 <sup>a</sup>	4	.022	.015		
Likelihood ratio	12.019	4	.017	.023		
Fisher's Exact Test	11.417			.012		
Linear-by-linear association	6.444 <sup>b</sup>	1	.011	.011	.006	.002
N of valid cases	118					

### 5.23 CHI-SQUARE TESTS

The results indicated that 82.6% (n=57) of professional nurses chose 'always' that they were using hibitane spray after attending to each patient whilst 11.6% (n=8) chose 'often' and 5.8% (n=4) chose 'sometimes'.

The results indicated that 98.0% (n=50) of enrolled nurses chose 'always', and -.8 (n=1) chose 'sometimes'. Analysis shows that there is a significant relationship between professional nurses and enrolled nurses because a high percentage of enrolled nurses were using hibitane spray after attending to each patient (**Fisher's Exact test =8.023,p=.009**).

**Table 5.12 Chi-Square Tests**

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.732 <sup>a</sup>	2	.021	.016		
Likelihood Ratio	10.766	2	.005	.007		
Fisher's Exact Test	8.023			.009		
Linear-by-Linear Association	5.120 <sup>b</sup>	1	.024	.025	.015	.012
N of Valid Cases	120					

a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is 2.13.

b. The standardized statistic is 2.263.

## 5.24 CHI-SQUARE TESTS

The results showed that 100% (n=49) of respondents who chose 'always' that they always use hibitane spray after attending to each patient had undergone nurse training for 2 years, 80.8% (n=42) of respondents who chose 'always' had a Diploma in Nursing whilst 11.5% (n=6) chose often and 7.7% (n=4) chose 'sometimes'. 88.2% (n=15) who chose 'always' had a Bachelor of Nursing degree and 11.8% (n=2) chose 'often'. There is a significant relationship between qualifications and using hibitane spray after attending to each patient (**Fisher's Exact test=11.489<sup>a</sup>, p=.007**).

**Table 5.13: Chi-Square Tests**

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	11.803 <sup>a</sup>	4	.019	.019		
Likelihood Ratio	16.182	4	.003	.003		
Fisher's Exact Test	11.489			.007		
Linear-by-Linear Association	3.757 <sup>b</sup>	1	.053	.065	.040	.020
N of Valid Cases	118					

a. 6 cells (66.7%) have expected count less than 5. The minimum expected count is .58.

b. The standardized statistic is -1.938.

## 5.25 CORRELATIONS

According to the results, there is a significant negative correlation between age and frequency of placing patients in a well-ventilated area ( $\rho = -.238$ ,  $p=.011$ ). Greater age is associated with lower frequency because participants who are older than others were not placing patients in a well-ventilated area.

**Table 5.14: Correlations**

			Age	Placing patients in a well-ventilated area
Spearman's rho	Age	Correlation Coefficient	1.000	-.238*
		Sig. (2-tailed)	.	.011
		N	115	114
	Placing patients in a well-ventilated area	Correlation Coefficient	-.238*	1.000
		Sig. (2-tailed)	.011	.
		N	114	121

\*Correlation is significant at the 0.05 level (2-tailed).

## 5.26 GROUP STATISTICS

The results indicated that (n=50) of enrolled nurses (M=4.64) agree significantly more than professional nurses (n=69) (M=4.28) that HCWs take measures to check for signs of TB in patients suffering from chronic diseases like diabetes. Independent samples t-test were used to test for significant differences in the average agreement score for different categories of nurses. ( $t(106.412) = -2.728, p=007$ ).

**Table 5.15: Group Statistics**

Category	N	Mean	Std. Deviation	Std. Error Mean
HCWs take measures to check for signs of T.B. in patients suffering from chronic illnesses like diabetes	Professional Nurse	69	4.28	.953
	Enrolled Nurse	50	4.64	.485

## 5.27 GROUP STATISTICS

The results showed that males (n=14) (M=5.00) agree more significantly than females (n=108) (M=4.79) that they were giving health education to patients about healthy eating. Independent samples-t-test were used to test for significant differences in the average agreement score for different genders. ( $t(107.000)=4.870, p=.000$ ).

**Table 5.16: Statistics**

	Gender	N	Mean	Std. Deviation	Std. Error Mean
I give health education to patients about healthy eating	Male	14	5.00	.000	.000
	Female	108	4.79	.454	.044

## 5.28 CORRELATIONS

The results showed that there is a significant negative weak correlation between the age and checking of signs of TB in patients suffering from chronic illnesses like diabetes, there is less agreement with greater age ( $\rho = -0.236, p=.012$ ).

There is a significant negative correlation between the age and giving of health education to family members accompanying a relative with TB, there is less agreement with greater age ( $\rho = -.214, p=.022$ ).

## 5.17 CORRELATIONS

			Age	HCWs take measures to check for signs of T.B. in patients suffering from chronic illnesses like diabetes	I give health education to family members accompanying a relative with T.B.
Spearman's rho	Age	Correlation Coefficient	1.000	-.236*	-.214*
		Sig. (2-tailed)	.	.012	.022
		N	115	112	114

## 5.29 CORRELATION

Table 5.18 shows that there is a significant negative correlation between experience and checking of signs of TB by health workers in patients suffering from chronic diseases like diabetes mellitus, more experience is associated with less agreement ( $\rho = -.195, p = .035$ ).

Table 5.18 further reveals that there is a significant positive correlation between experience and giving of health education to the community for the prevention of MDR-TB, more experience is associated with more agreement ( $\rho = .254, p = .005$ ).



**Table 5.18: Correlation**

			Experience	HCWs take measures to check for signs of TB in patients suffering from chronic illnesses like diabetes	Health education to the community is important for the prevention of MDR-TB
Spearman's rho	Experience	Correlation Coefficient	1.000	-.195*	.254**
		Sig. (2-tailed)	.	.035	.005
		N	120	117	119

\*. Correlation is significant at the 0.05 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

### 5.30 SUMMARY OF THE CHAPTER

Chapter 5 dealt with presentation of findings of data that was collected from the professional and enrolled nurses. Chapter 6 will be the discussion of findings.

## **CHAPTER 6**

### **DISCUSSION OF RESULTS**

#### **6.1 INTRODUCTION**

This chapter will discuss the results that were presented in the previous chapter. The discussion of the results is based on the research which describes the practice of nurses in the prevention of MDR-TB and to determine the factors that influence the role of nurses in the prevention of MDR-TB. Literature is reviewed where necessary as it relates to the findings.

The three strong elements that are depicted in Pender's health model which are important for health promotion guided the identification of the practice of nurses in the prevention of MDR-TB. The three important elements are:

- **Individual characteristics and experiences**

Individual characteristics which include prior related behaviour, personal factors and bio psychosocial factors have a direct effect on the desired health promotion behaviour which in the case of MDR-TB will influence whether the clients on TB treatment are complying with TB treatment. The researcher considered that in order for MDR-TB prevention to be effective the provider and the receiver of health education are equally important. The experiences and qualifications of nurses who are responsible for monitoring TB clients are important.

