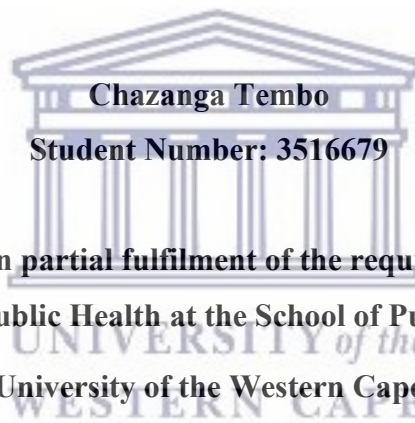




**AN EXPLORATION OF THE FACTORS WHICH CAN CONTRIBUTE TO
NOSOCOMIAL TB INFECTION AMONG HEALTHCARE WORKERS IN A
PUBLIC HOSPITAL IN FREE STATE PROVINCE, SOUTH AFRICA.**



**A mini-thesis submitted in partial fulfilment of the requirements for the degree of
Master in Public Health at the School of Public Health,
University of the Western Cape**

Supervisor: Nikki Schaay

7 March 2019

Key Words

Tuberculosis

Nosocomial TB infection

Healthcare Workers

Hospital Setting

TB Prevention and Control

Occupational health

Qualitative research methods

Free State Province

South Africa



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ABSTRACT

Introduction

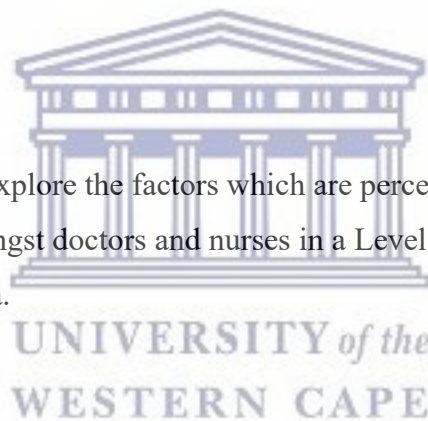
Despite ongoing training provided to healthcare workers (HCWs) on tuberculosis infection prevention and control (TB IPC), at the health institution and implementation of TB IPC precautions, nosocomial TB infection within the hospital persist. The facility's 2017 *Occupational Infection & Needle Prick Report* showed the proportions of new nosocomial TB infection cases among HCWs rose steadily from (5.6%) n=2 in 2013/14, (7.8%) n= 4 2015/16 and (9%) n=7, to (11%) n=11 cases in 2017/18. Study findings confirmed high new nosocomial TB infections among HCWs and a likelihood that these cases were usually under-reported meaning the problem of nosocomial TB infection among HCWs was actually bigger than understood at the hospital. In fact during the period of the mini-thesis study (July 2018) alone, three (3) cases of nosocomial TB infections were reported among HCWs (a porter and 2 nurses).

Aim

The aim of this study was to explore the factors which are perceived to be contributing to nosocomial TB infection amongst doctors and nurses in a Level 2 referral hospital in the Free State Province of South Africa.

Methodology

This exploratory descriptive study used qualitative research methods. Ethical approval and permission to conduct the study was obtained from the University of Western Cape Research Ethics Committee and the Free State Department of Health Research and Ethics Committee respectively. Qualitative data was collected during face-to-face interviews using a semi-structured interview guide to explore health workers experiences of factors which they believe are and can contribute to nosocomial TB infection in the study setting. Purposive sampling methods were utilized to identify study participants. Six HCWs participated in the study and the data from their interviews was analysed using thematic content analysis. Throughout the research study, I was guided by ethical principles in ensuring that all participants were able to make informed decisions regarding their participation in the study and that appropriate measures were taken to safeguard their anonymity and confidentiality of the data that was being collected.



Findings

Overall, nosocomial TB infections among HCWs in the study setting were confirmed to be a significant occupational challenge. However, despite this, HCWs expressed a strong sense of responsibility and duty for caring for their patients. The interviews revealed a number of factors that were raised as contributing to nosocomial TB infections in this setting: these included a particularly weak patient triage system, the limited use of N95 masks in non-TB wards, a lack of proper ventilation in some doctors and nursing consulting rooms, improper uniform or the use of personal garments such as warm clothing during winter and non-functioning or subserviced ultra violet (UV) lights in most parts of the hospital. The interviews also revealed that HCW practices and administrative control measures were found to be the first line of defence against nosocomial TB transmission within the hospital.

Conclusion

The findings from this study strongly support the need for diligent implementation of a comprehensive TB-IPC policy to ensure consistent application of TB-IPC measures within this hospital setting. It is thus recommended that the hospital conduct a regular, scheduled surveillance of TB disease among HCWs along with strengthening mechanisms for promptly identifying people with TB symptoms (triage), separating infectious patients, controlling the spread of pathogens (cough etiquette and respiratory hygiene) and minimize time spent in TB high risk areas by, for instance, instituting regular staff rotations. Lastly, the implementation of the TB-IPC should be intensified especially in the non-TB wards.

Declaration

I hereby declare that “An exploration of the factors which can contribute to nosocomial TB infection among healthcare workers in a public hospital in Free State Province, South Africa” is my own work and that this research work has not been submitted for any degree or examination in any other university, and that all sources I have used or quoted have been indicated and acknowledged by complete references.

Full Name: Chazanga Tembo

Date: 7 March 2019

Signed:



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Abbreviations

CDC	Centre for Disease Control
FS DOH	Free State Department of Health
HIV	Human Immunodeficiency Virus
HCWs	Healthcare Workers
HSRC	Human Sciences Research Council
LMICs	Low to Medium Income Countries
MDR TB	Multi Drug Resistant Tuberculosis
MPH	Master of Public Health
NDOH	National Department of Health
OPD	Out Patient Department
SA	South Africa
SSA	Sub-Saharan Africa
SOP	Standard Operating Procedure
TB	Tuberculosis
TB IPC	Tuberculosis Infection Prevention & Control
UWC	University of the Western Cape
UVGI	Ultraviolet Germicidal Irradiation
WHO	World Health Organization
XDR TB	Extensively Drug Resistant Tuberculosis

CHAPTER ONE

A DESCRIPTION OF THE STUDY

1.1 Introduction

Tuberculosis (TB) remains one of the greatest public health challenges of our time (Rasanathan et al., 2011). In 2013 globally, 10.6 million people became sick with TB, the second leading cause of death after human immunodeficiency virus (HIV) (World Health Organization (WHO), 2013). The Center for Disease Control (CDC), defines TB as a communicable disease caused by mycobacterium tuberculosis, an organism that is most commonly transmitted by inhaling airborne droplets expelled by the cough of a person with infectious tuberculosis.

South Africa is one of the countries with the highest burden of TB, with an estimated TB incidence of almost 500 000 cases of active TB in 2011 according to a WHO Report released in 2016. This is particularly high in a population estimated at 56.52 million (Statistics South Africa, 2017). Consequently, an increased risk of TB has been documented amongst all categories of health care personnel (including facility staff, community health workers and volunteers) compared to the general population (WHO, 2016; NDOH, 2015). Nosocomial infections can be described as the type of infection which occurs within a health institution (Wenzel et al., 1983). As in most low to medium income countries (LMICs), nosocomial TB infection is a significant occupational health problem among health care workers (HCWs) in South Africa (Joshi et al., 2006).

Some authors suggest that the risk of nosocomial infections appears particularly high when there is (a) increased exposure combined with (b) inadequate infection control measures (Menzies et al., 2007), within (c) certain health care settings such as operating in an in-patient TB facility, a laboratory, internal medicine, and emergency facilities (Joshi et al., 2006). Joshi et al., (2006) further assert that certain occupational categories are also associated with a higher risk of nosocomial TB infection - such as radiology technicians, patient attendants, nurses, ward attendants, paramedics, and clinical associates or clinical officers.

However, many nosocomial infections (including TB) can be prevented by using integrated universal precautions with healthcare managers supporting the implementation of

administrative, clinical and environmental controls that aim at TB infection control (WHO, 2013). According to the WHO (2013), infection control measures should be established to reduce the risk of TB transmission to both the general population and to health care personnel. The South African National Department of Health (NDoH) affirms the latter by putting in place legislation which addresses occupational health and safety in the workplace. This is evidenced by The *South Africa TB, MDR TB and XDR TB Infection Prevention & Control (IPC) Guidelines* the current version which was revised in 2015 (South Africa NDoH, 2015). According to the TB, MDR TB and XDR TB IPC guidelines (2015), it is the responsibility of hospital management and staff to minimize the risk of TB transmission in health settings.

Even though such guidelines exist, nosocomial TB infections amongst health care workers appeared to be on the rise at a regional (Level 2) hospital in the Free State Province, South Africa. From initial conversations with the clinical services Manager and Nursing Manager (November 2016), it was understood that the hospital, in line with the National Department of Health's TB IPC guidelines, had provided varied TB IPC related trainings to HCWs and had implemented the necessary infection control guidelines. However, despite the training and implementation of the TB IPC, the high rate of nosocomial TB infection within the hospital seemed to have persisted. This was evidenced in the facility's 2017 *Occupational Infection & Needle Prick Report* where the proportions of reported new nosocomial TB infection cases among HCWs rose steadily from (5.6%) (2 cases in 2013/14), (7.8%) (4 cases in 2015/16) and (9%) i.e. 7 cases in 2016/17. Of course – the figure might be higher given some HCWs might choose to consult private GPs to access TB treatment and to not disclose – with their case not being recorded by the Occupational Health & Safety department of the hospital.

This obviously raises concern amongst both HCWs and hospital management. It is important to note that during the period in which this study was conceptualized and conducted (2016 – 2018), the factors contributing to nosocomial TB infection amongst HCWs in the hospital were not well understood.

1.2 Problem statement

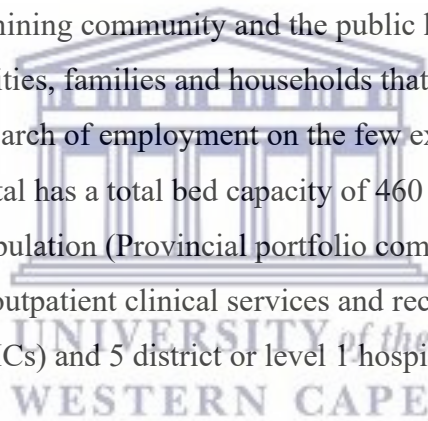
Despite ongoing training provided to HCWs at the health institution and implementation of TB IPC precautions, the high rates of nosocomial TB infection within the hospital persist. This has obvious implications for both the hospital staff and the institution: with the hospital

HCWs being at such acute risk of contracting TB in this setting the chances of them contracted TB are an ever-present threat. Once they have tested positive for TB they are unable to work which means that there are fewer trained HCWs available to provide care to TB patients in hospital. Moreover, replacing skilled members of the hospital's workforce might be a challenge, particularly in the Free State Province (Free State Department of Health, 2016) given the hospital also had the ongoing challenge of retaining staff due to its rural location (Provincial Portfolio Committee on Health, 2011).

