

**FACTORS CONTRIBUTING TO PULMONARY TUBERCULOSIS PATIENTS' NON-
CONVERSION AT CLINICS IN EKURHULENI HEALTH DISTRICT**

by

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DECLARATION

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FACTORS CONTRIBUTING TO PULMONARY TUBERCULOSIS PATIENTS' NON-CONVERSION AT CLINICS IN EKURHULENI HEALTH DISTRICT

I declare that the above dissertation is my own work, and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the dissertation to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.



30 December 2021

SIGNATURE

DATE

DEDICATION

This dissertation is dedicated to my supportive and caring family who showed me love and encouragement throughout this study; my late grandfather, Zama Willie Mthombeni, my father Vonani Johannes Baloyi and my mother, Hlamalani Joyce Baloyi for encouraging me to continue with my studies and always being available when I needed you most.

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ABSTRACT

According to the Global Tuberculosis report of 2015, South Africa had about 834 TB cases per 100 000 people, which was the second-highest rate of TB occurrence in the world. In response, 19 municipalities in South Africa identified districts with a high burden of TB and these were prioritised for concomitant remedial attention by the National Strategic Plan. The Ekurhuleni District Municipality was identified as one of those districts. Tuberculosis patients' non-conversion is a major contributing factor to strategies designed to end Tuberculosis in South Africa. The purpose of the study was to determine factors contributing to pulmonary Tuberculosis patients' non-conversion at two months of treatment. The study was conducted at five East sub-district clinics of Ekurhuleni Health District. A qualitative, explorative, and descriptive research design was adopted. Data were collected in two phases, through virtual and face-to-face interviews with seventeen purposively sampled participants comprising nine health care professionals and eight patients with Tuberculosis. Thematic data analysis was used to generate findings that revealed three themes in each phase. The following were determined as contributory factors to Tuberculosis patients' non-conversion as stated by the nurses: health system service, patient care, and social factors. Findings generated by the patients revealed health care, socio-economic and patient-related factors as contributing to non-conversion. There is a need to explore strategies that can address health care, patients' issues, and social issues faced by the nurses and patients.

Keywords: non-adherence; non-conversion; pulmonary tuberculosis; tuberculosis support programme; tuberculosis treatment

LIST OF ACRONYMS

AFB	Acid Fast Bacilli
CHW	Community Health workers
CoE	City of Ekurhuleni
DHIS	District Health Information Service
DM	Diabetes Mellitus
DOT	Directly Observed Therapy
DR-TB	Drug Resistance Tuberculosis
EPTB	Extra-Pulmonary TB
ESDR	East Sub-District Region
HCW	Health Care Workers
HIV	Human Immune Virus
LTF	Lost to Follow
NDoH	National Department of Health
NPO	Non-profit Organisation
NTCP	National Tuberculosis Control Programme
PHC	Primary Health Care
PNs	Professional Nurses
PTB	Pulmonary Tuberculosis
TB	Tuberculosis
WBPHCOT	Ward-Based Primary Health Care Outreach Team
WHO	World Health Organization

TABLE OF CONTENTS

DECLARATION.....	i
DEDICATION	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
LIST OF ACRONYMS	v
CHAPTER 1: ORIENTATION TO THE STUDY	1
1.1 INTRODUCTION AND BACKGROUND	1
1.2 RESEARCH PROBLEM	3
1.3 PURPOSE OF THE STUDY	4
1.3.1 Research objectives	4
1.3.2 Research questions.....	4
1.4 SIGNIFICANCE OF THE STUDY.....	5
1.4.1 Nursing practice.....	5
1.4.2 District clinics.....	5
The results of the study could be used in district clinics to improve the approach and educational materials used while treating patients with TB to enhance conversion at two months.....	5
1.4.3 Nursing Education.....	5
1.4.4 Existing body of knowledge	5
1.5 DEFINITION OF KEY CONCEPTS.....	5
1.5.1 Non-conversion	5
1.5.2 Patients with TB.....	6
1.5.3 Pulmonary Tuberculosis (PTB)	6
1.6 THEORETICAL FOUNDATIONS OF THE STUDY.....	6
1.6.1 Research paradigm	6
1.7 RESEARCH METHODOLOGY AND RESEARCH DESIGN	7
1.7.1 Research design.....	7
1.7.2 Setting.....	8
1.7.3 Population and Sampling	8
1.8 DATA COLLECTION.....	9
1.9 DATA ANALYSIS.....	10
1.10 MEASURES TO ENSURE TRUSTWORTHINESS.....	10
1.11 ETHICAL CONSIDERATIONS.....	10
1.12 STRUCTURE OF THE DISSERTATION.....	11
1.13 CONCLUSION	11
CHAPTER 2: LITERATURE REVIEW.....	12
2.1 INTRODUCTION	12
2.2 IMPLICATIONS OF TUBERCULOSIS NON-CONVERSION.....	12
2.2.1 Diagnosis of TB	12
2.2.2 Treatment of Tuberculosis.....	14
2.2.3 Monitoring of patients on treatment	15
2.3 THE WORLD HEALTH ORGANIZATION’S “END OF TB” STRATEGIES	16
2.3.1 Directly Observed Treatment Short Course.....	17
2.3.2 National and Provincial TB services in South Africa	17
2.3.3 Primary Health Care (PHC)-TB service delivery	18
2.3.4 Ward-Based PHC Outreach Teams	20
2.4 FACTORS CONTRIBUTING TO TB NON-CONVERSION	21
2.4.1 Sputum smear AFB grading	21
2.4.2 Timing of sputum smear collection	22
2.4.3 Sputum smear conversion	23
2.4.4 Gender	24
2.4.5 Socio-economic status.....	24
2.4.6 Smoking	25
2.5 NON-ADHERENCE AS A FACTOR OF NON-CONVERSION	25
2.5.1 Factors contributing to non-adherence.....	25

2.6 CONCLUSION	29
CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY	30
3.1 INTRODUCTION	30
3.2 RESEARCH DESIGN.....	30
3.2.1 Qualitative research design	30
3.2.2 Exploratory design	31
3.2.3 Descriptive design.....	31
3.3 RESEARCH METHODOLOGY	32
3.3.1 Setting.....	32
3.3.2 Sample and Sampling method	36
3.3.3 Data collection	36
3.3.3 Data analysis	42
3.4 MEASURES TO ENSURE TRUSTWORTHINESS.....	43
3.4.1 Credibility.....	44
3.4.2 Transferability.....	45
3.4.3 Dependability.....	45
3.4.4 Confirmability	45
3.4.5 Authenticity	45
3.5 ETHICAL CONSIDERATIONS.....	46
3.5.1 Informed consent	46
3.5.2 Principle of autonomy and respect.....	47
3.5.3 Principle of Justice	48
3.5.4 Principle of Beneficence and Non-maleficence	48
3.6 CONCLUSION	48
CHAPTER 4: DATA PRESENTATION, ANALYSIS AND INTERPRETATION	50
4.1 INTRODUCTION	50
4.2 DATA MANAGEMENT AND ANALYSIS	50
4.3 PHASE 1: PROFESSIONAL NURSES' RESEARCH FINDINGS	51
4.3.1 Professional nurses' demographic characteristics.....	51
4.3.2 Theme 1: Health System Service	53
4.3.3 Theme 2: Patient care.....	66
4.3.4 Theme 3: Social related factors	70
4.4 PHASE 2 – PATIENTS WITH TB RESEARCH RESULTS.....	73
4.4.1 Presentation of Phase 2 Themes	74
4.4.2 Healthcare-related factors.....	74
4.4.3 Socio-economic factors	80
4.4.4 Patient-related factors.....	83
4.5 OVERVIEW OF RESEARCH FINDINGS	87
4.6 CONCLUSION.....	87
CHAPTER 5: RECOMMENDATIONS, LIMITATIONS AND CONCLUSION.....	88
5.1 INTRODUCTION	88
5.2 RESEARCH DESIGN AND METHODS	88
5.3 SUMMARY AND INTERPRETATION OF THE RESEARCH FINDINGS.....	88
5.3.1 Health system service	89
5.3.2 Patient care.....	90
5.3.3 Social factors.....	90
5.3.4 Integration of nurses' and patients' results on factors contributing to pulmonary tuberculosis patients' non-conversion at clinics in the Ekurhuleni health district.....	91
5.4 RECOMMENDATIONS OF THE STUDY.....	91
5.4.1 Nursing service management	91
5.4.2 Support by facility personnel	93
5.4.3 Support from other stakeholders	94
5.5 CONTRIBUTIONS OF THE STUDY.....	94
5.5.1 Nursing practice.....	95
5.5.2 District TB short course training	95

5.5.3 Nursing education.....	95
5.6 LIMITATIONS OF THE STUDY	95
5.7 CONCLUSION	96
LIST OF REFERENCE	97
LIST OF ANNEXURES	97
ANNEXURE A: APPROVAL FROM THE UNIVERSITY	110
ANNEXURE B: LETTER SEEKING PERMISSION FROM THE EKURHULENI HEALTH DISTRICT	112
ANNEXURE C: LETTER OF APPROVAL: EKURHULENI HEALTH DISTRICT	113
ANNEXURE D: PARTICIPANT INFORMATION SHEET	115
ANNEXURE E: INTERVIEW GUIDE FOR PROFESSIONAL NURSES	120
ANNEXURE F: INTERVIEW GUIDE FOR PATIENTS.....	121
ANNEXURE G: INTERVIEW WITH NURSE MANAGING PATIENTS WITH TB.....	122
ANNEXURE H: INTERVIEW WITH PATIENTS WITH TB	128
ANNEXURE I: TURNITIN REPORT.....	133
ANNEXURE J: EDITING CERTIFICATE	134

LIST OF TABLES

Table 4.1: Overall professional nurse participants' demographic characteristics	51
Table 4.2: Summary of themes, sub-themes, and categories of professional nurses	52
Table 4.3: Overall patients with TB participants' demographic characteristics	73
Table 4.4: Summary of themes, sub-themes, and categories of patients with TB	74

LIST OF FIGURES

Figure 2.1: Algorithm for TB diagnosis (<i>Source: Adapted from DoH TB Guidelines, 2014</i>)	14
Figure 2.2: National TB Management Guideline factors influencing drug adherence.....	18
Figure 3.1: Map of City of Ekurhuleni (<i>Source: City of Ekurhuleni</i>)	33

CHAPTER 1: ORIENTATION TO THE STUDY

1.1 INTRODUCTION AND BACKGROUND

This qualitative research study explores and describes the factors that have an impact on the non-conversion of pulmonary tuberculosis patients at two months of treatment at selected clinics in the Ekurhuleni District Municipality. Tuberculosis (TB) is a complex disease that can affect any individual regardless of their socioeconomic status, biological well-being, and cultural background (Mlotshwa, Abraham, Beery, Williams, Smit, Uys, Reddy & Medina-Marino 2016:3). Epidemiologically it has been established that TB manifests in two types, namely; Pulmonary TB (PTB) and Extra-Pulmonary TB (EPTB). Both types of the disease are contagious and are also known to attack the lungs and other organs of the body (DoH 2014:9).

TB non-conversion presents among patients with a positive Acid-Fast Bacilli (AFB) pre-treatment smear, in which case the smear remains positive at two to three months of the intensive phase of treatment (Tweya, Feldacker, Phiri, Ben-Smith, Fenner, Jahn, Kalulu & Weigel 2013:2). The pulmonary manifestation and its non-conversion variant constitute salient aspects of the research topic, they are explicated in greater detail in Chapter 2. The primary focus of the study is on the causes, treatment, management, and implications of TB.

Sputum smear conversion during PTB treatment is an important indicator of patient response to therapy, and as such, determines the direction of patient care (Acquah, Quaye, Walana, Vicar, Osei, Amedor, Yahaya & Ziem 2015:24). The decrease in mortality is the result of effective diagnosis and treatment. Sputum smear conversion is part of monitoring the effectiveness of treatment and reducing the infectiousness, thereby decreasing the burden of disease (Jayakody, Harries, Malhotra, de Alwis, Samaraweera & Pallewatta 2013:29). Studies have highlighted that a negative delay in sputum conversion leads to an increase in the rate of relapse five to six times, and might be a cause for the emergence of drug-resistant -TB (DR-TB) (Linzamo 2011:iv).

According to the Global Tuberculosis (TB) report of 2015, South Africa (SA) has about 834 TB cases per 100 000 population, which is the second-highest rate of TB occurrence in the world (Massyn, Day, Peer, Padarath, Barron et al., 2018). TB epidemic is driven by

the combined impetus of social, economic, and environmental conditions, the HIV epidemic; as well as inadequate management of TB programmes (Sekotlong 2014:46).

The World Health Organisation (WHO 2015:1) estimated that of the 10 million people worldwide who contracted TB in 2017, 5.8 million were men, 3.2 million were women, and a million were children. In terms of age groups, 90% were adults in the ≥ 15 years age cohort (WHO 2015:1). A patient diagnosed with PTB that is untreated is likely to infect 10 to 15 people yearly (Jayakody et al 2013 29). Albeit the decrease in TB mortality, in 2014 of the 1.5 million people who died of TB, 890 000 were men, 480 000 were women, and 140 000 were children (WHO 2015:4).

TB continues to be a disconcerting health concern in SA, although a noticeable decline is occurring in TB-related deaths since 2009 (DoH 2014:11). Meanwhile, Statistics South Africa (2016:9) reports that the Gauteng Province reported the lowest TB incidence rates in SA with 114 per 100 000 population in 2010; and the second-lowest rate of 330 per 100 000 population in 2015. In 2015, the Ekurhuleni District Municipality was one of the 19 SA districts with a high burden of TB and was prioritised for concomitant remedial attention by the National Strategic Plan. For Gauteng Province, the first district to experience the highest TB burden was the West Rand, followed by the City of Johannesburg; with the Ekurhuleni District Municipality being the third with 298 per 100 000 per population (Massyn, Day, Peer, Padarath, Barron & English 2018:182).

Treatment of TB is aimed at curing, decreasing transmission, preventing acquired drug resistance, and avoiding deaths. The management of patients with TB is reliant on the smear microscopy results (Salam, Rehman, Munir, Iqbal, Aasim & Saeed 2016:5). In such instances, the patient is diagnosed using gene Xpert, and once tested positive, an initial smear microscopy smear is collected for grading (Kigozi, Chikobvu, Heunis & Van der Merwe 2014:66). The smear microscopy assists with the classification or grading of patients in respect of smear-positive PTB or smear-negative pulmonary TB classification (Yellappa, Kandpal, Lall & Tabassum 2016:1; Kayigamba, Bakker, Mugisha, Gasana & van der Loeff 2012:4). The grading is used to measure the infectiousness of the patient, which guides the management of contacts. The grading is also used to monitor the progress of patients on TB treatment. The efficacy is checked through periodic sputum sample inspection at the laboratory. The disappearance of acid-fast bacilli (AFB) from

sputum smear is viewed as the most acknowledged means to verify response to treatment (Yellappa, Kandpal, Lall & Tabassum 2016:1).

TB treatment guidelines provide direction for collecting sputum and managing patients after the sputum results (DoH 2014:32). A majority of patients who have smear-positive TB following two months' treatment, shall have sputum smear conversion to negative, however, the presence of multiple cavities in the lungs, bacillary load, diabetes mellitus, and smoking slows the sputum smear conversion time. Smear conversion following an intensive treatment phase provides the direction for the management of patients, while it also serves as a predictor of cure after TB treatment (Acquah et al 2015:38; Kayigamba, Bakker, Mugisha, De Naeyer, Gasana, Cobelens & van der Loeff 2013:4).

1.2 RESEARCH PROBLEM

In 1993, WHO declared TB a global public health emergency (WHO 1993:3). Consequently, the "Stop TB" global strategies were put in place by the WHO in 2006, to reduce the scourge of TB by 2015 (WHO 2006:3-7). This was followed by the "End TB" strategy adopted in 2014, after which the "90 90 90 Strategy" was instituted as a measure through which progress could be assessed. In the pursuit to achieve the global strategical goals of reducing TB, the National Department of Health instituted measures and produced the National TB Management Guideline in line with the "End TB Strategies" to manage TB and reach targets (WHO 2015b:15). Although this is the case, the researcher has observed that the Ekurhuleni Health District does not meet the set targets.

According to the District Health Information System (DHIS) statistics, there were 5791 new/re-treatment smear-positive patients from 01 April 2017 to 31 March 2019 for the Ekurhuleni Health District. The Ekurhuleni District TB Conversion Report (n.d.) indicates that 3216 of the 5791 patients had conversion at 7 weeks, 1508 had non-conversion, 792 patients were not evaluated, and 116 patients died before conversion while 74 patients were transferred out to other provinces or other districts before the conversion period. Additionally, a total of 82 patients were Lost to Follow (LTF), meaning they stopped accessing their TB treatment from a particular clinic and could not be found when traced from the addresses they registered on the clinic file. The above-cited DHIS report further indicates that no patient had Multi-Drug Resistance (MDR) TB during that period (01 April 2017 to 31 March 2019). Another challenge identified in the report is that there were 1508

patients during the first 11 weeks of patient TB treatment. Of the 1508 patients, only 638 patients' sputa conversion was negative, 291 remained positive, 550 patients' sputa were not evaluated, and seven patients died before their sputa were collected. Moreover, four patients were moved to other facilities in the district, while 15 patients were LTF, and three were diagnosed with MDR TB. From the above, it is evident that there is a need for further exploration of the factors contributing to the non-conversion of patients on PTB treatment at Ekurhuleni district clinics.

The researcher developed an interest to explore and describe factors contributing to the non-conversion of patients on PTB treatment at Ekurhuleni district clinics, and proposed recommendations that might assist healthcare workers and policymakers to improve patient conversion rates. Furthermore, the capacity of Ward-Based Primary Health Care Outreach Teams (WBPHCOTs) would be enhanced insofar as bringing healthcare services to individuals and communities in dire need of these services (DoH 2014a:15). A ward-based primary health care outreach team is a group of 6-10 community health workers (CHWs), and one professional or enrolled nurse who offers integrated services to individuals and households within various communities. Their duties include communication, screening, health promotion, referral, tracing, and psycho-social support. Accordingly, the study results and recommendations could benefit WBPHCOTs in their endeavour to support TB patients better in the community.

1.3 PURPOSE OF THE STUDY

The purpose of the study is to explore and describe contributing factors to the non-conversion of pulmonary patients with TB at two months of treatment, at Ekurhuleni Health District clinics.

1.3.1 Research objectives

- To explore and describe factors contributing to pulmonary Tuberculosis patients' non-conversion at two months of treatment at Ekurhuleni Health District clinics.

1.3.2 Research questions

- What are the factors contributing to pulmonary Tuberculosis patients' non-conversion at two months of treatment at Ekurhuleni district clinics?

1.4 SIGNIFICANCE OF THE STUDY

The significance of this study bears reference to nursing practice, district clinics, and nursing education.

1.4.1 Nursing practice

This study will benefit both the professional nurses during nursing practice and patients to adequately understand the reasons that contribute to TB non-conversion. As a result, patients with TB will have to be provided with adequate information during adherence counselling before treatment initiation, to improve conversion at two months.

1.4.2 District clinics

The results of the study could be used in district clinics to improve the approach and educational materials used while treating patients with TB to enhance conversion at two months.

1.4.3 Nursing Education

The results of this study could be included in the training of professional nurses and ward base primary health care outreach teams (WBPHCOT) in TB management. The recommendations would enhance such teams and capacitate them to better support patients with TB in the communities they serve.

1.4.4 Existing body of knowledge

The study could be helpful to future researchers in identifying the gaps that remain in respect of the effectiveness of adherence counselling. Also, the study could be used as a point of reference by the researchers in respect of contributing factors to TB non-conversion, which could then further establish recommendations for improving TB conversion information and management.

1.5 DEFINITION OF KEY CONCEPTS

1.5.1 Non-conversion

Non-conversion refers to instances of sputum smear remaining positive after the intensive phase of treatment two months for new cases and three months for those being re-treated

(Mlotshwa et al 2016: 3). In this study, non-conversion alludes to the patients who started TB treatment and did not exhibit conversion to the continuation phase after two or three months.

1.5.2 Patients with TB

Patients with TB refer to individuals who are receiving, or registered to receive TB treatment in a specific health care facility (Waite, Paasche-Orlow, Rintamaki, Davis & Wolf 2008:1368). In this study, patients with TB refer to the clients visiting selected clinics at Ekurhuleni Health District for TB treatment and management.

1.5.3 Pulmonary Tuberculosis (PTB)

Pulmonary Tuberculosis alludes to a contagious bacterial infection that attacks the lungs and may spread to other organs in the body (WHO 2015:4). In the current study, pulmonary tuberculosis means conditions diagnosed by GeneXpert sputum, whose results state that *Mycobacterium tuberculosis* has been detected and with rifampicin sensitivity.

1.6 THEORETICAL FOUNDATIONS OF THE STUDY

Some philosophically motivated perspectives (research traditions or paradigms) and epistemological assumptions informed and guided the scientific grounding or orientation of this study, which also directed its responses and approaches to both the research questions and methods of collecting, analysing, and interpreting the required data (Kumar 2015:117; Thanh & Thanh 2015:26).

1.6.1 Research paradigm

Research paradigms are a reflection of particular worldviews or perspectives held or adopted by researchers as influenced and guided by some basic set of assumptions concerning the nature of phenomena, reality, and knowledge (Creswell 2014:106; Thanh & Thanh 2015:26). Furthermore, Brink, Van der Walt, and Van Rensburg (2018:19) allude that paradigms are also shaped by assumptions about the interaction and contribution of various factors and circumstances in the construction and testing of hypotheses and theories. The assumptions themselves are the basic sets of ideas that are believed to be

true, but whose authenticity has not yet been proven (Brink et al 2018:19; Donley & Graueholz 2012:37).

Pilot and Beck (2017:11), described constructivism as characterised by lived complexity of people and the characteristics that impact and generate their own experiences. Information that can only be revealed by the participants is crucial as it is voicing out what they experienced. In this study, the researcher had prolonged interaction with participants to receive information about the lived experiences of the patients and professional nurses. For this study, the constructivist paradigm was adopted, based on its facilitation of participant-focused generation of data through interviews with participants using their own words and in their ecological environment. The findings of this study revealed in-depth rich information which was provided by patients with TB and the professional nurses as the first-hand information from people with experience of living with the disease and caring for patients with TB non-conversion.

1.7 RESEARCH METHODOLOGY AND RESEARCH DESIGN

Research methodology alludes to the methods used to organise or analyse data deemed to be relevant in resolving the research questions and achieving the aim/ purpose of the study (Polit & Beck 2017:11). The qualitative research design was adopted because it focused on exploring and explaining phenomena holistically through the collection of dense narrative material enabled by this easily modifiable research design (Polit & Beck 2017:741). The study has adopted a qualitative research design because of its focus on in-depth questions requiring participants with proficient experience concerning factors that contribute to the non-conversion of patients with TB. Participants were allowed to describe and explain these experiences in their own words, the meanings and motives thereof, the rationale for their actions, as well as interactions arising from their daily experiences (De Vos, Strydom, Fouche & Roestenburg 2011:65).

1.7.1 Research design

Research design is an overall plan of the study that detailed the process of data collection, analysis, and interpretation of the results with particular emphasis on answering the research questions (LoBiondo-Wood & Haber 2014:100). In this study, qualitative, explorative, and descriptive design was utilised to explore and describe the perceptions,

knowledge, and experiences of the participants concerning contributing factors of patients with TB' non-conversion at two months of treatment at Ekurhuleni Health District clinics.

An explorative design enhances the research study with relevant information, particularly when there is insufficient information to support an enquiry. Furthermore, an explorative design is relevant in instances where the researcher seeks to obtain a more detailed understanding of the problem whose prevalence, magnitude, and implications are being investigated (Babbie & Mounton 2010:92). Additionally, descriptive study designs involve the identification and articulation of the nature and attributes of nursing phenomena, as well as the interconnectedness of such attributes (Gray, Grove & Sutherland 2017:26). More details on the exploratory and descriptive design are discussed in Chapter 3.

1.7.2 Setting

A setting in research refers to a particular place or place at which data collection can take place (Brink et al 2018:59). Accordingly, this study was conducted in five selected clinics of the Ekurhuleni E2 sub-district region which provide TB treatment services to patients. A detailed description of the settings is provided in Chapter 3.

1.7.3 Population and Sampling

The population relates to the larger group whose characteristics are central to some issues of the study, sampling alludes to the process and methods applied by the researcher to choose a manageable number of individuals from the same larger group according to the criteria of the researcher (Padgett 2012:22; Patten & Galvan 2019:39). The population and sampling dynamics are detailed further in Chapter 3.

1.7.3.1 Population

According to Rebar and Gersch (2015:111), the term, 'population' alludes to a larger group from which a representative subset is selected based on the similarity or homogeneity of certain characteristics, qualities, or traits that represent those of the larger group from which the smaller sampled group was selected. The population in this study comprises patients with TB whose sputum had not converted at two months of their TB treatment at five selected clinics in Ekurhuleni East 2 sub-district, as well as all professional nurses who cared and provided treatment to patients with TB for a year or more at the same clinics.