- **Behaviour-specific cognitions and affect**

The individual characteristics and experiences have an indirect effect on behaviour-specific cognitions, affect and feelings that nurses have regarding the practices about the prevention of MDR-TB. The researcher assessed the specific behaviour cognitions and effects of the nurses based on their knowledge in the prevention of MDR-TB. Knowledge items included measures to be taken to prevent MDR-TB. When is the treatment started in

confirmed cases of TB and tracing process if the patient has interrupted treatment or has not returned for treatment.

- **Behavioural outcome**

Nola Pender developed her Health Promotion model, after seeing professionals intervening only after patients developed acute or chronic health problems. She became convinced that patients' quality of life could be improved by the prevention of diseases and illnesses, and the governments' money could be saved by the promotion of healthy lifestyles since MDR-TB treatment is expensive. After researching current models and discovering that most focused on negative motivation, she developed promotion model that focused on positive motivation.

## **6.2 GENDER OF NURSES WORKING IN THE CLINIC**

The results of the findings revealed that the majority of respondents who were working in the clinics were females. According to the South African Nursing Council statistics, the number of males have increased over the past 10 years, but the gap in the number of male nurse compared with female nurse is wide. Adding a male in a mixture can help to balance out the staff and make a more relaxed environment. Bringing a balance of perspective to any situation can be useful. Certain situations are handled better by having a balanced team. (Chikudu 2015:55) There has been an increase in the number of nurse applicants and acceptances over the last decade with regard to male nurses. There has been a growth of 96% in the number of qualified male nurses since 1991 compared with 6% growth in the number of qualified female nurses. A volume of research focuses on the factors that facilitate or constrain recruitment and retention of nurses, but there is a dearth of data on the length and distribution of working lives of nurses. The Office of Population Census may be used to indicate the length the nurses spend in the workforce and the extent to which this differs for men and women (Curtis, Robinson and Netten 2009:843-849).

### **6.3 QUALIFICATIONS AND EXPERIENCES OF NURSES WORKING IN THE CLINIC**

The nurses who were allocated in the clinics were professional nurses and enrolled nurses. The allocation of nurses was accepted because it was according to the SANC Regulation R2598 (Republic of South Africa 2005). There was a combination of nurses with regard to years of experience, some nurses had 10 years' experience and some had less than five years. Nurses with 20 years' experience were very few which may indicate that these nurses are leaving the profession may be because, these nurses have reached retirement age. As in many countries, the nursing workforce is ageing. Nurses leave the workforce as they age, combined with increasing demand from older nurses will result in a reduction in the number of nurses (15000) by 2035 (Clendon and Walker 2015:31).

The nurses who were allocated in the clinics were professional nurses and enrolled nurses. Pender states in her theory that, prior related behaviour includes individual characteristics and experiences. Individuals who made a habit of a previous promoting health behaviour and received a positive benefit as a result will engage in future health promoting behaviours (Korzier and Erb 2014:306). Qualifications of nurses has an impact in the prevention of MDR-TB, since without the necessary knowledge and skills, nurses will not be able to prevent MDR-TB.

### **6.4 ATTENDANCE OF SHORT COURSES IN TB**

The study findings revealed that not all respondents had attended short courses on TB. The majority of participants (66.9%) attended the courses for TB. The study revealed that 63.4% (n=45) of professional nurses attended short courses in TB and 70.6% (n=36) of enrolled nurses attended short courses in TB. 35.7% (n= 25) of professional nurses and 29.4% (n=15) of enrolled nurses did not attend short courses in TB. Lewin *et al.* (2005: 253-254) confirmed that nurses attended short in-service training programme for PHC staff. The TB training was undertaken by two clinical nurse practitioners who had experience of

working with TB patients. The staff who attended the training sessions included professional nurses, assistant nurses, doctors, health educators, clerical staff and community based lay health workers. An investigation completed by Matlala and van der Westhuizen (2012: 19) revealed that respondents were never given opportunity to attend orientation courses. Lack of orientation may cause medico-legal hazards especially when working with TB patients.

## **6.5 CATEGORY OF PATIENTS ADMITTED IN THE UNIT**

The findings of the study revealed that 82% of participants selected the option of both confirmed and unconfirmed TB patients. Nurses attend to all category of patients coming to the clinic, both confirmed and unconfirmed TB patients. Many nurses working in the clinics and hospital refuse to train as TB nurses because, they think that, they will get infected with MDR-TB (Ramela 2011: 24). Patients are not admitted; other clients are referred to hospital in TB clinic. They are seen by the nurses and the doctor. Referrals from clinics and CHC to TB hospitals are indicated if at least one of the following admission criteria are met: A medical reason for admission: when patients diagnosed with TB are too ill or too weak to go home, including severely emaciated TB patients without other complications Social or socio-medical reasons for admission, when clinic or community support and care cannot be achieved, particularly in patients with alcohol or drug dependence and patients who are mentally ill or previously non-compliant patients (Department of Health 2014: 79). South African patients with MDR-TB are admitted to inpatient facilities for initiation of MDR-TB treatment, where they remain during the intensive phase of treatment. This system facilitates a standardized treatment approach, but also encourages gathering of MDR-TB patients into single setting (Farley *et al.* 2012: 82).

## **6.6 THE MAXIMUM NUMBER THE UNIT CAN ACCOMMODATE**

The study findings concluded that 26-40 (29.5%) patients came daily for consultation in the clinics. In South Africa, up to 80% of young adults are infected with TB and there is a need to find shorter treatment regimens to treat people at risk of developing active disease. This may explain high numbers of

patients coming for consultation (Health24 2013: 2). The nurses in the clinics do not attend to TB patients only; they attend to patients with various diseases as well. South Africa is one of the countries with highest TB incidence rates in the world, 993 people out of 100 000 are living with the disease (Health24 2014: 1). KZN is one of the provinces with the largest burden of MDR-TB worldwide, with an estimated prevalence of 30 MDR-TB cases per 100 000 population. MDR-TB treatment outcomes in KZN are worse than those published from other countries (Maharaj *et al.* 2016: 4). The health promotion model focuses on prevention of diseases and illnesses. The nurses in the PHC setting attend to patients suffering from various diseases. The primary function of the nurses is to prevent all diseases and illnesses.

## **6.7 COPING WITH THE WORKLOAD IN THE UNIT**

The findings of the study revealed that not all respondents were able to cope with the workload in the unit. Of the total, 16.4% of the respondents indicated that they do not cope with the workload in the unit. Nurses experience an increase in workload in the PHC system globally. Bothamely *et al.* (2011: 6-7), argue that shortages of nurses is associated with a higher rate of loss to follow-up during treatment. Cities with decreasing TB notifications cited the following reasons for improvement: adequate nursing numbers, improved treatment completion rates, a good multidisciplinary TB team, and improvement in screening for latent TB, re-organisation of TB services across professional boundaries and prompt collection of sputum samples from PHC. The main obstacle to achieving clinic objectives has been the lack of sufficient TB nurses (Bothamely *et al.* 2011:6-7). Commissioners require a projected number of TB cases, calculated from the 10-year rate of change to ensure adequate resourcing. There are different documents that must be completed by nurses for every patient who attends the facility for example registers, books and forms. In a study done in KZN showed that professional increased daily workloads due to the introduction of new programmes. Increased workload due to the provision of free health services and shortage of staff were found to be the main problem in PHC setting (Shihundla, Lebese and Maputle 2016: 2-3).