Thus this mini thesis research study sought to explore the factors which can contribute to nosocomial TB infection within the facility and amongst its HCWs specifically.

1.3 Study setting

The study site was a regional or Level 2 referral hospital situated in the north western part of the Free State Province in South Africa. The district is largely rural with a total population of 627 626 people (19.66 per km²) according to the 2011 national census. Economically, the district was predominantly a mining community and the public health service thus largely drew its clients from communities, families and households that either worked in the mines or have migrated to the area in search of employment on the few existing mines and surrounding farmlands. The regional hospital has a total bed capacity of 460 beds and caters for about 86.3% of the entire district population (Provincial portfolio committee on Health, 2011) providing both specialist and outpatient clinical services and receives referrals from 46 primary healthcare clinics (PHCs) and 5 district or level 1 hospitals within the district.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Chapter one provided an orientation to the study by discussing the background information and the statement of the problem. This chapter reviews relevant literature starting with an overview of TB, how it is an occupational health issue and the factors which contribute to nosocomial TB infection. The TB case burden among HCWs in health facilities both internationally and within South Africa is then discussed. The chapter ends with some consideration about the recommendations that have been made in relation to the prevention and control of TB in health care settings.

2.2 Description of TB

TB can be described as an airborne disease caused by the bacterium *Mycobacterium tuberculosis* (*M. tuberculosis*). *M. tuberculosis* is carried in airborne particles, called droplet nuclei, of 1– 5 microns in diameter (Cole et al., 1998). According to Cole et al., (1998) infectious droplet nuclei are generated when persons who have pulmonary or laryngeal TB disease cough, sneeze, shout, or sing and depending on the environment, these tiny particles can remain suspended in the air for several hours. *M. tuberculosis* is transmitted through the air, not by surface contact. Transmission occurs when a person inhales droplet nuclei containing *M. tuberculosis*, and the droplet nuclei traverse the mouth or nasal passages, upper respiratory tract, and bronchi to reach the alveoli of the lungs. The TB bacteria can destroy parts of the lungs, making it difficult to breathe and can spread to, and damage other parts of the body, such as the digestive and urogenital tracts, bones, joints, nervous system, lymph nodes and skin. However, diagnosis and successful treatment of people with TB averts millions of deaths each year (Floyd et al, 2018). According to Floyd et al (2018), there are still large and persistent gaps in detection and treatment of TB.

2.3 Nosocomial TB infection

Nosocomial TB infection can be defined as TB infection which occurs within a health institution or place of work where active TB germs are present. Transmission and infection can occur from patient to patient and from patient to health care worker. In fact, TB has long been recognised as an important occupational hazard for HCWs. Transmission of TB in health care settings to both patients and HCWs has been reported from virtually every

country of the world, regardless of local TB incidence (Baussano et al., 2011). Other evidence indicates that HCWs are at increased risk of acquiring TB in settings where they are systematically exposed to both undiagnosed and diagnosed TB patients (Menzies et al. 2007). TB in its different forms is a significant occupational problem among HCWs especially in low to medium income countries (LMICs) (Joshi et al, 2006, O'Donnell et al., 2010).

2.4 Identifying the factors which contribute to nosocomial TB infection

Studies have been published internationally and in South Africa about TB infection in healthcare workers. For example, a nested case-control study conducted in India at a tertiary teaching hospital showed healthcare workers employed in medical wards who had frequent contact with any patients had a higher odds of developing TB (Mathew et al. 2013).

However, many factors can contribute to nosocomial TB infections. The risk of exposure is related to the underlying disease burden and the environment in which people live or work (Hargreaves et al, 2011; Apolinário et al., 2017; Pedrazzoli et al., 2017). There is evidence suggesting that HCWs who face frequent occupational exposure, are at particularly high risk of acquiring nosocomial TB infection (Salaniponi et al, 2008). According to Salaniponi (2008), TB patients in the hospital wards are a potential source of TB infection. In South Africa for example, over 454,000 new cases of active TB frequently end up in hospital wards every year (Floyd et al, 2018). Thus, hospitals as workplaces can become amplification points for TB transmission if infection control measures are not rigorously and routinely applied. The risk of nosocomial TB infection appears particularly high when there is increased exposure combined with inadequate infection control measures (Menzies et al., 2007). Compounding factors can include characteristics of the environment, such as airflow and number of people sharing the space (Lönnroth et al., 2009). According to Lönnroth et al., (2009) socioeconomic status can influence all stages of TB pathogenesis.

2.5 TB infection risk among healthcare workers

There is considerable evidence that HCWs in developing countries are occupationally at increased risk of TB (Jiamjarasrangsri, 2005; Zhang, 2013). Studies conducted in South Africa report the risk of contracting nosocomial TB infection amongst HCWs to be between 0.5% - 14.3% (Claassens et al., 2013; O'Donnell et al., 2010). Those at risk include not only professional health care providers, but all staff working in the hospital setting (including volunteers). Categories such as nurses, doctors, laboratory, radiology and administrative staff are at a disproportionate level of risk of contracting TB at their workplace due to the high

number of new TB infections, according to the SA TB Statistics Report (2015). This is mainly because they have direct contact with a person who has not yet been diagnosed and started on TB treatment. The heightened risk may be explained by frequent occupational exposure to patients with infectious TB disease, or due to poor infection control systems or the lack of capacity (Christopher et al., 2010). According to Christopher et al (2010), a higher risk of acquiring TB can also be associated with working in specific locations such as in-patient TB facilities or diagnostic laboratories. Other authors have also concluded that the risk of TB infection among HCWs is heightened where there are inadequate infection control measures (Menzies et al, 2007; Josh et al, 2006).

2.6 Nosocomial TB case burden among HCWs in health facilities

Various strategies, such as routine surveillance systems, could be used to evaluate the burden of TB in healthcare workers in order to calculate TB incidence, monitor trends and implement interventions to decrease occupational TB infection among healthcare workers. About 81% of TB cases among HCWs are understood to be due to occupational TB exposure with an estimated incident rate ratio of 2.6 (Baussano et al., 2011). A number of authors have concluded that nosocomial TB infections among HCWs in public sector hospitals is a serious problem (Naidoo & Jinabhai, 2006; Kanjee et al., 2007; Claassens et al., 2013). A study conducted in Uganda by Buregyeya, et al. (2012) reported five per cent (5%) of healthcare workers having had nosocomial TB infection. Similar findings were noted In Nigeria with 3.3% of healthcare workers with nosocomial TB infection (Kehinde, 2011). However, there is lack of similar evidence in South Africa. A study conducted in 2009 in five provinces in South Africa involving 659 facilities across 11 districts indicated that occupational TB incidence rate was more than double that of the general population (Claassens et al., 2013). As can be imagined, this can place a huge burden on the already stretched healthcare system and can potentially expose HCWs to new TB infections. However, the extent of the burden of TB infection in health care workers is generally underreported in South Africa (Dlamini, 2017).

2.7 TB infection prevention and control precautions in health care settings

As McCarthy et al. (2015:652) suggest there is “...an urgency to the call for improved adherence to guidelines for TB infection prevention and control, and the implementation of

occupational TB screening programmes for HCWs in health care facilities in high TB burden countries.”

This has long been advocated for by the WHO (2009), recommending regular reporting of cases of TB among staff from all facilities, and of the overall number of staff working at that facility. According to the WHO (2009), TB infection control ought not to be the sole responsibility of those working at a health facility level to put in place. However, this requires action at national and subnational level to provide managerial direction and support (WHO, 2009). Furthermore, TB infection control strategies must be implemented in a synergistic manner involving a combination of available nosocomial infection control strategies aimed at minimizing the risk of TB transmission within populations and preventing the further spread to others by people with infectious TB (Kanjee et al., 2011; WHO, 2009). Kanjee et al., (2011) argue that health workers' knowledge and attitudes are generally supportive of TB infection control measures. Salaniponi et al, (2008) suggested that work practice and administrative control measures have the greatest impact on preventing TB transmission within health care facilities. Such control measures serve as the first line of defence for preventing the spread of TB in health care settings. The goal of such measures is to prevent TB exposure to staff and patients, and to reduce the spread of infection by ensuring rapid diagnosis and treatment.

Available evidence therefore suggests there is growing consensus in tuberculosis control and investment in strengthening tuberculosis prevention, diagnostics and treatment but also action on the social determinants of tuberculosis (Hargreaves et al, 2011). A qualitative case study examining TB infection control at primary healthcare (PHC) level in Free State South Africa showed that strategies for improved TB infection control should include training for comprehensive TB infection control for all HCWs; clarifying TB infection control policy guidelines; improving patient education and awareness of TB infection control measures; emphasizing the active role HCWs can play in infection control as change agents; improving social support; practical, hands-on training or role playing to improve behavioural skills; and the de-stigmatisation of TB/HIV among HCWs and patients (Zinatsa et al, 2018). Similarly, another study evaluating the risk of incident TB infection among healthcare workers in South Africa indicated that more effective TB infection control should be implemented in South African health care facilities as well as putting more resources towards improving active surveillance of all hospital-acquired infections among HCWs, including TB (McCarthy et al.,

2015). Positive attitudes and good levels of knowledge regarding TB infection control were the main factors associated with good infection control practices (Engelbrecht et. al 2016). Other authors Blumberg et al., (1995) in their study about the efficacy of expanded tuberculosis infection control measures, consisting primarily of administrative controls, established that TB infection control measures can effectively prevent nosocomial transmission of tuberculosis to health care workers. However, identifying mechanisms to ensure compliance by health professionals remains a perplexing problem. Challenges regarding TB infection control and TB in hospital-based healthcare workers continue to persist, particularly administrative measures which are generally poorly implemented in many of facilities in South Africa (Farley et al., 2012). Dlamini (2017) notes that the expansion of control measures, political commitment and availability of financial resources are the cornerstone of successful TB prevention.



CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter outlines the aim and objectives of the research study. It describes and justifies the research design and methodology used to collect and analyse the data, identifies the limitations of the study and outlines the ethical considerations employed in the process of collecting and presenting the data.

3.2 Aim and Objective of the research study

The aim of the research study was to explore factors which contribute to nosocomial TB Infections among doctors, nurses and administrative staff in a public hospital in Free State Province, South Africa.

The objectives of the study were to:

- Collect qualitative information in order to determine whether nosocomial TB infection is a significant problem amongst doctors, nurses and administrative staff operating at a government run public hospital in Free State province;
- Explore and identify risks doctors, nurses and administrative staff face in relation to nosocomial transmission of TB within a level 2 public hospitals;
- Explore and identify any challenges that doctors, nurses and administrative staff might be facing in adhering to the current infection control policies, guidelines and or protocols when managing patients with TB;
- Make recommendations on how to implement existing hospital's TB infection prevention and control policy and SOPs so as to prevent nosocomial TB infection amongst doctors, nurses and administrative staff in the hospital.