1.7.3.2 Sampling Method and Sample Size

Sampling is the process of systematically choosing individuals to represent a larger population in a study (LoBiondo-Wood & Haber 2014:232). A non-probability purposive or judgemental sampling technique was applied in this study. This technique allowed the researcher to apply judgment in selecting the participants viewed as possessing sufficient information and knowledge conducive to the purpose of the study (Braun & Clarke 2013:56).

In this study, nurses managing patients with TBs and providing care to patients who did not have a conversion were purposively selected to participate in the study. Data saturation, rather than the refinement of the sample size, was relied on as the means to the effect of data saturation to the point where no new data was generated (Braun & Clarke 2013:55). Eventually, the sample size was 17 participants comprising of nine professional nurses and eight patients with TB.

1.8 DATA COLLECTION

Data collection refers to the systematic process of gathering information that is relevant for addressing the research problem and answering the related research questions (Polit & Beck 2017:725). On the other hand, Gray et al (2017:55) define data collection as a systematic process designed to acquire both primary and secondary data. Primary data methods include examples such as participant surveys, interviews, narratives, focus group discussions, and case stories.

In this study, interviews were used as the primary form of collecting required information and data in which case the interviewer posed questions and to which the participants responded (LoBiondo-Wood & Haber 2014:279). The researcher conducted individual semi-structured in-depth interviews, which enabled the researcher to probe for more responses from the participants. This method of inquiry is advantageous as it enables the researcher to engage and observe the inner human characteristics of the participant, such as their emotions, anxiety, distress, and body language in the context of the questions asked (Gerrish & Lacey 2006:349). The researcher wrote field notes during the interviews, and an audio recorder was used to capture the verbatim statements and voices of the participants, which was done after the permission to do so was granted by the participants. The researcher further developed ideas and further enhanced the

process of removing or eliminating any conceivable bias regarding TB non-conversion (Houser 2018:343).

1.9 DATA ANALYSIS

Data analysis is mainly concerned with the organisation, categorisation, and systematic classification of data and information accruing from both the audio-recorded interview statements and collating it into the secondary (literature-based) data (Brink et al 2018:26; Creswell 2014:218). The researcher used a computer-based programme (Atlas t i version 9) for the storage of textual data and its analysis. Tesch's method of open coding was used for the creation of group themes, categories, and relationships of text content (Babbie & Mouton 2010:338). The method entails eight steps of data analysis and is discussed further in Chapters 3 and 4.

1.10 MEASURES TO ENSURE TRUSTWORTHINESS

Trustworthiness is a measure of qualitative assurance on whose basis both the believability and acceptability of the study's findings are viewed by the research community (Polit & Beck 2017:511). In this study, trustworthiness was ensured based on the credibility, transferability, dependability, and confirmability of the study findings, details discussed in Chapter 3.

1.11 ETHICAL CONSIDERATIONS

According to Polit and Beck (2017:727), ethics refers to the moral, legal, professional, and socially acceptable standards and practices designed to allocate respectability, dignity, and regulation of conduct between the researcher and participants. In this regard, the Department of Health Studies Review and Research Ethics Committee of the University of South Africa (UNISA) granted ethical clearance to the researcher to commence with the study. In addition, further permission was granted by the Ekurhuleni Health District Ethics committee. The researcher observed and applied the ethical principles of beneficence, justice, and respect for persons' dignity throughout the study. These ethical principles are discussed in detail in Chapter 3.

1.12 STRUCTURE OF THE DISSERTATION

The dissertation is delineated into the following five chapters:

Chapter 1: Orientation to the research study

Chapter 2: Literature review

Chapter 3: Research design and methods

Chapter 4: Data analysis and presentation of results

Chapter 5: Recommendations, limitations, and conclusions of the research study.

1.13 CONCLUSION

This chapter provided details of an overview of the study as a whole concerning the background to the research problem; the problem statement of the research problem; the purpose of the study; research objectives, and the research questions. The significance of the study was also discussed, including the definition of key concepts, and theoretical foundations of the study. The research design and methodology, data collection and analysis, as well as the ethical considerations and the outline of the chapters were also discussed. The ensuing Chapter 2 provides the literature reviewed.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses the literature reviewed in relation to its relevance to the research topic (Creswell 2014:60). In its fundamental context, literature review entails a systematic or methodical process of searching, identifying, processing, and selecting sources of information by others in the same field of research (Burns & Grove 2017:193). Among other functions, the literature review serves to expose the researcher to new information and knowledge. It also informs the researcher about theoretical and methodological developments in the researched field and introduces gaps that may prevail. A thorough search for relevant literature is beneficial and enables researchers to the location of areas of the research subject that still need improvement (Gay, Mills & Airasian 2012:18). The authors go further to indicate that literature review assists in developing the particular research subject further and for comparing and/or benchmarking of the findings in that regard.

This chapter focuses on literature relevant to the global and local contexts of the causes relating to PTB patients' non-conversion; the magnitude and implications thereof, as well as the state of PTB at Ekurhuleni East clinics. In this regard, the researcher conducted a literature search strategy involving multiple sources including research articles from accredited journals, published and unpublished research reports from dissertations and theses, as well as internet-based searches focussing on search engines and databases specialising in health and in particular in the area of PTB non-conversion (Brink et al. 2018:47; Grove & Gray 2019:88).

2.2 IMPLICATIONS OF TUBERCULOSIS NON-CONVERSION

In an epidemiological context, TB non-conversion is situated in patients who had a positive AFB pre-treatment smear, and the result of the smear remains positive for two and three months following their intensive phase of treatment (Socorro, Maia, Toledo, de Abreu, Braga, Barreira & Trajman 2018:1; Mlotshwa et al 2016:3).

2.2.1 Diagnosis of TB

Tuberculosis is a contagious illness that frequently afflicts the lungs but can also attack other organs of the body (DoH 2014:9). This airborne disease is known to manifest in two

types: Pulmonary TB and Extra-Pulmonary TB. The infectious nature of PTB compels for more efforts to monitor patients to decrease transmission incidences. The Department of Health (2014:9) maintains that primary infection takes place on the first contact of tubercle bacilli, in which case the inhaled droplets that contain bacilli lodge themselves in the terminal alveoli of the lungs.

The development of TB amongst individuals is increased by the risk of bacillary load, close contact with the indexed patient, as well as anti-tuberculosis treatment duration. The symptoms and signs of TB include coughing for longer than two weeks (24 hours in patients with HIV); unintended weight loss; night sweats; and fever. The use of the GeneXpert test to diagnose TB has significantly improved the detection of TB (Lipman, Kunst, Loebinger, Milburn & King 2021:2; Jayakody et al 2013:2). The standard procedure focuses on the collection of GeneXpert for all people exhibiting TB symptoms and signs for diagnosis in cases of positive status, after which sputum specimen for microscopy is collected (DoH 2014:28). In such instances, Acid-fast bacilli are collected when the patient GeneXpert is positive to grade the infectiousness of TB and guide the treatment and management (Tweya et al 2013:2-3). Figure 2.1 below is a depiction of the flowchart that enables TB diagnosis.

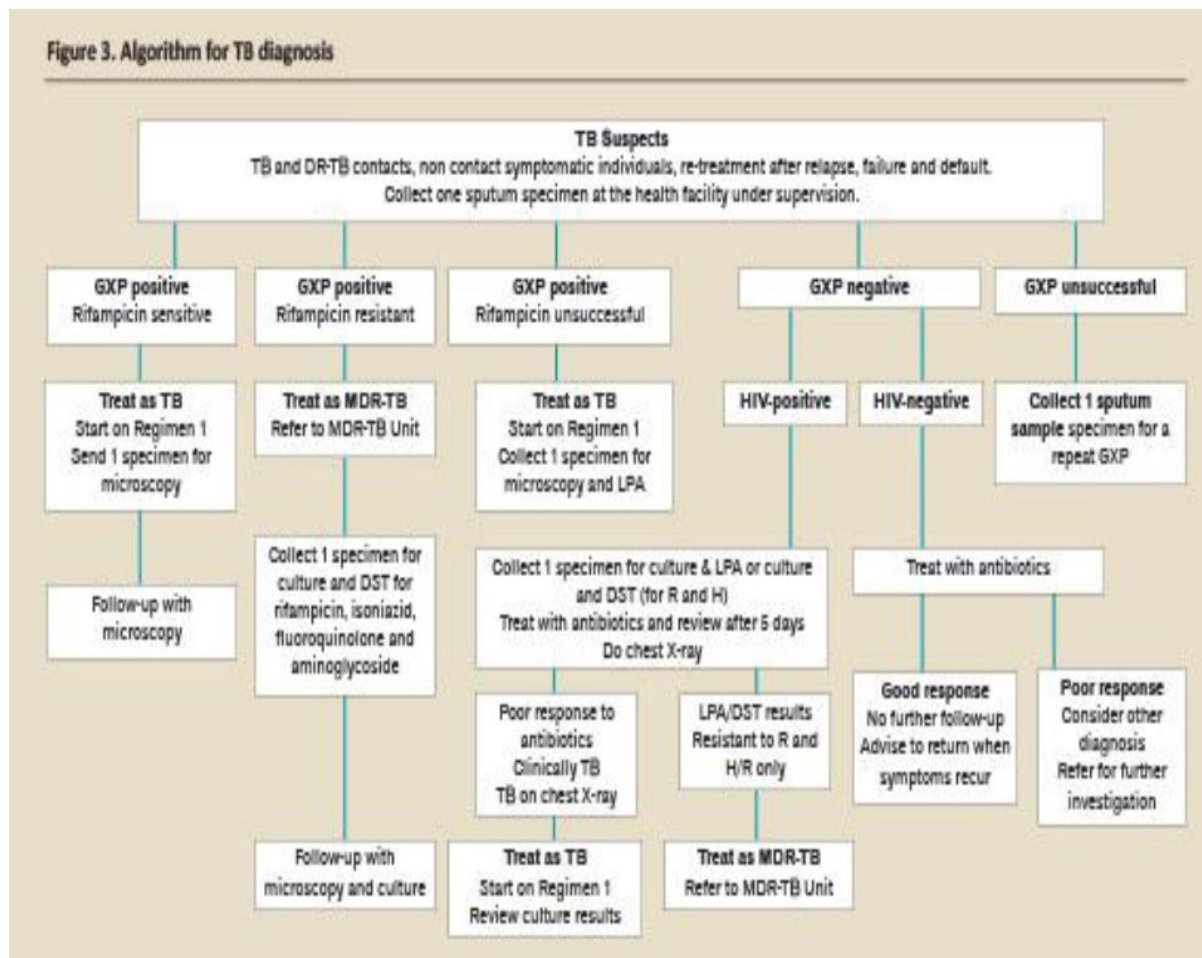


Figure 2.1: Algorithm for TB diagnosis (Source: Adapted from DoH TB Guidelines, 2014)

2.2.2 Treatment of Tuberculosis

Consistent with its two-phased manifestation, TB treatment is implemented following the intensive and continuation phases. The intensive phase starts from the first day of treatment initiation, until two months when it is followed by four months of the continuation phase. When the intensive phase is implemented, patients are treated with a fixed-dose combination (FDC) of four drugs: Rifampicin, Isoniazid, Pyrazinamide, and Ethambutol. The intensive phase of treatment is aimed at destroying the bacteria. Meanwhile, the continuation phase comprises a fixed-dose combination of two drugs Rifampicin and Isoniazid (Socorro et al 2018:2; Ukwaja, Oshi, Oshi & Alobu 2014:432). All these treatments are administered according to the weight of individual patients.

2.2.3 Monitoring of patients on treatment

The National Department of Health (2014:48) asserts that monitoring treatment response is particularly important for clinical management or care of all TB patient categories. It has also been established that patients exhibiting bacteriological confirmation of PTB ought to be clinically and bacteriologically assessed to monitor their treatment responses. The TB guidelines further stipulate that those patients who were diagnosed with GeneXpert must have their baseline sputum smear microscopy collected before the initiation of treatment. According to the DoH (2014:48), the positive and negative smear results at baseline determine the patient's monitoring by sputum smear examination.

2.2.3.1 Sputum smear AFB grading

Treatment of TB is aimed at curing, decreasing transmission, preventing deaths, and preventing acquired drug resistance (Kigozi, Chikobvu, Heunis & Van der Merwe 2014). According to Salam et al (2016:3), the management of patients with TB is reliant on smear microscopy results. Furthermore, patients are diagnosed with the use of the GeneXpert, and once tested positive, an initial smear microscopy smear is collected for grading (Kigozi et al 2014).

The smear microscopy or AFB assists with the classification of patients' TB status in respect of smear-positive or negative pulmonary TB (Yellappa, Kandpal, Lall & Tabassum 2016). Smear positive results are graded into four categories, which are: Scanty, p+, p++, and p+++; depending on the number of bacilli shown in the smear (DoH 2014:20). The grading is used to measure the infectiousness of the patient, which guides the management of contact and monitors the progress of patients, during which samples of sputum are periodically sent for laboratory check for the treatment's efficacy. The prominent AFB disappearance from any possible smear of sputum is the most widely acknowledged treatment option for patients with pulmonary TB (Yellappa et al 2016).

The TB treatment guidelines inform on the appropriate time for collecting sputum, and how to manage patients following the sputum results. The TB guidelines stipulate that a sputum smear or AFB must be collected at seven weeks or 11 weeks if the results came back with a smear-positive report after seven weeks, and 23 weeks for monitoring patient progress during treatment (DoH 2014:32).

2.2.3.2 Sputum smear for conversion

Two months' smear conversion sputum provides an important indication of the progress of TB treatment. The sputum smear results at the end of the intensive phase guide clinicians on whether or not the patient needs to be switched to the continuation phase; or whether the intensive phase ought to be extended for another month (Lukoye, Adatu, Musisi, Kasule, Were, Odeke, Kalamya, Awore, Date & Joloba 2013).

Sputum smear conversion is an effective predictor of treatment effectiveness and guides the resultant management of patients with PTB. Patients who are on treatment should be monitored according to the bacteriological manifestation of the disease. A study undertaken in Rwanda, on the assessment of a control programme found that factors related to sputum smear conversion included higher pre-treatment sputum grade and extensive disease involvement; whereas other studies found that age and the gender were related to failure to conversion (Sarkar & Seshadri 2014; Kayigamba et al 2013). Therefore, knowing the possible causes of sputum smear non-conversion is important in guiding the TB programme because the intervention can be tailored specifically to address the causes. The heavy initial bacillary load was found to be a significant risk factor to delay sputum smear conversion after the intensive TB treatment phase.

Avoidance of non-conversion at the end of the initial phase of TB treatment is incumbent on patients being diagnosed and treated early. Any procrastination in smear conversion is connected with treatment failure and ultimate death (Djouma, Noubom, Ateudjieu & Donfack 2015:5). Non-conversion of a positive sputum smear after the initial treatment phase poses a great public health risk of spreading the TB epidemic and prolonging the isolation of tuberculosis patients (Siddiqui, O'Toole, Kabir, Qureshi, Gibbons, Kane & Keane 2010:3). In a study conducted by Pefura-Yone, Kengne and Kuaban (2014:3), it was found that all patients with TB with sputum smear-positive after the first intensive treatment phase were provided with another month of intensive therapy followed by three months of the continuation phase treatment.

2.3 THE WORLD HEALTH ORGANIZATION'S "END OF TB" STRATEGIES

The WHO's "end of TB" strategies relate to worldwide initiatives and programmes implemented to eliminate TB and these include the directly observed treatment short-course (DOTS), the DoH TB management guidelines, primary health care service

delivery, and ward-based primary health care outreach teams. According to Maimela (2009:17) in 1993, the WHO declared TB a global emergency. Consequently, a five-point strategy was implemented to combat the increasing incidences of the disease and achieve the desired control objectives of reducing mortality and morbidity; as well as reducing transmission and decreasing the emergence of drug resistance TB (DR-TB) (Maimela 2009:17).

2.3.1 Directly Observed Treatment Short Course

According to the National TB Management Guidelines of the National Department of Health (2014:56), directly observed treatment (DOT) implies that a treatment supporter observes a patient who is swallowing tablets, and sensitively supports the patient's needs. Close monitoring and supervision of patients ensure treatment adherence and early detection of negative side effects induced by medication. Many countries have adopted the DOTS strategy to improve treatment and compliance. Preferred family members are educated as treatment supporters, and the Community Healthcare Workers (CHWs) are also trained as DOT supporters for the patients with TB (Parikh, Nataraj, Kanade, Khatri & Mehta 2012:28).

According to a study conducted by Mabunda and Bradley (2011:13-15), several factors are identified as affecting DOTS, and these include food shortage, medication side effects, poverty, and cultural beliefs. Poverty is associated with poor treatment outcomes, some patients who receive disability grants prefer to remain uncured so that they can continue receiving the grant (Gugssa, Shimels & Bilal 2017:530). On the other hand, the smear conversion rate is an indicator for measuring the effectiveness of the DOTS strategy (Tiwari, Kumar & Kapoor 2012:1).

2.3.2 National and Provincial TB services in South Africa

The National Department of Health implemented a policy for National TB Management Guidelines (NTMG) are practical ways to manage and eradicate the TB epidemic in SA. To a large extent, the NTMG the TB programme aims to reduce transmission of TB, early detection of TB, early initiation of treatment to all patients diagnosed with TB, and maintain patients' adherence to TB treatment for the entire six months. This can only be achieved by ensuring good compliance with treatment.

Tuberculosis is curable provided that patients take a full and uninterrupted course of the recommended treatment (DoH 2014:3:51). Tuberculosis is a complex disease that affects the socio-economic status, cultural beliefs, and biological well-being of the patients. It is in this regard that health care workers have a huge responsibility towards patients with TB because they are supposed to educate, ensure treatment adherence, attend to side effects and prevent transmission. Therefore, patients ought to know what is expected of them throughout the treatment. The above-mentioned information should be recorded in the patient’s file every time the patient visits the health care facility (DoH 2014:51). Figure 2.2 below is an indication or reflection of the NTMG’s treatment outcomes for patients with TB.

<p>Social and Economic Factors</p> <ul style="list-style-type: none"> • Extreme poverty • Poor support networks • Unstable living circumstances • Substance abuse • Beliefs about TB and its treatment 	<p>Health System Factors</p> <ul style="list-style-type: none"> • Poor health infrastructure • Poorly trained or supervised health care personnel • Low levels of accountability of health staff • Poor relationships with patients • Inadequate development of community based support for patients
<p>Patient related factors</p> <ul style="list-style-type: none"> • Stigma • Depression • Disempowerment • Poor knowledge about TB and the efficacy of treatment 	<p>Therapy related factors</p> <ul style="list-style-type: none"> • Complex treatment regimens • Large pill burden • Adverse effects of medication • Long treatment duration.

Figure 2.2: National TB Management Guideline factors influencing drug adherence
(Source: DoH 2014a:51)

2.3.3 Primary Health Care (PHC)-TB service delivery

The NTMG of the DoH (2014) illuminates that the PHC nurse managing patients with TB ought to develop a clear treatment needs a plan for each patient. The PHC nurse managing patients with TB needs to involve the patient while developing this plan which ensures that the patients understand their role and commitment needed for treatment success.

The treatment plan should include the important steps such as dates for collection of sputa for conversion and end of treatment, medication to be used during intensive and continuation phase, patient’s nutritional status, prevention of TB to contacts at home and colleagues at work if the patient is employed. The patient appointment and sputa

collection dates ought to be documented in the treatment section of the blue clinic card, the green patient-held card, and the diary of appointments as a reminder to both patients and the PHC nurse managing patients with TB. The PHC nurse managing patients with TB should advise the patient about the need to inform clinic staff of any temporary or long-term change of address and contact numbers causes of facilitating continued treatment and any movements during the treatment period, such notifications are helpful in planning treatment during visits that may take place away from the area.

Patients who for any reason travel unexpectedly away from the area should be advised to take the green card with them and to present it at the nearest clinic providing similar treatment. The PHC nurse managing patients with TB should make sure that the clinic name and contact details are clearly stated on the green card in case of the patient encounters problems while visiting another clinic (DoH 2014:59; 2016:64;100). Additionally, the PHC nurse managing patients with TB should ensure that all the information discussed and planned with the patient is being documented in the file of the patient and must be captured in Tier.Net. It is the responsibility of the nurse managing patients with TB to write patient progress reports, TB statistics and reports, and patient evaluation reports and make sure that the information is captured on Tier.net (DoH 2014:59).

Socio-economic and health problems other than TB may hinder the patient's progress toward completing TB treatment. The problem-solving strategy should be developed to minimise such foreseeable problems and should also be included in the plan. The patient and the PHC nurse are obligated to adhere to the strategic steps to strengthen the patient's adherence to treatment (DoH 2014:52-55). In case there are some challenges that the patient comes across that prevent them from adhering to treatment, the PHC nurse has to assist the patient, and help the patient to solve the problems, to enhance adherence (DoH 2016:7). The patient-related barriers to adherence to treatment are:

- Lack of knowledge or information and understanding concerning TB and its treatment;
- The patients do not believe and understand the TB management as applied in the health care facility;
- Mental health by stress due to the disease, such as depression and anxiety;

- Factors related to treatment burden and adverse drug events such as pill burden, and treatment side effects;
- Socio-economic status such as stigma, transportation to the facility, and possible isolation; and
- Insufficient support by family members and the nurses.

Health care facility barriers might include:

- Lack of health education by the health promoters, counsellors, WBPHCOT, and nurses in the facility; and
- Lack of communication: face to face, via phone call, or text message. For example, the nurse not giving information to the patient regarding DOT, nurses not sending the WBPHCOT to visit patients, tracing in cases of default; or the need for the patients to visit the clinic before the return date.

From the above-mentioned, it is clear that the PHC nurse taking care of patients with TB cannot treat or manage patients alone. For example, there could be up to 20 patients with TB in the facility, some will be new, came retreatment, came for a follow-up visit, came for collection of sputum and others defaulted and need to be traced. This scenario illustrates that a multidisciplinary team is a necessity, nurses need other team members to assist. It is in this regard that the DoH adopted the WBPHCOT method as an additional mechanism to provide an extra hand to the facility (DoH 2016:49; 99-103).

2.3.4 Ward-Based PHC Outreach Teams

The adherence guidelines for HIV, TB, and NCDs of the DoH (2016:35) stated that the integration of work between facility nurses and the ward-based PHC outreach teams (WBPHCOTs) will enable the development of a sustainable community care programme. The WBPHCOT's role is to render preventive, promotive, curative, and rehabilitation services to patients, their families, and the community. The WBPHCOT has the advantage of having sufficient time to discuss patient-related problems during home visits. The WBPHCOTs are also a viable alternative for patients whose socio-economic status renders them unable to travel far for treatment. In some areas, clinics are overwhelmed by limited resources and high TB caseloads. Therefore, using WBPHCOT could be a measure to mitigate limited resources. The team can also train family members to become patient treatment supporters (DoH 2016:56-59).

2.4 FACTORS CONTRIBUTING TO TB NON-CONVERSION

Studies identified factors that contribute to tuberculosis related to sputum smear AFB grading, the timing of sputum smear collection, sputum smear conversion, gender, socioeconomic status, and smoking.

2.4.1 Sputum smear AFB grading

An epidemiological study conducted by Mota, Carvalho, Valente, Braga and Duarte (2012:73) indicates that the ratio of patients with TB remaining smear-positive after two months of treatment could be more than 20%. The study also emphasises that the failure of sputum smear conversion in the second TB treatment month indicates patient infectivity and inefficacy. Initial bacillary load shown by smear grading is usually linked to sputum conversion time in patients and it could be a useful predictive indicator for the planning of programmes and patient counselling (Mlotshwa et al 2016:1).

An analysis of 12,742 PTB cases with recorded smear results after the intensive treatment phase between 2007 and 2013 indicated an overall sputum smear non-conversion rate of new and re-treatment cases of 13.3 and 9.9% respectively (Mlotshwa et al 2016:1). Sputum acid-fast bacilli are used to predict outcomes of patient care during the treatment. Studies have shown that between 5% and 30% of patients with first-time TB episode remains positive following the two months of treatment, and continue to spread the disease (Tiwari et al 2012). Sputum grading of AFB 3+ (referred to as P+++ in the study) and diabetes mellitus have also been linked to poor TB outcomes. A patient who does not have conversion after two months of treatment has a one-month extension of the intensive phase (Bouti, Aharmim, Marc, Soualhi, Zahraoui, Benamor, Bourkadi & Iraqi 2013; Tweya et al 2013:3).

Several studies have highlighted the salience of initial sputum smear grading, and that higher smear positivity grades resulted in delayed smear conversion and poor treatment outcomes. For instance, a Saudi Arabian study reported copious bacilli on pre-treatment sputum smear inspection as an independent risk factor linked to persistent sputum smear positivity after two months of treatment during DOT (directly observed treatment) (Tiwari et al 2012). The self-same study revealed that patients exhibiting higher sputum positivity grades at the initial treatment have relatively lower conversion rates at two and three

months, despite that overall treatment outcomes showed insignificant sputum grading differences.