## **6.8 RESOURCES FOR THE PREVENTION OF INFECTION IN THE UNIT**

The results of the study revealed that the respondents gave different responses 35% agreed that the resources are sufficient for the prevention of infection; 34.4% of respondents disagreed that the resources are sufficient for the prevention of infection. Health care in South Africa varies from basic PHC to highly specialized, hi-tech services available. The challenge is that the public health sector is stretched and in places is under resourced (Department of Health 2012: 2). According a study conducted in three districts in South Africa, the findings revealed that there was a shortage of N95 mask at the clinics and lack of knowledge on the correct use of N95 mask and surgical mask. The majority of clinics did not provide coughing patients with mask or tissues and half of the clinics did not have an infection control committee (Engelbrecht and van Rensburg 2013: 225). According to Mdolo (2015:23), South Africa commemorates World TB day on 24 March yearly to dedicate all efforts to fight this killer disease. In 2015, President Jacob Zuma announced that, government is committed to fighting the disease. During 2015 the focus was on three critical areas: offenders at the South Africa's correctional services, mineworkers and areas surrounding mines.

Sufficient resources in the PHC clinics enable the nurses to function effectively, perceived barriers to action for example shortage of N95 mask will hinder the nurse practice in the prevention of MDR-TB. A person's perceptions about available time, inconvenience, expense and difficulty performing the activity may act as a barriers Perceived barriers to action affect health-promoting behaviours by decreasing the person's commitment to a plan of action (Korzier and Erb 2014:306).

## **6.9 MEASURES TAKEN TO PREVENT TRANSMISSION OF INFECTION IN BETWEEN PATIENTS**

The study findings revealed that 49.2% of respondents agreed that they take measures to prevent infection in between patients, other respondents disagreed. Karim (2011: 1130-1131) highlight that inadequate infection control procedures have been suggested to expose patients and staff to risky environments for the emergence and transmission of TB. Good hand hygiene is recommended. In a study conducted in Uganda, there was poor implementation of infection control measures like screening and separation of patients who were coughing. Half of the facilities had poorly ventilated waiting areas. Barriers to implementation included scarce human resource, lack of space and lack of funds. The situation was worsened by inadequate ventilation in consulting rooms, in patient wards; an open window policy was not followed. Reasons for poor implementation were lack of space and poor staffing. Petiprin (2016: 2) confirms that the greater the commitment to a specific plan, the more likely that health promoting behaviours are maintained over time.

## **6.10 OVERCROWDING IN THE UNIT**

The study findings indicated that 37.7% of respondents agreed that the unit is overcrowded, 23.8% disagreed. The majority of nurses agreed that they were working in an overcrowded environment; this is supported by Situmbeko, Katanekwa and Dahlback (2016: 9) that nurses in developing countries commonly work in overcrowded healthcare settings. The shortage of trained health personnel and an inability to fill essential post constitutes a key barrier to achieving the implementation and provision of district-based health system in South Africa. The shortage of HCWs has undermined the development of decentralised health system and full implementation of PHC services. The privatization of health care, the unequal distribution of HCWs and resources across the public sector are the obstacles to health system development and adequate provision of services (Kautzky and Tollman 2008: 24-25).



Khunou and Maselesele (2016: 2) highlighted that, there were too many nurses in the cities and very few in rural areas that have demand for nurses. To address the shortage of nurses, CEOs should create a positive practice environment.

According to Appiah-Denkyira *et al.* (2013: 4), a lack of human resources prevents health services from being accessed by those mandated to receive it. A number of research studies suggest that there is a maldistribution of health workers in rural areas (Hegney *et al.* 2002; Jenkins *et al.* 2015; Sibiya and Gwele 2013). Human resource strategies should be more focused on nurses, as they are the frontline health care professionals in PHC settings in South Africa (Sibiya and Gwele 2013: 387). Although many nurses are needed for the overburdened health care system, the shortage of nurses continues to widen with increasing demand without a commensurate increase in the supply of trained nurses (Mokoka, Oosthuizen and Ehlers 2010: 3). This is in part a result of the provincial health care budget cuts that nurses rely on for training finance (David and Chopra 2008: 48). Consequently, with health care resources becoming increasingly limited, the need for innovative strategies to maximise the effectiveness of the care delivered with the existing human resources becomes even more crucial (David and Chopra 2008:48).

#### **6.11 AVAILABILITY OF TB DRUGS IN THE UNIT**

The findings of the study revealed that 51.6% of respondents strongly agreed that TB drugs were consistently available, some of the respondents disagreed. The majority of nurses agreed that TB drugs were consistently available. According to Deriemer *et al.* (2005: 1240), the information and referral system were improved to ensure adequate, uninterrupted supplies of quality TB drugs. Magadzire *et al.* (2014: 13) highlighted that the medicines supply chain is undermined by severe resource constraints and structural weaknesses leading to stock outs. If patients do not receive TB treatment they will shop for better services within the system or with other providers. Providers highlighted haphazard movement of patients within the health system as one of the threats to the down referral programme. This emerged as an important factor that

inhibits efficient planning at PHC level. The supply chain needs to be efficient in dealing with growing demand for consistent supply of TB drugs. Circular migration emerged as a common feature of the patient population yet health services assume that patients are permanently situated in a particular area, as a result, patients are lost to follow up or interrupt treatment as they migrate from one place to another (Magadzire *et al.* 2014:13).

## **6.12 AVAILABILITY OF THE DOCTOR**

The findings of the study predicted that the majority (62.3%) of respondents disagree that the doctor was available 24 hours a day. In South Africa, the doctors usually visit the clinic once a week. The doctor-to-population ratio is estimated to be 0.77 per 1000, because 73% of general practitioners work in private sector, there is one practicing doctor for every 4219 people (Department of Health 2012: 4). The strategies to address human resource difficulties suggest that countries should invest in medical training infrastructure although this is not feasible in short term. Medical schools are experiencing an exit of specialist lecturers who are providers of health services themselves. There are other difficulties in the strategy that stresses medical and nursing training in developing countries, for example it takes at least five years to train a doctor and three years to produce a nurse (Hongoro and McPake 2004: 1453).

## **6.13 CHECKING OF SIGNS OF TB IN PATIENTS SUFFERING FROM CHRONIC ILLNESSES**

The findings of the study revealed that 54.1% of respondents strongly agreed that, they were checking for signs of TB in patients suffering from chronic illnesses like diabetes, 2.5% disagreed, 1.6% strongly disagreed. The majority of respondents agreed that they assess for signs of TB in patients suffering from chronic illnesses like diabetes. People with diabetes have a 300% higher risk of developing TB than people without diabetes because of the lowered immune system, it is important for the nurses to integrate diabetes and TB services. All patients with diabetes attending the clinic must be screened for TB (Health24 2011). Workneh, Bjneh and Yimer (2016: 135) indicate that an

integrated management is recommended to deal with the burden of TB and diabetes and on its impact on achieving the TB elimination goal. The WHO have launched a framework for care and control of TB and diabetes. The framework focuses on three strategies namely establishing mechanisms of collaboration between TB and diabetes, detection and management of diabetes in patients with TB and management of diabetes in patients with TB ( (Workneh, Bjneh and Yimer 2016:135).