3.3 Methodology

3.3.1 Study design

This was an explorative research study that used qualitative research methods. Observations of the study setting and in-depth interviews with health workers were used to explore and consider the potential factors that were thought to be contributing to nosocomial TB Infections among doctors, nurses and administrative staff in a TB pathogenesis public health hospital in a rural district in South Africa. As Mays & Pope (1995) suggest this approach is useful in understanding health behaviours and people's beliefs and also how people

experience phenomena in unique ways. A qualitative approach was considered appropriate for this study as it seeks to describe the lived experiences of respondents and facilitate responses to the questions of “why”, “what”, and “how” (Green and Thorogood, 2004).

3.3.2 Sampling: Study Population, Sample Size and Procedure

Sampling is defined as an investigation of a small but well-chosen group of persons representing a much wider group - the latter often referred to as the study population (Bless and Higson-Smith, 1995). In qualitative research, the intention is to describe the experiences and perceptions of a phenomenon rather than its distribution, and a qualitative study is thus not concerned with ensuring that its findings can be generalizable (Liamputtong and Ezzy, 2005).

From a population of 318 healthcare workers employed at the hospital at the time of data collection in this study, a sample of 8 HCWs in different categories was identified as a realistic number to aim for given it covered a reasonable range of portfolios within the setting and was manageable in relation to the resource constraints. These included the following portfolios:

a) Health Professionals

- Three (3) nurses: (2 nurses operating in the adult male and female wards, and 1 nurse from the paediatric ward)
- One (1) doctors who provides care to adult, and paediatric patients at the hospital

b) Administration or Management

- Two (2) officials from the hospital administration in senior portfolio of management
- One (1) infection control officer based at the hospital who oversees hospital infection control precautions

Unfortunately two of the above respondents (one of the Doctors and one of the administration staff) cancelled their interviews at the last minute on the last day of the field work, and the I was not able to re-schedule their interviews or to find alternative respondents to replace them. The Free State province as a whole had in the recent past suffered a great loss of doctors to other provinces such as Gauteng, and therefore the few remaining at the hospitals are over stretched and could not be available to participate in the study. Specific to the cancelled

interviews, in one instance, the HCW confirmed their participation a week before the interview with the research but did not show up at the agreed time for interview, and in the other instance the participant switched off their phone after confirming a 3:00pm interview on the Friday afternoon, leaving me with no time to establish a replacement interview.

This descriptive, qualitative research study thus used a non-probability sampling technique called purposive sampling to identify a small group of participants (Ritchie et al., 2003). The main reason for using purposive sampling in this study was to attempt to gather together a range of perceptions across both health worker and management categories working within the institutions.

In preparing for data collection, I was assisted in introducing the study to stakeholders within the institution by the Clinical Services Manager who identified potential staff members in each of the above staff categories. Prior to the commencement of this phase, all relevant personnel at the hospital were informed about the proposed study, and specifically its purpose, objectives and requirements in terms of potential respondents. This was communicated to stakeholders through a senior management meeting within the hospital. Once this was done, potential interviewees were contacted by the Clinical Services Manager and if they expressed a willingness to take part in the study they were then contacted by myself via telephone. During these telephone calls I explained to them the details of the study and request their voluntary and informed participation in the study and if they were still willing to be a study participant– a suitable appointment date, time and venue for the interview was then agreed upon. All participants suggested that an appropriate time to conduct the interviews would be in the afternoon – at the end of the day before their duties at the hospital ended. A week prior to the scheduled interviews, I contacted the research participants individually to remind them about the planned interview and to confirm whether the agreed upon time was still suitable for the participants.

3.3.3 Data collection methods and procedures

Semi structured, face to face interviews designed to elicit a vivid picture of the participant's perspective on the research topic and detailed information about a person's thoughts and behaviours (Boyce & Neale, 2006) were used in this study. This method offered me an opportunity to modify his enquiry and follow up interesting responses in a way that a

questionnaire may not be able to do so (Mack *et al.*, 2005). The interviews with the 6 participants were conducted over 2 days in June 2018.

At the start of each interview, I explained the purpose of the interview using the information sheet (Annex 1) as a guideline. I then went through the consent form which he read out loud together with the participant (Annex 2). In this process the interviewee was reminded that they could freely and voluntarily agree to participate or not to participate in the study.

Interviews were recorded using a digital recorder and the recordings kept in a secure and safe place by myself during the study and the data will continue to be kept for 5 years after the study. Polgar and Thomas (2011) suggest that methods of recording information should be well thought through. Therefore prior to recording interviews, I ensured that the recorder was in correct working order and that it was able to capture the conversation audibly. The hospital administration provided a quiet space for the interviews to take place in (the boardroom), and relevant staff members were notified that the board room would be in use for the interview so that there was no disturbance. During the interview, the participant sat across the boardroom table and maintained eye contact with me being the interviewer. This allowed me to observe other body language expressions and the recorder was placed in the middle, closest to the participant for quality capturing of their voice. Guion (2006) suggests that a skilled qualitative interviewer is one who is a good and active listener, patient enough to allow interviewees to speak, able to notice and react to non-verbal clues, flexible, open minded, and willing to release power and control.

Liamputtong & Ezzy (2005) further suggest that a good interview is like a good conversation and it's a two way affair. In fact, Patton (2002) notes that it is a conversation or dialogue between an interviewer and interviewee in which meanings are negotiated and reformulated. More practically, Berry (1999) notes that the interviewer must ask clear questions, ask single questions, ask truly open ended questions, sequence the questions, probe and follow up questions, interpret the questions, avoid sensitive questions, encourage a free rein but maintain control and lastly be able to establish rapport. Based on these criteria, I was able to address the critical steps in conducting the interview by carefully listening, responding and encouraging the interviewee to explain some of the points they had raised. An interview guide was used to guide the interviews (Annex 3). Interviews lasted for approximately 45 minutes. I closed the interview by asking whether the participant had any questions. On all

occasions of the interviews, participants did not ask any questions. I thanked the participants for accepting to be interviewed and ended the interview.

3.3.4 Data analysis

After collecting the data, I transcribed the audio recordings verbatim. A colleague volunteered to listen to the recordings so as to check the accuracy of the transcriptions. Minor corrections were made to the transcripts. An inductive approach was utilized for data analysis. All parts of the data transcripts were read several times, and open coded. Similar codes emerging from the data were then merged. Thematic coding analysis is a generic approach to the analysis and pattern recognition of qualitative data (Robson, 2011; Rice & Ezzy, 1999). Rice and Ezzy (1999) suggest that thematic coding analysis is a form of pattern recognition within the data, where emerging themes become the categories for analysis. By implication, the approach is a search for themes that emerge as being important to the description of the phenomenon (Daly, Kellehear, & Gliksman, 1997). Moreover, thematic coding analysis was used inductively where the codes and themes emerged purely from interaction with the data (Robson, 2011).

In practice this involved familiarizing myself with the data. At this stage, I “immersed” myself in the raw data by listening to the recorded interviews, reading and re-reading the transcripts and studying the field notes and noted down a list of key and recurrent ideas and themes. Through this process I was able to identify key issues, recurring and emerging themes, common ideas or issues between the interviews and began to identify relationships between the various themes. In other words, at this stage I was able to identify analytical categories and theoretical explanations (Pope *et al*, 2007). Thus I devised a framework or template inductively by interacting with the data. Thereafter, I developed a thematic map of the analysis by charting or rearranging the data according to the appropriate part of the thematic framework to which they relate (Robson, 2011; Aronson, 1995). I examined all the data within a particular category, looking for key ideas within it, similarities and differences in the way the participants responded to similar questions. Recurrent themes were elicited for further explanation and they served as basis for further analysis and interpretation (Robson, 2011). At this stage, I identified all the key issues, concepts, and themes by which the data was examined and referenced (Robson, 2011). I inductively weaved the analytical categories and explanations which emerged from the data into a logical narrative taking into account the research question and objectives of the study. Thereafter, I explored, described, summarized

and interpreted the patterns. The process of mapping and interpretation was influenced by the original research objectives as well as by the themes that emerged from the data themselves. Following that, I put together the interpretation of the data and in writing the narrative, some information was quoted and presented verbatim from the sources to reinforce findings of the study (Terre Blanche, Durrheim & Kelly, 2006).

3.3.5 Study Rigor

To achieve rigor in this study, I attempted to provide a detailed description of the study setting, the study participants and the themes that were identified within the data in order to allow the audience to judge for themselves this study's applicability or transferability to other settings or similar contexts (Lincoln and Guba, 1985; Mays and Pope, 1995). I also worked closely with my supervisor for the mini-thesis who provided on-going technical support and guidance throughout the research process. During the process, I kept records of interview schedules, observations, verbatim transcriptions and the original recordings of the interview: all of which are available for review by others. Finally, I also provided a detailed description of the data collection methods to allow others to assess how transferable the research findings are (Sinkovics, Penz & Ghauri, 2008).

3.4 Limitations

There are a number of limitations of this study. Firstly, the study focused on a rural hospital setting and therefore some of the challenges reported by the health care team are very likely to be unique to this rural setting. A study focusing on such health facilities in both rural and urban settings would be ideal to further investigate these findings and the issue of nosocomial TB infection in general within hospital settings in South Africa.

Secondly, another limitation was experienced in terms of time and funding. The study site was identified while I lived and worked in the Free State Province but by the time the protocol was finalized and ethics approval granted, I had transferred to another workplace and province over 350Kms away from the study site. Given that I was still on probation in my new role at a different organization based in Gauteng province, I had limited annual leave days and thus could not take leave. As such, I was restricted in terms of time for data collection. As a result all the interviews with respondents were scheduled over a two day period – and when two of the eight confirmed participants were not able to make their interviews at the last minute it was not possible for me to re-schedule the interviews with

them or find alternative interviewees at such short notice. Thus, given the small study sample (6 participants) the findings of this study, whilst still valid, ought not to be over exaggerated.

