

**FACTORS AFFECTING COMPLIANCE TO TUBERCULOSIS TREATMENT
IN ANDARA KAVANGO REGION NAMIBIA**

by

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submitted in part fulfilment of the requirements for

the degree of

MASTER OF PUBLIC HEALTH

at the

UNIVERSITY OF SOUTH AFRICA

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November 2010

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DECLARATION

I declare that **FACTORS AFFECTING COMPLIANCE TO TUBERCULOSIS TREATMENT IN ANDARA KAVANGO REGION NAMIBIA** 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, and that this work has not been submitted before for any other degree at any other institution.

.....

Signature

Kudakwashe Chani

Full names

November 2010

Date

ACKNOWLEDGEMENTS

I am grateful to God for giving me the opportunity to work on this dissertation, and give Him thanks and praise.

I would also like to give thanks to the following persons for their invaluable support and unending encouragement:

- Dr. BL. Dolamo, my supervisor at UNISA, for all she taught me and the timely encouragement when I felt like giving up.
- Fungisisai, my loving wife, Sheunopa and Sarah, my two children for sacrificing the time that I should have spent with them.
- Sr. Angela Bock, the CHS Director for allowing me to conduct the study in one of the hospitals.
- Dr. K. Bunjira, Andara Principal Medical Officer, for allowing me to collect data from his beautiful hospital.
- Mr. D. Mutamangira, Registered Nurse, for assisting me with data collection and interviewing the respondents.
- Ms Emmy-Else Hango for all the support with literature as well as moral support.
- The UNISA Library staff for the literature search.
- Dr. S. Kabamba for the helpful textbooks.
- Mrs. L. Pazvakavambwa, for helping me with the development of the questionnaire, data entry and analysis.
- Ms R. Hendriks for all knowledge imparted to me.
- Mr. Moses Magadza and Dr. Andrew for editing the document.

To you all, my sincere thanks and love and I wish you all the strength in your endeavours; may people show you as much care and help as you have shown me.

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ABSTRACT

The study seeks to identify factors affecting compliance to TB treatment and determine those that make some patients complete TB treatment in Andara district, Kavango region in Namibia. The self-efficacy model by Shorridge-Baggett and Van der Bijl (1996) was the conceptual framework which guided this study. A quantitative, cross-sectional, descriptive and comparative study design was used. Data was collected using a structured questionnaire administered by a registered nurse. A total of 49 respondents were interviewed: (23 compliant and 26 non-compliant). Informed consent was obtained from each respondent prior to data collection. SPSS and *MS Excel* were used to analyse data and describe differences between the two groups. Respondents (N=26) gave 'feeling better' 7 (27%), 'distance' 8 (31%), 'lack of family support' 4 (15%), no food 2 (8%), side effects 2 (8%), other reasons 2 (8%) and medicines not working 1 (4%), as their reasons for not completing treatment. However, long waiting times at the clinic, non availability of food and lack of

knowledge of TB or treatment are the significant factors contributing to non-compliance.

Key Concepts: Affecting, Compliance, Tuberculosis, Defaulter, Self-efficacy.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
CHPA	Chief Health Programme Administrator
CHS	Catholic Health Services
CNR	Case Notification Rate
CPT	Cotrimoxazole Preventive Therapy
DOTS	Directly Observed Treatment Short course
DR-TB	Drug-Resistant Tuberculosis
ETH	Ethambutol
HIV	Human Immunodeficiency Virus
INH	Isoniazid
IPT	Isoniazid Preventive Therapy
IUATLD	International Union against Tuberculosis and Lung Diseases
MDR-TB	Multi-Drug Resistant Tuberculosis
MoHSS	Ministry of Health and Social Services
MTB	Mycobacterium Tuberculosis
NTCP	National Tuberculosis Control Programme
PZA	Pyrazinamide
RIF	Rifampicin
RMT	Regional Management Team
TB	Tuberculosis

TBCTA	Tuberculosis Coalition for Technical Assistance
S	Streptomycin
WHA	World Health Assembly
WHO	World Health Organization
XDR-TB	Extensive Drug Resistance Tuberculosis

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CHAPTER 1.

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium Tuberculosis* (MTB), which is transmitted through the air or by ingesting infected milk or meat (Bovine TB) and it is both preventable and curable (World Health Organization 2006a:5; Caminero 2003:24). People who have pulmonary tuberculosis (TB disease in the lungs) can infect others through droplet infection when they cough, sneeze or talk (World Health Organization 2006a:5). The prevalence of TB among close contacts of infectious patients can be about 2.5 times higher than in the general population (Lemos, Matos, Pedral-Sampaio & Netto, 2004:428). A person who is infected with the Human Immuno-deficiency Virus (HIV) has a 5-10% risk of developing TB each year, and this is higher with more immune-suppression, compared to a 5-10% lifetime risk in those who are HIV negative (Caminero 2003:51; ITECH 2008:28).