#### **6.14 WEARING OF N95 MASK WHICH COVERS MOUTH AND NOSE**

The findings of the study implied that 59.0% of participants chose endorsed that they were wearing a surgical mask, which covers mouth and nose to protect themselves from infection. According to the study conducted in Beijing, there was a high reported mask adherence despite the majority of health workers having reported adverse effects of mask wearing (Yang *et al.* 2011: 104). This high level of mask wearing could be attributed to enhanced prevention of nosocomial infection following SARS outbreak in 2003 in Beijing. It was found that the majority of respondents wore reusable cotton-yarn mask. N95 mask were not reported as being used frequently because the departments preferred reusable cotton-yarn mask, which could be considered not expensive as compared to N95. This study revealed that HCWs with good adherence to mask-wearing were at lower risk of respiratory infection (Yang *et al.* 2011: 107). It is imperative that the nurses should wear mask to protect themselves irrespective of clinical placement whether in high risk or low risk areas.

#### **6.15 PRACTICING COUGH HYGIENE**

The findings of the study concluded that 85.2% of respondents 'chose' always' meaning they were practicing cough hygiene that is covering their mouth and nose when coughing to prevent transmission of infection, the majority of respondents were practicing cough hygiene. Cough etiquette is also a cost effective measure that needs to be implemented at all levels by nurses and other HCWs (Zulma *et al.* 2012: 5228). According to CDC (2016: 1), cough hygiene is one of the infection control measures that must be practiced by

nurses and patients. All persons who have cough should cover their mouths with a tissue to stop the spread of microbes, avoid contact with sick people, wash hands with soap and water, staff and patients who have cough and MDR-TB should wear a N95 mask, the health facility should provide tissues and receptacles for disposal according to protocol and alcohol based dispensers. In Health Promotion Model, it is stated that people are more likely to commit to health- promoting behaviours, when others demonstrate the behaviour, expect it to occur and provide support to enable it (Petiprin 2016: 2).

#### **6.16 PLACING PATIENTS IN A WELL-VENTILATED AREA**

The study findings indicated that the majority (76.2%) of respondents chose 'always' meaning they were placing patients in a well-ventilated area to prevent infection while waiting to be seen. According to the World Medical Association (2008: 176), in many health facilities in developing countries, patients are waiting to be seen every day. Hallways and waiting areas are often crowded with patients, families and nurses leading to long queues. Nurses should take responsibility to reduce nosocomial infection by fast tracking patients who are coughing and known patients with MDR-TB. Chen *et al.* (2016: 3) found that environmental control is another means of reducing the concentration of droplets nuclei in the air. Ventilation is an important environmental control measure. Natural ventilation such as opening windows and doors is efficient and less costly for the movement of air. Mechanical ventilation is needed in high risk areas with poor natural ventilation. The effectiveness and function of ventilation should be checked regularly by infection control representative. The TB infection control survey that was done in fifty hospitals revealed that many hospitals were not implementing infection control measures increasing the risk to HCWs.

#### **6.17 USING HIBITANE SPRAY AFTER ATTENDING TO EACH PATIENT**

The findings of the study revealed that 93% of respondents were using hibitane after attending to each patient. Alcohol based-hand antiseptics are quick and convenient. The use of alcohol based-antiseptics reduces hand flora more effectively than hand washing with soap. Alcohol content should be 60-90%. Alcohol based-antiseptics will not remove dirt. Any visible dirt in the hands should be washed with soap before using alcohol based-antiseptics. Adequate supply of alcohol based-antiseptic will ensure that proper hand hygiene is practiced. Hands must be cleaned immediately before and after encounter with every patient (USAID 2013: 29).

#### **6.18 COLLECTION OF SPUTUM FROM PATIENTS WHO HAVE BEEN COUGHING FOR TWO WEEKS**

The findings of the study revealed that 89.3% of respondents chose 'always' meaning that they were collecting sputum from patients who have been coughing for two weeks. The majority of respondents collect sputum from patients coughing for two weeks. According to the study conducted in the general medical clinic KZN (South Africa), the nurses were involved in intensive case finding for TB. The identified suspects with cough for more than two weeks were requested to cough up sputum for evaluation at hospital. According to the Hospital Policy, a staff nurse interviewed all patients attending outpatient department (Shenoi 2013: 1).

#### **6.19 TURNAROUND TIME FOR TB SMEARS**

The findings of the study revealed that 51% of respondents chose 'up to 48 hours' meaning that, sputums results that were sent from the laboratory were received within 48 hours. 4.1% of respondents chose 'up to 72 hours. Some of the PHC clinics receive the results within 24 hours because of the text messaging service that is used, unless during the weekends when the drivers are not working or if the network system is down than the results will be received

after 48 hours. The study that was conducted in five provinces in South Africa where the unit of investigation was a PHC facility and the outcome was the initial loss to follow up rate per facility. The initial loss to follow up was calculated by comparing the sputum register with the TB treatment register. A prolonged turnaround time was defined as more than 48 hours from when the sample was documented in the sputum register to receipt of the result at facility. A turnaround time of less than 48% is better because initial loss to follow up may be prevented. Initial loss to follow up should be reported to ensure that patients are initiated on TB treatment to prevent transmission of infection in the community (Claassens *et al.* 2013: 605).

## **6.20 GIVING OF TREATMENT TO CONFIRMED CASES OF TB**

The findings of the study revealed that 73.0% of respondents chose immediately, others chose after 48 hours. The majority of respondents chose immediately as it is important to start the TB treatment as early as possible to prevent the spread of TB. After the treatment has been prescribed by the doctor the nurses should give it immediately. According to the Department of Health (2014: 27), all patients diagnosed with TB must be initiated on TB treatment within 2 days.

## **6.21 GIVING OF EDUCATION TO PATIENTS SUFFERING FROM TB ABOUT THE IMPORTANCE OF TAKING TB TREATMENT AT HOME**

The findings of the study revealed that the majority (91.8%) of respondents chose 'always' that they give health education to patients suffering from TB about the importance of taking TB treatment at home. The majority of the respondents chose always as it is imperative to educate patients with regard to taking of TB treatment to prevent treatment interruption. Tshabalala (2007: 30) and Bristow (2013: 6) concur that, nurses should give health education to patients with regard to TB treatment to prevent treatment interruption and to promote compliance to treatment. The nurses are giving health education to patients while waiting in waiting areas. Pender (2011:5) highlighted that self-initiated reconfiguration of the interactive patterns between people and their

environment is necessary for a change in behaviour. Families, peers and health professionals are sources of interpersonal influences that can influence person's health promoting behaviours (Korzier and Erb 2014:306).

#### **6.22 GIVING OF PROPHYLACTIC TREATMENT TO PATIENT EXPOSED TO MDR-TB**

The findings of the study revealed that the majority (75.4%) of respondents chose 'always' that they were giving prophylactic treatment to patients exposed to MDR-TB to prevent MDR-TB. Van Wyk *et al.* (2011: 1) indicated that, the risk of developing TB in children can be reduced with the administration of isoniazid preventive therapy (IPT). The risk of developing TB is high in children under 5 children who are exposed to MDR-TB regardless of age, therefore the WHO and South African National Tuberculosis Programme recommends the administration of IPT in all under 5 children regardless of age. The study conducted in South Africa indicated that there is more than 60% reduction of TB in HIV infected adults after the administration of isoniazid preventive therapy (IPT). South Africa has implemented the WHO Policy and IPT is now recommended for HIV positive people for up to 36 months (Wood and Bekker 2014: 1).