3.5 Ethics Statement

The protocol for this study were reviewed and approved by the University of Western Cape Research Ethics Committee on 07 December 2017(Appendix 4) and the Biomedical Research Ethics Committee from the Free State Province Department of Health in South Africa on 05 February 2018 (Appendix 5). In addition, permission was sought and granted from the Chief Executive Officer (CEO) of the hospital on 11 May 2018 following a series of follow up telephone calls to the CEO's Personal Assistant to enable the investigator to conduct the interviews with the staff. Ethical principles guided me in assisting him to both meet the goals of the research as well as to maintain the rights of the research participants (Orb et al., 2001). For example, I ensured that participants were sufficiently informed about the purpose and process of the study, the potential risks in participating in the study and ensuring that their participation was of a voluntary nature. This was conveyed to them through the information sheet and the informed consent procedures (Appendix 1 and 2). No names or personal identifiers were used in the write-up and presentation of the data. To ensure that the autonomy and respect and dignity of the interviewees was observed, participants were informed that they could withdraw from the study at any stage of the research if they so wished. In addition, the participants were informed that they did not have to answer any questions that they found uncomfortable so as to ensure that harm either as a direct or indirect consequence of the research was minimized (Wassenaar, 2015). To ensure privacy, interviews took place in a private location that was chosen by the Clinical Services Manager. To protect the confidentiality of the study participants, pseudonyms were used in all the transcribed transcripts and the data collected (along with the original recordings) is saved on a password protected computer. Furthermore, the identity of the hospital where the study was undertaken has not been revealed.

CHAPTER FOUR

PRESENTATION OF THE RESULTS

4.1 Introduction

This chapter describes the findings from the research study. The chapter starts by describing my observations of the study sites by commenting on general hygiene and upkeep of the hospital and TB prevention materials for health education displayed at various sections of the hospital. These materials informed the public and reminded the staff about precautions in relation to TB infection. This is then followed by a detailed description of the study sample and their characteristics. Subsequent sections illustrate the key themes that emerged from the interviews.

4.2 General hygiene observation of the hospital



There was also a designated IPC officer whose job most importantly was to ensure infection control. The occupational health department was also active and provided support to HCWs in terms of regular TB screening, IPC trainings and, or facilitating compensation to HCWs who were infected nosocomially.

4.3 Description of sample & characteristics

A total of six out of the eight of the previously confirmed participants were interviewed. This included doctors ($n = 1$), professional nurses ($n = 3$), an infection control officer ($n = 1$) and a senior member of the hospital administration ($n = 1$).

Table 4.1: Respondents Interviewed

Staff Cadre interviewed	Gender		Years of service at the hospital
	Male	Female	
Nurse		x	10
Nurse	x		8
Nurse		x	12
Doctor		x	6
Infection Control Officer		x	7
Senior Manager	x		3
TOTAL	2	4	46 years

Four out of six study participants were female as illustrated above and all of the 6 participants interviewed were of black African ethnicity. Out of the 8 interviews that were originally scheduled only 6 were successfully conducted due to unanticipated and competing priorities that two respondents had to respond and manage at the last minute during the data collection period.

4.4 Data Analysis

Four recurrent and interconnected themes emerged during data analysis. Theme identification is one of the most fundamental tasks in qualitative research (Strauss, 1987). These key themes were identified by reading the interview transcripts and noting the insights, issues and experiences that the respondents mentioned across the six interviews. Guided by the interview schedule and the issues that interviewees raised across the six interviews I identified a set of 4 key themes which I thought were important. Further line-by-line analysis of the transcripts surfaced a number of sub-themes linked to each of the 4 key themes. Both these key- and sub-themes were then shared with my supervisor and as a result of further dialogue the following set of themes and sub-themes was finally agreed upon:

Table 4.2 Illustrates key & sub-themes identified during analysis

KEY THEMES	SUB THEMES
<p>1. Perception of nosocomial TB infection among HCWs at the hospital</p>	<ul style="list-style-type: none"> • Nosocomial TB infection is a significant challenge among HCWs at the hospital • Nosocomial TB Infection cases are not always reported by HCWs • Nosocomial TB infections among HCWs are common in perceived low risk areas of the hospital such as casualty section and other non TB wards • Knowledge of any case of nosocomial TB infection in the hospital
<p>2. Factors related to what can contribute to increased risk of nosocomial TB infection among HCWs on the job</p>	<ul style="list-style-type: none"> • HCWs Attitudes towards TB IPC • Weak or lack of patient triage system • Lack of use of N95 masks • Hospital structural issues e.g. small windows at the top in some consultation rooms • HCWs improper uniform • Work overload and general understaffing • Non adherence to TB IPC provisions by HCWs
<p>3. HCWs experienced risk of nosocomial TB infection</p>	<ul style="list-style-type: none"> • Fear of TB infection • A wake-up call to hospital management
<p>4. Recommendations by HCWs on what can be done to prevent nosocomial TB infections among HCWs</p>	<ul style="list-style-type: none"> • Continuous reminder about the risk of nosocomial TB infection • Treat non-TB wards as high risk areas for nosocomial TB infections • Make N95 Masks more readily available in non TB wards such as casualty section • HCWs should eat healthily and conduct regular breaks while on duty

4.5 Presentation of Findings

This part of the thesis reports on the findings from the six semi-structured interviews which were conducted with the purposely selected respondents. The key themes as indicated in table 4.2 above will provide the framework for how the broad issues emerging from the interviews are presented in this chapter and the nuances of the sub themes will be explored in greater detail, along with the literature, in the next chapter.

Theme 1: Perception of nosocomial TB infection among HCWs at the hospital

In order to discuss the perception held by HCWs of nosocomial TB infection at the hospital, it is important to determine whether HCWs believe nosocomial TB infection is a significant problem. According to Claassens et al, (2013), the high rate of TB in healthcare workers suggests a substantial nosocomial transmission risk particularly in hospital-based HCWs in South Africa. Study participants noted that nosocomial TB infection was a significant challenge at the hospital, especially among the nurses. The heightened risk may be explained by frequent occupational exposure to patients with infectious TB disease, or due to poor infection control systems or the lack of capacity (Christopher et al., 2010). As one HCW noted:

“Yes. I think it is significant because there is a lot of nurses that I know who have taken the TB treatment in the recent past. I’m one of them! In 2015, I was diagnosed with TB and I took TB treatment. So, I think really, really it is [TB] a significant challenge” Healthcare Worker, 8 years of service

The infection control officer explained that of late, nearly every month, there is a report of a newly diagnosed TB patient that is a staff member at the hospital. However, it was suggested by four out of six study participants that nosocomial TB Infection cases are not always reported by HCWs. Some of the study participants were in fact, not aware of any case of nosocomial TB infection in the hospital.

“Maybe because of stigma attached to the HIV and the TB status, so some of them [healthcare workers] tend to hide their diagnoses”. Health Worker, 10 years of service.

However, contrary views were observed in another interview where the study participant noted that nosocomial TB infections were not considered to be a problem – at least amongst doctors:

“(I am) mostly only concerned with the doctors... I don’t think it’s [nosocomial TB infection] a challenge among doctors because I have not encountered any reports of doctors being infected.” Senior Manager, 3 years of service

Another study participant noted that they felt that HCWs did not report nosocomial TB infections because hospital management did not provide enough support to those who are infected whilst on duty:

“You know, I think what is in their [hospital management’s] minds mostly (is that) they will talk about compensation. I didn’t even know about compensation. I even told them that, what I want is for me to be healthy... (but) they were saying no we cannot compensate”.

Healthcare Worker, 8 Year in service

Theme 2: Factors related to what can contribute to increased risk of nosocomial TB infection among HCWs on the job

Many factors can contribute to nosocomial TB infections. For example, the risk of exposure is related to the underlying disease burden and the environment in which people live or work (Hargreaves et al, 2011; Apolinário et al., 2017; Pedrazzoli et al., 2017). In order to understand fully the perceptions held by HCWs of the specific factors which can contribute to nosocomial TB infection, I considered the HCWs’ attitudes towards TB IPC, patient triage system at the hospital, the availability and utilization of N95 masks and the use of personal garments – the latter being an issue that arose during the course of the interviews.

A common theme when exploring factors which can contribute to nosocomial TB infection amongst the study participants was the attitude of the HCWs towards the risk of infection. More than half of the study participants said were aware of TB IPC precautions, but did not always use simple protective guidelines or equipment which can prevent the transmission of TB.

“You know sometimes you tend to overlook some of the things (TB IPC): Like for instance when you are on duty you use the N95 masks...to open the windows and the doors when you are with patients or to let those who are coughing to be seen first so that you minimize the infection” Healthcare Worker, 8 Years of service

In order to understand why HCWs did not always use TB IPC precautions, I explored with the health workers some aspects of their work practice. Salaniponi et al, (2008) suggested that practices in the workplace have the greatest impact on preventing TB transmission within health care facilities. Such control measures serve as the first line of defence for preventing the spread of TB in health care settings. One of the common themes occurring in the interviews was the practice of not opening windows in areas where patients congregate.

For example, the opening of windows, it is a problem at this hospital. When you [HCW] are coming into the unit [TB unit] you would find that the windows are closed but on the windows there are stickers that say “open the windows”. Infection Control Official, 7 year of Service

Opening windows in the wards and use of natural light is important and is highlighted as one of the preventative measures in the TB IPC. Study participants were certainly aware of and understood the importance of using such protective measures but appeared to continue to work in situations of risk:

“This is my consulting room. No I don’t have good ventilation. You can see my windows are there [points to the top in the roof], they up and you cannot even feel any movement of air. Mhmm, so no, ventilation is not that good and I don’t have blue lights [UV] here. That side is even worse, no window, no lights, no nothing and is winter we want to close the door”

Healthcare Worker 6 years of service

Published findings suggest that HCWs are at increased risk of acquiring TB in settings where they are systematically exposed to both undiagnosed and diagnosed TB patients (Menzies et al, 2007). Compounding factors within a healthcare setting can include characteristics of the environment, such as airflow and number of people sharing the space (Lönnroth et al, 2009).

Unfortunately, in some instances when HCWs did not use protective equipment, they relied on their “expert knowledge” suggesting that it will take 8 hours to contract TB if they are in the same room with a person who is coughing.

“Yah, most of the times I do it [use protective equipment], but when I don’t, do it [seek protective gear], I’m like okay they say it will take me 8 hours to contract TB if am in the same room to be with a person coughing.” Healthcare Worker 8 years of service

The weak patient triage system at the hospital was raised by a number of participants during the study. Without a well-functioning triage system at the hospital, all patients referred to the hospital from primary health facility congregate in the casualty ward. This is where infectious TB droplet nuclei are generated when persons who have pulmonary or laryngeal TB disease cough, sneeze, shout, or sing and depending on the environment, these tiny particles can remain suspended in the air for several hours (Cole et al., (1998).

“Unfortunately our triaging system is not up to scratch. So we don’t actually get to pick the coughing patients, or your query TB suspect patient early. They just queue along together with other patients.” Healthcare Worker, 6 Years of Service

“So, I see patients quickly – (so as to try and) clear the line. That’s how I argue it out - can you believe it? Yoh, so no I don’t always use TB IPC.” Healthcare Worker, 6 Year of Service

However, one participant noted that there *is* a patient triage system in place although acknowledged it is a recent development at the hospital.