A field study by Salam et al (2016:3) further found that a longer duration of symptoms was reportedly connected to the lower sputum smear conversion rate as compared to patients with less duration of symptoms at diagnosis. The study also found that the presence of co-morbidities such as diabetes lengthened or prolonged sputum conversion rates. In the same study by Salam et al (2016:3), it was also found that sputum smear non-conversion rate was directly associated with the initial bacillary count of the patient at the time of diagnosis. In a retrospective, a cohort study conducted in Free State Province found that age, pre-treatment smear grading, and TB disease classification were significantly associated with failure to convert smear at the end of the intensive phase of treatment (Mlotshwa et al 2016:1).

A Rwandan study by Kayigamba et al (2012) investigating the link between health facility factors and sputum conversion rates, established that sputum conversion was significantly connected to the location of the health facility. Urban sites experienced more adequate sputum conversion rates as compared to their rural counterparts. Proximity to facilities and corresponding lower travel costs could be some of the underlying factors of the rural-urban disparities.

A Cape Town study found that variables such as age categories above 15 years, being male, HIV infection, smear grading (> AFB+) before treatment, and being treated in Mossel Bay and George sub-districts, were independent factors linked to new cases in TB non-conversion. The non-conversion risk after the intensive treatment phase was 66% among males, and 53% in HIV-TB coinfecting patients. Moreover, re-treatment cases with smear grades of AFB++ and AFB+++ before treatment were about three to five times likelier to remain smear non-converted after the intensive treatment phase (Mlotshwa et al 2016:1).

2.4.2 Timing of sputum smear collection

Early collection, non-collection, and late collection of sputum could become the cause of low smear conversion rates and may impact negatively on the management of patients (Kayigamba, Bakker, Mugisha, De Naeyer, Gasana, Cobelens & van der Loeff 2013). Proper management of TB is aimed at improving patients' lives and preventing drug-

resistant TB (DoH 2014). Furthermore, Pefura-Yone et al (2014) reiterate that the sputum smear completion rate is important in identifying the prevalence of smear-positive patients after two months of treatment.

2.4.3 Sputum smear conversion

Monitoring patients on treatment is valuable in ensuring that each patient who displays TB symptoms and that TB cases receive appropriate treatment. To this effect, early detection of patients with an increased risk of poor outcomes, together with interventions such as treatment modification, could reduce the burden of TB (Kigozi, Chikobvu, Heunis & Van der Merwe 2014).

According to Su, Feng, Chiu, Huang and Lee (2011), sputum acid-fast bacilli smears are important predictors of response to treatment. For a patient to progress to the continuation phase after two months of treatment, the results of the AFB are negative. There is also the importance of the AFB being collected according to the guidelines. The WHO recommends the use of sputum conversion rates at two months as a helpful indicator for TB control and monitoring. These recommendations are also a propellant for rigorous evaluation of patients with positive smears (Kayigamba, Bakker, Mugisha, Gasana & van der Loeff 2012). Patient education regarding the importance of treatment adherence, sputum collection, and the role of the sputum in TB management, are essential variables in TB management. The use of sputum examination in determining the transition of patients to the continuation phase as a criterion alone is not efficient.

Patients who improve bacteriologically but are still clinically ill, are also assessed using the same criteria (Su et al 2011). A study by Pefura-Yone, Kengne and Kuaban (2014) reports that in developing countries, the criteria for transition to the continuation phase of TB treatment is based on direct sputum examination for the presence of AFB. Susceptibility to anti-TB drugs is not used as a routine test due to resource constraints in some countries. As such, early collection, non-collection, and late collection of sputum can result in a low smear conversion rate and this could impact negatively the management of patients with TB (Kayigamba et al 2013). In essence, proper management of TB is necessary and it is aimed at improving patients' lives and preventing drug-resistant TB (DoH 2014).

The sputum smear completion rate is important in identifying the prevalence of smear-positive patients after two months of treatment (Pefura-Yone et al 2014). Copious studies have shown that there is a high association between a high smear grading and its conversion at two months. Therefore, it is important to manage patients who are still positive two months after receiving treatment, because these patients are still infectious. Studies in Saudi Arabia and Burkina Faso have shown that older patients with TB are exposed to high non-conversion risk (Kigozi et al 2014:91).

A Rwandese study by Kayigamba et al (2012:5) found that sputum conversion was highly linked to the situatedness of the health facility. Urban facilities frequently had more adequate sputum conversion rates than rural facilities. In a coordinated review of the effect of diabetes mellitus (DM) on TB treatment outcomes, it was found that DM accelerated a combined risk of failure, relapse, and even death. In the afore-mentioned review, DM patients were four times more likely to develop TB relapse than non-DM patients (Baker, Harries, Jeon, Hart, Kapur, Lönnroth, Ottmani & Goonesekera 2011:1).

2.4.4 Gender

In a study conducted in Pakistan, it was found that females were the first prominent factor associated with poor sputum smear conversion (Salam et al 2016:3). This finding is different from another study by Visser, Stead, Walzl, Warren, Schomaker, Swart & Maartens (2012:3) which showed that males were more prone to sputum smear non-conversion. However, both studies are in disagreement with the study undertaken by Kayigamba et al (2013:8-9), which reports that delayed sputum smear conversion time is associated with high bacillary count patients and not gender.

2.4.5 Socio-economic status

Socio-economic status is also a factor that has an impact on adherence to treatment and influences treatment outcome (Sukumani, Lebese, Khoza & Risenga in press: 1-3). Cavitation disease and high pre-treatment smear grade (i.e., past TB history) are among other determinants of smear conversion at two months. Failing to convert after the intensive treatment phase serves as a determinant of such failure. Accordingly, patients ought to be closely monitored to enablement of treatment adherence (Pefura-Yone et al 2014:6).

Lower socioeconomic status, illiteracy, and sparse TB knowledge are more prevalent in rural contexts. Furthermore, health facilities that serve high numbers of new patients with TB were more likely to experience a low rate of completion, which is attributable to increased overworked and under-staffed facilities (Kayigamba et al 2012:5-6). In this regard, proximity and lower travel costs become the foremost underlying factors.

2.4.6 Smoking

According to a study conducted by Nandawula (2013:31), at Western Reserve University-Makerere, patients with positive smoking history were about two times likelier to have sputum smear-positive results at the end of two months of TB treatment. Therefore, individuals with positive smoking history are likely to have a radiologically extensive disease, which some studies have associated with sputum smear non-conversion (Xu, Lu, Zhou, Zhu, Shen & Wang 2009:1-2). The study by Siddiqui et al (2010:1) found similar results whereby smokers on TB treatment were associated with delayed sputum smear conversion at eight weeks. Visser et al (2012:3) also found that positive smoking history is associated with delayed sputum smear conversion in SA.

2.5 NON-ADHERENCE AS A FACTOR OF NON-CONVERSION

Tuberculosis treatment is a long-term process requiring sufficient improvement efforts that enhance outcomes based on the understanding of factors contributing to poor adherence. These factors if not appropriately addressed could lead to high possibilities of patients remaining smear-positive after the intensive phase of treatment (Xu et al 2009:1-2). To identify factors leading to poor adherence, it is important to know the number of patients who did not have sputum smear conversion and then unpack factors that caused smear non-conversion (Pefura-Yone et al 2014:3).

2.5.1 Factors contributing to non-adherence

The Chinese study by Ai, Men, Guo, Zhang, Zhao, Sun, Zhang and He (2010:5) it is maintained that the side effects of PTB treatment did influence adherence. The participants in the study stated that Hepatic syndrome and the yellowish discolouration of the eyes were some of the reasons that caused them to be non-adherent to treatment. While experiencing such side effects, the participants were encouraged to regularly visit the hospital for assessment and treatment and not to discontinue the treatment.

Another Chinese study by Tang and Squire (2005:4) reported participants' non-adherence due to moving from one area to another. The patients gave an example of poor working conditions which caused them to relocate to other countries. This caused them to discontinue treatment on arrival because they did not have referral letters or supporting documentation. They also referred to the issue of the language barrier in the cities or countries to which they were relocated to. A 2018 Ethiopian study by Mekonnen and Azagew (2018) found that forgetfulness, busy work schedules, and absence from home for long periods resulted in non-adherence.

In a study conducted in the North-West Province of SA, the participants mentioned that they tended to forget treatment because they were not used to it. They were away from home and busy at work during the times they were supposed to take their treatment. Working long hours and busy work schedules caused them to forget their treatment (Mekonnen & Azagew 2018:6; van der Zee 2018:80).

According to a study conducted in the KwaZulu Natal Province of SA by Ndwandwe, Mahomed, Lutge, and Knight (2014:58), travelling a long distance to the clinics, the inability to pay money for transport by the patient, were identified as contributory factors to non-adherence to TB treatment. Other barriers stated in the study are unemployment, poverty, and lack of food; especially since the majority of the participants were receiving disability grants due to PTB. Low educational level was also indicated as the leading cause of non-adherence.

Medication-related factors such as the pill burden (high number of tablets the patients were receiving) were also non-adherence factors. According to Aiyegoro (2016:47), adverse drug reaction or side effects experienced by patients on PTB treatment was identified as contributing factor to non-adherence by patients with TB in the Gauteng Province of SA. Furthermore, the province patients with poor treatment support systems develop poor adherence. Patients who were not provided with counselling throughout the treatment course were likely to become non-adherent. Lack of support from family members due to family beliefs towards PTB contributed to non-adherence by patients. Additionally, patients who were not receiving messages as reminders for follow-up clinic visits were prone to non-adherence.

An Eastern Cape study by Cramm, Finkenflügel, Møller and Nieboer (2010:6) found that stigma does influence PTB treatment adherence in most patients, who reported that they did not appreciate how their neighbours look at them when they (patients) leave their homes fetched by the transport to the clinic. They also did not appreciate the fact that patients with TB were allocated the same room and were treated by a nurse known to be treating only patients with TB.

The possible influence of social stigma on smear conversion can be explained by the loss of both financial and emotional support, coupled with neglect by family and the community. The interplay of these multiple social factors may lead to lowered adherence to anti-TB therapy (ATT), coupled with nutrition-induced food deprivation, which may, in turn, result in a delayed smear conversion, as evident in the literature.

Knowledge concerning tuberculosis and its treatment impacted significantly the extent of patients' adherence. Studies show that health education talks in clinics by health professionals are advantageous. Molapo (2012:247) confirms that health education linked to a particular condition (e.g. TB) does improve the knowledge of the patient about that condition. Patients with scant knowledge about TB and treatment are mostly non-adherent, and this is apparent in their health behaviour (Kaona, Tuba, Siziya & Sikaona 2004:7). Therefore, there is a need to improve communication and health education in health care facilities.

The TB duration, treatment, and side effects ought to be discussed before the treatment even starts. Moreover, patients ought to be motivated to notify and involve their families, friends, and, where appropriate their significant others in their treatment journey. Proper communication is vital for health workers' advancement of the patients' understanding of their condition and related treatment. A Senegalese study conducted by Hane, Thiam, Fall, Vidal, Diop, Ndir & Lienhardt (2007) affirms the absence of proper communication between healthcare providers and patients concerning registration, diagnosis, and treatment has negative outcomes. A separate study further found that TB information to patients was not adequate, which caused them to default (Hane et al 2007).

Hane et al (2007) confirm further that patients believed they are cured after only two months of treatment when they felt better. Those patients were not provided with relevant knowledge that links the cure of TB to completing the full treatment course. The results

of the self-same study revealed further that the short messages received by patients with TB from healthcare workers reinforced TB stigmatisation. The study further recommended that information concerning the prevention and spread of TB should be communicated to all patients with TB.

Low-level health literacy and shortages of staff in rural settings could also render proper and efficient sharing of information concerning the patients with TB to obviate poor treatment follow-up and defaulting. According to Pawlak (2005:175), health literacy premises on the capacity of an individual to obtain, process, and understand basic health services and information required to make informed health decisions. Such literacies are also linked to individuals' levels of formal education. Among indigent SA communities, health literacy could likely be lower and partially attributes to low adherence levels (Kagee 2008:416). The WHO (2006) proposes that a correlational relationship exists between the level of education and levels of health literacy. As such, a low level of education has a collective effect on patients' treatment adherence capacity. Such a state of affairs could lead to patients' poor adherence or non-adherence.

Notwithstanding that health literacy is not necessarily confined to linguistic proficiency, low-level health literacy in SA still constitutes a major problem (Osborne 2004:2). In addition to the generally high illiteracy levels, many patients with TB are not proficient in English (Osborne 2004:2). The strong affinity between health educational status and low-level literacy is observable in many patients with general health problems. This leads to patients being less cognisant of preventive and curative health options and services causing the poor status of health and unhealthy lifestyle practices (Gebremariam, Bjune & Frich 2010:5). This is viewed as one of the many challenges experienced in the SA health care sector today.

Knowledge of a disease's aetiology is required for self-referral before the onset of the disease itself (Muture, Keraka, Kimuu, Kabiru, Ombeka & Oguya 2011:5). The authors propound that treatment ignorance and deficient TB knowledge were cited in 20 of the 120 cases as the foremost factor of treatment default. A study undertaken in the Waterberg District of SA by Dladla (2013) concludes that health care workers' negative attitudes towards TB clients constitute one of the foremost non-compliance factors to the National Tuberculosis Control Programme (NTCP). The Limpopo Province study by

Tshitangano, Pengpid and Peltzer (2010) confirmed the prevalence of health professionals' lack of knowledge relating to TB management.

Kandel, Mfenyana, Chandia and Yogeswaran (2008) report that poor communication between patients and health care providers is also attributable to non-compliance to TB treatment. Meanwhile, the study by Malik and Ahmad (2009) also reported a strong link between non-compliance to TB treatment and the attitude of health care workers. The results showed that 91.6% of respondents did record sputum results for smear conversion as soon as they received them, while 8.4% of the respondents did so only during weekends. These results are an indication of professional nurses' poor documentation of sputum results, leading to quantitatively fewer recordings and the likelihood of negatively affecting the management of the NTCP (Sekotlong 2014:44).

2.6 CONCLUSION

This chapter provided a review of literature on TB diagnosis, treatment, and monitoring. The literature reviewed described TB as a serious lung infection presenting as Pulmonary Tuberculosis and Extra-Pulmonary Tuberculosis. TB treatment aims to cure, decrease the transmission, and prevention of acquired drug-resistant TB. The literature revealed that factors contributing to smear non-conversion include higher pre-treatment sputum grading, gender, social support, smoking; as well as stigma, lack of social support, pill burden, distanced health facilities, and lack of information from the health care workers. The ensuing Chapter 3 presents the research design and methodology employed by the study.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter outlines and discusses the adopted research design and methodology by expanding the key units of analysis that are highlighted in Chapter 1. Therefore, the chapter focuses on the qualitative data acquisition and analysis processes and encapsulates the sampling aspects, trustworthiness concerns, and ethical issues that were followed.

3.2 RESEARCH DESIGN

According to LoBiondo-Wood and Haber (2014:100) and Efron and Ravid (2018:27), the research design alludes to an overarching plan or strategy designed to inform and explains how data is collected, analysed, and interpreted as part of answering the research questions in a study. According to Polit and Beck (2017:743), the research design is the blueprint for conducting research and provides a guide or structure according to which answers are generated for the research question, and the possible resolution of the research problem is enhanced. In this study, qualitative, explorative, and descriptive design was utilised to explore and describe the various experiences and perspectives of participants regarding factors viewed as contributing factors to the non-conversion of pulmonary Patients with TB after two months of treatment, at Ekurhuleni Health District clinics.

3.2.1 Qualitative research design

Houser (2018:70); Ehrlich and Joubert (2014:66), described qualitative research design as a participant-focused approach to an enquiry, in which pertinent information is obtained from specific individuals or key informants according to their experiences, understanding, and perceptions. Therefore, the critical role of key informants or participants in qualitative research design is to provide an interpretative framework from which to view a particular situation (Creswell 2014:255).

In the context of this study, the qualitative research design was preferable, because it enabled the researcher to obtain first-hand information and evidence from the participants, who also provided underlying motives and meanings of their experiences in their own words and without any interruptions (Gay et al 2012:56; Neuman & Robson

2018:23). In addition to that, the qualitative research design was preferred in this study as it infuses a characterisation of the human aspect of a phenomenon as explained first-hand by the participants. For example, in the course of interviewing the participants, the researcher was able to observe their human side in terms of their body language and emotions as determinants of their attitudes and feelings in response to different questions.

The research process in the qualitative research design is emergent. This implies that the research process in its entirety is not static, but is subject to variabilities which may compel the researcher to alter some aspects or phases of the process as the study unfolds (Franklin 2013:19). For instance, the mere fact that the participants present reality from their subjective positions implies that different aspects of the phenomenon will continue to emerge as responses emerged from one participant to the other. Ultimately, it is the responsibility of the researcher to convert such emerging situations, however disparate they may be (Creswell 2014:188).

3.2.2 Exploratory design

An explorative design is a study that is conducted when exploring and familiarising the researcher with a topic (Koonin 2014:36). Such exploration is mostly a factor of the researcher's curiosity and desire to understand the problem better or any state of affairs relevant to the study. The researcher explored the perspectives of patients and nurses to understand and gain more information that would not be easily obtainable through others in respect of factors that contribute to patients with TB' non-conversion at two months of treatment.

3.2.3 Descriptive design

Descriptive design involves the identification of the nature and attributes of nursing phenomena, as well as the relationships among these phenomena (Gray et al 2017:26). In this study, the descriptive design was facilitated by the researcher's comprehensive account of all the stages in the research, beginning with processes and strategies undertaken during the research, and the ultimate acquisition of relevant literature sources; as well as providing details of the research environment, the participants as well as other pertinent information such as their human condition. The participants narrated their own lived experiences, while the researcher listened and noted the important elements during the audio recorded and virtual interviews.

According to Machi and McEvoy (2018:46), the descriptive approach is useful and helpful in the development of concepts and themes which the researcher obtained in the process of explaining and providing better understanding and possible interventions that can be applied in practice. Furthermore, the participants enhanced the descriptive aspect of the study through the explanations they provided spontaneously to the probing questions posed by the researcher concerning their experiences of non-conversion at two months of TB treatment.

3.3 RESEARCH METHODOLOGY

Braun and Clarke (2013:333) intimate that methodology is derived from the theory of conducting research which includes considerations such as the methods of collecting data, selection of relevant participants, the role of the researcher, as well as the applicable ethical consideration. In addition, the research methodology includes methods by which the population is selected, as well as the sampling frame and size of the sample, approach, and technique, data-collection method, data analysis, and strategies to enhance rigour. On the other hand (Brink et al 2018:187) inform the readers about what the researcher did to solve the problem.

3.3.1 Setting

A research setting relates to the specific place or places at which data collection (Saldanha & O'Brien 2013:47). As previously alluded to, it is likely for qualitative studies to collect data in a natural setting where the main providers of information are to be found, and in which the researcher has no control over the environment as that may alter the very experiences of the individual from whom s/he intends to obtain relevant information (Gray et al 2017:660).

This study was conducted in the Ekurhuleni E2 Sub-district of the City of Ekurhuleni (CoE) Municipality. The CoE is one of Gauteng Province's five district municipalities and is situated in the eastern region of the province. The municipality comprises three district regions, namely: the East, the North, and the South. There are six health Sub-districts located in the three regions, which are: Ekurhuleni E1 and E2, Ekurhuleni N1 and N2, and Ekurhuleni S1 and S2.

The study was conducted at Ekurhuleni E2 Sub-District Region (ESDR), which has two Community Health Centres (CHCs) and fourteen Primary Health Care clinics (PHCs). All the selected clinics operate from 7h30 to 16h30, on weekdays, Monday to Friday. According to the South African population figures, there were 3 461 050 people in the CoE in 2018 (Massyn et al 2018:278). The researcher's choice of five selected clinics was informed by the high number of patients who had non-conversion at two months of TB treatment, as mentioned in Chapter 1, 1.3. Figure 3.1 depicts the City of Ekurhuleni's municipality regions and health districts.



Figure 3.1: Map of City of Ekurhuleni (Source: City of Ekurhuleni)

3.3.1.1 Natural setting

Data is collected from participants' natural environment/habitat or ecological surroundings without introducing any changes to it. This is where participants daily experience their reality, nature, and other relevant phenomena (Nieuwenhuis 2017:39). Accordingly, the study was held in the natural environment of the participants, whereby the researcher could access the virtually held semi-structured interviews with the nurse participants and face-to-face interviews with the patients participants. In this study, the researcher applied all due processes of informed consent and full disclosure to gain negotiated entry to the

living spaces of the participants. The virtual interviews were held individually. However, the face-to-face was conducted without any physical contact in observance of the Covid-19 regulations (UNISA 2020:1).

3.3.1.2 Population

According to Rebar and Gersch (2015:111), a population refers to the group of individuals, events, or objects that have common characteristics that serve as a reference point of interest to the researcher. Meanwhile, Polit and Beck (2017:249), described the population could be accessible and thus become targeted by the researcher on account of accessibility or possession of particular criteria that the researcher has considered before the study's execution. Accordingly, the population was characterised as patients who had non-conversion at two months of TB treatment and the nurses in their care.

The population for this study was as follows:

- Patients who had non-conversion at two months of their TB treatment in selected Ekurhuleni clinics.
- All professional nurses who had been working in the TB room for one year and more.

According to Franklin (2013:49), phenomena exist in total complexity and require that multiple perspectives be explored and engaged because no single perspective is complete. Hence, the study has not sought to obtain the versions of only a single category of participant views but involved a heterogenous participant group consisting of both nurses and patients. The rationale was for the researcher to obtain a holistic understanding of the phenomena, because a monolithic account from a single category of participants may promote a mono-dimensional picture of the issue under-investigated (Creswell 2014:188).

3.3.1.3 Recruiting research participants

This process involves identification, accessing, and communicating with the prospective participants who were selected from the target group (Polit & Beck 2017:261). According to Gray et al (2017:354), the researcher's communication with the participants is an important aspect that could potentially affect the participants' decision-making regarding being part of the study or not. When recruiting participants, the researcher needs to make full disclosure about what is expected from them. It is also incumbent on the researcher to explain why the study is undertaken, as well as what will the role of the participants be.

Logistical information should also be disclosed, such as how much time will be needed from each participant, and the duration of the study. For purposes of ethical protocol, the researcher sent letters of request to Facility managers requesting permission to approach the professional nurses who are working and/or had worked in the TB unit for their participation in the study.

Once the permission was granted by the manager, the researcher then approached the professional nurses and explain the informed consent issues as she did with the facility managers. The researcher also issued informed consent forms to the participants to sign after they voluntarily agreed to participate, based on all the full disclosure issues the researcher had explained (Thomas 2016:34). The researcher also recruited patients with TB who visited the clinics for review or follow-up consultations. The researcher firstly explained the informed consent issues as s/he did with the professional nurses. The researcher then issued pamphlets for those who would be interested in sending “please call me” messages to the researcher for the arrangement of appointments. The letter of request was attached to the ethical clearance copy from the University’s Ethics Committee and the Ekurhuleni District Research Ethics Committee. This procedure is reflective of the researcher’s transparency and administrative compliance with the clinics where the study was conducted.

3.3.1.4 Inclusion criteria

The inclusion criteria are a set or repertoire of standards or norms which the researcher incorporates when deciding on what is deemed relevant for participants to be included in the study (Gray et al 2017:294). The inclusion criteria were:

- Professional nurses working in the TB room for one year and more.
- Patients who had non-conversion at 2 months of their TB treatment.
- Both males and females between the ages of 18 and 60.
- Only patients who understand the following languages English, Isizulu, and Sesotho.
- Participants who agree to share information with the researcher.

3.3.1.5 Exclusion criteria

Exclusion criteria refer to the elimination from possible participation in the study due to possession of traits in which the researcher is not interested in (Gray et al 2017:287). The exclusion criteria were:

- Participants under 18 years.
- Professional nurses who have worked for less than a year in the TB unit.
- Participants who spoke other languages than the ones mentioned above, to prevent miscommunication and language constraints.

3.3.2 Sample and Sampling method

Sampling relates to a particular group of individuals chosen to represent the larger group from which it originates (LoBiondo-Wood & Haber 2014:232). In this study, non-probability purposive sampling was applied. This method applies when the judgement of the researcher becomes preeminent in the choice of participants selected for their involvement in the study. Purposive sampling is most appropriate in situations where participants are not guaranteed any chance of involvement in the study. The fundamental selection of participants is based on the judgement of the researcher. The group of participants is selected based on some criteria the researcher has determined before the commencement of the study. Furthermore, the researcher's judgement is enhanced by the understanding of the particularities of the research environment.

In this study, the researcher purposively selected nurses managing patients with TBs, providing treatment to patients with TB, as well as patients with TB who were registered in the selected health care facilities. Whereas the total number of participants indicated in Chapter 4 is 17, it is worth mentioning that data saturation was the fundamental consideration and influential factor in the eventual selection of the number of participants who participated in the study (Machi & McEvoy 2018:39). According to Kumar (2015:117), data saturation refers to the stage in the research process at which the researcher acquired data beyond any new information being required.