#### **6.23 TAKING OF HISTORY FROM PATIENTS WITH TB ABOUT TB CONTACTS AT HOME**

The findings of the study indicated that 91.8% of respondents chose 'always' that they take a history from patients about TB contacts at home. The majority of respondents chose 'always' as it is important to take history about TB contacts at home so that they can be screened for TB. The patient is requested to provide a list of persons living with the patient. These people are invited for screening. The patient is encouraged to identify any one at home who is presenting with signs and symptoms of TB. All children under the age of five are examined (ICN 2008: 33).

## **6.24 GIVING OF HEALTH EDUCATION ABOUT SAFE COUGHING PRACTICES AT HOME**

The findings of the study showed that 92.6% of respondents chose 'always' that they give health education about safe coughing practices at home. The majority of respondents chose always indicating that, it is important to give health education about cough hygiene. HATP (2013: 3) and Zumla *et al.* (2012: 5228) are of the same opinion that all patients to be educated on proper cough hygiene measures for example patients should cough into a piece of cloth, tissue, these should be disposed of in a receptacle container. If this material is not available, the mouth and nose should be covered with the bend of the elbow which must then be cleaned immediately. Cough etiquette is a cost-effective measure that needs to be urgently implemented at all level. The study conducted in KZN by Malangu and Mngomezulu (2015: 3) confirmed that all facilities had complied with requirements about educating patients about cough etiquette and teaching patients about the signs and symptoms of TB. About 80% of facilities have complied with having a cough symptom checklist, specimen tracking system in place, printed educational materials for patients and coughing etiquette posters.

## **6.25 TRACING OF PATIENTS WHO HAVE NOT RETURNED FOR TREATMENT**

The results of the study revealed that 67.2% of respondents trace the patients who have not returned for TB treatment, and 2.5% do not trace patients who had not returned for treatment. According to the study done in UMgungundlovu Health District in 2010, 79% of patients were traced after interrupting treatment for one month, on interview respondents cited that the problem was money to travel to the clinic and ill-health (Ndwandwe *et al.* 2010: 3). Bristow *et al.* (2013: 6) mentioned that the tracer teams were regarded as a reliable method for returning patients to treatment despite the challenges reported by tracer teams. Practices employed by tracer teams focused on patient education and development of future treatment adherence plan. When a patient return to the clinic, personnel at tracer facilities commonly discussed alternative DOTS



arrangements with patients. In PHC setting, CCGs are responsible for tracing of patients. People can modify cognitions, affect, interpersonal influences and situational influences to create incentives for health promoting behaviour. Patient education is important to promote adherence to treatment (Petiprin 2016:2)

#### **6.26 EDUCATING THE PATIENT WHO INTERRUPTED TREATMENT ABOUT THE NECESSITY OF CONTINUING TREATMENT**

The findings of the study revealed that 73.8% of the respondents give education to patients about the importance of continuing with treatment. Yukselturk and Dinc (2013: 48) suggest that nurses are responsible for giving of anti-TB drugs to patients; they should have knowledge about the effects, side effects and potential interactions of TB drugs. Nurses are the first contact with new-borns when they administer Bacillus of Calmette-Guerin, providing care and giving education. The findings of a study conducted in Thembisa revealed that nurses were giving health education on TB and its treatment to patients and members of the family to strengthen prevention of TB and to improve compliance with treatment (Tshabalala 2007: 30).

#### **6.27 BENEFITS OF CONTACT TRACING**

The findings of the study revealed that the majority of respondents (70%) indicated the importance of preventing the spread of TB and 38% of respondents suggested that identification of suspects and early diagnosis of TB are crucial. Furthermore, the respondents stated the importance of early initiation of treatment in patients diagnosed with TB. The importance of promoting adherence to treatment, giving of prophylactic treatment to TB contacts, the importance of preventing MDR-TB, importance of supporting the patient and family and the importance of giving health education to the patients and the community. Ekwueme, Omotowo and Agwuna (2014: 4) suggest that contact tracing is the evaluation of persons who have been in contact with TB patients. Contact tracing can be active or passive. In active contact tracing, HCWs visit the family of each TB case. Passive contact tracing occurs in TB

clinics. Contact tracing enhances case finding and thereby increasing treatment outcomes. Contacts of TB are at high risk of acquiring the infection.

#### **6.28 TRAINING OF EMPLOYEES WITH REGARD TO TB**

The findings of the study reveal that the majority of respondents (93%) strongly agreed that training of employees is important in the management of TB. The finding of the study conducted by Adebajo (2011: 9) revealed that lack of training of HCWs resulted in poor knowledge about MDR-TB concerning its causation and mode of transmission and of treatment. PHC nurses were trained to use the Practical Approach to Lung Health in South Africa at different clinics. The aim of the training was to increase detection of active TB among adults with cough or difficulty breathing, to improve diagnosis and treatment of TB and to improve referral of other respiratory conditions (Fairall *et al.* 2010: 278).

#### **6.29 HEALTH EDUCATION ABOUT HEALTHY EATING**

The findings of the study revealed that, most of the respondents (82.8%) give health education to patients about healthy eating. Adults and children must eat between four to nine servings of fruits and vegetables, grains such as cereal and pasta. These starches can be made from whole grain flour which contain fibre, vitamins and minerals and refined flour. Three servings are needed per day. Non-fat and low fat-dairy is also needed by the body. Two to three servings are needed by children per day (Best Children's Hospital 2016: 1-2).

#### **6.30 HEALTH EDUCATION ABOUT AVOIDING SMOKING**

The findings of the study revealed that the majority of respondents (82%) give health education to patients about avoiding smoking. Louwagie and Ayo-Yusuf (2015: 47-478) indicated that, studies that evaluate the effects of coping skills training on tobacco smoking and substance abuse are limited in developing countries. TB patients need coping skills to adhere to prescribed medication. Tobacco cessation services can be introduced in TB services. Coakely and

Ruston 2001: 1) suggest that smoking cessation needs to become a priority of health promotion for all patients with pulmonary disease. Government acknowledged nurses and as having a key role in health education and health promotion and one to one support from a nurse is essential in smoke cessation programmes. Individual counselling offered by nurses has proved to be effective (Louwagie and Ayo-suf 2015:47-78). According to health promotion model, when positive emotions are associated with a behaviour, the probability of commitment to action is increase. Situational influences are direct and indirect influences on health-promoting behaviours. Demand characteristics can directly affect healthy behaviours through policies such as company regulation that establishes a “no smoking” environment (Korzier and Erb 2014:307).