“Patient triage is there. It is a recent attempt whereby, we separate the TB suspects while you are still waiting for the results for confirmation” Administration or Management, 3 years of service

Another important theme that arose was the ever-present sense of how HCWs shared how they feel or (somewhat irrationally) believe they are immune to TB infection. This is despite the TB in-service trainings which is reportedly provided every Tuesday to HCWs.

Unfortunately, it was also noted that most HCWs do not attend this weekly TB IPC training session which is provided by the occupational health unit.

“I think as health care workers we think that we are immune to these things [TB infection], that’s the problem” Healthcare Worker, 12 year of Service.

The lack of correct and consistent use of N95 masks is also a key factor contributing to nosocomial TB infection. While some study participants reported consistently using N95 masks, many of them reported they did not.

I make sure that I don’t get in there without taking the N95 mask. It’s good that after leaving that ward I must leave that mask there. I believe that just moving around with that mask all over the place you know, can contribute to the spread [TB]. There is a Doctor that I am trying to warn all the time.” Senior Manager, 3 years of service

Five of the study participants observed that N95 masks were not readily available when needed especially in non TB wards of the hospital such as the casualty ward. HCWs in this ward interact with undiagnosed patients- some of whom might have TB. Cases of TB infection in such areas that were of seemingly low risk areas were noted.

“(There is) a porter now on TB treatment. A porter! A porter is wheeling, transporting patients to the wards, he goes everywhere without a mask and I have got another one [another HCW] in an orthopaedic ward. So you see, those are accordingly seen as the low risk areas especially the orthopaedic ward, because the patients there are straight forward, with fractures. In those wards we don’t use masks and therefore can get TB while working there.” Healthcare Worker, 10 Year of Service

However, another important view was raised where a study participant was ambivalent about whether they would use N95 masks (even if they were readily available) as they had experienced that the N95 was suffocating to use.

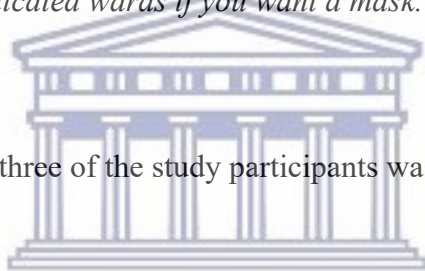
“We don’t have masks: You know, but then I wonder if we had, will I use them? We [HCWs] know the right things, but personally, I don’t know why...but the N95, that thing is suffocating. Eish, that’s the truth man. I should tell the truth, so [giggles]. I don’t want to use the N95 Mask because I need to make clinician-patient contact.” Healthcare Worker, 6 Years of Service.

The study also identified some structural and administrative issues around TB precautionary measures such as UV lights being put in place more in the TB wards than other parts of the hospital, such as the casualty or maternity wards.

“Sometimes the people are at risk due to structural issues of the hospital, though some of the things we [HCWs] are contributing.” Infection Control Official, 7 year of Service.

One of the participants gave a specific example of this:

“Uhhh, like your blue lights [UV] are fully functioning there [TB wards], N95 masks are provided there, and some areas such as the maternity ward also have got blue lights. But then, uhhh casualty we don’t have blue lights in casualty. There are no masks in casualty, so you have to go to those TB dedicated wards if you want a mask.” Healthcare Worker 6 Years of service.



Another experience shared by three of the study participants was that the hospital setting is very cold physically:

“You can even see that our hospital is every cold. HCWs tend to ignore such things (TB IPC) like opening windows during winter because the location of our department is very cold.”

Healthcare Worker, 10 years of Service

The use of personal garments by HCW was another common theme identified by some study participants as a factor contributing to nosocomial TB infections at the hospital. According to Mitchell et al, (2015), HCWs wear uniforms, such as scrubs and lab coats, for several reasons: (1) to identify themselves as hospital personnel to their patients and employers; (2) to display professionalism; and (3) to provide barrier protection for street clothes from unexpected exposures during the work shift. A growing body of evidence suggests that HCWs’ apparel is often contaminated with micro-organisms or pathogens that can cause infections or illnesses (Mitchell et al, 2015). The use of personal clothes was explained as being a means to keep warm as the hospital was cold during winters. This however, can further increase the risk of TB transmission to as far as the HCWs communities. Cross infection can happen where a HCW- say, from the TB ward, uses the same N95 or scrub in

other sections of the hospital. This can particularly be important for other HCWs such as porters who transport patients to various wards. Meaning, such HCWs must change N95 masks very often to avoid cross infection and further spread of the TB germ. HCWs' apparel is a vehicle for cross-contamination and transmission.

“The other thing with uniform, we used to be given uniform as nurses - now of late everybody is buying his own type of uniform. So if I'm wearing a golf t-shirt that is too warm or what, everybody is wearing like me now and you know what...you (then) don't control infection”.
Healthcare Worker, 10 years of service.

Another study participant reflected on a situation where a doctor's scrubs are being worn outside hospital settings or outside of a TB designated area in other wards of the hospital. This further increases the risk of cross infection:

“I remember I found someone wearing hospital scrubs at the mall, you know? People (should) wear it at only in the hospital environment...but once they leave then they can wear their own clothes. I think that one can also help, in terms of limiting the spread of TB.”
Senior Manager, 3 years of Service.

Work overload and general understaffing was also raised as another factor contributing to nosocomial TB infection at the hospital. Being under-staffed can mean that HCWs then try to “clear the patients” as rapidly as possible and “push a line”. In these circumstances they won't necessarily take precautionary measures like wearing a mask - even if the patient is coughing:

“The way we are short staffed it's not easy for you to survive the risk of TB infection. It's not easy because you find that in my clinic at the moment I am the only professional nurse working (so there is) one nurse. We're not even having the chance to go for lunch or tea sometimes. (So) when are you going to get the chance to go for your own TB screenings in the occupational health clinic? Healthcare Worker, 10 years of Service.

Non adherence to TB IPC provisions by HCWs is also a major risk factor. Some study participants noted that this risk was due to their own negligence:

“I say it is our negligence: For example now when I am doing TB care, I notice that the nurses have been careless, they are having the masks [N95] but not using them. The permanent TB staff there they are using the masks. Even if we are giving them in-service training about the importance of the masks, they would tell you that “we are used to TB, there is nothing that will make us ill”. In (the) casualty section, I think that one, those people [HCWs] need support because they are having contact with patients, they don’t even know if the patient is TB positive or they are just having a cough and they [HCWs] are not protecting themselves because most of the times they are working without masks. Sometimes there is a shortage of masks.” Infection Control Official, 7 year of Service.

Theme 3: HCW experienced risk of nosocomial TB infection

Fear of TB infection appeared to be related to one’s personal experience of being at risk. For example, one participant who had previously suffered from nosocomial TB infection, understandably, feared re-infection:

“I think I’m at risk of re-infection. I’m even afraid right now. When a person is coughing next to me, something that comes into my mind I say ey, this person it might be TB you know. Suffering from TB was not a nice experience for me. I even wanted to resign, because I didn’t even get the support from the hospital management.” Healthcare Worker, 8 Years of Service.

Patients with pulmonary or laryngeal disease (or suspected disease) are considered contagious. Despite the difficulties and risks involved with caring for such patients, many study participants were unanimous in their desire to assist patients and showed a sense of responsibility and a sense of duty to their patients:

“I know that as a health care worker, each and every employment is having its own risks and its own hazards. As long as you have done your risk assessment and you know your precautionary measures and you know how to prevent, how to control it, doesn’t change how I see the patients, but I know that am at risk.” Healthcare Worker, 10 Years of Service.

However, another HCW explained their opinion on being at risk of TB infection to a situation where a patient coughs directly at them during consultation as “blame the patient” and how it impacts on the rest of the consultation with that patient:

“Yoh., it [consultation] is already soured. I promise you. It will be rush, rush though, and just go for the chest. And forget about anything else.” Healthcare Worker, 6 Years of Service.

A nosocomial TB infection within the hospital setting was suggested can be a “wakeup call” for the hospital administration and management structures to take action on the issue. For example, one HCW recalled their own experience of having multi-drug resistant TB and how the hospital administration responded:

“It made a wakeup call to the management. Fortunately it was taken very serious (because) it was a case of multi drug resistant TB (MDR TB). So they [Management] said you must all go and check for TB and whatever. And then after that then it was (just) me (that had TB). So I got sick... firstly my GP said it is pneumonia, then he said bronchitis ... I was coughing, coughing taking out the sputum. When I consulted then x-rays said nothing was showing. So at a later stage my GP decided to take the moto test, and then that moto test lead him to say, no I think this is TB really.” Healthcare Worker, 8 Years of service.

Theme 4: Recommendations by HCWs on what can be done to prevent nosocomial TB infections among HCWs

Reminding staff, on a continuous basis about the risk of nosocomial TB infection emerged as an important recommendation from participants. It was suggested that a high level of observation and vigilance must always be present in HCWs when they are engaging with patients. Reinforcing simple and basic techniques such as washing your hands between seeing one patient and another and making sure that a ward is properly ventilated was suggested as critical things to consider:

“In order to prevent nosocomial TB infection, it must be an every day reminder that you must control TB, we must prevent TB, give health education, screen for TB” Healthcare Worker, 8 Years of service.

Monitoring that HCWs are in fact practicing the basics on a regular basis was also highlighted as something that ought to be put in place:

“More in-service training making people aware of TB is important ...but sometimes the infection control nurses must (also) just check if people are really adhering to infection control measures.” Healthcare Worker, 8 Years of service.

Another key recommendation was that HCWs should now also consider non-TB wards as high risk areas for nosocomial TB infections:

“According to my own risk assessment, the OPD, the casualty, the admissions, the non-medical departments for me those are the high risk areas. The likelihood of the employees contacting TB in those departments is very high as compared to the likelihood of the employees contacting TB infections in a TB unit.” Healthcare Worker, 6 years of Service.

Another common suggestion made by study participants was to make N95 Masks more readily available in non TB wards such as the casualty section. It was suggested that N95 masks should be in every consultation room, even at the reception for easy access by all HCWs:

“If we think that nosocomial TB amongst us is that important, then it should be part of the routine. When they check the trolleys they should check that the masks are there. Just like I would not touch blood without gloves, then I should not touch patients. Especially high risk patients without a mask.” Healthcare Workers, 10 years of service.

Another participant also suggested that patients could also get masks:

“Patients also should be given masks, or should be seen as soon as they arrive, but then unfortunately our triaging system is not up to scratch. So we don’t actually get to pick the coughing patients or your query TB aspects patient earlier. They just queue along together with other patients” Healthcare Worker, 12 years of service.

Another repeated recommendation was that HCWs should eat healthily and take regular breaks while on duty:

“You know I think what you can do akere (right), it’s to eat healthy, and I think that is the most thing that we normally don’t do. Because when we are busy, like we’ve got the

challenge of the shortage of staff, we find (that) you didn't have breakfast, you didn't have a lunch, so I think it's some of the challenges that we are having. You'll be postponing lunch time, postponing tea time until you knockoff." Healthcare Worker, 8 Years of service.