3.3.3 Data collection

Data collection refers to the systematic process employing which the researcher obtains permission from those sources who are likely to provide answers to the possible resolution of the research problem and achievement of the aim of the study (Saunders, Lewis & Thornhill 2019:112). In qualitative research, data is mostly collected empirically through interviews and focus group discussions. In this study, the researcher mentioned suitable times and venues to conduct the study. The researcher further made appointments with professional nurses who met the inclusion criteria. The researcher had

previously made the necessary arrangements with the facilities to enable permission for the selected professional nurses to participate in the study at their place of work at pre-arranged times to prevent disruptions.

Participants were also interviewed virtually during times that were convenient to them on those days that they visited the clinics for follow-up consultation. According to Polit and Beck (2017:78), interview questions allow the spontaneous response of the participants without the confinement of rigid questions. Interviews are usually conducted in exploratory and descriptive research studies and are helpful to the researcher to obtain first-hand information about their natural environment. They also make room for the researcher to take notes on non-verbal communication, attitudes, beliefs, and dislikes.

It is the researcher's reflection of who they are, what their belief systems are, and what they have experienced about the phenomenon under investigation, without influencing the participants' perspectives or the ultimate findings of the study (Gray et al 2017:44; Rani 2016:2).

3.3.3.1 Data Collection Method

The researcher has multiple options for collecting qualitative data; such as observing the visual cues and the tone of the conversation when participants respond to questions (Dantzker & Hunter 2012:22). In this study, data was first collected through the review of literature, followed by virtual interviews during which field notes were taken to document non-verbal cues that could not be captured with the use of the audio-recorder. Participants were interviewed by asking semi-structured questions using the interview guide, and field notes were written during interviews while voices were recorded.

In this study, data were collected using individual in-depth semi-structured interviews. An interview is a method of collecting information where the interviewer asks the interviewee sets of open-ended questions (Yin & Campbell 2018:28). Interviews are usually conducted in exploratory and descriptive research, and case studies. It is a method of obtaining facts from interviewees or participants and can be useful in ascertaining values, preferences, interests, tasks, attitudes, beliefs, and experiences (Brink et al 2018:143).

Interviews can take place face to face, over the telephone or cell phone, or via other electronic devices (Brink et al 2018:143; LoBiondo-Wood & Haber 2014:279). In this study

virtual interviews were conducted to collect data. A virtual interview means an interview conducted using the internet, email, or telephone, rather than face to face. In-depth individual semi-structured interviews provided the researcher with an opportunity to probe, and investigate hidden, suppressed views and experiences of participants. The virtual nature of the interviews implied that the researcher could use the internet or the telephone without physically being in the interview setting.

3.3.3.2 Pilot interview

A pilot interview is a mini-research that enables the researcher to pre-test a research instrument before the main study. Such a pre-tested instrument offers the researcher the opportunity to detect and eliminate any weaknesses that may be found during the preliminary stages of an enquiry (Grove & Gray 2019:68). Accordingly, pilot interviews were conducted at the facility which was not part of the study. Two professional nurses who were not included in the main study were interviewed. It should be borne in mind that the main reason for pilot interview testing was not to collect interpretable data, but was meant to identify the problems that may arise during the main study and to revise the interview guide (Gray et al 2017:127).

The pilot study also assisted in familiarising the researcher with the efficacy questions which enabled a determination of questions to be added, excluded, or included in the final interview guide. The researcher interviewed the participants who were from clinics that were not part of the study. The interviews were like a formal interview and the questions included the grand question, clarification seeking questions, follow-up, and probing. The interviewed participants answered the questions sufficiently, and they did not indicate difficulties, therefore no further changes were made to the interview guide which was used for main data collection.

3.3.3.3 Data collection instrument

In qualitative research, the researcher is viewed as an important or key instrument because of the investigative skills and knowledge s/he possesses and displays in the form of the range of interview questions (closed and open-ended) to elicit different types of responses. In this regard, s/he can influence how the participants answer the questions, which is unlikely in quantitative research because objectivity is a major requirement. Hence, the researcher is detached from proceedings, except by interacting

with the participants only through the research instrument (Bertram & Christiansen 2014:17). In this study, the researcher fulfilled the key instrument role by asking a range of questions to probe into various aspects relating to PTB non-conversion at two months of treatment.

For purposes of this study, the use of the virtual interview mode to collect data through the semi-structured compelled the researcher to opt for a combination of face-to-face and virtual interviews due to logistical and other challenges some of the participants were experiencing. For instance, the patients participants to be interviewed were from disadvantaged backgrounds. Therefore, it would be impossible for some of them to have access to phones, airtime or data, hence the researcher opted for face-to-face interviews in the clinics. The researcher used Microsoft teams' when interviewing the professional nurses and was assisted by a research assistant who was using the researcher's laptop for connectivity. This was done because of the high number of COVID-19.

In this study, the researcher used two interview guides to lead the interview dialogues with the participants. These interview guides were based on one central question for each group of participants. The researcher first interviewed the professional nurses working in TB rooms, or who had experience managing patients with TB, and the following central question was asked: "Could you please share your experiences regarding the factors contributing to non-conversion of patients with TB?". When interviewing the patient participants, the central question was: "Could you please share your experiences regarding the factors contributing to non-conversion during your TB treatment. The central questions were followed-up by probing questions, which emerged after the participants' responses.

3.3.3.4 Data collection process

An interview is a method of collecting information where the interviewer asks the participants a set of questions, it can take place face to face, over the telephone or cell phone, or via electronic devices (LoBiondo-Wood & Haber 2014:279; Yazan 2015:66). The researcher went clinic by the clinic to introduce the study to the facility managers and the professional nurses, the participants' leaflets were shared, and the type of data collection was also shared as the researcher was not allowed to spend a lot of time at the facilities to prevent the spread of COVID-19.

During the data collection process, participants were provided with details of the study, after which they voluntarily signed the informed consent. In the beginning, the researcher welcomed each participant to let them feel at ease. The researcher also outlined the purpose, objectives, and benefits of the study and explained that the study was for academic purposes for professional nurses and patients with TB. The researcher disclosed in the letters of request to the facilities that the venue would be requested for the participants as the professional nurses had their own where they were interviewed at different times, through arranged appointments.

Professional nurse participants were provided with 1Gig data for one day to avoid the challenges of accessing the internet while joining the virtual interviews while using the researcher's garget. The process of data collection was explained to the professional nurses, stating that their faces would be shaded to ensure anonymity, and after obtaining their consent, virtual interviews were conducted. The interviews were conducted in English, IsiZulu, and Sesotho. The IsiZulu and Sesotho transcripts were translated to English by an expert translator. The rationale for engaging some of the participants was to ensure that their life-world, was as comprehensively as possible without any language barriers. During the process of data collection, the participants' gestures were collected through field notes. The virtual interviews lasted between 45 and 60 minutes.

Patients with TB were also allocated their special room in the healthcare facilities which they accessed individually for the interviews on days that they visited the clinic for their TB examination. In-depth semi-structured interviews were conducted following the interview guide, the grand question was asked, followed by probing questions. The participants were encouraged to share their experiences, without being intimidated by the recording and the researcher while asking clarity-seeking questions and writing field notes. The face-to-face interviews lasted between 30 to 45 minutes among different participants.

During the interviews, participants were encouraged to share their views without being intimidated and were also allowed to ask questions. The researcher compiled field notes to observe the non-verbal communications emanating from the participants who were also allowed to halt the conversations to ask their questions. Furthermore, the researcher informed the participants that they were allowed to report the researcher or stop participating if the researcher was asking invasive questions. The interview rooms were

safe for the interviews and had minimal destruction, as a note of 'Do not disturb' was pasted on the doors of each interview room.

- ***Strengths of virtual interview***
 - Participants do not travel away from their homes to meet the researcher; the interviews take place in the comfort of their homes.
 - It is ideal for participants who are shy and are afraid to raise opinions in face-to-face settings.
 - Participants may feel more comfortable disclosing sensitive information, because of less social pressure and no visual cues.
 - The interviews are saved on the virtual meeting application (Braun & Clarke 2013:98-99).
- ***Weaknesses of the interview mode***
 - The interview might be less accessible to the participants especially those without network coverage or the gadgets to connect to the interview.
 - Participants who are technologically challenged can find it hard to connect to the interview.
 - The researcher has to compensate those who do not have the means to access the internet.
 - The interview might be longer than expected due to a break-up in connectivity since the country is experiencing load shedding (Braun & Clarke 2013:100-101).

The participants were informed about future contact for verification and clarification of the content of the findings with the researcher (Masimula 2020:31). Participants were encouraged to ask any questions and say anything they would like to share or add regarding the study. The researcher explained how the participants can access the results of the study from the Ekurhuleni Ethics committee. All the participants were thanked for their participation.

3.3.2.5 Data management

In qualitative, explorative, descriptive design, transcription of verbal data into written data is a routine component (Gray et al 2017:508). The audio and virtual recorded interviews

were typed by the researcher in the form of verbatim transcription. Verbatim transcription refers to the transcripts that are prepared by typing all details of what the participants made, including audible noises, such as background noises, laughing, coughing, hesitating, and including head nodding, and hand gestures (Grove & Gray 2019:116). The researcher used a computer analysis tool Atlas t i version 9 for storage of textual data and data analysis. The researcher stored collected data on the personal computer and external hard drive, the files folder was protected by a password.

3.3.3 Data analysis

Data analysis is a dependable and accurate manner for summarising data collected in the study. In qualitative research, data analysis involves coding and finding patterns or themes in narrative data (Saldanha & O'Brien 2013:44). Qualitative data was carefully stored in its original form and subsequently analysed. Based on the multiple approaches of data acquisition used by the researcher, general and specific patterns, categories and themes were organised, structured, and interpreted from different approaches as informed by literature (secondary data) and the interviews (primary data) (Berg & Lune 2012:48). As such, different skills and approaches (e.g. Thematic, content, and discourse-based) to draw specific conclusions from general contexts in response to the state of PTB non-conversion at two months in the Ekurhuleni E-sub-district clinics. The data analysis process in Chapter 4 is emblematic of the complexity of reasoning required in the analysis and sense-making of this study.

Qualitative research seeks different meanings from different participants based on their different subjective views on the same phenomenon (Ehrlich & Joubert 2014:48). In this study, the collected data represents what the participants have shared, and not what the researcher feels about the investigated phenomenon (Houser 2018:343). Although participants experienced the same phenomenon, their version of the truth or the event might not be the same, even though the question directed to each participant was the same. The information from all the participants and the reviewed literature are discussed in Chapter 4.

The researcher used a computer analysis tool Atlas ti version 9 for storage of textual data and data analysis. Tesch's method of open coding was used in this study, as it refers to the creation of categories, themes, and relationships of text content in groups (Babbie &

Mouton 2010:338). In this study, Tesch's coding of eight steps of data analysis was utilised (Creswell 2014:218).

Step 1: The researcher prepares for analysing data by transcribing all the recorded interviews into a verbatim transcript. The transcript removes the participants' identities and makes use of pseudo names.

Step 2: The researcher reread the transcripts, viewed, and listened to the recorded interviews repeatedly, to familiarise himself or herself with the content. Starting with the shortest interview to the longest.

Step 3: After reading the transcripts and making sense of the data, the researcher came up with a list of topics and return to the data. The topics were then abbreviated as codes and the codes were written next to the appropriate segments of the text.

Step 4: The codes were based on what the participants shared during the interviews. The researcher categorised the transcripts into different codes.

Step 5: The researcher made the final decision on the abbreviations for each theme and alphabetises the codes. The researcher then connected codes with similar meanings to make up a theme, as it serves as building blocks for creating a theme. Codes can be used as sub-themes in qualitative research.

Step 6: The researcher found the most descriptive wording for the topics and turned them into themes, sub-themes, and categories. The researcher endeavoured to reduce the total list of themes by grouping topics that relate to each other.

Step 7: The researcher presented the themes and sub-themes in a tabular form to offer the reader a snapshot of what are the major findings from data collection. The researcher described each theme first before discussing it and its sub-themes.

Step 8: The researcher interpreted the results of the study, by putting meanings to the themes and sub-themes with the assistance of the literature consulted. During this stage, the researcher can be able to make recommendations after identifying gaps in the practice and the literature for future research.

3.4 MEASURES TO ENSURE TRUSTWORTHINESS

Trustworthiness is an expression of the degree to which the findings or processes of the research are accorded a modicum of acceptability by the research community. In this study, trustworthiness was ensured by adhering to aspects of credibility, transferability, dependability, and conformability (Polit & Beck 2008:511).

3.4.1 Credibility

Credibility is a criterion used to evaluate the quality of a qualitative research study, ensuring that the data and its interpretation are a representation of what happened in the field (Polit & Beck 2017:724). In this study, credibility was achieved through prolonged engagement and persistent observation of the participants during the interviews. According to Brink et al (2018:172), prolonged engagement means that the researcher gains an in-depth understanding of the studied phenomenon by building trust and rapport during the engagements with the participants. The researcher spent time with the participants during telephone calls building trusting relationships, it was difficult since the researcher and participants never met face to face. Participants spent sufficiently long periods during the interview, and different types of questions such as probing, clarity seeking, and follow up, helped the researcher to gather more information on the contributing factors of Patients with TB' non-conversion at two months of treatment.

3.4.1.1 Triangulation

Triangulation refers to the use of multiple data collection and interpretation sources or methods for the researcher to gain a full understanding of the phenomenon. This was done to provide an enriched understanding and converge an accurate description of the phenomenon (Withrow 2014:67). In this study, triangulation was used whereby the researcher utilised different types of resources while collecting data, such as virtual interviews, writing of field notes, and face-to-face interviews.

3.4.1.2 Peer debriefing

Peer debriefing refers to seeking attention from a colleague or doctor who has knowledge about research, understanding of the study, and can debate with the researcher about the steps of the research process (Withrow 2014:67). The researcher requested a doctoral research student to examine the research method, transcripts, and results discussions to avoid the researcher's biases. Throughout the data collection, data analysis, and interpretation of the results, the researcher worked together with the research supervisor to be guided, this enhanced credibility of the study.

3.4.2 Transferability

Transferability refers to “asserting that the researcher collects enough descriptions of data in the context and reports them with enough details and precision to allow judgements about transferability to be made by the reader” (Babbie & Mouton, 2010:151). Transferability refers to the ability to apply the research findings in the other context (Welman, Kruger & Mitchell 2014:56). The researcher ensured transferability in this study through a detailed description of the factors that contributed to patients with TB’s non-conversion at 2 months of treatment, non-purposive sampling of participants, and research findings. In this study, data was collected from the participants who met the inclusion criteria, until data-saturated as discussed in Chapter 3. Data findings and interpretation of the results as discussed in detail in Chapter 4.

3.4.3 Dependability

Dependability refers to “the provision of evidence such that if the study was to be repeated with the same or similar participants in the same or similar context, its findings would be similar” (Welman et al 2012:59). In this study, the researcher provided detailed information on the setting, research paradigm, data collection, and analysis methods utilised. This was done to ensure easy reference if another researcher wants to replicate the study.

3.4.4 Confirmability

According to Walshe, Ewing, and Griffiths (2012:69), confirmability refers to “objectivity, that is, the potential for congruence between two or more independent people about the data accuracy, relevance or meaning”. Confirmability was ensured in this study by providing the research supervisor and the independent auditor with interview recordings and transcribed data for the audit trail. An audit trail refers to the examination of data collection, findings, interpretation, and recommendations (Brink et al 2018:173; Punch 2014:27).

3.4.5 Authenticity

Authenticity is an element that anticipates the researcher to show fairness throughout the study (Brink et al 2018:158). In this study, authenticity was attained by the researcher by revealing actualities during this research irrespective of the underlying knowledge, skills,

values, issues, and concerns, patients' participants experienced whilst on TB treatment and professional nurses managing such patients.

3.5 ETHICAL CONSIDERATIONS

Ethics is defined as a system of moral values that is concerned with the degree to which research procedures adhere to professional, legal, and social obligations to study participants (Thanh & Thanh 2015:46). The researcher observed and applied the ethical principles of beneficence, justice, and the principle of autonomy, and respect throughout the study.

3.5.1 Informed consent

Informed consent means that the participants are provided with adequate information about the study, to enable them to make an informed decision to either participate in the study or not (Gay et al 2012: 21; Polgar & Thomas 2011:12). According to Yazan (2015:71), the researchers have to obtain informed consent from the participants and ensure that they participate out of their free will without being forced. The researcher must explain any possible dangers that might arise from taking part in the study. In this study, the participants were provided with study information from the participants' leaflet.

The purpose of the study, the methods of the study and data collection, and the significance of the study, including voluntary participation, anonymity, and confidentiality were explained before the participants sign the consent form. This was done to ensure that the participants understand what the study entails, and they have to give consent in writing. The participants were allowed to ask questions, information was provided on their will to participate and to withdraw without any consequences. The facility managers assisted the researcher in coordinating the signing of the consent forms due to COVID-19 preventive measures.

3.5.1.1 Anonymity

The participants have the right to know that the data provided will be kept strictly confidential and anonymous. Anonymity is the most secure means of protecting confidentiality in the study, which occurs when the participants cannot be linked to the data they provided (Walliman 2017:102). In this study, the researcher posted a sign of 'Do not disturb' on the door wherein the interview room. This was done to ensure that no

unauthorised person enters the room or listen to the interviews. The researcher provided the participants with pseudo names so that the data collected was not linked to the participant or clinic.

The signed consent forms and virtual recordings were kept in the locked cupboard and also in the folder protected by a password on the researcher's laptop. The research data was only accessible to the researcher and research supervisor. Data collected was used to satisfy the aim of the study and nothing else. The researcher explained to the participants when data can be published in accredited journals and presented at conferences and workshops.

3.5.1.2 Confidentiality

When anonymity is not possible, other means of confidentiality must be applied. Confidentiality is a pledge that any information participants provided to the researcher, would not be publicly shared in a manner that identifies them and the information will not be accessible to unauthorised people (Polit & Beck 2017:147). Welman et al (2012:624), described confidentiality as the right to protect participants' identities and keep shared information private. The researchers must not disclose participants' identities and the transcripts must be stored in a secured environment. The participants' names and identity numbers were not used to identify the participants in this study. The researcher assured the participants that the information recorded would be destroyed after two years of publication of the study.

3.5.2 Principle of autonomy and respect

The principle of autonomy and respect is important for all people, including the rights of individuals to privacy, rights to full disclosure, confidentiality, and self-determination (Yin & Campbell 2018:43). The right to self-determination is based on participants' must be treated as autonomous agents, who are capable of controlling their actions and having the right to voluntarily participate or withdraw from taking part in the study without prejudicial treatment (Yin & Campbell 2018:43).

In this study, the researcher provided professional nurses managing patients with TB and patients who had non-conversion at two months of TB treatment with relevant information about the study, participants have the right to ask questions, rights to refuse or withdraw

from participating in the study without any coercion and no incentives to reward the participants from the study. The names of the participants were not included in the verbatim transcripts of the interview, instead, the pseudo names were used to ensure confidentiality.

3.5.3 Principle of Justice

The principle of justice is based on the participants' rights to fair treatment and privacy rights. The principle of justice means the participants are entitled to fairness and equal access to benefits from the contributions of the study (Polit & Beck 2017:141; Gay et al 2012:20). The participants were selected based on the inclusion and exclusion criteria, and not based on their vulnerability as both the professional nurses and patients were sampled in this study. In this study, participants who refused to participate were treated with respect and in a non-judgemental way. Participants were not forced to answer any question, they answered out of their own will. The recordings for the interview and transcripts have been stored in a secure file and a password-protected personal computer.

3.5.4 Principle of Beneficence and Non-maleficence

The principle of beneficence refers to the researcher minimising harm to the participants and increasing benefits (Polit & Beck 2017:139). The researcher must bring no harm to the participants or other people (Bertram & Christiansen 2014:66; De Vos et al 2011:115). The participants were given a holistic explanation of the study and the purpose and were informed that they have the freedom to participate or not. In this study, the researcher minimised harm to the participants by not exposing them to the risk of being infected with COVID-19. Physical harm was therefore avoided as participants. The interviews were also conducted virtually to maximise benefits and minimise harm. Participants were informed that they can stop participating at any time in the study, and also that the study might be published in an academic journal and that their names or identity shall remain anonymous.

3.6 CONCLUSION

This chapter discussed the research design and methods used in this study, including the population dynamics, study setting, and sampling methods. Data collection, research

instrument, and data analysis were described in detail. Measures to ensure trustworthiness and ethical considerations were explained. Chapter 4 discusses the data analysis and presentation of results.

CHAPTER 4: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

In Chapter 3, the researcher presented and discussed the study's preferred and adopted research methodology and research design. The current chapter focuses on the presentation, analysis, and interpretation of the self-same data as findings whose framework of generation was explained in Chapter 3. Importantly, the interpretation of the findings is complemented and supported with extended reference to literature sources that either corroborate or disprove some aspects of the findings (Walliman 2017:109; Whitley & Kite 2012:26).

The objective of the study was to explore and describe the factors contributing to PTB patients' non-conversion at 2 months of treatment at Ekurhuleni district clinics. The chapter is organised into three main sections: an outline of the demographic characteristics, as well as two phases highlighting the participants' responses and the thematic analysis and interpretation thereof.

4.2 DATA MANAGEMENT AND ANALYSIS

This study took place in five selected Primary Health Care (PHC) clinics in Ekurhuleni Health District. Data was collected from different participants between October 2020 and March 2021. Data was collected from professional nurses (PNs) who were working in the TB rooms of the selected five clinics, and from patients with TB who had non-conversion during their TB treatment. Data were collected in the following two phases, In Phase 1: data was collected from experienced professional nurses who worked or were still working at the TB rooms. During Phase 2: data were collected from patients with TB who experienced non-conversion during the second or third months of their TB treatment. The data was analysed using the Atlas ti version 9 application. Data was analysed through the use of Tesch's method of data analysis as discussed in Chapter 3 (Creswell 2014:218). During data analysis, six themes, nine sub-themes and 30 (thirty) categories emerged from the collected data. The results are presented in two phases as discussed in the next sections of the chapter.

4.3 PHASE 1: PROFESSIONAL NURSES' RESEARCH FINDINGS

This section presents the interview-based findings on factors contributing to patients with TB non-conversion as described by professional nurses who worked or were still working in the TB rooms at the clinics. The ensuing section discusses the demographic characteristics of the participants.

4.3.1 Professional nurses' demographic characteristics

This section presents the demographic characteristics of the professional nurses who participated in the study. Table 4.1 (overleaf) shows these demographic characteristics in the context of the participants' age, gender, educational qualifications, and work-related experience. The interviewed participants' age ranged from 26 and 52 years. Of the nine participants, five were females, and four were males. All the participants were professional nurses (PNs) and registered with the South African Nursing Council (SANC) the professional body. Five of the professional nurses had the highest qualification as a postgraduate diploma in PHC, and the other four had an undergraduate Diploma in Nursing.

The least number of years of working experience by the professional nurses was two years, and the highest was 21 years. All the nurses had more than one year of experience in the TB room, with the highest being six years. Furthermore, the majority of the PNs were trained in TB, apart from two who were yet to be trained.

Table 4.1: Overall professional nurse participants' demographic characteristics

Sample composition	Sample size	Study population	Age	Total	
Professional Nurses	9	72	20-26yrs	3	
			27-35yrs	2	
			36-45yrs	2	
			46-55yrs	2	
Years of experience	Total	Gender	Total	Nursing qualifications	Total
1-5yrs	3	Male	4	TB training	7
6-10yrs	4	Female	5	Diploma	3
11-20yrs	1			B Degree	1

21-30yrs	1			Post Graduate	5
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4.3.1.1 Phase 1 Themes and sub-themes

After data was collected from the above-mentioned participants, data were analysed and three themes were identified, namely:

- Health system services,
- Patient care, and
- Social related factors.

The themes, sub-themes, and categories are presented in Table 4.2 below. In this chapter the mentioned themes, sub-themes and categories would be discussed in detail. Each of these themes is described in this section.

Table 4.2: Summary of themes, sub-themes, and categories of professional nurses

THEMES	SUB-THEMES	CATEGORIES
4.3.2 Health System Service	4.3.2.1 Nursing care	<ul style="list-style-type: none"> ○ Clinicians' use of TB guideline ○ Patient education ○ History taking ○ Nurses attitude ○ Involvement of Nurse managing patients with TB inpatient Management
	4.3.2.2 Management factors	<ul style="list-style-type: none"> ○ DOT strategy ○ Support from the facility manager ○ Support for TB programme
	4.3.2.3 Education	<ul style="list-style-type: none"> ○ Healthcare workers lack skills ○ Health care workers' training
	4.3.2.4 Ward-based Primary Health Care Outreach team	<ul style="list-style-type: none"> ○ Involvement of WBPHCOT

4.3.3 Patient care	4.3.3.1 Patient factors	<ul style="list-style-type: none"> ○ Denial ○ Co-morbidities ○ Treatment side effects ○ Substance use ○ Treatment compliance ○ Use of traditional medicine
4.3.4 Social issues	4.3.4.1 Social issues	<ul style="list-style-type: none"> ○ <i>Patient stigma</i> ○ <i>Support system</i>

4.3.2 Theme 1: Health System Service

The health system service was the major factor that the PNs mentioned to be contributing to patients with TB non-conversion. From this theme, the following sub-themes emerged: Nursing care, management factors, clinicians' education, and ward-based primary health care outreach team; these would be discussed in detail with categories.