### **6.31 HEALTH EDUCATION ABOUT AVOIDING ALCOHOL**

The findings of the study revealed that the majority of respondents (82.8%) give health education to patients about avoiding alcohol but some of the respondents were not giving health education. According to the study conducted by Peltzer *et al.* (2013: 2), CHWs were allocated to implement screening and brief intervention for alcohol problems in PHC settings in South Africa. Low risk drinkers are given health education and brief counselling for risk zone drinkers (Peltzer *et al.* 2013: 2). Low confidence and lack of knowledge have been identified as obstacles to talking about alcohol use by patients. The aim of the study was to investigate whether it is more efficient to rely on hospital staff to talk to patients about alcohol use or to have staff from outpatient alcohol treatment institutions to come and carry out brief interventions with the hospitalized patients). The nurses found that the Relay study had contributed with positive factors especially the screening of alcohol use. As a result of their participation in the project, it became easier for the nurses to talk about alcohol (Hellum, Bjerregaard and Nielsen 2016: 416). Nursing is a collaboration among patients, families and communities to create the best conditions for the expression of optimal health and high level well-being.

## **6.32 HEALTH EDUCATION TO FAMILY MEMBERS**

The study findings revealed that the majority (73.8%) of respondents give health education to family members accompanying a relative suffering from TB. According to the WHO (2007: 15), the family and patients should be provided with information with regard to the disease and its management, enhancing economic development and strengthening the ability of TB patients to better control and be involved in the treatment process. Nurses give health education through face to face discussions with patients and family in order for them to gain adequate understanding of TB. In the study that was conducted in El Salvador, to improve patient and family understanding of TB, a videography based educational tool was developed. It included patient testimonials, visual aids and how TB can be successfully treated and cured (Wilson *et al.* 2016: 16). Families, peers and health care providers are important sources of interpersonal influence that can increase or decrease commitment to health promoting behaviour.

### **6.33. HEALTH EDUCATION TO THE COMMUNITY ABOUT PREVENTION OF MDR-TB**

The finding of the study revealed that most of the respondents give health education about preventing MDR-TB in the community. Cramm *et al.* (2010: 2) indicated that giving health education is crucial for the success of prevention and treatment efforts in high-risk populations and represents a key challenge for public health initiatives. Effective treatment provision, individual well-being and social welfare are important to gain insight into the opinions of people regarding TB. Tshabalala (2007: 30) highlighted that poor health education on TB was the cause of treatment interruption by TB patients leading to the development of MDR-TB. Health personnel are too busy to health educate patients. Most of the respondents were not aware of the dangers of treatment interruption.

### **6.34 CONCLUSION**

This chapter discussed the findings of the study with regard to the demographic data of respondents, for example age, gender and qualifications. Performance of nurses in the control of TB was discussed focusing on the resources with regard to the prevention of infection, coping with the workload in the clinic, infection prevention control measures and factors influencing prevention of MDR-TB like giving of health education to patients suffering from TB and tracing of patients who interrupted TB treatment.

## **CHAPTER 7**

### **CONCLUSION, LIMITATIONS AND RECOMMENDATIONS**

#### **7.1 INTRODUCTION**

The aim of the study was to describe the practice of nurses in the prevention of MDR-TB and to determine whether the practice is effective and that nurses have necessary knowledge in the prevention of MDR-TB. According to the findings of the study nurses were implementing the measures for preventing of MDR-TB however, there were gaps.

The findings of the study revealed that some of the nurses were not provided with the opportunities to attend short courses in TB and MDR-TB. Some nurses are working in overcrowded conditions where it is difficult to implement the measures for preventing MDR-TB due to lack of space. Nurses are not coping with the workload in the PHC setting. There is an increase in the workload due to the high number of patients having TB and shortage of nurses. Nurses are at risk of contracting TB infection because unconfirmed TB patients who come for consultation may spread the disease. The doctors are not enough in South Africa. According to the Health24 (2012: 4), there is one practicing doctor for every 4219 people. The resources for the prevention of MDR-TB are scarce; sometimes the masks (respirator N95) are not available. Some nurses are not assessing for signs of TB in patients suffering from diabetes mellitus, people with diabetes are at high risk of developing TB than people without diabetes.

#### **7.2 GAPS RELATED TO THE PREVENTION OF MDR-TB**

The findings of the study revealed that some of the nurses were not giving prophylactic treatment which may be due to lack of knowledge about MDR-TB. Nurses are involved in contact tracing and tracing of patients who interrupted treatment. If the patient has interrupted the treatment for five days, nurses will communicate with CCGs so that the caregivers can trace the patient to prevent

the spread of the diseases. Some of the nurses lack knowledge with regard to the benefits of contact tracing.

### **7.3 LIMITATIONS OF THE STUDY**

Limitations are barriers or constraints that weaken or decrease the credibility of the study results. These could be the research design, sample of the study or research methods (Botma, Greeff, Mulaudzi & Wright 2010: 107; Burns and Grove 2011: 48). According to de Vos *et al.* (2011: 288), limitations of the study should be identified so that precautionary measures may be applied to reduce any possible negative impact that the study could have. The current study was restricted to King Cetshwayo District in selected PHC clinics only and a small sample was used, therefore findings cannot be generalized; however, similar findings may be prevalent in other parts of Africa burdened with TB. The sample of the study comprised professional nurses and enrolled nurses. The enrolled nursing auxiliaries and student nurses were excluded.

### **7.4 CONCLUSION**

In this study, although nurses employed in the clinics scored well in areas with regard to collection of sputum from patients, placing patients in a well-ventilated area, giving of health education to patients about the importance of taking treatment at home, safe coughing practices, avoiding alcohol and smoking. The findings of the study indicated that there are respondents were not taking measures to prevent infection in-between patients. There is a need for training of nurses about TB management in order to increase knowledge with regard TB and MDR-TB. The findings of the study can be used to support nurses in their working environment. The results of this study can be used at hospitals and PHC clinics that attend to TB patients and TB suspects.

## **7.5 RECOMMENDATIONS BASED ON THE FINDINGS OF THE STUDY**

Recommendations were based on the findings of this study and address performance of nurses in the control of TB and prevention of MDR-TB.

### **7.5.1 Recommendations for nursing practice**

- Training of nurses at PHC facilities is imperative in order to assist them to acquire the skills and knowledge. Nurses should be given opportunity to attend short courses in TB. In-service education to be given to the staff about TB infection preventive measures to prevent patients and nurses from contracting TB, and about assessment of signs and symptoms in patient suffering from chronic illness like diabetes and HIV.
- Adequate supplies of human and material resources should be ensured at all times for rendering of quality service since nurses are unable to cope with the workload in the clinics.
- Management support and communication with staff is important for improvement of working conditions, since some nurses are working in overcrowded conditions where there is a lack of space.

### **7.5.2 Recommendations for the prevention of MDR-TB**

- N95 respirators to be made available to all staff because it is effective in preventing infection.
- The nurses in the PHC clinic should read the guidelines for the prevention of MDR-TB
- Reinforcement of tracing of patients who interrupted treatment and contact tracing to ensure continuity of treatment.
- Training of nurses with regard to signs and symptoms and transmission of MDR-TB
- Training of nurses about giving of preventive therapy to TB contacts.
- Recruiting more nurses who will work permanently with TB and MDR-TB patients because other nurses are afraid of infection.



### **7.5.3 Further research**

Nursing research is imperative and must be encouraged and developed in order to build the profession. Further research should be conducted with regard to secondary prevention of MDR-TB. Further research should be conducted with patients to determine the knowledge of patients about MDR-TB prevention.