In conclusion, infectious diseases place a considerable burden on health care individuals and organizations (Minnaar et al, 2008). According to Minnaar et al (2008), clinical teams must demonstrate high levels of compliance with the policies and other standard infection control precautions, all of which should be frequently measured. Awareness programmes must also be in place. Induction programmes on infection control for all staff, including agency and locums, to ensure reduced infection risk. Therefore infection control should be considered part of staff development for every staff member in a health service.



CHAPTER FIVE: DISCUSSION

5.1 Introduction

In this chapter the findings are further elaborated upon in relation to the study objectives and the literature review.

The study established that nosocomial TB infection amongst HCWs was a significant challenge at the hospital. The general observation and accounts by the participants was that nosocomial TB infection was commonest amongst staff operating in the areas or wards of the hospital generally perceived to be low risk areas for TB infection. The casualty ward, the maternity and paediatric ward and the orthopaedic ward were identified by participants as examples of areas that are currently designated as low risk areas but ought not to be considered as such. Important to note was that participants were unanimous on the opinion that their working environment was not adequately equipped to prevent nosocomial TB infections.

This study found that nosocomial TB Infection was a significant problem among HCWs in wards and sections of the hospital designated or perceived as low risk areas for TB infection. According to the study respondents, low risk areas at the hospital included casualty, orthopaedic and maternity wards. High-risk areas for TB transmission, according to WHO (2009) include TB and medical wards, including emergency rooms, outpatient departments to which infectious TB patients and people suspected of having infectious TB are referred.

A view that featured prominently in the interviews was the concern that was expressed about the increased risk of potential TB transmission from the weak patient triage system at the hospital. A good triage system ought to separate TB suspects when they visit the hospital for various healthcare requirements (Casey et al., 2015). Study participants explained that in the current situation patients congregate in the casualty ward to be seen by doctors or nurses and that is where they are also assisted by queue marshals and porters. At this point, most of the patients waiting to be seen by the HCWs are undiagnosed and therefore pose a great nosocomial TB transmission risk to hospital staff and other patients. Evidence has shown that staff of all job designations face increasing risk of TB disease for every additional hour per day that they spend in a room with patients (Galgolo et al, 2008). According to Galgolo et al, (2008), for every additional hour per day that hospital staff spend in a room with patients,

their odds of being diagnosed with TB are multiplied by 1.3, regardless of their job designation.

5.2 Nosocomial TB Infection among HCWs

Like many discoveries made by other authors (Naidoo & Jinabhai, 2006; Kanjee et al., 2007; Claassens et al., 2013), findings in this study confirmed that nosocomial TB infections among HCWs in a government public sector hospital in rural Free State province was a significant problem among HCWs - especially in relation to nurses. This can be explained by the fact that nurses are the ‘backbone’ of our public health service, are generally providing a ‘frontline’ type of service before patients are referred elsewhere and are therefore more likely to be at increased risk. HCWs such as porters can be to be at disproportionate risk of nosocomial TB infection. Another finding from this study was that nosocomial TB infection did not appear to be a common problem amongst doctors. This could perhaps be due to the small sample size of doctors interviewed and therefore, more research is required to make a firm conclusion.

Interestingly, the interviews revealed that some of the HCWs did not know of any colleague who had TB at work or were not sure whether nosocomial TB infection among HCWs was a problem at the hospital or not.

For the most part, though, study participants did reveal that they felt that the risk of TB exposure within the hospital was high and that the cases of nosocomial TB infections amongst HCWs in the setting were under-reported. They suggested that one of the reasons for this under-reporting was the stigma attached to the disease. In addition, HCWs in the setting of a generalized HIV epidemic are more likely to be HIV-infected themselves and if infected, they are more likely to develop TB (Sissolak et al., 2010).

Those HCWs who had previously suffered from nosocomial TB infection shared how the risk of disclosure was too high and felt that the hospital management did not support them adequately. One participant suggested that the hospital management tended to suggest that those who reported having acquired nosocomial TB were only reporting on it to get some form of compensation from the hospital.

HCWs who had previously suffered from nosocomial TB infection, were afraid of re-infection and had contemplated resigning.

5.2.1 Factors which can contribute to increased risk of nosocomial TB

The study also established that the physical working environment within the hospital was not adequately equipped to prevent nosocomial TB infection. For instance, UV light infrastructure was noted to be mostly not working and not serviced on a regular basis - especially in the non-TB wards. The respondents explained the lack of regular servicing of UV lights or proper ventilation system in the small areas in which they worked (such as the consulting rooms) many of which only had small windows high up near the roof, placed them at an even higher risk.

TB IPC in healthcare settings depends on early identification, isolating TB infected persons, and rapidly and effectively treating persons with TB (Flick et al, 2017). Study participants explained that patient queue marshals at the hospital assist by identifying patients who are coughing and separate them for further TB screening. However, not all patients with a cough were separated from the general population at casualty ward, the outpatient department where they arrive to access health care.

Another important point is that we were able to establish that there was a weak or non-existent patient triage system in a hospital with a high turn-over of patients. This greatly increased the risk or can contribute to nosocomial TB infections amongst HCWs. Triage of symptomatic patients to expedite care can reduce the amount of potential exposure to others.

The implementation of simple measures in the assessment and management of patients with suspected TB can significantly reduce the length of patient stay. This potentially reduces the risk of transmission of TB to both staff and patients (Casey et al, 2015).

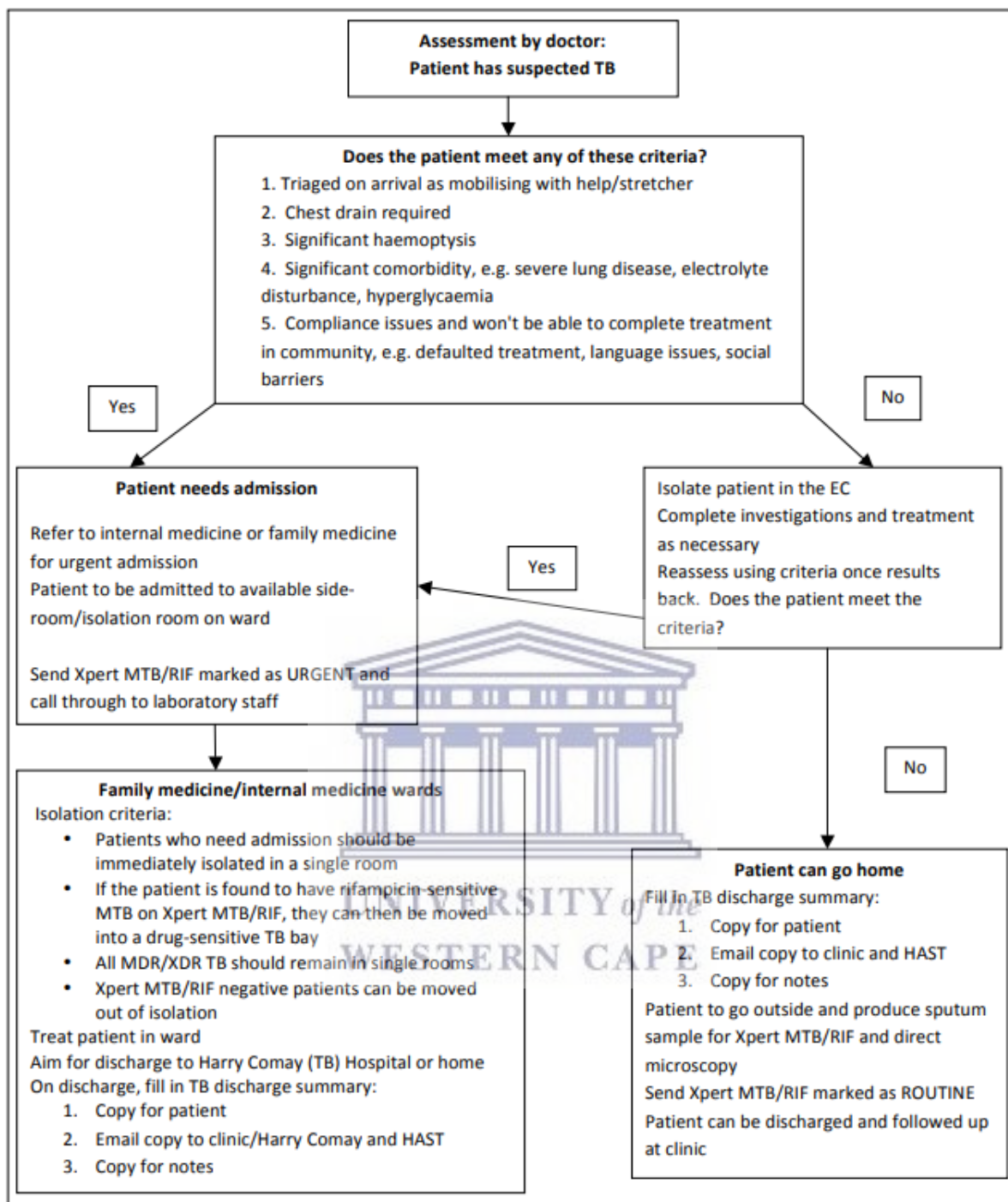


Figure 1: SOP Triage for patients with TB which could be applied in this hospital setting.

Source: Casey et al., October 2015, South Africa Medical Journal, page 863 Vol. 105 No.10

Gaps in the implementation and practice of the TB IPC predispose HCWs to nosocomial TB infection. HCWs who are already immunologically suppressed are at even greater risk. The respondents cited examples of HCWs with HIV or diabetes as being at increased risk.

Another key finding emerging from interviews was that it was recognized that the use of N95 masks, as part of standard personal protective equipment at the hospital, is important. Whilst five of the study respondents agreed that N95 masks were available in most wards some respondents from non-TB wards said that N95 masks were either not available or infrequently used in many cases. In this study, HCWs unanimously said that they used N95 masks only when they visited wards designated as TB ward. Other wards such as casualty, orthopaedic and maternity were perceived to be "TB low risk" areas, and hence HCWs did not use N95 masks in those areas.

One of the respondents reported that they did not use the N95 mask because it felt suffocating and they wanted to maintain the clinician-patient contact.

HCWs attitude or having a sense of being immune to TB infection was a rather worrying finding. One HCW with 8 years of work experience claimed if they only spent less than 8 hours with a patient, they might not contract TB: "*They say it will take me 8 hours to contract TB if am in the same room to be with a person coughing*". This is a risky attitude considering that the hospital has a high patient turn over per day.