4.3.2.1 Nursing care

In this study, nursing care was identified as a factor in patients' non-conversion as the clinician's inability to use TB guidelines while managing the patients with TB. The participants stipulated that for PNs to be able to provide quality care to patients with TB they are supposed to follow the TB guidelines, which provide steps to follow throughout the TB treatment management course. Clinicians' use of TB guidelines, patient education, history taking, nurses' attitude, and the involvement of nurses managing patients with TB and inpatient management were identified as categories. Each category would be discussed, followed by participants' quotes in italic and the literature control to support the verbatim.

- ***Clinician use of TB guideline***

Clinicians' use of TB guidelines was identified as a factor contributing to patients with TB non-conversion. The majority of the nurse participants were not making use of the TB guideline to manage their patients. Although one PN indicated that s/he uses the guideline what the participant said was not a total reflection of what was stipulated in the TB guideline (DoH 2014). The participant said:

PN1: *“...So, we normally collect the sputum for culture. If the patient does not convert after the second sputum, we do TB culture at 3 months”.*

This revealed the clinicians' inability to use TB guidelines correctly as a factor contributing to patients' non-conversion during TB treatment. As one participant indicated that s/he collect the sputum for culture when a patient was not having conversion. This is different from what is described in the TB guideline (DoH 2014). The guideline state that the sputum must be collected for LPA in patients with TB, and culture if they are failing to have conversion (DoH 2014:49-50). The study conducted by Fong (2020:367), states that the use of guidelines shapes the behaviour and practice of clinicians on how they must assess, treat, or manage different conditions. The participants' responses show that they do not always use the guideline. Furthermore, a study by Sasaki, Yamaguchi, Okumura, Yoshida, Sugawara, Shin, Kunisawa and Imanaka (2020), indicates that compliance with the use of guidelines was low among clinicians around the world.

Other participants indicated that they make use of TB guidelines when treating their patients and they also refer to the guideline when they experience challenges. Although other participants did not explain what the guideline says when the patient did not have conversion at 2 months or 3 months of TB treatment. They said:

PN5: *“The patient who did not convert... we always used guidelines”.*

PN6: *“...every time I have a patient that is not converting, I usually refer to the guideline to see what else can be done. If the LPA must be done and the culture, I double-check. The guideline is always on my desk”.*

PN9: *“Each patient that we came across with TB diagnoses. We treat them according to the guideline”.*

The WHO recommends the use of sputum conversion rates at two months as a useful indicator for TB control programs to monitor the program's performance and also as a trigger for rigorous assessment of patients with smears that remain positive (Kayigamba et al 2012:1). According to a study conducted by Su et al (2011), sputum acid-fast bacilli (AFB) smears serve as an indicator of treatment response for a patient to progress to the continuation phase. After two months of treatment, the results of the AFB should be negative.

In the study done in the North West province of SA, it is stated that if the TB PNs can identify negative personal traits early in treatments, they could focus on the support systems and other strategies to ensure that patients swallow their tablets every morning under supervision e.g. with the re-engineering system which is currently being out rolling. The CHW can visit the patient in the morning to ensure that TB medications are taken and problems experienced are addressed (van der Zee 2018). The nurse managing patients with TBs need to be proactive at the start of the treatment and implement the DOT strategy for all patients with sputum positive. In this study, participants indicated that when the patients were not converting at two months of the intensive phase, the nurses did refer to the guidelines although it was not always done. The findings concur with the other studies about clinicians' behaviour concerning the use of the guidelines.

- ***Patient education***

Patient education emerged as a contributory factor to TB non-conversion, as the patient does not have information about the TB condition they were suffering from. One participant indicated that some PNs are reactive instead of proactive and ensure that they provide necessary information at the start of TB treatment. The participant said that when the patient returns to care after being initiated to TB treatment it is then that they give the patient education. There is a conflicting approach where participants indicated that they provide health education to the patients only when patients are facing challenges. The participant responded as follows:

PN5: *“We manage them, then we do continuous counselling on the importance of not skipping an appointment if the patient is not converting. ...because some patients do not understand anything when they start treatment”.*

Other participants indicated that health education is important for the patients to understand the need to comply with their treatment and the consequences of non-compliance. The following was mentioned:

PN3: *“You must educate the patient on the spot from the first day of diagnosis. We reinforce the education if the patient is not converting from initial to continuation phase”.*

PN1: *“We need to explain to the patient the importance of the compliances and then we need to explain to the patient the dangers of not taking treatment because they might end up having TB resistant which may later develop into MDR”.*

Another participant reported that the nurses must not just educate but ensure that the patients understand the information so that they can adhere to the treatment. From what the above participant said it seems like health education is offered for the sake of ticking the box. Other participants stated that some patients do not have an understanding of their treatment and as such do not adhere to treatment, so it is important to educate the patients before they can start treatment, as explained by the participants below:

PN8: *“Usually when you educate your patients, first you need to make sure that the patient understands because at times people do not adhere because they did not understand”.*

PN7: *“...what we do when we start, we just tell the patient that treatment is taken here at the clinic. This is how we will go about it. You come every day and take the treatment here”.*

In this study, the participants showed that they are providing patient education although sometimes this is not adequate. The participants illustrated that they were providing health education to the patients, but their responses are not consistent. Inconsistency in the findings was also identified in the study by Kigozi, Heunis, Engelbrecht, van Rensburg and van Rensburg (2017), where it was reported that health education is important to empower patients and encourage compliance toward TB treatment. In another study by Schaffler, Rodriguez and Milstein (1996), the results show that providing health education to the patients improves the relationship between patients and clinicians.

Patients who receive health education were found to be compliant with their treatment and following their scheduled treatment visits to the clinic (Schaffler et al 1996). If the patients' knowledge of TB and treatment is poor this influence them to be non-compliant. Lack of knowledge leads to a deficit in self-care. It was indicated that the most important contributing factor to non-compliance to treatment was the unpleasant relationship between patients and the nurses (Carlsson, Johansson, Eale & Kaboru 2014).

Health literacy is a skill that an individual obtains, process, and understand to make appropriately informed health decisions (Pawlak 2005:175). Health literacy often relates

to the educational level. Among poor communities in SA, health literacy is likely to be low and account in part for low levels of adherence (Kagee 2008:416). Lower levels of education and poor health literacy were identified as contributing factors that negatively impact patients' ability to adhere to treatment (WHO 2006). In this study, nurses did provide health education although not, in the same manner, some were reactive while others were proactive. The proactive nurses and their patients are likely to adhere to treatment and vice versa (Schauffler et al 1996).

- **History taking**

History-taking emerged as an important element that nurses are supposed to master especially when they are working in primary health care. Participants in this study indicated the importance of history taking before the patient can be initiated TB treatment. It was emphasised that detailed history taking must be done on an individual patient and the patients must provide the nurse with the correct information. The participant said:

PN4: *"Uh, okay what the health care worker can do is to thoroughly take the information of the patient because is very important when admitting the patient to ensure that the patient will be able to take treatment correctly at home. We have to understand who the patient lives with, what is the support system, ...eh what is the patient medical or any surgical condition anything that you can gather from the patient"*.

One participant revealed that proper history was collected when clinicians experience a problem with the patient. Instead of taking employment history and asking the patients if they have an occupational health nurse at their workplace, and also liaising with the occupational health nurse to DOT the patient at work. The nurses in their workplace allow the patient to go to the clinic in the morning before they can go to work. This was revealed by the following quote:

PN5: *"If the patient is working... I will ask the patient to start at the clinic before going to work. ...I will give the patient a letter to go to work, they are given priority because they do not even stand in the queue, they come straight to the TB room. And remember, with doting, we also check the compliance we also check the other treatments that the patient is taking"*.

These findings were consistent with the results of the study by Salam et al (2016:3), where the researcher stated that a longer duration of symptoms before patient diagnosis was found to be associated with a lower sputum smear conversion rate as compared to the patients with less duration of the symptoms at the time of diagnosis. History taking is of paramount importance i.e. if the address and the contact details are incorrect it is difficult to locate the patient. If the patient was a contact with a DR, that information will guide the nurse in managing the patient.

- **Nurses' attitude**

Nurses' negative attitude toward patients with TB is a serious challenge, whereby patients end up not receiving the quality care that they are supposed to get. The negative attitude does not only affect patient care but also affects other nurses, whereby, they have to compromise on their time. Participants who experienced negative attitudes from colleagues said the following.

PN6: *“Uhm yea... some colleagues do not want anything to do with TB. I do not know whether they are disgusted by the sputum but some are willing to assist even when you are on leave, they will continue the service... while others will just say your sister is not here and turn the patients back. Yes, nurses are not the same, others will assist you with the TB patient others will not.”*

PN5: *“I think the nurses ...okay have to speak to nurses. Some nurse's attitude needs to change. We need to be friendly towards the patient so that the patient must feel welcomed.”*

The negative nurse attitude is described as one of the contributing factors to poor treatment outcomes by Loveday, Padayatchi, Wallengren, Roberts, Brust, Ngozo, Master and Voce (2014). In this study, participants stated that some nurses are disgusted by the sputum and turned the patients away. Participants further stated that some nurse clinicians in the facilities are unable to collect patients' sputum and document that in the TB folders. This was confirmed by three nurses who experienced colleagues' negative attitudes.

PN1: *“Nurses' attitude has an impact because when you are having a TB patient sometimes you must be with the patient for more than 30 minutes. They always complain that you are not pushing the queue”.*

PN6: *“... they just say the chief sister is not here and in some cases, the nurse that, assist do not know much about TB. The patient comes on the day to convert to take the sputum for conversion, however, the nurse does not collect that sputum they just give treatment”.*

PN3: *“So, with me neh... I have a passion for TB treatment, ... what makes me say this is I think not everyone has that passion, because when you are not there the patient comes and the sputum must be collected it does not happen. ... the patient will tell you, sister, I did come with the sputum then the sister told me it is not time for the sputum just throw it in the dustbin. ... I have discovered that people do not like TB, that is number 1. I think you have your understanding but people do not like the programme. ...I ended up saying to the manager let's involve everyone so that all of us can do this for the benefit of the patient. I do not know if you understand. There is passion and there is lack of passion”.*

The findings of this study are similar to those of Malik and Ahmad (2009), where it was found that health care workers' attitude is associated with patients with TB non-compliance to TB treatment. Moreover, the study conducted by Dladla (2013) in Limpopo province concludes that one of the contributing factors to non-compliance of the patient to the National Tuberculosis Control Programme (NTCP) is due to the negative attitude of health care workers toward TB clients.

Regular on-site facility visit by the TB coordinators makes the staff and facility manager feel supported and they feel empowered to call for help when experiencing challenges. Inadequate clinical skills coupled with poor adherence to clinical guidelines contribute to fewer successful treatment outcomes (Loveday et al 2014).

- ***Involvement of nurses managing patients with TB inpatient management***

Participants stated that involving the previous nurse managing patients with TB inpatient management helps. In this study, participants stipulated that they received help from the nurses who previously worked in the TB room, and they are continuously mentoring them and giving support when needed. Teamwork between the health care professionals is important for patients with TB management. In this study, participants described that the involvement of the previous nurse in managing patients with TB helps improve patient management and said the following:

PN4: *“...so that we will all come up with ideas and solutions to improve the patient situation. We also involve the manager which is the facility manager in charge, and we involve our coordinators who are aware of all our patients with TB”.*

PN7: *“Yoh! I involve the previous sisters who were doing TB. I think they are 2, I normally call both guys from that side because they know better. I normally involve them”.*

4.3.2.2 Management factors

In this study, it was found that the less support there is from the managers in the facilities, TB program managers, doctors, and the multidisciplinary team contribute to patients with TB' non-conversion. Participants mentioned different challenges that they come across in the facilities which affect nurses' ability to assist patients with TB holistically. Three categories were identified which are facility DOT, facility manager, and TB coordinator.

- **Facility DOT**

Directly observed therapy was one of the strategies that is used to ensure that patients are taking their TB treatment, the strategy is usually used when the patient is not adhering to the treatment. Participants mentioned that they usually use this strategy when the patient fails to convert TB treatment at 2 months although the guideline recommends DOT when the patient starts treatment. In this study, participants stated that DOT support was important if patients are not having conversion. They further said that facility-based DOT or home-based DOT can be done. One of the participants commented that it is impossible at the facility because it is small. Participants said that they do the following when patients fail to have conversion at 2 or 3 months of TB treatment.

PN5: *“We give 7 days' treatment because..., DOT is not possible in our case because the clinic is so small. So, we put them on a weekly routine, as the patient comes on a Monday, so you schedule them for Monday next week”.*

Other participants said:

PN8: *“Direct Observatory Treatment, whereby the patient will come to the facility daily to take treatment in front of the TB clinician or then if the patient does not convert, I think those are the interventions from patients who are not converting”.*

PN9: *"We started to DOT the patient. Even after dotting, at 11 weeks sputum came back positive again. Therefore, we had to send the patient to Pholosong only to find that the patient was having resistance to the treatment. That is another problem as well".*

PN2: *"Okay. What we usually do if they do not convert, is use the DOT system. At first when you admit a patient you give them two days to come back for follow-up".*

The current study findings are in concordance with a study by Kigozi, Heunis, Chikobvu, Botha and van Rensburg (2017:95), which revealed that DOT was said to be the mainstay of TB control in SA. These are supported by the National Tuberculosis management guideline (DoH 2014:56), which stated that directly observed treatment (DOT), means that a treatment supporter watches the patient while swallowing the tablets, in a way that is sensitive and supportive to the patient's needs.

The findings of this study are consistent with the study that reported that close supervision and monitoring of patients ensure treatment compliance and early detection of adverse side effects due to medication. The directly observed therapy strategy has been adopted by many countries and SA is one of the countries to improve treatment adherence and assist in the monitoring of patients on treatment. Family members are educated as treatment supporters, and the community healthcare workers (CHWs) were also trained as DOT supporters for patients with TB (Parikh Nataraj, Kanade, Khatri & Mehta 2012).

- ***Facility manager support***

Participants indicated that during patients with TB management, not only the patients need support, but also nurses who manage them. The need for support from the facility managers was reiterated. Furthermore, participants indicated that some facility managers do not know about TB, and others are pushed into the program by nurses. The participants said the following in this regard:

PN3: *"I ended up saying to the manager let's involve everyone so that all of us can do this for the benefit of the patient".*

PN1: *"Uhm, firstly we always communicate with our facility manager".*

PN7: *"Most of the time I involve the TB coordinator because our manager does not have any knowledge about TB. The manager will say something like you have many patients, but you only trace 1 patient. I then explain to her that the person is having TB, so s/he is still spreading it out there, it is going to be our burden".*

These findings are in line with the results of Burnett, Zawedde-Muyanja, Hermans, Weaver, Colebunders and Manabe (2018), which identified that the facility manager is like the captain of the ship. They are expected to provide direction within the facility. Participants described their varied encounters with their managers. Some participants indicated their managers are supportive of the TB programme while others are not and this demoralises the clinicians. Regular supportive supervision can effectively improve the clinical skills of mid-level practitioners.

- ***TB coordinator support***

The TB coordinator was seen as someone who can assist the nurses in managing patients to dealing with difficult cases. The TB coordinator is nurses' hope when they come across challenges. When the patients do not convert at 2 months or 3 months of their TB treatment, the TB coordinators assist to guide the nurse on how they can manage them. In this study, the participants explained that they do communicate and consult with the TB coordinators when they face challenges.

In this study, participants stated that they involve the TB program coordinators while having challenges with patients with TB management. The involvement of the TB coordinator to support the facilities physically or via other means seems to be helping and giving nurses managing patients with TBs hope and courage.

PN6: *“Isn’t that the guidelines are guiding us? Then we have our TB coordinator. ...you remember at the beginning I told you we are having the monthly meetings, ...such files we are taken to the TB coordinator and the cases are presented there.”*

PN3: *“...TB coordinators, if we think we need some clarity we do contact our TB coordinator. Yes, I think we work well with the facility manager, the coordinator, and amongst ourselves the TB clinicians.”*

PN5: *“Most of the time I involve the TB coordinator because our manager does not have any knowledge about TB. So, I usually involve the coordinator if there is a patient who did not convert.”*

PN4: *“Eeeh, the coordinator, I used to report to the coordinator that the patients are not converting or professional doctors. They used to tell me that I must re-test after a month.”*

PN2: *“We have TB coordinators that work hand in hand with us”.*

From the above-mentioned information, it is clear that the PHC nurse managing patients with TB cannot manage and treat patients on their own. For example, if there are 20 patients with TB in the facility, some are new, some are there for retreatment, some came for a follow-up visit, some came for collection of sputum and others have defaulted and need to be traced. The findings of this study are consistent with the statement by the DoH (2014:49,99-103), which shows that the nurse needs other team members to assist according to patients' needs. The reason that the DoH employed WBPHCOT is to be the extra help in the facilities.

4.3.2.3 Education

Another sub-theme identified is health care workers' training. For employees to perform their duties diligently and successfully the employer needs to provide training in the form of a workshop, in-service training, on-spot training, and also ongoing mentorship.

- **Health care workers lack skills**

Most participants mentioned that the other contributing factor to patients with TB non-conversion was the lack of knowledge and skills by the nurses. The participants revealed that some nurses managing patients with TBs were not trained in the TB programme. As such, some nurses do not collect patients' sputum for conversion when it is due and some nurses misdiagnose the patients.

Health care workers' lack of knowledge in TB management was also stated as a factor to have contributed to patients with TB non-conversion during TB treatment. In this study, participants indicated that some nurses lack skills and they are managing patients with TB. The participants supported that lack of skills in TB management affects the management of patients with TB and said:

PN1: *"..and then nurse-related factors that I have identified, some of them lack knowledge, like they put nurses to manage the TB programme without training. Some are not trained but others are not trained"*.

PN5: *"Well the patient might be an MDR patient because... misdiagnosed neh. You might find that the patient is an MDR patient but will be given ...eh eh eh rifafour. And it is obvious the rifafour will not work for an MDR patient."*

PN3: *“If you put someone, say if the chief sister is not there and that person does not know much about TB patients can come on the day to convert or to take the sputum for conversion, they do not collect that sputum they just give treatment.”*

PN7: *“Like now, we are short-staffed I am the only one working on acute and chronic. I try by all means at least once a week to encourage the colleagues, and ...tell them how to admit a patient”.*

The study findings were similar to the one conducted in the Limpopo Province by Tshitangano, Pengpid and Peltzer (2010), which revealed a lack of knowledge by health professionals in TB management and implementation. However, the study by Kayigamba et al (2012) showed that the majority of health facilities did not get regular technical supervision or regular on-the-job training for TB management. Results indicated the need to improve regular on-the-job training for health care workers. The education for the nurse managing patients with TB is of paramount importance to ensure that the patients receive quality care.

- ***Health care worker training***

Proper management of TB is aimed at improving patients' lives and preventing drug-resistant TB (DoH 2014). The sputum smear collection rate is important in identifying the prevalence of smear-positive patients after two months of treatment (Pefura-Yone et al 2014). In this study, participants enforced the importance of nurses' training. They identified training as crucial as some nurses were not trained and they indicated that there is no ongoing mentorship in their facilities. Participants said the following regarding the training about TB management:

PN8: *“And then nurse-related factors that I have identified, ...some of them is maybe lack of knowledge”.*

PN4: *“Not really. Not really. Since then. The last training was in 2019 to be specific”.*

The findings in this study are similar to results in Zinatsa, Engelbrecht, van Rensburg and Kigozi (2018), which emphasised that nurses managing patients with TB lacked training on TB infection control. The findings are also in line with another study by Mekgoe, Lepedi, Makhutle, Makhado, Madiba and Langa (2019) which indicated that students are not getting enough guidance in the clinical areas concerning the management of TB and HIV. The findings of this study suggest the need for more support and training for nurses

who are managing patients with TB as discussed in by Lyakurwa, Lyimo, Mulder, Pelzer, Koppelaar & Heus (2021), whose study findings revealed that training received by the HCWs empowered them to initiate DR-TB treatment. Lyakurwa et al (2021) also reported that mentoring and supervision had an added advantage compared to training as it offers skills building and bridging the gaps that the HCW might be having.

4.3.2.4 Ward-Based Primary Health Care Outreach Teams

According to the Department of Health Adherence guidelines for HIV, TB, and NCDs (DoH 2016:35), the integration of work between facility nurses and the ward-based PHC outreach teams (WBPHCOT) allows for a sustainable community care programme. The WBPHCOTs role is to provide preventive, promotive, and rehabilitation services to the patients and families in the community. The WBPHCOT has the advantage of having sufficient time to discuss patient-related problems during patient home visits. The team can train family members to be the patient's treatment supporters (DoH 2016:56-59). In this study, WBPHCOT was identified to be a contributing factor to patients with TB's non-conversion. One category mentioned was the involvement of WBPHCOT.

- ***Involvement of WBPHCOT***

In this study majority of the participants eluded the importance of WBPHCOT in their facilities and communities. The participants spoke about the involvement of the WBPHCOT in the management of patients with TB. They further said that previously the CHWs were giving patients with TB treatment at their homes, and this reduced the congestion of the facilities. In this study, the participants reported how they interact with the WBPHCOTs to trace and DOT the patients and said:

PN2: *"...we involve the community care workers to go trace those patients".*

PN5: *"We send the health care workers, and you find that when they go to those addresses patients do not stay there".*

PN7: *"No, we have the WBOTs. We send them to the family but sometimes they do not come with a clear answer of what happened and why the patient is not there".*

PN8: *"There must be more people to go house to house instead of the patient coming to the facility because they always wait here. ...we used to send WBOTs to go and give them medication".*

PN9: *“We have always had the outreach, the WBOTs team. At first, I would personally go there and talk with the patient. The WBOTs team are based in their neighbourhood, it is mostly the patients that they see every day”.*

The findings are parallel to a study by Thomas, Buch and Pillay (2021:1) which reported that CHW forms the core and performs several health and psychosocial services and health education in households and poor communities in SA. According to the study CHW assists in screening patients with TB at their homes and also deliver medication.

4.3.3 Theme 2: Patient care

Patient care is said to be an interdisciplinary process centred on the care that the patients receive, and it includes the services received from a multi-disciplinary team (Ozbolt & Bakken 2006:564). The quality of care that the patient receives when visiting the health establishment also has an impact on how the patient behaves. From this theme, the following sub-theme with six categories were identified: denial, co-morbidities, treatment side effects, substance abuse, treatment compliance and use of traditional medicine. The subtheme and categories are presented in the next section.

4.3.3.1 Patient factors

Denial, co-morbidities, treatment side effects, substance use, treatment compliance, and use of traditional medicine were identified as patient factors that contribute to patients with TB non-conversion. Participants related some of the challenges that patients come across which prevent them from adhering to treatment. The PHC nurse managing patients with TB assist them by discussing with them some of these issues (DoH 2016:7).

- **Denial**

Participants from this study stated that denial was one factor that contributed to TB non-conversion. They further elaborated that most patients are unable to have conversion during TB treatment because they are unable to accept the TB disease. Patients do not accept that they are sick, hence they do not take treatment. Participants said the following regarding patient denial of disease diagnoses:

PN9: *“Mmmh, another one could be that other patients are still in denial, so they do not take treatment at all.”*

PN6: *"Other patients do not accept that they are sick. They think maybe it is witchcraft, we need to start somewhere for the patient to take their medication".*

The findings of this study are similar to those reported by Kalucha, Mishra and Gedam (2017), which found that the most frequent reason for non-compliance was related to denial of the illness. This finding is further corroborated by Oshi, Omeje, Oshi, Alobu, Chukwu, Nwokocha, Emelumadu and Ogbudebe (2017); Kalucha et al (2017); Oshi et al (2017), who revealed that denial of the TB disease diagnosis was the contributing factor to patients' non-compliance with their treatment, especially those patients that were not very sick.

- **Co-morbidities**

Co-morbidities were said to also affect the timing of patient conversion at two or three months of their TB treatment. In this study, participants confirmed that co-morbidity such as TB/HIV co-infection contributes to patients' non-conversion. The following was said by participants regarding TB/HIV comorbidity.