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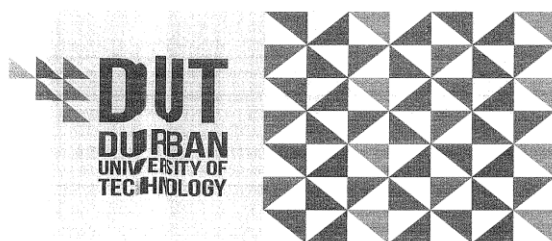
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## **APPENDICES**



## Appendix 1: DUT ethics clearance



Institutional Research Ethics Committee  
Faculty of Health Sciences  
Room MS 49, Mansfield School Site  
Gate 8, Ritson Campus  
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2900

Fax: 031 373 2407

Email: lavishad@dut.ac.za

[http://www.dut.ac.za/research/institutional\\_research\\_ethics](http://www.dut.ac.za/research/institutional_research_ethics)

[www.dut.ac.za](http://www.dut.ac.za)

26 April 2016

IREC Reference Number: **REC 17/16**

Ms T T Mahaye  
P O Box 7766  
Empangeni Rail  
3910

Dear Ms Mahaye

### **The practice of nurses in the prevention of multidrug- resistant tuberculosis**

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.

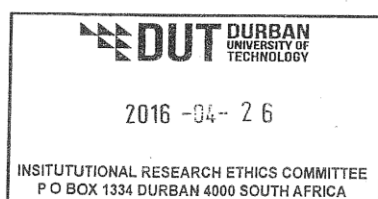
In addition, the IREC acknowledges receipt of your gatekeeper permission letter.

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

Yours Sincerely,



Professor J K Adam  
Chairperson: IREC



## **Appendix 2a: Letter of permission to uThungulu District Manager**

Ngwelezana Nursing Campus  
P/Bag X20016  
Empangeni  
3880

The District Manager  
UThungulu Health District  
Empangeni  
3880

Dear Sir/ Madam

### **REQUEST FOR A PERMISSION TO CONDUCT A STUDY**

I am currently registered for a Master's Degree in the Department of Nursing at the Durban University of Technology. I request for permission to conduct a study on '*The practice of nurses in the prevention of multidrug-resistant tuberculosis*'. The study will be conducted at the following primary health care clinics: XXX clinic, XXX clinic, XXX clinic, XXX clinic, XXX clinic and XXX Community Health Centre. A questionnaire will be used to collect data from the professional nurses and enrolled nurses who are allocated in TB units in these three selected hospitals. The researcher will ensure that service delivery is not interrupted during data collection process by collecting data during tea and lunch breaks. A copy of the summary of the research proposal is enclosed.

Your support and permission to conduct the study in your facility will be appreciated. Please do not hesitate to contact Prof MN Sibiya, my supervisor if you have questions. Her telephone number is 031-373 2606. Her email address is [nokuthulas@dut.ac.za](mailto:nokuthulas@dut.ac.za).

Yours sincerely

.....

Ms TT Mahaye (Master's student)

Email: [thandile.mahaye1@gmail.com](mailto:thandile.mahaye1@gmail.com)

Tel: 035-901 7036

Cell: 079 388 5953

## Appendix 2b: Letter of approval from uThungulu District Manager



**health**

Department:  
Health  
PROVINCE OF KWAZULU-NATAL

Physical Address: No 2 Corner Lood Avenue & Chrynia Crescent, Empangeni 3880  
Postal Address: Private Bag x 20034, Empangeni 3880  
Tel: 0357870631 Fax: 0357870044 Email: Thembelile.maphalala@kzn.health.gov.za  
www.kzn.health.gov.za

Deputy District Manager

<b>Date:</b> 29 March 2016	<b>File No:</b>
<b>To:</b> Ms TT Mahaye Ngwelezane Nursing Campus P/Bag x 20016 Empangeni 3880	<b>From:</b> Ms TE Maphalala Acting District Manager uThungulu District
<b>SUBJECT: PERMISSION TO CONDUCT A STUDY</b>	

1. I have pleasure in informing you that permission has been granted to you by uThungulu District to conduct a study on **"The practice of nurses in the prevention of multi-drug resistance tuberculosis"** in 6 PCH facilities in Uthungulu District.
2. This study will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure that this office is informed in writing before you commence your study.
4. This office will not provide any resource for this study.
5. You will be expected to provide feedback on your findings to this office.

Yours sincerely

Ms TE Maphalala  
Acting District Manager  
uThungulu District

### **Appendix 3a: Letter of permission to KZN Department of Health**

Ngwelezana Nursing Campus

P/Bag X20016

Empangeni

3880

Dr Elizabeth Lutge

Health KwaZulu-Natal Department of Health

Health Research and Knowledge Management Secretariat

330 Langalibalele Street

Natalia Building

Pietermaritzburg

3200

Dear Dr Lutge

#### **REQUEST FOR A PERMISSION TO CONDUCT A STUDY**

I am currently registered for a Master's Degree in the Department of Nursing at the Durban University of Technology. I request for permission to conduct a study on '*The practice of nurses in the prevention of multidrug-resistant tuberculosis*'. The study will be conducted at the following primary health care clinics: XXX clinic, XXX clinic, XXX clinic, XXX clinic, XXX clinic and XXX Community Health Centre. A questionnaire will be used to collect data from the professional nurses and enrolled nurses who are allocated in clinics. The researcher will ensure that service delivery is not interrupted during data collection process by collecting data during tea and lunch breaks. A copy of the summary of the research proposal is enclosed.

Your support and permission to conduct the study in your facility will be appreciated. Please do not hesitate to contact Prof MN Sibiya, my supervisor if you have questions. Her telephone number is 031-373 2606. Her email address is [nokuthulas@dut.ac.za](mailto:nokuthulas@dut.ac.za).

Yours sincerely

.....

Ms TT Mahaye (Master's student)

Email: [thandile.mahaye1@gmail.com](mailto:thandile.mahaye1@gmail.com)

Tel: 035-901 7036

Cell: 079 388 5953

## Appendix 3b: Letter of approval from KZN Department of Health



**health**

Department:  
Health  
PROVINCE OF KWAZULU-NATAL

Physical Address: 330 Langalibalele Street, Pietermaritzburg  
Postal Address: Private Bag X9051  
Tel: 033 395 2805/3189/3123 Fax: 033 394 3782  
Email:  
[www.kznhealth.gov.za](http://www.kznhealth.gov.za)

DIRECTORATE:

Health Research & Knowledge  
Management

Reference: 114/16  
KZ\_2015RP48\_422

Date: 25 April 2016

Dear Ms T.T. Mahaye  
Durban University of Technology  
Email: [thandile.mahaye1@gmail.com](mailto:thandile.mahaye1@gmail.com)

### Approval of research

1. The research proposal titled '**The practice of nurses ion the prevention of multi-drug resistant tuberculosis**' was reviewed by the KwaZulu-Natal Department of Health.

The proposal is hereby **approved** for research to be undertaken at Nseleni CHC, Thokozani, Phaphamani, Ngwelezana, Khandisa and Mkhontokayise clinic.