Some researchers have identified HIV infection, time spent with patients, job designation, duration of service, work location, and failure to wear personal protective equipment to be significant risk factors for tuberculosis (Galgalo et al, 2008). According to these authors there is an increased risk for tuberculosis among HCWs spending 5 hours or more per day with patients. This means for every additional hour per day that hospital staff spend in a room with patients, their odds of being diagnosed with TB are multiplied by 1.3, regardless of their job designation.

5.3 TB Infection Prevention Control

Infection control is part of risk management in any health service (Minnaar et al, 2008).

Infection control in hospitals and health services is all about protection of the patients and the health professionals. Overall, we were able to establish that effective TB-IPC practices such as use of N95 masks by HCWs were hampered by non-availability of masks especially in areas such as casualty ward. The casualty ward was generally perceived to be low risk area for nosocomial TB infection by our study participants. In terms of TB IPC, these areas perceived to be low risk were also areas which generally lacked proper functioning UV lights and lacked sufficient natural ventilation. Such structural or systemic issues, including the lack

of a policy to provide N95 masks on every trolley were noted as increasing the risk of TB infection for the HCWs.

All patients presenting to healthcare facilities, irrespective of their diagnoses must be treated using standard precautions. These include hand washing (using either aqueous or non-aqueous hand decontamination agents), wearing of personal protective equipment as necessary (gloves, masks; gowns, and eye protection), safe disposal of waste, appropriate cleaning, disinfection or sterilisation of equipment and patient-care items as well as appropriate decontamination of linen and the environment. The chart below is illustrative of a simple infection control model:

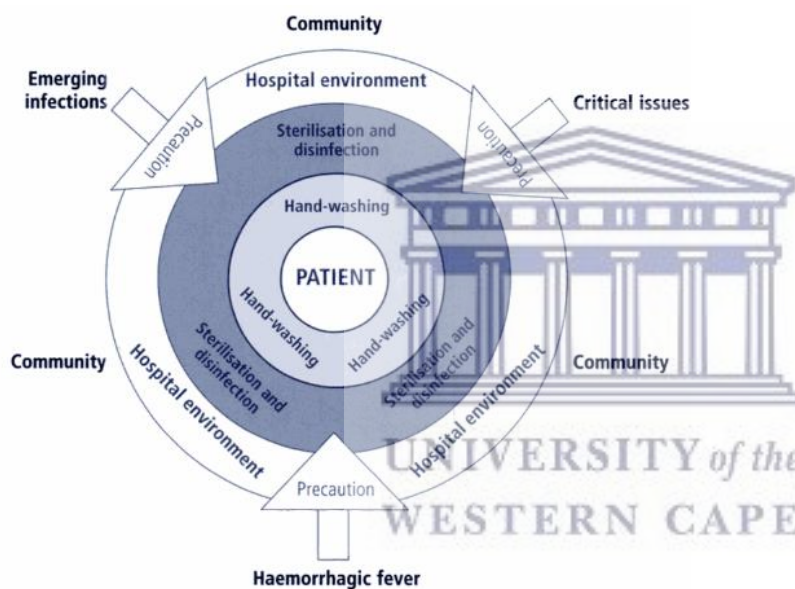


Fig 2: Infection control model

Source: Minnaar et al., (2008). Infection Control made Easy, A Hospital Guide for health Professionals. Page 10

These simple preventive strategies especially in resource limited settings can significantly reduce disease transmission rates (Saloojee and Steenhoff, 2001). Saloojee and Steenhoff, (2001) suggest that frequent hand washing remains the single most important intervention in infection control

Consistent with other authors, nosocomial TB infection at the hospital was established to be due to poor compliance or non-existent of infection control measures (Menzies et al., 2007). According to Menzies et al, (2007) the risk of nosocomial infections appears particularly high when there is increased exposure combined with inadequate infection control measures. Our

findings agree on the fact that non-adherence to IPC provisions and non-availability of personal protective equipment and poor infrastructural fittings such as proper ventilation and inadequately working ultra violet lighting can render HCWs at risk of nosocomial TB infection.

Our findings also established that HCWs were either negligent or lazy to use TB IPC equipment or personal protection. Several training sessions were provided in the past but HCWs would opt not to attend. Moreover, posters on TB IPC could be seen in virtually every section of the hospital. Barriers to TB IPC compliance included understaffing, cough etiquette, access to N95 masks and none functional UV lighting.

Access and adherence to TB IPC personal equipment was determined to be an issue during this study. Non TB-Wards of the hospital generally did not have proper working UV lights and the wards had windows closed most of the time. Our findings, consistent with findings by Mathlotle et al, (2017) demonstrate that HCWs do not always use respirators when required, suggesting that broader strategies for ensuring protection (e.g. adequate supply of N95 respirators, individual HCW behaviour change and culture change) need to be strongly promoted. For non-clinical staff who also have frequent exposure to TB patients, IPC training is extremely limited, implying that a risk-managed approach to educating support workers on occupational TB prevention is strongly warranted.

In South Africa, according to the Human Sciences Research Council (HSRC, 2014), the Department of Health advocates IPC as a pillar for a sound healthcare delivery system (Mehtar et al, 2014). Findings from our study established that inconsistent and inadequate TB IPC measures in the non TB wards of the hospital can increase the risk of HCW staff to nosocomial TB infection. This is consistent with the findings by Malotle et al, (2017) in their study conducted at a tertiary hospital in Gauteng investigating HCWs adherence to recommended TB IPC. Their findings suggested that improved coordination and uptake of TB infection prevention training is urgently needed, especially for non-clinical HCWs in settings of regular exposure to TB patients. Adequate supplies of appropriate respiratory protection must also be made available.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The findings of the study identified the pressing need for ceaseless and continuous TB infection prevention and control training for all healthcare workers (both nurses & doctors), administrative and support staff such as porters at the hospital aimed at modifying HCW attitudes and practices towards the acceptance and implementation of the TB IPC. Important to note, nosocomial TB infections can be prevented by using integrated universal precautions with healthcare managers supporting the implementation of administrative, clinical and environmental controls that aim at TB infection control (Salaniponi et al, 2008). This study also highlights the continuing need for improvements in infection control and HCW screening programs. Healthcare system inadequacies such as weak patient triage system, delays in TB diagnosis, lack of maintenance of available UV lights and early detection of TB cases among HCWs, access to N95 masks especially in the outpatient and non TB wards were the major transmission risk factors. In many ways, irrational work practices and the perception of HCWs that they are immune to TB infection while on duty can contribute to a higher risk of exposure and nosocomial TB transmission.

In view of the high incidence rate of nosocomial TB infection at this hospital - (5.6%) n=2 in 2013/14, (7.8%) n= 4 2015/16 and (9%) n=7, (11%) n=11 cases in 2017/18 - the hospital's senior management and administrative team should focus on greatly improving the approach that this health care setting adopts towards TB infection control – and specifically in relation to its staff. For example, relatively simple interventions could include standardized and compulsory training for all new HCWs and administrative staff (namely, those that come into contact with patients – like the porters or admission clerks) and the selection of a team of “champions” who could be responsible for distributing N95 masks so that they become more readily available in all wards. They could, in addition, promote the opening of windows in wards and monitor that UV lights are in good working order. In addition, hospital management could insist on the mandatory application of N95 respirator masks by particular cadres of hospital staff.

It would also likely be beneficial to have further research investigate what is needed to evaluate occupational risk factors for tuberculosis among HCWs in both clinics and hospital settings – including in urban areas. Specifically there might be a need for such research to investigate the educational content and process employed in the in-service training on TB IPC, and explore how HCWs and their managers could be trained in a way that facilitates their effective and more collaborative implementation of the TB IPC precautions.

6.2 Recommendations

TB infection control requires and complements implementation of core activities in TB control. The importance of planning to maximize the ease with which the basic components of TB infection control can be implemented in spaces designated for potentially infectious patients such as the casualty ward ought to be acknowledged. The following recommendations are thus proposed for immediate consideration by the hospital management and infection control officer:

1. In line with the WHO Stop TB campaign (2015), the hospital ought to more deliberately conduct regular, mandatory scheduled surveillance of TB amongst its health workers and staff. Surveillance of TB disease among staff, and assessment of the magnitude of the burden of TB amongst personnel within this setting will provide data that is essential for informing the further refinement and strengthened implementation of TB infection control measures at the hospital.
2. Strengthen clinical, human resource management and administrative processes and procedures that enable the prompt identification of people with TB symptoms (triage) and separating out of infectious patients without compromising patient flow; controlling the spread of pathogens by raising awareness about cough etiquette and respiratory hygiene; and reducing exposure by, for instance, providing N95 masks to all patients in the outpatient ward. In addition, ultraviolet germicidal irradiation (UVGI) fixtures should be installed and regularly maintained – at the very least in sections of the hospital where adequate ventilation cannot be achieved.
3. Adequate training plans ought to be put in place to ensure that all healthcare staff, including support staff, receive continuous and appropriate training in TB infection control on a regular basis.
4. Hospital management could rethink the use of available spaces, especially in the casualty ward and the HIV clinics which appear to have weaker TB IPC facilities, and

consider how the existing ventilation systems (windows) within the facility could be renovated so as to increase ventilation and allow direct sunlight into the work areas.

5. The hospital ought to put in place a policy and provide the necessary budget and procedures to provide N95 masks in all sections of the hospital, particularly as part of the nursing trolley preparation and to intensify the provision and use of ordinary masks to patients who are coughing while waiting to see a doctor - especially in the casualty wards. The latter should be accompanied by sensitive communication to the patient so that they are aware of why they are being provided with a mask as part of the hospital procedures related to TB infection control.
6. Lastly, an action plan ought to be put in place in the short-term – ideally one that is jointly spear-headed by representatives from both the hospital’s management and administration sections along with health care worker representatives. Facilitated by the Infection Control Officer, this action plan could set in motion a review of the existing TB infection control measures, assess which areas require improvement and then collaboratiely develop an appropriate response to the priority TB infection control needs.



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Appendix 1: Participant information sheet



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PARTICIPANT INFORMATION SHEET

Project Title: An Exploration of factors which can contribute to nosocomial TB infection among healthcare workers in a public hospital in Free State Province, South Africa.

What is this study about?

This is a research project being conducted by Chazanga Tembo, a student at the University of the Western Cape, Cape Town, South Africa. I am inviting you to participate in this research project by taking part in an interview. I would like to interview healthcare workers at the hospital who work with TB patients. I would like to discuss with them the factors which can contribute to nosocomial TB infection among healthcare workers in a public hospital. The purpose of this research project is to obtain first-hand information from HCWs about this topic in order to improve TB Infection Prevention and Control (IPC) procedures, SOPs and policy.

What will I be asked to do if I agree to participate?

You will be asked to participate in an interview with the researcher for approximately one hour. The researcher will have a set of questions that he will be asking you to respond to. The questions that will be asked will be those that will explore the factors which can contribute to nosocomial TB infection among healthcare workers in a public hospital. During the interview, the researcher will be taking down notes in a note-book, while also recording the whole interview on a voice recorder.