PN1: *"Most of the patients with TB are also HIV positive, they are co-infected".*

PN7: *"Other patients also present with HIV and AIDS".*

The findings of this study are in line with a study by Sinshaw, Alemu, Fekadu & Gizachew (2017), which found that patients co-infected with TB and HIV experienced delayed conversion compared to patients who were not. A similar study conducted in Thailand on TB/HIV co-infected patients showed that patients experience TB-related stigma and default on their TB treatment (Kigozi et al 2017:96). However, a study by Burnett et al (2018), found that facilities that have HIV/TB collaboration improve patient outcomes unlike where patients are seen in different units. Patients that are infected with both HIV and TB are faced with an increased pill burden and they are likely to default on their TB treatment and as such, they will have poor outcomes.

- **Treatment side effects**

The side effects that the patients experience while taking TB treatment affect the patients and result in patients' non-conversion at 2 or 3 months of TB treatment. One of the participants revealed that some patients experience treatment side effects, the following is what was said.

PN2: *“There are just a few patients who complain about side effects of the treatment that makes them not adhere to the treatment and it is difficult for the patient to have conversion in week 8”.*

The nurse sentiment was supported by the study conducted by Ai et al (2010:5), in China, who noted that the side effects of PTB treatment were influencing patients’ adherence negatively. The participants in the above-mentioned study stated that Hepatic syndrome and yellowish discolouration of the eyes were some of the reasons that caused patients not to adhere to TB treatment. While experiencing such side effects, the participants were supposed to be in and out of the hospital for assessment and they ended up leaving and not taking their treatment.

The findings of the study suggest that adverse drug reactions as well as other side effects which patients experienced when on PTB treatment are some of the main factors be the factors contributing to the non-adherence of patients to TB treatments in Gauteng province (Aiyegoro 2016:45).

- **Substance use**

Substance use was reported to be another reason for patient non-conversion while on TB treatment. Participants stated that some of the patients with TB continue drinking alcohol and smoking, hence they had non-conversion at 2 or 3 months of TB treatment. Participants said the following regarding substance abuse by patients.

PN9: *“The socialisation. Others are drinking others are smoking. When they come, they test positive for TB”.*

PN3: *“Yes, the problem of the patient not converting is, firstly, drug abuse interferes with everything, especially the treatment”.*

The results of this study indicate that patients who abuse substances are at high risk of not converting within 2 months of their treatment and tend to forget to take their treatment. These findings are similar to those found in Abdelbary, Garcia-Viveros, Ramirez-Oropesa, Rahbar and Restrepo (2017:3022), where it is stated that patients with excessive use of alcohol are also at higher risk of non-conversion. Another study agreed with the above-mentioned and showed that heavy smoking significantly delays sputum

smear conversion (Jayawardena & Samarathunga 2010:6). However, the results found in the study conducted by Salam et al (2016:3), disputed this and indicated that addiction to tobacco or other drugs did not influence sputum smear conversion.

- ***Treatment non-compliance***

Treatment non-compliance was reported to be an important factor that contributes to patients with TB conversion. Nurses stated that it was difficult for patients who do not comply with the TB treatment to have conversion within 2 or 3 months of treatment. The majority of the participants stated that patients are having non-conversion at 2 or 3 months of TB treatment because they are not taking treatment as prescribed.

Participants stated that patients have different reasons which cause them not to comply with treatment such as not taking treatment on time, not visiting the clinic or facility per appointment, some end up not visiting the facility and need to be traced, and some forget because they are working. The following is what the participants said about treatment non-compliance.

PN1: *“...eh the one that I have just noticed is non-compliance to treatment, neh... non-compliance to treatment”.*

PN5: *“Okay, the first one could be non-compliance to treatment, most patients do not comply with their treatment they do not take their treatment every day.”*

PN7: *“Okay, as I said, I think most of the time is about patients. They do not comply because if they comply from the first week when they start treatment, it will cause them to convert.”*

PN1: *“I will start with conversion, ...usually, the non-adherence is high, ... those times we have difficulty tracing and tracking the patients”.*

PN4: *“Another one is non-compliance, patient used to be non-compliance, ...some of them used to tell me that they are working and to forget to take treatment when I am at work”.*

The findings of this study are the same as the results in the study by Mekonnen and Azagew (2018), conducted in Ethiopia which state that forgetting, being busy with work, and being out of home for a long period resulted in non-adherence. Working long hours and busy working schedules were leading patients to forget to take treatment (Mekonnen & Azagew 2018:6; van der Zee 2018:80).

- ***Use of traditional medicine***

Participants reported that some patients take TB treatment with traditional medicine, hence they had non-conversion. The participants further indicated that traditional medicine flushes away the TB treatment. In their own words they said:

PN1: “...others do not comply because they use,...they mix treatment with traditional medication. They use TB medication with umh, ...this medication, ...mmh from the villages, ...mmh imbiza.”

PN2: “They are using herbs or sometimes as supplements because they also go to traditional healers”.

The study by Gugssa et al (2017), concurred with the findings that traditional medicine is widely used as an alternative. However, it does not help the patients and they resort back to the TB treatment. Traditional medicine is widely used in the indigenous African communities and some patients end up using both which at times render western medicine ineffective.

4.3.4 Theme 3: Social related factors

Social support is said to be a fundamental component in the encouragement and provision of supportive behaviours to the patient (Bastardo & Kimberlin 2000:675). Under this theme, three sub-themes were identified which are: a shortage of food, patient stigma, and support system.

4.3.4.1 Social issues

Socio-economic and health problems other than TB may hinder the patient's progress toward completing TB treatment. To minimise the effects of these problem-solving strategies they must be included in the plan. The patient and the PHC nurse managing patients with TB have to go through adherence strategy steps, to strengthen the patient's adherence to treatment (DoH 2014:52-55). Four categories have emerged with regards to social issues which are shortage of food, social support, patient stigma, and support system.

- **Shortage of food**

The shortage of food experienced by some participants was mentioned as a challenge as some patients end up taking treatment without eating. According to the participants, food shortages were a contributing factor to patients' non-conversion at 2 or 3 months of treatment. Participants mentioned other factors such as low socioeconomic status and unemployment, which are also contributing factors to patients with TB non-conversion. The following is what the participants said:

PN1: *“We have noted that..., they are of low social-economic status. They do not have anything to eat. So we try by all means to supply them with food parcels and make referrals to social workers.”*

PN3: *“Other patients ... fail to convert due to their situations at home. Like having no food at all.”*

PN7: *“Unemployment is one of the major problems because most of our patients will tell you that they have a problem with getting food.”*

PN4: *“Sometimes they say they cannot take treatment because they did not eat, sometimes we get them food parcels.”*

The findings concurred with the study by Carlsson, Johansson, Eale & Kaboru (2014), that shortage of food influenced patients with TB non-conversion. Patients need to be supported, arrangements are made by nurses for patients to get assistance from social services. if the nurse looks well after the patient, the patient, in turn, will comply with the treatment regimen. The results are in parallel to those found in the study conducted by Carlsson et al (2014) where lack of food or food insecurity was found to be a factor in non-compliance and when the patient does not have food, they will rather not take their treatment. When the patient does not have food or the means to have food, they end up not taking their treatment altogether to prevent side effects associated with taking treatment without food.

- **Patient stigma**

The stigma associated with the TB disease affects the patients' outcome when it is time for conversion at 2 months. The stigma can be seen in both the clinicians, families, and the community. There is still resistance to accepting that TB is a treatable disease that requires mostly 6 months of treatment. Participants illustrated that there is stigma around

TB, and this ends up causing patients to be neglected. Participants mentioned the following:

PN5: *“If the patient says I brought the sputum what do you say when the sister said I must throw it away. ”*

PN2: *“Another factor that causes non-conversion is that TB is still stigmatised in the community and by the patient’s families.”*

In the study by Baniqued, Ballecer, Ballesteros, Balmonte, Bancud, Rebueno & Macindo (2020), it was shown that the TB stigma is a barrier to treatment continuation. The lack of knowledge about transmission is said to be the main cause that fuels stigma. In the study conducted in the Eastern Cape of SA by Ajudua & Mash (2020), the stigma associated with TB disease was found to be high as it was associated with HIV. The stigma of HIV/TB is associated with the patient not taking their treatment which will cause them not to convert after 2 months of TB treatment.

- **Support system**

The support that both the nurse and the patients receive is of paramount importance. It motivates the nurse, the fact that there are people they can consult gives them courage when dealing with difficult cases. In this regard the participants said the following about the support system:

PN1: *“We cannot go house to house to check if this person is taking medication? Community Health workers go and ask the family but still, they do not supervise the patients.”*

PN6: *“Yes, TB coordinators do assist by informing our managers because sometimes we have to sit down with all our patients with them then they will inform our managers...”*

Patients with TB and their families have better information about TB compared to the general population and this could be related to the health talk that the patients and families get when visiting the clinics (Datiko, Habte, Jerene & Suarez 2019:11). In this study, participants came up with various ideas of the support they need and also support they can offer in the health care facilities to patients, their families, and friends.

4.4 PHASE 2 – PATIENTS WITH TB RESEARCH RESULTS

During Phase 2, in-depth individual data were collected using semi-structured interviews from 8 patients who experienced non-conversion during months 2 or 3 of TB treatment. The interviews were conducted in different clinic consultation rooms that were quiet and away from the patient's waiting areas. Data management and analysis were the same as the one used in Phase 1. During data analysis 3 themes, 3 sub-themes, and 11 categories emerged from the collected data. The demographic characteristics of patients who participated in the study were as follows:

For this phase of the study, 8 participants were between the ages of 23 and 58. Of the 8, 4 were females and 4 were males. The highest level of education among participants was grade 12 with a college certificate and there was at least one patient who never attended school. In terms of marital status, the majority of participants (5) were having partners with 3 being single. Only 2 participants were employed and 6 were unemployed.

Table 4.3: Overall patients with TB participants' demographic characteristics

Sample Composition	Sample size	Study Population	Age	Total	Gender	Total	Qualifications	Total
Patients with TB	8	24	20-26yrs	1	Male	4	Grade 12 with a college certificate	1
			27-35yrs	2			Grade 12	3
			36-45yrs	1	Female	4	Grade 10	1
			46-55yrs	4			Grade 9	1
							Grade 2	1
							Never attended school	1

4.4.1 Presentation of Phase 2 Themes

After data was collected from the above-mentioned participants, data were analysed following eight of Tesch's coding steps (Creswell 2014:218). From the data analysis, the following three themes emerged:

- Healthcare-related factors,
- Social economic-related factors, and
- Patients related factors.

The themes, sub-themes, and categories are presented in Table 4.3 below.

Table 4.4: Summary of themes, sub-themes, and categories of patients with TB

Themes	Sub-themes	Categories
4.4.2 Healthcare-related factors	4.4.2.1 Health education	<ul style="list-style-type: none"> ○ <i>Patient health literacy</i> ○ <i>Nurses' attitudes towards patients with TB</i> ○ <i>Facility support</i> ○ <i>Treatment timing</i>
4.4.3 Socio-economic related factors	4.4.3.1 Low socioeconomic status	<ul style="list-style-type: none"> ○ <i>Unemployment</i> ○ <i>Poor family support</i> ○ <i>Low education level</i> ○ <i>Family support</i>
4.4.4 Patient-related factors	4.4.4.1 Challenges experienced by patients	<ul style="list-style-type: none"> ○ <i>Health conditions other than TB</i> ○ <i>Treatment timing</i> ○ <i>Treatment side effects</i>

The themes, sub-themes, and categories of the patients participants analysed data are discussed below.

4.4.2 Healthcare-related factors

Patients who generally have several health problems are less aware of preventive and curative health measures and services which contribute to poor health status and the adoption of unhealthy lifestyles (Gebremariam, Bjune & Frich 2010:5). The authors also concluded that patients often have a poor understanding of the medication they are using

due to health illiteracy. This is one of the many challenges faced by the South African health care system today. Knowledge of disease symptoms is the prerequisite for self-referral in good time. According to Muture et al (2011:5), ignorance of the necessity for treatment compliance coupled with inadequate knowledge about TB was cited in 20 out of 120 cases and was most importantly attributed to treatment default. Health education emerged as a major contributory factor to patients with TB non-conversion.

4.4.2.1 Health education

According to the patients who participated in this study, they do not understand the health education offered in the health care facilities. Some patients do not know what TB is; some stated that they do not remember any health education given at the clinic. Three participants reported that they do not remember the patient education offered at the clinic. According to a study done by Osborne (2004:2), SA has low health literacy and this is a serious challenge that was caused mainly by the language barrier. The study continued to state that most patients with TB do not speak English. There is a strong relationship between low literacy and health status. Patients' health literacy, nurses' attitudes towards Patients with TB' and facility support are sub-themes mentioned; and would be discussed in detail below.

- **Patient health literacy**

In this study, participants stated that they have not received health education concerning TB. This was confirmed by their challenge in answering their understanding of what is TB?

P3: *"...I do not want to lie, I do not know what TB is, but the symptoms I experienced such as cough made my visit to the clinic."*

P5: *"I do not know how to define TB, because they just took my sputum and then inform me that I have TB."*

P2: *"Aah... they did not explain anything to me, not knowing maybe other patients were informed. But me no, I have never been told anything about TB"*.

The findings of this study are parallel to the study by Kaona, Tuba, Siziya & Sikaona (2004:7) which showed that patients who have low knowledge about TB and treatment are usually non-adherent. However, adequate knowledge about the disease tends to

have an impact on the health behaviour and adherence of the patients. There is a need to improve communication and health education between health facilities and clinics and the communities they serve. TB treatment, its side effects, and duration should be discussed with patients before the commencement of treatment. In addition, patients should always be encouraged to inform and include family members, friends, and, their significant others about their treatment journey (Kaona et al 2004:7).

Molapo (2012:247) indicates that health education related to a specific condition, such as TB, improves a patient's knowledge and adherence to treatment. Patient education regarding the importance of treatment adherence, sputum collection, and the role of the sputum in TB control is essential. The knowledge has a significant impact on the adherence of patients.

The participants who had adequate health literacy levels indicated they acquired their knowledge from health education and talks from health professionals in the clinics.

- ***Nurses' attitudes toward patients with TB***

Participants indicated that they experienced nurses' negative attitudes while visiting the health care facilities to receive TB care. The participants stated that when the nurse managing patients with TB is off duty, the relieving nurse does not listen to their needs and also did not give the patient time to ask questions. In this regard the participants said the following:

P1: *“There are situations whereby when the patients come to the clinic, we are unable to ask nurses questions on how we must take their treatment and how we will feel after taking treatment”.*

P3: *“As I have told you when we started, I came here and our nurse was off, the one who was working just gave me treatment. I told her that my sister told me that I must be collected sputum. She refused and said I came late and I must come in the morning. I was angry I left, and I knew that I was going on a trip. The clinic staff is rude when our nurse is not at work...”*

In this study, participants expressed different opinions on the nurses' attitudes. Some patients experienced a positive attitude from the nurses and some did not. The participants stated that the nurses managing patients with TB take good care of the

patients, and gave them time to ask questions and get clarity. The following was what the participants said:

P5: *“It is great, whenever I come to collect my treatment, they treat good and always talk to me in a very good way, now I have started taking my treatment daily at the clinic. When I have questions, they allow me to ask and also explain where I don’t understand regarding my treatment”.*

P2: *“I was treated well; a sister is a person I am free to talk to. She always explains my condition and motivates me to continue with my treatment”.*

The nurse managing patients with TBs take good care of the patients with TB, the problem arises when the nurse managing patients with TB is not on duty. Then patients are supposed to be attended to by other nurses in the clinic. Patients with TB need to feel welcomed and at ease to be able to comply and ask questions that they don't understand.

- **Facility support**

Participants in this study illustrated that they were taking their treatments as directed. They shared various reasons for taking their treatment which include having better health, and others even mentioned that irrespective of the side effects they experienced. Below is what the participants said:

P8: *“I feel better because I have been fighting for my life. I think the best thing to do is to take treatment to improve my health and to live better. ...I do not know because I was taking the medication every day the way they told me to do”.*

P3: *“I took the treatment accordingly as directed because I wanted to get better. I was very weak, however, I persevered. I am taking the treatment, the way I was directed”.*

P5: *“No, I take my treatment always, I am fighting to get better when I go out and I go to get food, I will eat and come back to my room and take treatment. I will not stop taking treatment”.*

In this study, the participants reported that when they failed to have conversion within 2 months of taking TB treatment, the nurses subjected them to collecting treatment daily at the clinic. Furthermore, one participant indicated that s/he support taking the TB treatment daily at the clinic. The participants said the following.

P5: *“It is great, whenever I come to collect my treatment, they treat me good and always talk to me in a very polite way. Currently I’m taking my treatment daily here at the clinic”.*

The participant also indicated that the WBPHCOT do visit their homes if one is not taking treatment as expected. This is how they described their engagements with the WBPHCOTs.

P5: *“If the tablet is not working, or you are stubborn to take medication, then sisters will come to your home every day to give you medication.”*

P7: *“Sometimes they also bring food. We struggle to get food sometimes. It is also important that they test all our family members for TB and counsel us so that our family can understand TB and know that it can be cured”.*

One participant had a different opinion regarding the TB diagnosis and treatment and indicated that s/he did not have any problem accepting the TB status and was able to take treatment anywhere. The participant said the following:

P1: *“Whether I go, whether I go to town, to the bank I am never shy to take my tablets with me and drink them when it is time. I keep to my time, it is easy when people set the time on their phones. You set the alarm and it will notify you that this time to take your tablets”.*

In this study, almost participants alluded that they do not know what caused them not to have conversion after two months of TB treatment. One patient said that he spent 2 weeks without taking treatment because the nurse did not give him enough treatment when he was traveling for work.

P8: *“I do not know but I think it’s because there was a time when I came late to take my treatment, and the nurse was off, another nurse helped me. I asked for more treatment because during the day I am busy and I was about to travel, but the nurse refused and told me to come in the morning when my nurse is around. Due to the trip, I spend 2 weeks without taking my treatment”.*

The findings of this study are consistent with a study done by Tang and Squire (2005:4) in China, which established that non-adherence to treatment was related to patients traveling or relocating to other places. The patients in the study indicated that poor

working conditions made them relocate to other countries, then they stopped taking treatment because they did not have referral letters and/or other related documentation.

P3: *“...and then I started working part-time, I told my sister that I am working. Then there was a month when I came late to take my treatment and my sister was not there. I was taking medication around 7 when I woke up but then when I started going to work, I was taking the medication in the morning around 6, when I am late, I'll take the medication during teatime at 10. ...mmmh, the tablets must be taken every day at the same time before eating.”*

P7: *“I think the clinic delayed me as they first said I have covid in January. They should have put me straight to TB treatment as I was coughing blood-stained sputum and not getting better. I take my treatment daily at 06h00 in the morning and eat my breakfast at 08h00 to avoid vomiting after meals. I took my treatment exactly at 06h00 in the morning from the start. I even set the alarm to remind me.”*

The findings of this study are similar to a study done by Kandel, Mfenyana, Chandia and Yogeswaran (2008) which revealed that poor communication between health care providers and patients was a contributory factor to non-compliance to TB treatment.

- **Treatment timing**

In this study, patients corroborated what the nurses said that they were not taking treatment consistently at the same time every day. Some patients were not taking treatment every day as directed by the nurses and some skipped treatment collection appointment dates. Participants gave different reasons for not taking treatment and/or collecting treatment as scheduled. The participants gave the following explanations.

P4: *“I think what happened with me is that when I started. I think it was my time, ...my time. Sometimes I will take my medication at 09H00 sometimes at 10H00 or even at 11H00. I was not consistent.*

P6: *...eish I do not know, why I did not change because I was taking treatment daily, I was not skipping a treatment. Yes, it has happened maybe for 2 days or 3 days”.*

The timing for collection of treatment also seems to have an effect when it relates to patients converting at 2 months of TB treatment. Patients' participants indicated that they were not taking treatment on the prescribed time daily.

4.4.3 Socio-economic factors

In this study there were two patient participants who stated that nurses do help with DOT, either in the facility-based setting or at home-based.

P6: *“It is great, whenever I come to collect my treatment, they treat good and always talk to me in a very good way, now I have started taking my treatment daily at the clinic.”*

Another patient said that:

P5: *“If the tablet is not working or you are stubborn to take it, then sisters will come and give it to you every day. To make sure that you take it”.*

The findings concurred with the results of the study conducted by Mabunda and Bradley (2011), which identified several factors that affect DOTS which include poverty, food shortage, cultural beliefs, and side effects of medication. In the same study, poverty was associated with poor treatment outcomes. It was stated that some of the patients who receive disability grants prefer to remain uncured so that the grant can continue. The smear conversion rate can be regarded as an indicator of the effectiveness of the DOTS strategy (Tiwari et al 2012).

4.4.3.1 Low socioeconomic status

Food scarcity and shortage of food play a role in patients not being stable to take their treatment and some participants indicated that they sometimes take treatment on an empty stomach and this exacerbates the treatment's side effects. One patient stated that it was hard to take treatment because of not having enough to eat and sometimes taking treatment without having eaten anything (Gugssa et al 2017:529).

P7: *“...sometimes the nurses bring us food. We struggle to get food sometimes”.*

Socio-economic status such as stigma must be discussed at the facilities during adherence steps are planned. The findings of this study are similar to those of a study conducted at Eastern Cape of SA by Cramm, Finkenflügel, Møller, and Nieboer (2010:6), which revealed that stigma influences PTB treatment adherence in most patients. The participants reported that they did not like the way their neighbours look at them when the nurses visit them at home or when the transport from the clinic fetch them. They also did not appreciate the fact that patients with TB were designated to one room and were assisted by a nurse known to be treating only patients with TB. The possible influence of social stigma on smear conversion can be explained by the loss of support, both economic

as well as emotional, coupled with neglect by their families and communities. The interplay of these multiple social factors may lead to lowered adherence to anti-TB therapy.

- **Unemployment**

Some participants reported that they take TB treatment on an empty stomach because of a shortage of food in their homes. Furthermore, some said they only eat when neighbours and friends provide them with food. The participants said the following.

P5: “...sometimes I would sleep without having not eaten anything. Sometimes I would tell the people am used to, then they will give me something and I’ll be able to cook a meal. If they do not give me anything, I would go to sleep without eating”.

P8: “...no there is nothing the only problem is sometimes we experience shortages of food at home, I heard I can get soft porridge at the clinic, so I also came to ask for soft porridge. Even today I took my pills on an empty stomach. I think if I can get food, I will be fine”.

P4: “ Always towards month-end we run out of food. Then I’ll normally eat half of my plate at night so I can have food for breakfast. I will stay the whole day without food until I get food for the evening. It is really difficult towards month-end as the money I get from my boyfriend is not enough and does not sustain us until month end”.

The findings of this study are consistent with the results of the study conducted in KwaZulu Natal by Ndwandwe, Mahomed, Lutge and Knight (2014:58), which reported that unemployment, poverty, and lack of food were some of the causes as the majority of the patients rely on disability grants.

- **Poor family support**

Patients with TB and their families who have a fair knowledge of TB compared to the general population could be related to the health talks that they get when visiting the clinics (Datiko et al 2019:11). In this study, participants came up with various ideas for support that can be rendered to patients and their families, and friends. The support system is said to be an important factor that influences patients to have conversion.

P2: “Okay,.. (crying) I have a daughter. She is 11 years old. She is my everything, she has motivated me in such a way that every time I look at her I’m motivated to get better.

I was very sick, she had to look after me like I was a child. She would even bath and cook for me because I could not even walk”.

P5: *“My friend is giving me support, he accompanied me to Pholosong, and even when I was discharged he was the one who has collected me. The participant went further to say that “He is assisting me with anything I need, he provided me when I did not have food, he always assists me with most of the things I need”.*

P7: *“I feel better because I have told my family that I have TB then they started supporting me and reminding me to take treatment at the clinic and they also remind me when it’s time to take my pills”.*

P1: *“...I woke up in the morning and took my tablets, without food”. They are helping a lot since diagnosed with TB as they wake me up when it is time to take treatment and even when I’m not feeling well enough to prepare food and other things”.*

Lack of support from the nurse and family is one of the factors identified by the participants. Aiyegoro (2016:47) indicates that patients who have a poor support system in the Gauteng province of SA have poor adherence. Patients who were not given counselling throughout the treatment course were likely to non-adhere to treatment. Lack of support from family members and beliefs towards PTB leads to non-adherence by patients while on PTB treatment. Patients who are not getting reminder messages to follow-up visits are likely to non-adherence because they forget (Lipman et al 2021:4).

P5: *“Yes, they used to console me that I will convert and then they advised me to stop smoking and drinking alcohol. Maybe smoking and drinking contributed to my having TB, so I should stop so that I will convert.”*

P6: *“My friend supported me very much, I remember the day I came back angry because my results were positive, and they did not change my treatment. He was the one who gave me information because he had TB in 2015. He told me to obey the nurses’ instructions if I wanted to be healed. He told me to take my treatment every day and to go to collect my treatment in the morning. He also told me to request for transfer to the clinic that operates every day, so that can start work in the morning even on the days when I am going to collect my treatment.”*

P1: *“It was difficult at first because I did not tell my wife and children, I was here in Gauteng and staying alone. At the clinic, they told me that I will take treatment for 6 months. So, I told myself that I will only go home when I finish treatment. And then my*

wife came to visit me while I was admitted and they told her that I had TB. Since that time, she is the one who is giving me my tablets in the morning before I can go to work. She is really supporting me.”