2. You are requested to take note of the following:
  - a. Make the necessary arrangement with the identified facility before commencing with your research project.
  - b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.
3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to [hrkm@kznhealth.gov.za](mailto:hrkm@kznhealth.gov.za)

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

Yours Sincerely

  
Dr E Lutge

Chairperson, Health Research Committee

Date: 05/07/16

Fighting Disease, Fighting Poverty, Giving Hope

## Appendix 4a: Letter of information



**Title of the Research Study:** The practice of nurses in the prevention of multidrug-resistant tuberculosis.

Dear Participant

You are being invited to take part in a research study. It is important for you to participate in, and understand why this study is being undertaken. The aim of the study is to determine the practice of the nurses in the prevention of Multi Drug Resistant Tuberculosis (MDR-TB). Please take time to read through this information sheet that contains all the pertinent information relating to this study.

**Principal Investigator/s/researcher:** Ms. Thandile Theodora Mahaye (B Cur)

**Co-Investigator/s/supervisor/s:** Professor M.N. Sibiya (D Tech Nursing); Co-Supervisor: Ms M Munsamy (M Tech: Nursing).

**Brief introduction and purpose of the study:** MDR-TB is the number one cause of death in South Africa. The basic role of the nurse is to provide emotional support to patients with MDR-TB to assure psychological well-being. However, some nurses have poor knowledge of MDR-TB which leads to failure to follow up on people who had been in close contact with MDR-TB patients, such as house hold members. Therefore, the aim of the study is to describe the practice of the nurses in the prevention of MDR-TB.

**Outline of the Procedures:** You are kindly requested to answer the questions in the questionnaire. The questionnaire should take approximately 30-35 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 can be used to improve the care provided to patients with MDR-TB.

**Reasons why the participant may be withdrawn from the study:** You can withdraw from the study at any point in time if you wish to do so. There will be no penalty for withdrawing from the study.

**Remuneration:** You will not receive any money for participating in this study.



**Costs of the Study:** You will not be expected to pay money to be involved in the study.

**Confidentiality:** There will be no mention of your name on the questionnaire that will be used for the study. The consent form with your name will be kept separately from the questionnaire by the researcher.

**Research-related Injury:** The nature of the study does not have the risk of you being injured.

**Persons to Contact in the Event of Any Problems or Queries:** Please contact the researcher: Ms T.T. Mahaye on 079 388 5953, Prof MN Sibiya (Supervisor) on 031-373 2606 or the Institutional Research Ethics administrator on 031-373 2900. Complaints can be reported to the DVC: TIP, Prof F. Otieno on 031-373 2382 or [dvctip@dut.ac.za](mailto:dvctip@dut.ac.za).

## Appendix 4b: Consent



### Statement of agreement to participate in the research study:

- I----- (participant full name), hereby confirm that I have been informed by the researcher Ms TT Mahaye about the nature, conduct, benefits and risks of this study – Research Ethics Clearance Number-----.
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a 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**  
**Thumbprint**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Time**

\_\_\_\_\_  
**Signature/**

**Right**

I, \_\_\_\_\_ (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

\_\_\_\_\_  
**Full Name of Researcher**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Full Name of Witness (If applicable)**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Full Name of Legal Guardian (If applicable)**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature**

## Appendix 5: Questionnaire

**Title: The practice of nurses in the prevention of multidrug-resistant tuberculosis.**

Thank you for agreeing to participate in the study. Please provide the following information by placing a cross in the appropriate block.

### 1. Demographic data

#### 1.1. Race

Black	
White	
Coloured	
Indian	

#### 1.2 Age.....

#### 1.3 Staff category

Professional	
Enrolled nurse	

#### 1.4 Highest qualification

Nurse training-2 years	
Diploma in Nursing	
Bachelor's Degree in	
Honor's Degree	

#### 1.5 Gender

Male	
Female	

1.6 Years of experience in TB unit

Less than 5 years	
5-10	
11-15	
16-20	
21-25	
More than 25 years	

**2. To determine factors which affect the performance of nurses in the control of TB**

2.1 Have you attended any short courses in TB?

Yes	
No	

2.1.1 If yes how long was the course?

.....

2.1.2 What was the course?

.....

2.2 What category of TB patients are admitted in this unit? (Select **ONE** option only).

Only confirmed TB patients	
Only unconfirmed TB patients	
Both confirmed and unconfirmed patients	

2.3 What is the maximum number of patients this unit can accommodate?

Up to 15	
16-20	
21-25	
26-40	
More than 40	

2.4 Indicate the staff allocation in each category for this unit.

Staff Category	Number of
2.4.1 Registered nurses	
2.4.2 Enrolled nurses	
2.4.3 Nurse assistants	

2.5 On average, what is the nurse to patient ratio in this unit?

..... nurses to .....patients

2.6 Indicate your agreement with the following statements.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
2.6.1 Generally, I am able to cope with the work load in this unit.					
2.6.2 There are enough resources with regard to the prevention of infection in TB ward.					
2.6.3 I take measures to prevent transmission of infection in between patients.					
2.6.4 The unit is overcrowded					
2.6.5 TB drugs are consistently available.					
2.6.6 A doctor is available 24 hours a day					
2.6.7 Health care workers take measures to check for signs of TB in patients suffering from chronic illnesses like diabetes.					

2.7 Indicate the frequency with which you practice the following preventative measures

PREVENTATIVE MEASURES	Never	Rarely	Sometimes	Often	Always
2.7.1 Wearing a surgical mask which covers mouth and nose.					
2.7.2 Practising cough hygiene, i.e. covering my mouth and nose by flexing my arm.					
2.7.3 Placing patients in a well ventilated area.					
2.7.4 Using Hibitane spray after attending to each patient.					
2.7.5 Collecting sputum from patients who have been coughing for two weeks.					

2.8 What is the turnaround time for T.B. smears? (Select ONE option only)

Up to 24 hour	
Up to 48 hours	
Up to 72 hours	
More than 72 hours	

2.9 When do you start giving treatment to confirmed cases of T.B? (Select **one** option only)

Immediately	
Within 24 hours	
Within 24 to 48 hours	
After 48 hours	

### 3. To explore the factors influencing the prevention of MDR-TB

3.1 Indicate the frequency of the following actions.

<b>ACTION</b>	<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Often</b>	<b>Always</b>
3.1.1 I give health education to patients suffering from TB about the importance of taking TB treatment at home.					
3.1.2 I give prophylactic treatment to patients exposed to MDR-TB					
3.1.3 I take history from patients with TB about TB contacts at home.					
3.1.4 I give health education about safe coughing practices at home.					

3.2 Indicate your agreement that the following measures are taken if a patient interrupts treatment after less than a month.

<b>MEASURES</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
3.2.1 If possible: Trace the patient, if they have not returned for treatment, and address the problem with counselling and continue treatment					
3.2.2 If possible: Educate the patient on the necessity of continuing treatment					

3.3 List three benefits of contact tracing?

3.3.1.....

3.3.2.....

3.3.3.....

3.4. Indicate your agreement with the following statements.

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
3.4.1 I think T.B. training is important in the management of TB					
3.4.2 I give health education to patients about healthy eating					
3.4.3 I give health education to patients about avoiding smoking					
3.4.4 I give health education to patients about avoiding alcohol					
3.4.5 I give health education to family members accompanying a relative with TB					
3.4.6 Health education to the community is important for the prevention of MDR-TB					

**Thank you for participating in the study.**