Would my participation in this study be kept confidential?

The researcher undertakes to protect your identity and the nature of your contribution. To ensure your anonymity, a pseudonym will be used and only the researcher will be aware of your true identity. To ensure your confidentiality, only the researcher will have access to the collected data. The collected data will be stored in locked filing cabinet only accessible to the researcher and transcribed notes typed and kept in a password-protected computer file.

If I write a report or article about this research project, your identity will be protected through the use of pseudonyms.

In accordance with legal requirements and/or professional standards, I will disclose to the appropriate individuals and/or authorities information that comes to our attention concerning child abuse or neglect or potential harm to you or others. In this event, I will inform you that we have to break confidentiality to fulfil our legal responsibility to report to the designated authorities.

What are the risks of this research?

All human interactions and talking about self or others carry some amount of risks. I will nevertheless minimize such risks and act promptly to assist you if you experience any discomfort, psychological or otherwise during the process of your participation in this study. Where necessary, an appropriate referral will be made to a suitable professional for further assistance or intervention.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator explore the factors which can contribute to nosocomial TB infection among healthcare workers in a public hospital. I hope that, in the future, other people might benefit from this study through improved TB infection prevention control. This would help to add onto the body of knowledge with regards TB IPC.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

What if I have questions?

This research is being conducted by Chazanga Tembo and School of Public Health at the University of the Western Cape. If you have any questions about the research study itself, please contact Chazanga Tembo at: +27721332563 and Temboc@live.com

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

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This research has been approved by the University of the Western Cape's Research Ethics Committee. **(REFERENCE NUMBER: BM17/10/14)**

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION

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Appendix 2: Consent Form



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CONSENT FORM

Title of Research Project: **An Exploration of factors which can contribute to nosocomial TB infection among healthcare workers in a public hospital in Free State Province, South Africa.**

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will.

I understand that my identity will not be disclosed to anyone.

I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

Participant's name.....

Participant's signature.....

Date.....

...I agree to be audiotaped during my participation in this study.

...I do not agree to be audiotaped during my participation in this study.

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION

Research Office New Arts Building, C-Block, Top Floor, Room 28 University of the Western Cape Private Bag X17, Bellville 7535

Appendix 3: Interview guide

Part 1: SELF-INTRODUCTION

My Name is Chazanga Tembo. I am conducting research to explore **the factors which can contribute to nosocomial TB infection among HCWs in a public hospital in Free State Province here in South Africa.** This research is in partial fulfilment for the qualification of Master's Degree in Public Health at the University of Western Cape, School of Public Health, South Africa.

Prompt: Hand the respondent a hard copy of the participant Information Sheet, and read it aloud. Give an opportunity for questions.

Note: Once it established that the person has no further questions, then ask the following:

I would like to know if you are willing to participate in this interview.

If the potential participant says NO,

THANK THE RESPONDENT AND CLOSE THE INTERVIEW.

Else, proceed to part 2

Part 2 ESTABLISHING THE INTERVIEW

If the respondent has agreed to be interviewed, then proceed with the following:

Thanking the respondent

I want to thank you for accepting to participate in this interview. I am interested in asking you a few questions that will assist me to identify **factors which can contribute to nosocomial TB infection among HCWs in this hospital.** I have prepared a few questions to ask you: The interview can take up to 40 minutes from your time but please feel free to elaborate issues outside the scope of the questions whenever you feel it is necessary. Of course, you have the right to end the interview at any point during our conversation. The interview will be recorded and you are free to request for a summary of the transcription of the interview before I use it in my research.

Note: emphasize the following

The interview will be conducted in English

The participant can withdraw at any stage of the interview or choose not to answer questions that make them uncomfortable

The interview is confidential and that the identity of the researched will remain anonymous or by pseudo name. No personal identifiers will be used in the report

Explain why I want to use a tape recorder and request permission to do so.

But before we start the interview, I would like us to go through the information sheet and informed consent form.

GIVE THE RESPONDANT A COPY OF BOTH THE INFORMATION SHEET AND THE CONSENT FORM

(The consent form to be read in English together with the participant).

ENSURE THAT THE CONSENT FORM IS SIGNED BY BOTH PARTICIPANT, OR CONSENT IS GIVEN ON TAPE AND THE PERSON CONDUCTING THE RESEARCH.

Thank you again, I just want to assure you that everything discussed here will be used solely for the purpose of my studies and the overall findings will be reported back to UWC, SOPH. Your name will not however be included in the research report or referred to during the report back process.



Part 3: INTERVIEW GUIDE FOR DOCTORS

First I would like to find out some background information about you:

Part 3a: PARTICIPANT IDENTIFICATION

1. Demographic information

Participant Number		Sex (to be noted by the interviewer)	(M/F)
Number of years of service		Staff cadre	

1.1 TELL ME ABOUT YOUR ROLE IN THE HOSPITAL?

NOTES:

1.2 COULD YOU PLEASE DESCRIBE TO ME WHAT YOU DO AT THIS HOSPITAL?

1.3 WOULD YOU DESCRIBE TB AS A SIGNIFICANT OCCUPATIONAL INFECTION PROBLEM AMONG HCWs IN THIS HOSPITAL? *Please elaborate on your response/ Examples?*

NOTES:

1.4 DO YOU FEEL AT RISK OF CONTRACTING TB FROM THE PATIENTS THAT YOU ARE PROVIDING CARE TO?

NOTES:

1.5 DO YOU THINK THE NECESSARY (AND BASIC) RESOURCES REQUIRED TO PREVENT NOSOCOMIAL TB INFECTION AMONG HCWs IN THIS HOSPITAL ARE AVAILABLE WHEN YOU NEED THEM? *What do you think can be done to improve this?*

1.6 HAVE YOU EVER HAD FORMAL TRAINING ON THE MANAGEMENT OF TB? PLEASE ELABORATE:

NOTES:

1.7 WHAT DO YOU THINK SHOULD BE DONE WITHIN THIS HOSPITAL TO PREVENT TB INFECTIONS AMONG HCWS?

NOTES:

1.8 IN YOUR OPINION, IS THIS FACILITY EQUIPPED APPROPRIATELY TO PREVENT NOSOCOMIAL TB INFECTION IN HEALTH CARE WORKERS? (PROBE

EXISTENCE AND KNOWLEDGE OF TB PREVENTION GUIDELINES, OCCUPATIONAL HEALTH AND SAFETY)? KINDLY ELABORATE.

NOTES:

1.9 ELABORATE WHETHER THERE ARE ANY RISKS TO YOUR HEALTH WHILE PROVIDING CLINICAL CARE TO TB INFECTED PATIENTS (ELICIT CONVERSATION- BUILDING ON RESPONDENT'S RESPONSE)

NOTES:

1.10 TELL ME WHETHER THESE PRECAUTIONS ARE KNOWN AND FOLLOWED BY YOURSELF AND OTHER HCWs (DOCTORS AND NURSES) AND ADMINISTRATIVE STAFF

NOTES:

1.11 TELL ME ABOUT YOUR OPINION REGARDING WHY HCws MAY NOT FOLLOW TB INFECTION PREVENTION

NOTES:

1.12 ARE YOU AWARE OF ANY WORK COLLEAGUE WHO MIGHT HAVE CONTRACTED TB WHILE ON DUTY? PLEASE EXPLAIN. WHO IS MOST AT RISK?

NOTES:

1.13 WHAT IS THE RESPONDENT'S RECOMMENDATION, SUGGESTION OR OPINION ON HOW NOSOCOMIAL TB INFECTION CAN BE PREVENTED OR CONTROLLED AMONG HEALTHCARE WORKERS: WHAT IS THE ROLE OF HCWS? ARE THERE SYSTEMIC ISSUES WHICH MUST BE ADDRESSED- WHAT ARE THOSE?

NOTES:

THANK THE STUDY PARTICIPANT AND END THE INTERVIEW

Appendix 4: UWC Biomedical Science Research Ethics Approval



OFFICE OF THE DIRECTOR: RESEARCH RESEARCH AND INNOVATION DIVISION

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07 December 2017

Mr C Tembo
School of Public Health
Faculty of Community and Health Sciences

Ethics Reference Number: BM17/10/14

Project Title: An exploration of the factors, which can contribute to nosocomial TB infection amongst healthcare workers in a public hospital in Free State Province, South Africa.

Approval Period: 07 December 2017 – 07 December 2018

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report in good time for annual renewal.

The permission from the Provincial Health Department must be submitted for record keeping purposes


The Committee must be informed of any serious adverse event and/or termination of the study.

A handwritten signature in black ink, appearing to read 'Patricia Josias'.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

PROVISIONAL REC NUMBER -130416-050

Appendix 5: Free State Department of Health Approval



health
Department of
Health
FREE STATE PROVINCE

05 February 2018

Mr. C Tembo
School of Public Health
Faculty of Community and Health Science
UWC

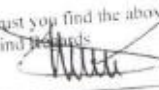
Dear Mr. C Tembo

Subject: An exploration of the factors which can contribute to nosocomial TB infection amongst healthcare workers in a public hospital in Free State Province, South Africa.

Please ensure that you read the whole document. Permission is hereby granted for the above-mentioned research on the following conditions:

- Participation in the study must be voluntary.
- A written consent by each participant must be obtained.
- Serious Adverse events to be reported to the Free State department of health and/or termination of the study
- Ascertain that your data collection exercise neither interferes with the day-to-day running of Bongani Hospital nor the performance of duties by the respondents or health care workers.
- Confidentiality of information will be ensured and please do not obtain information regarding the identity of the participants.
- **Research results and a complete report should be made available to the Free State Department of Health on completion of the study (a hard copy plus a soft copy).**
- Progress report must be presented not later than one year after approval of the project to the Ethics Committee of the University of Western Cape and to Free State Department of Health.
- Any amendments, extension or other modifications to the protocol or investigators must be submitted to the Ethics Committee of the University of Western Cape and to Free State Department of Health.
- **Conditions stated in your Ethical Approval letter should be adhered to and a final copy of the Ethics Clearance Certificate should be submitted to services@health.gov.za before you commence with the study**
- No financial liability will be placed on the Free State Department of Health
- Please discuss your study with the institution manager/CEOs on commencement for logistical arrangements
- Department of Health to be fully indemnified from any harm that participants and staff experiences in the study
- Researchers will be required to enter in to a formal agreement with the Free State department of health regulating and formalizing the research relationship (document will follow)
- You are encouraged to present your study findings/results at the Free State Provincial health research day
- Future research will only be granted permission if correct procedures are followed see <http://nhrd.hst.org.za>

Kind regards



Dr D Mutau
HEAD: HEALTH
Date: 9/02/2018

Head: Health
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