Lack of family support plays a role in patients being non-adherent to their TB treatment. During the intensive phase of TB treatment, family support is crucial for patients to comply with their TB treatment. According to a study conducted by Gugssa et al (2017:530), one patient stated that she stopped taking treatment due to a lack of family support. The patient-nurse relationship is also of utmost importance and patients who had a bad interaction were likely to be non-compliant, compared to those who had a good relationship with the nurse. The health facility operating hours was also identified as a hindering factor to TB treatment compliance as some patients could not manage to visit the facility during the operating hours due to other commitments (Gugssa et al 2017).

- ***Low education level***

The findings are similar to a study done in Sudan, which show that a lower educational level is associated with treatment default. Lack of knowledge and awareness about TB and the treatment thereof was found to be associated with non-compliance. TB education at the start of the treatment is a crucial step in the management and will enhance patients' knowledge, awareness, treatment, and mitigate drug side effects, and therefore minimise early default. According to Elmuttalut and Elnimeiri (2017) patients with TB of low socio-economic status should be provided with more focused supervision, health education, and support to enhance their compliance. As they are prone to be non-adherent to their treatment and thereby prone not to convert at 2 months of TB treatment.

4.4.4 Patient-related factors

The patient as the main role player in the treatment process has to take responsibility. Health literacy was said to affect the patient's capacity to obtain, process, and understand basic health information, and services needed to make appropriate health decisions (Jin, Kim & Rhie 2016:2118). Under this theme, one sub-theme was identified with three categories being health conditions other than TB, treatment timing, and treatment side effects. The sub-theme and categories are discussed below.

4.4.4.1 Challenges experienced by patients

A study conducted in Pakistan found that females are the leading factor found associated with poor sputum smear conversion (Salam et al 2016). These findings are different from a study that showed that males are more prone to sputum smear non-conversion (Güler, Ünsal, Dursun, Aydin & Capan 2007). Whilst a study by Kayigamba et al (2012:8-9) reports that delayed sputum smear conversion time is associated with high bacillary count patients, not gender.

- ***Health conditions other than TB***

The participants stated that they are co-infected with HIV and TB and taking both treatments. One of three indicated that s/he is doing well on treatment as s/he is taking the medication at different times.

P2: *“Yes, I have HIV.”*

P6: *“It is HIV.”*

P7: *“...I was getting better, I did not have a problem, because I was taking TB pills in the morning and taking ARVs in the evening.”*

Studies showed that HIV was not the only condition that caused patients with TB not to have converted at two months. Patients with TB type two diabetes mellitus (DM) were more likely to remain positive for AFB after 2 months. Type 2 DM patients were found to have more than 3,5 times greater risk of persisting with smear-positive in the second month of treatment (Perez-Navarro, Restrepo, Fuentes-Dominguez, Duggirala, Morales-Romero, López-Alvarenga, Comas & Zenteno-Cuevas 2017:83;88). The study by Salam et al (2016), also found that the presence of co-morbidities like diabetes did not have an effect on the sputum conversion rate at 2 months of TB treatment but the bacillary load at treatment start was the predictor of conversion at 2 months. In this study, co-morbidity was for HIV and no patient had diabetes mellitus. The patients who are having co-morbidity of HIV are also prone to not converting at two months of TB treatment.

- ***Treatment side effects***

Although the patients interviewed during this study stated that they experienced different side effects during TB treatment, they did not stop taking treatment. Patients experienced side effects such as sore or swollen legs, itchy back, and vomiting, however, they did not

stop taking treatment but instead, returned to the clinic to seek medical advice and intervention.

P3: *“The first tablet gave me an itchy back and sore feet. It was very sore... My feet were sore sometimes I could not stand, I could not walk it was so painful.”*

P2: *“Okay, my legs become problematic. I would have swollen legs and after walking long distances they would be very painful. If I do house chores for 2 hours, I become very tired and weak, which caused me to do our laundry sitting down.”*

P1: *“The first tablet made my legs feel hot and numb. I could not walk; it was so painful. Then after 7 days, I went to the clinic, then sister told me it is like that, I must continue taking my medication and I will be fine, I continued and started to feel better.”*

P6: *“The first 3 days of treatment I took my tablets at 06h00 in the morning then ate my breakfast around 06h30 or 07h00. Then I will vomit since I was not used to the treatment, and it smelled funny. I also had pins and needles on my legs which the sister (nurse) explained as side effects of the treatment and gave treatment for legs”.*

A study conducted by Ailegoro (2016:45), disagree with the results of this study and indicated that nurses stated that the patients are not having conversion because they stop TB treatment when they experience side effects. Whereas patients interviewed in this study stated that irrespective of the side effects experienced, they continued taking their treatment. Adverse drug reactions such as the side effects which patients experienced when on PTB treatment were identified by the nurses to be the factors that contribute to non-adherence to patients with TB in Gauteng province (Aiyegoro 2016:45). Gugssa, Shimels and Bilal (2017), also indicate treatment side effects were found to be associated with TB treatment non-compliance. However, in this study, participants did not indicate pill burden as a factor that contributed to non-conversion to TB treatment.

- **Substance use**

Patients who smoke failed to have conversion at 2 months of TB treatment and these were mainly males. According to Abdelbary et al (2017:3022) patients with excessive use of alcohol are also at higher risk of non-conversion. Participants in this study stated that they were using substances such as alcohol and smoking, which might have contributed to non-conversion. The participants said:

P3: *“I was told to stop smoking and drinking alcohol when taking pills. I must not change the time of taking treatment, I must take treatment same time every day”.*

P1: *“Yes. I smoke but now I was told to stop smoking but it is difficult, and I experience blood coming out of my nose. I now smoke one in the morning and one in the evening to prevent blood that comes out of the nose. I was used to smoke around 20 cigarettes per day”.*

Studies by Siddiqui et al (2010:1) and Güler et al (2007) also revealed that smoking whilst on TB treatment is associated with delayed sputum smear conversion. Another study by Visser et al (2012:3) also found that a positive smoking history was associated with delayed sputum smear conversion in SA. These are in line with the findings of this study where participants indicated that they used to smoke but they stopped smoking after starting treatment. Although the patients have stopped smoking the effects of smoking have contributed to them not converting at two months of TB treatment. However, a study conducted by Salam et al (2016:3), highlighted that addiction to tobacco or other drugs did not influence sputum smear conversion. This is contradicted by the study conducted by Jayawardena and Samarathunga (2010:6) which showed that heavy smoking significantly delays sputum smear conversion. In support, the study conducted by Nandawula (2013:31) at Western Reserve University-Makerere, found similar results that patients with positive smoking history were about two times more likely to have sputum smear-positive results at the end of two months of tuberculosis treatment. Individuals with positive smoking history are likely to have a radiologically extensive disease, which some studies have associated with sputum smear non-conversion (Güler et al 2007:232).

- ***Patients with TB use traditional medicine***

In this study, one patient stated the use of traditional medicine, and nurses also indicated that patients use traditional medicine. The nurses further indicated that this might be a factor contributing to patients with TB non-conversion. The patient said:

P5: *“Initially when I started coughing, I took traditional medicine and hot tea. I later came to the clinic to start treatment.”*

According to Kigozi et al (2017:6) there are misconceptions about the causes of TB and these include witchcraft. The findings concurred with those of this study that traditional medicine was widely used as an alternative to western medicine, although it did not help.

Patients had to resort to western medicine the traditional treatment was not yielding the desired results.

4.5 OVERVIEW OF RESEARCH FINDINGS

The patients with TB as well as the nurses working in the TB room shared their experiences concerning patient non-conversion at two months of TB treatment. Their lived experiences shared light on what are the factors that contribute to patient non-conversion at two months of TB treatment. The identified factors ranged from healthcare, socio-economic, and patient-related factors. These factors were extracted from both phase one for professional nurses and phase two for patients with TB.

4.6 CONCLUSION

This chapter presented the research findings, discussion, and literature control with the purpose to explore the factors contributing to patients with TB non-conversion while on TB treatment. The findings of this study were categorised into themes and sub-themes. This chapter also presented a summary of the study findings. The next chapter presents the recommendations, limitations and concludes the study.

CHAPTER 5: RECOMMENDATIONS, LIMITATIONS AND CONCLUSION

5.1 INTRODUCTION

This chapter focuses on the presentation of the summary of the research study, with particular emphasis on the main findings discussed in Chapter 4, as well as recommendations derived from the findings. In essence, the recommendations are a portrayal of improvements suggested by the researcher as collated from the findings of the study (Babbie & Mouton 2010:65; De Vos et al 2011:104). The limitations that were identified during this study are also described.

5.2 RESEARCH DESIGN AND METHODS

The purpose of this study was to explore and describe contributing factors to the non-conversion of pulmonary patients with TB at two months of treatment. The two below-mentioned research questions were pivotal in fulfilling the above-cited purpose of the study:

- *What are the factors contributing to pulmonary Tuberculosis patients' non-conversion at two months of treatment at Ekurhuleni district clinics?*
- *Could you please share your experiences regarding the factors contributing to non-conversion during TB treatment?*

An exploratory, descriptive, and qualitative research design was utilised to accomplish the objectives of this study. Non-probability purposive sampling was utilised to select the participants who were informative and experienced about the factors contributing to patients with TB' non-conversion. This study consisted of 17 participants from five clinics in the Eastern Region of the Ekurhuleni Health District.

5.3 SUMMARY AND INTERPRETATION OF THE RESEARCH FINDINGS

This section presents the summary and interpretation of the research findings. The discussion is based on each theme identified during the data analysis process as reflected in Chapter 4.

5.3.1 Health system service

Nursing care appears to be a factor identified under the theme of health system serves as a sub-theme and in the categories that emerged during data analysis. The findings of this study outlined that the professional nurses managing patients with TB do not adhere to TB guidelines. This was noted when the participants stated they only used guidelines when patients encounter problems of non-conversion. It was also noted that patient education and history taking were not adhered to, and not enhanced or reinforced as stipulated in the TB guideline.

It was stated that some nurses showed a negative attitude towards patients with TB and their colleagues, and this affected the TB programme. For example, patients were not asked to produce sputum because the nurse managing patients with TB was not on duty. Also, nurses in most facilities do not display teamwork, this is noted when nurses managing TB patients are absent from work for whatever reasons, patients are just given treatment and their sputum is not collected, and do not give patients health education. The lack of skills by professional nurses was another crucial factor affecting patient management (Mabunda & Bradley 2011:101). Some nurses indicated that they were not trained in TB, but they were working in the TB room managing patients.

Staff receiving support from managers are likely to perform well in their work (Ukwaja et al 2014:433). The findings in this study outlined that some nurses were not receiving adequate support from their facility managers, because the managers lacked TB knowledge. Some participants revealed that they were receiving support from the TB Coordinators, and they had monthly meetings to share experiences and challenges they were facing. The participants further stated that the DOT of patients who had non-conversion either at home or in the facility was important while suspecting treatment adherence. This was also corroborated by participants who confirmed receiving treatment daily, even at the time the study was conducted.

The findings further showed that the nurses need continuous TB training. Some participants indicated that they received TB training and updates a while back. This means mentoring and onsite training is not provided to assist HCWs to perform well in their work, which hampers their growth, personal development, and proper patient care (Lyakurwa et al 2021:56).

The involvement of the WBPHCOT in TB patient management was identified as an important finding in this study. Some participants stated that they were working with the CHWs to trace and support patients through DOT.

5.3.2 Patient care

The findings in this study revealed that co-morbidities and substance use are some of the contributing factors to TB non-conversion as some patients stated that they had other conditions. Few participants also stated that they were smoking when they started treatment and have since stopped. However, there was one that continued to smoke due to health reasons. Nurses pointed out that some patients are in denial and this is making it difficult for those patients to have a conversion, the latter statement is supported by Masimula (2020:1).

Treatment compliance was stipulated by nurse participants to be another important factor contributing to patients' non-conversion, whereas most of the patients stated that they were taking treatment as prescribed. The use of traditional medicine by the patients was noted by the nurses participants, which was confirmed by one participant, who indicated using traditional medicine before starting TB treatment. Linzamo (2011:19) corroborated the dual practice.

5.3.3 Social factors

Patients are experiencing social issues such as a lack of support system and stigma from their families and nurses, shortage of food, and social support. Nutrition-related challenges caused some patients to take treatment on empty stomachs, which was detrimental to the progress of cure (Djouma et al 2015: 26; Kigozi et al 2014:2). The majority of the patients were unemployed and not receiving social grants this was corroborated by both the patients and the nurses. The stigmatisation of the patients was also noted by the nurses, who noted that some patients were not receiving support from their families, and did not participate in the patients' TB treatment process, such exclusions pose a significant gap in the treatment process (Fong 2020:368).

5.3.4 Integrated nurses' and patients' results on factors contributing to pulmonary tuberculosis patients' non-conversion at clinics in the Ekurhuleni health district

The findings of this study were similar in cases where both the nurses and the patients stated that some nurses have negative attitudes toward patients with TB. It was said that when nurses delegated to work in the TB room were not at work, the patients were not well attended to. Patients concurred that when the TB nurse was not present, the sputum was not collected for conversion although it was due, and patients were told to return when the nurse delegated to TB was on duty. Nevertheless, some patients noted a positive attitude toward the nurses working in the TB room and this was also attested by a nurse stating to have a passion for working with TB patients.

The socio-economic status was identified by both nurses and patients, and it was stated that some patients do not have food in their homes and some would even take treatment without having eaten anything. It was further stated that some patients receive food parcels from the clinics or from members of the community in the form of donations.

The patients' and nurses' results findings were consistent whereby both participants emphasised the patients need family support through their TB treatment. It was noted that when the patient is getting support from family members they are likely to have conversion.

However, there were also contrasting statements whereby the nurses stated that they give patients education, whereas patients indicated that they were not informed about the disease.

5.4 RECOMMENDATIONS OF THE STUDY

This section makes recommendations in the context of nursing service management, support by facility personnel, and support from other stakeholders. It is worth stating that these recommendations are not peripheral to the findings established in Chapter 4 (Dantzker & Hunter 2012:36; Maxfield & Babbie 2014:12).

5.4.1 Nursing service management

- Health system services must be improved to ensure that all health care workers managing patients with TB are using TB guidelines whenever patients are admitted

into the TB programme. It was shown in this study that failure to do so is inimical to TB management (van der Zee 2018:29).

- Teamwork and communication between the nurses and the facility managers are crucial. In some facilities, however, nurses are the ones teaching the facility manager about TB management.
- All professional nurses must be trained in basic TB management so that they can be in a position to help patients with TB in the facilities, even when the nurse delegated in the TB room is not on duty. Patients must not be turned back without receiving proper care (Yellappa et al 2016:2416).
- Enhanced patient education must be conducted from the time the patient start TB treatment, and by following the HIV/TB and NCD adherence guideline.
- Full history must be collected from all the patients because this will give the nurses a clear picture of how to manage the patients (Yellappa et al 2016:2418). Nurses must ensure that patients comprehend the information, as some patients do not understand and continue to provide incorrect information.
- WBPHCOT must be strengthened in all the health care facilities as the team represents the facility in the community and provides health information to the self-same community. The outreach team leader must be able to accompany the CHW to the families if the patient has agreed to have such visits.
- The WBPHCOT must be able to involve other stakeholders which are part of the patient care. It is important to have a 'war room' composed of all the multidisciplinary team members.
- Reports or challenges from the WBPHCOT must be addressed in a weekly meeting and there must be a quality improvement plan for actions in compliance with the DoH's national guidelines.
- The WBPHCOT must assist in educating the community through the Imbizos, door-to-door sessions, and other community forums about TB and how to take care of the family members diagnosed with TB. This will reduce the stigma attached to patients with TB.

- The WBPHCOT must also involve the NGOs, NPOs, and other stakeholders, as this would assist the patients, the families, and the community at large (Zinatsa et al 2018:269).
- The facility managers must ensure that all staff members are trained on TB management and that nurses managing patients with TB utilise the TB guideline all the time.
- On-site training and mentorship must be provided by the TB programme coordinators, to ensure a good understanding of TB management by nurses managing patients with TBs and their colleagues.
- The training unit must plan for full TB training and refresher courses twice a year, which will ensure that all nurses in the facility are capable of managing patients with TB (WHO 2015:3).
- The WBPHCOT should be trained regularly, which will ensure that every team member is well versed in their responsibilities (DoH 2016: 2; WHO 2015:3).
- Health promoters should be trained regularly on how to give constructive health education to patients with TB, to ensure that the patients understand their condition and how it can be managed.
- Future research is needed to evaluate the TB training provided to the professional nurses in the district. Assessment of quality health education that is provided to patients with TB. A study survey can be done in the whole of Gauteng province to find out why patients with TB are not having conversion.

5.4.2 Support by facility personnel

- The facility personnel needs to develop nursing care plans and give the patients information about their conditions so that they would be able to take full responsibility.
- The nurses must explain the importance of adhering to treatment so that the patients can understand the importance thereof, and what is expected of them during the treatment (DoH 2014:19).

- The patients must be provided with the facility's working hours so that they could plan their clinic visits accordingly.
- The support system from the facility manager, TB programme coordinators, and the other colleagues in the facility is important. The nurse managing patients with TBs must be allowed to debrief with colleagues periodically since it was shown that they are overwhelmed.
- The TB programme managers in the sub-district must undertake facility support visits monthly, considering the effects of the Covid-19 pandemic on health care personnel.
- There must be inter-facility communication for proper referral of patients, since some facilities work only on weekdays, while others operate 24 hrs for 7 days.

5.4.3 Support from other stakeholders

- It is important to involve the patient's family, especially during family screening to ensure that they are involved in patient management of TB. This would eliminate the discrimination against patients (Nandawula 2013:1; Ozbolt & Bakken 2016:569).
- Involvement of other stakeholders, especially in the case where the patient does not have food. The social workers, dieticians, and doctors must be included to ensure that patients receive a balanced diet.
- The importance of meetings in the facilities could not be underestimated. This will improve both the communication and management of TB (Ndwandwe et al 2014:57).

5.5 CONTRIBUTIONS OF THE STUDY

The contributions of the study are determined by the extent of the impact it makes in the realm of knowledge development in the field of research, to healthcare institutions and personnel involved in TB management, as well as its practical relevance to society (Guest et al 2013:38; Khaldi 2017:18-19). Accordingly, this study makes its contribution to the field of nursing in respect of nursing practice, as well as district and nursing education and these contributions are described below.

5.5.1 Nursing practice

Nursing practice will be enhanced in terms of patient education and implementation of nursing care to the patients. Skilled nurses would ensure that they take a full history from the patients for diagnosis and management reasons. The provision of health education to the patient and the family members for the enhancement of patient treatment adherence (Tweya et al 2013: e56248; WHO 2015b:16).

5.5.2 District TB short course training

The TB programme coordinators will benefit by supporting the facilities with mentorship and onsite training and involving the stakeholders through monthly meetings. The emphasis on professional nurses' short courses on TB management and WBPHCOT training will elevate the role and status of health facilities in the communities they serve (Tshitangano et al 2010:81; Waite et al 2008: 1369).

5.5.3 Nursing education

The study's emphasis on nursing education could influence the relevant health education policymakers to include TB management course modules in the nursing curriculum at nursing colleges and universities at both undergraduate and postgraduate levels. This would ensure that nurses are sufficiently skilled and well-informed in the nursing ethics to reduce the negative attitudes and misconceptions that some nurses have towards TB. Further research needs to be undertaken on other strategies which must be implemented to end TB, nursing students' perception of TB, and community support programmes for patients with TB.

5.6 LIMITATIONS OF THE STUDY

The limitations of the study relate to those factors that could render the study ineffective (Berg & Lune 2012:46). This study was conducted in Ekurhuleni district Eastern Region in five clinics only. As such, the findings may not be generalised to all clinics and other sub-districts in the district. Also, the study focused only on nurses who were in TB patient management, which could negatively affect those nurses whose specialities are in other health care fields. Another limitation can be the study only focus on patients with TB non-conversion at two months. During the literature search, few articles were related to this study, hence it was difficult to support the results with recent literature.

5.7 CONCLUSION

This chapter presented a summary of the main study findings, recommendations, contributions, and limitations of the study. The chapter encapsulates all critical research variables that presaged the study in Chapter 1. It is the researcher's firm view that the study was worth conducting. Among other factors, the study has enhanced the researcher's understanding of the value of research in general. In that regard, the study has improved the researcher's communication skills, given the need to communicate with various stakeholders throughout the research process.

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LIST OF ANNEXURES

ANNEXURE A: APPROVAL FROM THE UNIVERSITY



UNISA HEALTH STUDIES HIGHER DEGREES ETHICS REVIEW COMMITTEE

Date 8 July 2020

Dear Ntwanano Fiona Baloyi

Decision: Ethics Approval from
8 July 2020 to 8 July 2023

NHREC Registration # : REC-012714-039
ERC Reference # : **HS HDC/1006/2020**
Name : Ntwanano Fiona Baloyi
Student # : 53434412
Staff # :

Researcher(s): Name Ntwanano Fiona Baloyi

Address

E-mail address fnntwanano@gmail.com, telephone # 071 879 1339

Supervisor (s): Name Dr ZM Manyisa

E-mail address manyizm@unisa.ac.za, telephone # 0124292008

Working title of research:

Factors contributing to pulmonary Tuberculosis patients' non-conversion at Ekurhuleni East clinics

Qualification: MA

Thank you for the application for research ethics clearance by the Unisa Health Studies Higher Degrees Ethics Review Committee for the above mentioned research. Ethics approval is granted for three (3) years.

*The **low risk application** was **reviewed** by a Sub-committee of URERC on 7 July 2020 in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment. The decision was approved on 7 July 2020.*

The proposed research may now commence with the provisions that:

1. The researcher will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.
2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.



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3. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the Health Studies Research Ethics Committee HSREC@unisa.ac.za.
4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
8. No field work activities may continue after the expiry date (8 July 2023). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number **HSRDC/1006/2020** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Yours sincerely,

Signatures :



Chair of HSREC : Prof JM Mathibe-Neke

E-mail: mathijm@unisa.ac.za

Tel: (012) 429-6443



Executive Dean : Prof K Masemola

E-mail: masemk@unisa.ac.za

Tel: (012) 429-6825

**ANNEXURE B: LETTER SEEKING PERMISSION FROM THE EKURHULENI HEALTH
DISTRICT**

1 Paschendaele Road

Delville

Germiston

1401

13 July 2020

The Chief Executive Officer

Ekurhuleni Department of Health and Social Development

West Wing

40 Catlin Street

Germiston

1401

Dear Sir/ Madam

Request to conduct research at selected Ekurhuleni Eastern Sub-District Region Primary health care clinics

My name is Ntwanano Fiona Baloyi, and I am a Master of Public Health (MPH) student at the University of South Africa (UNISA).

The research I wish to conduct for my master's dissertation is on the Factors contributing to pulmonary Tuberculosis patients' non-conversion at Ekurhuleni East clinics. I am hereby seeking approval to interview professional nurses and the patients' who were treated for TB in the following health care facilities: Alrapark, Andries Raditsela, Sead, Selope Thema, and White City. I have provided you with copies of my research proposal which includes the interview guides to be used in the research process and the ethical clearance from UNISA HSREC.

The participants will not be subjected to any physical harm by participating in this study. If the participants show signs of psychological stress owing to the interview during the participation period, the researcher will stop the interview process and schedule for another day if the participant may feel that they can continue with the interview.

Upon completion of the study, the Ekurhuleni Department of Health will be provided with a copy of the research report.

Hope this application will be taken into consideration. Thanking you in advance.

Yours faithfully

Baloyi Ntwanano Fiona

071 879 1339 or fntwanano@gmail.com

ANNEXURE C: LETTER OF APPROVAL: EKURHULENI HEALTH DISTRICT



EKURHULENI HEALTH DISTRICT RESEARCH PERMISSION

Research Project Title: Factors contributing to pulmonary Tuberculosis patients' non-conversion at Ekurhuleni East clinics.

NHRD No: GP_202008_157

Research Project Number: 31/08/2020-04

Name of Researcher(s): Ms Baloyi Ntwanano Fiona

Division/Institution/Company: University of South Africa

Date of review by the EHDC: 20 August 2020

DECISION TAKEN BY THE EKURHULENI HEALTH DISTRICT RESEARCH COMMITTEE (EHDC)

- This document certifies that the above research project has been reviewed by the EHDC and permission is granted for the researcher(s) to commence with the intended research project.
- Facilities approved for the research: Alra park, Andries Raditsela, Sead, Selope Thema and White City clinics.
- Participants' rights and confidentiality must be maintained throughout the study period and when disseminating the findings.
- No resources (financial, material and human resources) from the health facilities will be used for the study. Neither the district nor the health facilities will incur any additional cost for the study.
- The study will comply with Publicly Financed Research and Development Act 2008 (Act 51 of 2008) and its related regulations.

Title: Factors contributing to pulmonary Tuberculosis patients' non-conversion at Ekurhuleni East clinics.

- The EHDC must be informed in writing before publication or presentation of research findings and a copy of the report/publications/presentation must be submitted to the EHDC
- The district must be acknowledged in all the reports/publications generated from the research.
- The researcher will be expected to provide the EHDC with
 - Six monthly progress updates including any adverse events
 - The final study report in electronic format
 - Present the final research findings at the annual Ekurhuleni research conference if possible.
- The EDHRC reserves the right to withdraw the approval, if any of the conditions mentioned above have being breached
- The research committee wishes the researcher(s) the best of success.

DR. J. SEPHYA

DEPUTY CHAIRPERSON: CITY OF EKURHULENI

Dated: *20/08/2020*

Dr. R. Kelleman

CHAIRPERSON: GAUTENG DEPARTMENT OF HEALTH (EKURHULENI HEALTH DISTRICT)

Dated: *20/08/2020*

ANNEXURE D: PARTICIPANT INFORMATION SHEET



PARTICIPANT INFORMATION SHEET

Ethics clearance reference number:

Research permission reference number:

Title: Factors contributing to pulmonary Tuberculosis patients' non-conversion at Ekurhuleni East clinics

Dear Prospective Participant

My name is Ntwanano Fiona Baloyi and I am doing research with Dr Zodwa Margaret Manyisa, a lecturer in the Department of Health Studies. I am doing Master of Arts in Public Health (MPH) at the University of South Africa. We have not been funded for this study. We are inviting you to participate in a study entitled "Factors contributing to pulmonary Tuberculosis patients' non-conversion at Ekurhuleni East clinics".

WHAT IS THE PURPOSE OF THE STUDY?

I am conducting this research to explore and describe contributing factors to non-conversion of pulmonary TB patients at 2 months of treatment.

WHY AM I BEING INVITED TO PARTICIPATE?

The researcher obtained your contact details from the data capturers through the clinic's supervisor consent. The researcher has invited you to participate in this study as you are having experience of non-conversion during TB treatment. Approximately 10- 15 participants shall be included in this study. At the end of the study, the results shall contribute to the body of knowledge in nursing in making recommendations on how Ward base primary health care outreach team will better support Tuberculosis patients in the facility and community, and for publication of the results in accredited journals.



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WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

Participant's role in the study will be to shed more light to the study through answering of research questions regarding the factors contributing to pulmonary Tuberculosis patients' non-conversion at Ekurhuleni East clinics. The study involves audio taping and is a semi-structured in-depth interview.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Statement that participation is voluntary and that there is no penalty or loss of benefit for non-participation. Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

WHAT ARE THERE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

The participants are not expected to pay anything to participate and will not receive benefits or compensation of any kind during and after participating in this study. The researcher is intending to work with Ekurhuleni Health District in making a protocol of treating TB treatment to improve patients' health because the Department of Health will work on the results of this study to assist other patients and to in-service their staff members.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

The participants will not be subjected to any physical harm by participating in this study. If the participants show signs of psychological stress owing to the interview during the participation period, the researcher will stop with the interview process and schedule for another day if the participant may feel that they can continue with the interview.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

All participants will remain anonymous during this study. No names will be divulged to anyone. No names will be recorded during recordings, and only codes will be used. All information that the participants will share will remain confidential and not shared with



anyone. In the case where your information will be needed to be shared with others or the Department of Health, the permission will be required from you.

Please keep in mind that your anonymous data may be used for other purposes, such as a research report, journal articles and/or conference proceedings. Privacy will be upheld to protect your information. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report. Please keep in mind that it is sometimes impossible to make an absolute guarantee of confidentiality or anonymity.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at the researcher's resident. Electronic information will be stored in a password protected file on a password protected personal computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Information will be destroyed after a certain period, hard copies will be shredded, and electronic copies will be permanently deleted from the hard drive of the computer.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

There will be no incentives or gifts that will be given to the participants by the researcher.

HAS THE STUDY RECEIVED ETHICS APPROVAL?

This study has not yet received written approval from the Research Ethics Review Committee of the College of Human Sciences, UNISA. A copy of the approval letter will be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, or you require any further information or want to contact the researcher about any aspect of this study, please contact Baloyi Ntwanano Fiona on 071 879 1339 or send email at fntwanano@gmail.co.za. The findings are accessible for 1 year.



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Should you have concerns about the way in which the research has been conducted, you may contact Dr ZM Manyisa on 012 429 2008, or send email at manyizm@unisa.ac.za. Contact the research ethics chairperson of the HSREC, Prof J E Maritz at HSREC@unisa.ac.za if you have any ethical concerns.

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.



Baloyi Ntwanano Fiona

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the interview

I have received a signed copy of the informed consent agreement.

Participant Name and Surname (please print)

Participant Signature..... Date.....

Researcher's Name and Surname..... (please print)

Researcher's signature..... Date.....



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ANNEXURE E: INTERVIEW GUIDE FOR PROFESSIONAL NURSES

Professional Nurses Interview Guide

Title: Factors contributing to pulmonary Tuberculosis patients' non-conversion at Ekurhuleni East clinics

The participant's role in the study will be to shed more light on the study by answering research questions regarding factors contributing to the non-conversion of Patients with TB. The study involves audiotaping and is a semi-structured in-depth interview. The researcher would like to understand your experience while rendering service to Patients with TB who did not have conversion during their TB treatment in your facility. You are assured that all the information gathered in this room/ place will be kept confidential and your identity will be protected. You will not be required to provide your identity at any time. Feel free to answer the questions as the information will be used for the research purpose.

1. Grand question: Could you please share your experiences regarding the factors contributing to the non-conversion of Patients with TB?
2. How frequently do you use National TB guidelines while managing Patients with TB?
3. What have you done when patients did not have conversion during TB treatment?
4. Whom did you involve in this situation? And why?
5. What can be done by the patient, and health care workers to prevent this situation in the future?
6. As the Department of Health at Ekurhuleni District, what can they do to assist you in this situation?

ANNEXURE F: INTERVIEW GUIDE FOR PATIENTS

Patient Interview Guide

Title: Factors contributing to pulmonary Tuberculosis patients' non-conversion at Ekurhuleni East clinics

The participant's role in the study will be to shed more light on the study by answering the research questions regarding factors contributing to non-conversion, during your TB treatment. The study involves audiotaping and is a semi-structured in-depth interview. You are assured that all the information gathered in this room/ place will be kept confidential and your identity will be protected. You will not be required to provide your identity at any time. Feel free to answer the questions as the information will be used for the research purpose.

1. Could you please share your experiences regarding the factors contributing to non-conversion during TB treatment?
2. What is your understanding of TB?
3. How many times were you diagnosed with Pulmonary TB?
4. What is your perception of TB treatment?
5. What do you think caused you not to have conversion?
6. What kind of support did you receive at home?
7. Have you experienced any side effects of the treatment? And if yes how did you get over them?
8. Were you having other medical conditions at the time you were diagnosed with TB?
9. How were the clinic staff towards you during the treatment?
10. What do you think can be done to prevent this problem in the future?

ANNEXURE G: INTERVIEW WITH NURSE MANAGING PATIENTS WITH TB

Interviewer: Could you please share your experiences regarding the factors contributing to TB patient non-conversion?

Nurse: According to my knowledge the main factor that contributes to the patient not converting at two months in particular.

Interviewer: Mmh

Nurse: It's the fact that it is fear, fear of the unknown. The patient does not know why it is me that I am having TB. It is one of the contributing factors because patients question a lot regarding this TB thing. It is mostly psychological. Another factor that causes non-conversion is that TB is still stigmatised. The fact that TB is associated with HIV people...most patients cannot even confide or tell their immediate family members unless is a facility where that clinician goes to that patient's family and interview them and be able to seek sputum. Most of the time it is also stigmatisation of TB because people end up even not taking their treatment.

Interviewer: I heard you talking about the patient factors such as fear and stigma. As a clinician how do you assist the client through all this?

Nurse: As a TB clinician my strategy is that as soon as I admit a patient, I do a family visit. I go to the patient's address and set up a meeting with their immediate family members. To educate them regarding TB. To get sputum from the whole family members. During that process, I build a report amongst the family members and my client because if the other family member is supporting them. It is not easy for the patient to not take the treatment because the patient has moral support from the family members and their family members are oriented regarding food that they are supposed to take and the precautionary measures that they should take to prevent the spread of Tuberculosis.

Interviewer: I heard you talking about the support and the relationship with the family. Can you explain more how is your relationship with the client and the family members at first you find that you did not get concerned when you were going to their homes and then they did not want to share with the family?

Nurse: The first thing that I do is to sit down with the patient and try to negotiate with the patient and tell them the importance of meeting with their family members. Through making the patient understand, basically sympathising and empathising. Do you understand the situation? I also put myself in their situation so that they can trust the process through you explaining the importance of confiding to their family members.

Interviewer: how frequently do you use the National TB Guidelines while managing TB clients?

Nurse: Frequently. I would say frequently.

Interviewer: Can you tell me more about that?

Nurse: Our facility always has students. I prefer to read through the guidelines and use my own words because they understand more, and they get the actual content of the guideline rather than me telling them that this is how you should do things. We just read through, then we share, then we discuss.

Interviewer: What have you done when the patient did not convert during their TB treatment?

Nurse: Okay. What do we usually do if they do not convert? It uses the DOT system. At first, when you admit a patient you give them two days to come back for follow-up. Fortunately, some of them convert and some of them do not convert. Then we use the dotting system. We have always had the outreach, the WBOTs team. At first, I would personally go there and talk with the patient. The WBOTs team is based in their neighbourhood, it is mostly the patients that they see every day. Let us say for example I stay here around this clinic. I would allocate someone who stays in the same place with the patient so every morning before they come to work, they go to the patient and make sure that he takes the medication. That is the best option ever. This occurs every day. The WBOT go to personally DOT the patient because I sometimes give them the medication so that they give it to the right patient.

Interviewer: I heard you talking about the WBOT, what if the patient does not convert, even after the WBOT team goes to visit them every morning?

Nurse: When they do not convert, according to the National Guideline we add another month. If the patient is in the initiation phase, we will just add. We prolong the treatment until the patient converts.

Interviewer: What happens if the patient does not convert at 11 weeks? Let us say for example the patient did not convert at 7 weeks and now it is the 11th week and still, the patient is not converting. What do you usually do?

Nurse: I have not had that experience. No. I have not. Week 8 and 9 or 10 they usually convert.

Interviewer: Whom do you involve in a situation where the patient does not convert?

Nurse: I call them immediately. In most cases, I call the coordinators if, in those difficult situations, they usually intervene.

Interviewer: How are the coordinators assisting you?

Nurse: they give me support because they have been here. They give me coping mechanisms on how to deal with such situations, that I feel that I cannot handle personally. Sometimes you find yourself in a situation where you need someone to assist you on how to deal with that relevant matter.

Interviewer: What can be done by the patient and the Health Care worker to prevent the situation in the future patient not converting?

Nurse: Above everything else. It is cooperation from all parties. As far as the patient is concerned. Cooperation is the best option ever.

Interviewer: What more can be done except cooperation? To make sure that the patient...

Nurse: ... Thorough health education. Emphasis! Emphasis! Emphasis!

Interviewer: What do you mean by thorough education?

Nurse: There is a quote that says "repetition is the mother of education" for a person to be familiarised with something. They need to be told frequently. Then the information will be easily absorbed.

Interviewer: As the Department of Health at Ekurhuleni District what can be done to assist you in a situation where the clients are not converting? Or assist the client who is not converting.

Nurse: Providing transport is the first so that we can access the relevant families. Because it becomes a challenge sometimes, we must use our cars so that the patient's well-being is maintained. Provision of supplements for those patients that are experiencing malnutrition or those that test positive. Another challenge is that some patients complain that they do not have food and they will complain that these tablets give them ulcers. We can also involve Social Development, for every patient that tests positive for TB a social worker needs to intervene to assess the whole situation and provide encouragement along the way. I feel like for the fact that you are going to take treatment for 6 months, it will...because it is taboo to the patients. Some sort of debriefing is needed because we are health care professionals who give health care education but the way we encourage the patient. Some problems do not need us as Health Care workers. They are social problems.

Interviewer: I have heard you. What more can you share with me regarding TB patient non-conversion on the side of health care workers?

Nurse: On the side of health care workers, as I mentioned earlier, sympathy and empathy we are living in an environment or today's life people are not easily trusting. As a health care worker, for you to admit a TB patient you need to sympathise and empathise with them. You need to go down

to the patient's level. It is very important. Because if you act superior to the patient the patient will not be free. He will even fear to tell you about their family situation, or their problems regarding that. They will not even be truthful about the fact that they are even smoking. For such things, you need to be at par with the patient.

Interviewer: At some point, you find that you are off duty, or you are on leave. What is the relationship between your clients and your colleagues?

Nurse: To be honest with you, it is very bad. In all facilities that I have worked at. They will tell the patient that your nurse is not available. It becomes a challenge. It becomes difficult for me to take four weeks' leave. I know that there will be new patients that were initiated, and there will be problems. Sputum will be taken sometimes. There is another nurse that usually helps me, but it becomes a challenge. Just like now, we are short-staffed I am the only one working on acute and chronic. I try by all means at least once a week to encourage the staff just tell them how to admit a patient. I give them instructions. Sputum conversion. I even have a book where I write those that are supposed to be converting, sputum that is supposed to be taken at 7 weeks and 11 weeks as to unite them because it becomes a challenge. I feel like there should not be a designation when it comes to TB, everyone should rotate. Everyone should be able to render the service because in my absentia it becomes a problem patients are told that their nurse is not on duty. You will come back next week.

Interviewer: Can you tell me more especially on the part where sputum is not taken and then the clients are just given treatment and then sent them back.

Nurse: That is when we lose a patient because it causes inconsistency because the patients are not converting, and they are not attended to due to sputum not being taken.

Interviewer: How do you deal with that challenge in your facility if the sputum is not collected or the client's records are not up to date and the client was supposed to convert but did not convert and clients are not being recorded.

Nurse: As I said earlier. I try to encourage them to put up a new culture because these patients are not my patients. They are our patients, so we need to be fair whenever we treat those patients, but it is still a difficult situation.

Interviewer: If the file is not documented how do you deal with this matter together with the data capturers?

Nurse: I will go to the person that was with the patient and ask for recent dates or days they checked the patient so that they update it on the system. I am also trying to learn Tier.Net because I also want to help data capturers.

Interviewer: How can we assist you and the data capturers in this situation if the information is not available and the client is not converting?

Nurse: Giving support is the best option. Giving Inservice training to staff members even the clinic facilitators should frequently come to the clinic to talk about the importance of completing TB. Because if it is internal or a colleague the message can sometimes fall on deaf ears but someone senior, I think can take charge.

Interviewer: I heard you talking about the clinical facilitators, do you mean the coordinators?

Nurse: The coordinators, yes

Interviewer: How frequently do the coordinators come for support visits in the facility?

Nurse: Honestly speaking, only when there are problems or when there are things they want to iron out or may be due to COVID-19, but I am not sure. Lately, it is a challenge across the board. The support has defaulted. Mid-COVID most patients eventually defaulted to the TB treatment. It is a provincial travelling's. Some people will go to Mpumalanga, some will go to Limpopo. It is a challenge.

Interviewer: I can hear you. So, in that situation where the client now is having challenges because they have moved from one province to another, how do you assist them?

Nurse: I usually communicate with the family members to give me the patient's phone numbers. I also advise them to go to the nearest clinic and get information so that I can send an email or do something about the patient by transferring out a form so that the patient can continue with the treatment. That is what I usually do. Then communicate with the clinician from the nearest clinic. Then we take it from there.

Interviewer: Since you started working in the TB room. How frequently did you receive training and even the refresher courses?

Nurse: Okay, back in 2017 when I was still working at Kwa-Thema and now in Joburg in 2019 and around September 2019 I attended another training.

Interviewer: Any refresher course in-between?

Nurse: not really. Not really. Since then. The last training was in 2019 to be specific. Just now they were...I would not even call it a refresher because they were just introducing the new TB register when we attended. It was between November and December I do not remember clearly. We had gone back to the basics.

Interviewer: how frequently do you have meetings with the clinic coordinators?

Nurse: before COVID-19 which is a year ago. It was at least two times a month and we will also have one on one sessions with the coordinator the other is TB meeting with the TB coordinator, and the data capturers but now because of COVID-19 we do not have meetings.

Interviewer: do you mean that close to a year now you have never met a TB coordinator in your facility?

Nurse: It is six months. But now it is over six months

Interviewer: Okay, thank you very much. Anything that you would like to share with me?

Nurse: Mmh, I believe that is about it as far as TB is concerned.

Interviewer: Okay, thank you

Nurse: Thank you

ANNEXURE H: INTERVIEW WITH PATIENTS WITH TB

Interviewer: Could you share your experiences regarding the factors that contributed to TB patient non-conversion?

Patient: Mmh, can you clarify it for me? The question

Interviewer: What made you not convert during your TB treatment?

Patient: The first one or the second treatment?

Interviewer: yes, because when you started your treatment you started with the first. At the time you were supposed to move to the second one you could not go because you were supposed to take it for two months and then from the third month you were supposed to start the new treatment for four months.

Patient: Yes

Interviewer: What made you not to...

Patient: Convert?

Interviewer: Yes

Patient: I think what happened with me is when I started. I think it was my time. My time. Sometimes I will take it at 09H00 or 10H00 or 11H00. Not being consistent at the same time.

Interviewer: Okay

Patient: That is what I find out. Then later when I kept my time on the same level it was when I converted to the second one. This means that when you take it at 10H00, take it at 10H00 every day or past 10H00. Do not take it at 10H00 then past 12H00. Do you understand? Time is very important.

Interviewer: Okay. Do you think that it was only time that made you not convert or there were other things? That you were going through?

Patient: I think time. For me, it is time because I am not someone that goes around. I do not have friends, I do not have flu, and I do not have coughs. I think...maybe I do not have an appetite that much. In the first two months, I was so very weak. I think my appetite was not there, I was not that strong yet.

Interviewer: eh, what do you understand about TB?

Patient: Eh, Tuberculosis is a virus that you get from people, dirty toilets, I think is the virus you get from people breathing, by coughing without closing their mouth then it spreads. It is how you get TB.

Interviewer: How many times were you been diagnosed with pulmonary TB or diagnosed with TB?

Patient: This is my second time.

Interviewer: When was your first time?

Patient: Ooooh, I cannot even remember. [thinking], I cannot remember honestly. I think it's two years now. I think three years ago. I think three or four years ago.

Interviewer: What is your perception or understanding of TB treatment?

Patient: My understanding or perception of TB is that once you are diagnosed with TB? You should drink your tablets. For you to get rid of the virus drink your tablets every day. If you do not drink your tablets every day, you become resistant. Which makes the tablets not work and therefore it will switch over to MDR. With MDR then it means you will be taken to a hospice and I think the injection will be used. So, by having TB you must complete your medication for you to be well.

Interviewer: I heard you saying that the person who is having TB must take treatment. How are they supposed to take it? How is the TB treatment taken?

Patient: Mmmh, from my understanding, I started by Rifafour, and then I took three because they are a little bit lighter, small. Then after two or three months depending on the results, you transition to the other pills for the other months and then once you are done you will be discharged. If the tablet is not working or you are stubborn to take it, then sisters will come and give it to you every day. To make sure that you take it. If not and you still do not take it, they also use the injection and with that one, I will not recommend it because of what I have heard. It is very painful.

Interviewer: Okay, I heard you talking about there is supposed to be timing for the patient. Can you share with me how are you supposed to note the time you should take your treatment? How were you timing yourself?

Patient: Uhm, I will normally wake up. I am a morning person. I will clean first thing. Brush my teeth and then my comfortable time is ten o'clock. That is my comfortable time. Ten or eleven o'clock. When I go somewhere, I will set a watch. It is so monitored in my brain that this is the time you should take the tablets. I never made a mistake. It automatically clicks that it is now ten or eleven o'clock, and I should take my medication. Whether I go to town, whether I go to a bank

I am never shy to take my tablets with me and drink them. It is how I keep my timing. It is easy for people to set it on their phones. Every day they should set the alarm, it will notify them that this time you should drink your tablets.

Interviewer: What kind of support did you receive at home? During the time you were having TB.

Patient: Okay, I have a daughter. She is 11 years old. She is my everything, she motivated me in such a way that every time I look at her...she was my motivation when I was very sick. I was very sick. She had to look after me like her mother. She would bathe me. She had to cook for me because I could not even walk. She is 11 but she is very strong. She would tell me, mommy you are strong, you taught me how to pray. She would also exercise me. Then I have a sister who is not very emotional. She would be there financially. You know. I am the one who is outspoken, and very strong. I can take everything. But my sister was there financially she helped, and she also helped my daughter. I said if I would continue being like this, she would not have a mother and I would love to be there to see her complete her school.

Interviewer: I heard you sharing with me that you got support from your daughter. How did you share what was happening in your life?

Patient: I told her that I have TB. She asked me what TB was? I told her that it is a disease mommy got from somewhere because I do not know where I got it from. It is maybe a disease that I picked up at the toilet because I think I am sensitive I pick up on germs. I pick up germs very easily. I am that kind of a person. That is why you can see I am always clean. Even where I stay is not the best, but it is very clean. I pick up on germs very easily. I explained to her what TB is and I explained to her that I am sick. I explained to her that this is what mommy must go through. I must go to the clinic and I must take tablets this time every day. Luckily with the COVID-19, she was so helpful that she understands every day she would say mommy did you take your tablets? It is time to take your tablets. Okay, mommy now you must transition. I told her from these pills we are going to the next one. She would ask me what the function of the pills is or if I do not take what is going to happen. I told her that I might be resistant, and I might die. We have that relationship.

Interviewer: This means that during that time you were having TB the only people who were supporting you it was your sister and your...

Patient: And my daughter

Interviewer: Daughter. Have you ever experienced the side effects of the treatment?

Patient: In the beginning, I had an itchy back. The first tablet gave me an itchy back and sore feet. It was very sore feet. My feet were sore sometimes I could not stand. I could not walk; it was so

painful. When I sleep, I would find it difficult to stand on my feet, and with this one, not really. It is only the puffy eyes in the morning.

Interviewer: with the first one you mean Rifafour?

Patient: Yes, Rifafour

Interviewer: Okay, how was your take when you started feeling pain?

Patient: How was it?

Interviewer: How was your take? Did you react when you started to feel like your legs are having problems?

Patient: I would go to the clinic and they would say no. These are the side effects of Rifafour. But as the days goes on it would get better. It was an everyday thing until I went on to the Rifafour.

Interviewer: Did you think that these side effects contributed to you not converting in two months?

Patient: No. not really.

Interviewer: Okay were you having any other conditions at the time when you were diagnosed with TB?

Patient: No. I only have asthma.

Interviewer: How were the clinic staff towards you during your TB treatment?

Patient: Oooohh! They are lovely. First, it was [thinking]...Natasha. They were lovely to me. The staff is so lovely. They are friendly they are friends. They were there for me and I always felt comfortable with them because I would ask them anything

Interviewer: What do you mean [laughs] when you say you would ask them anything?

Patient: Uhm! I would not be scared to ask them...you know sometimes you would be scared to ask things because I had this thing and I still could not get an answer. If I have TB next time, I will have AIDS? Can I get it next time? You know, I am comfortable talking to them. That is what I am trying to say.

Interviewer: What do you think can be done to prevent this problem of TB non-conversion in the future?

Patient: Wow! Like I said honestly it is up to you as an individual, because when I did not transition it hurt me as a patient a lot. It hurt me in such a way that I did not blame the sisters. I did not blame the workers. I did not expect the workers to come and give me the tablets daily. I blame

myself in such a way that it was my fault. I was supposed to know that I must take treatment at a certain time. It was my responsibility as the patient.

Interviewer: Mmmh

Patient: To do... [interruption]

Interviewer: Okay

Patient 1: To do what I am supposed to do. It is my responsibility, so I did not blame anyone. Like I said if people do not drink their tablets it is not the sister's problem. It is the responsibility of the patient you know what you are supposed to do.

Interviewer: Okay, thank you very much

ANNEXURE I: TURNITIN REPORT



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FACTORS CONTRIBUTING TO PULMONARY TUBERCULOSIS PATIENTS' NON-
CONVERSION AT CLINICS IN EKURHULENI HEALTH DISTRICT

by

NTWANANO FIONA BALOYI

submitted in accordance with the requirements for
the degree of

MASTER OF PUBLIC HEALTH

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: DR.ZU MANYISA

December 2021

ANNEXURE J: EDITING CERTIFICATE



Unit 3 West Square Business Park
407 West Avenue
Randburg
2194

27 May 2022

TO WHOM IT MAY CONCERN

This serves to confirm that I have proofread the article and have made the necessary corrections and emendations:

FACTORS CONTRIBUTING TO PULMONARY TUBERCULOSIS PATIENTS' NON-CONVERSION AT CLINICS IN EKURHULENI HEALTH DISTRICT

by

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Sincerely
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