The World Health Organization (WHO) estimates that almost 9 million new patients develop TB each year, and that 1.8 million people died from TB globally in 2008 (WHO 2009:5). TB has a huge impact on patients, families and their communities through spending on diagnosis, treatment, transport to and from the health facilities and time lost from work (WHO 2006c:24). However, if TB is detected early and fully treated, people with the disease quickly become non-infectious and are eventually cured (Caminero 2003:33; Rieder 2002:51). The WHO, in its global plan to stop TB,

reports that poor treatment has resulted in evolution of mycobacterium TB strains that do not respond to treatment with standard first line combination of anti-tuberculosis medicines, resulting in the emergence of multi-drug resistance tuberculosis (MDR-TB) in almost every country of the world (WHO 2006c:24). According to Laserson and Wells (2007:378), Multi-Drug Resistant and Extensive Drug Resistant Tuberculosis (MDR-TB and XDR-TB, respectively), Human Immunodeficiency Virus (HIV) associated TB, and weak health systems are the major challenges to TB control globally.

One of the greatest dilemmas and challenges facing most TB programmes is that of patients who do not complete their TB treatment for one reason or another (Rieder 2002:84; WHO 2008a:6). Such patients are not only at risk of relapsing, but they may develop resistance to one or more of the potent first line TB medicines, such as Isoniazid (INH), Rifampicin (RIF), Pyrazinamide (PZA), Ethambutol (ETH) and Streptomycin (S) (Caminero 2003:204; Namibia 2006:70; Rieder 2002:85). Resistance to both INH and RIF is defined as multi-drug resistance TB (MDR-TB) and extensively as drug-resistance (XDR-TB), as resistance to INH and RIF plus a Fluoroquinolone and one of the second line injectable drugs, namely; Capreomycin, Kanamycin or Amikacin (Namibia 2006:44; WHO 2008b: 20).

1.2 BACKGROUND TO THE PROBLEM

The WHO global plan to stop TB strives to halt and reverse its incidence by 2015 and halve the 1990 prevalence and death rates by 2015 (WHO 2006c:24). While these goals may appear ambitious they can be achieved through good TB programmes that ensure early case detection and treatment, by putting all patients

on treatment and by ensuring they complete it (WHO 2006c:24). Namibia, with 717 incidences per 100,000 in 2006, had one of the highest TB rates in the world, ranked second only to Swaziland (Namibia 2008c:8). According to records (Namibia 2008c:7), the Case Notification Rate (CNR), which is defined as the number of TB patients notified per 100,000 population during a particular period (Namibia 2006:198), was 722 per 100,000 population, that is a total of 15,244 TB patients diagnosed and reported. Of these, 5,114 were new sputum smear positive patients and 1,433 smear positive retreatment patients. Kavango region had a CNR of 615/100,000 population (Namibia 2008c:7).

The TB epidemic in Namibia is thought to be due to a multitude of factors that include poor housing, HIV infection, alcoholism, poor nutrition and poor access to high quality health services (Namibia 2006:1). Poverty has been cited as one of the main causes of this TB epidemic as it is associated with overcrowding and poor ventilation, enhancing high transmission (Namibia 2006:1). The increase has also been attributed to the HIV epidemic, of which there is a prevalence of 17.8% among antenatal clinic attendees (Namibia 2008b:11).

According to records (Namibia, 2007:7), the treatment success rate in 2006 was far below the WHO target of 85%, reaching only 76%, with the remainder comprising defaulters (8%), transfers (6%), deaths (7%) and failures (3%). Reduction of the high death and defaulter rates due to TB, coupled with improved reporting of treatment outcomes for patients transferred to other sites, will significantly improve the treatment success rates. Even though the defaulter rate is still high at 8%, there has been an improvement since 2004, when it was 13% (Namibia 2008c:9). On the other

hand, a high defaulter rate of 12% in 2007 was the most significant contributor to the low treatment success rates in Andara (Catholic Health Services 2008:34).

Compliance to TB treatment continues to be one of the major obstacles that TB control programmes worldwide have to deal with, especially in developing countries (Tessema, Muche, Bekele, Reissig, Emmrich & Sack 2009:2). Thus, understanding the factors affecting compliance to tuberculosis treatment in Andara district of Kavango region in Namibia could help address issues to improve patient compliance to treatment and improve health outcomes. Non-compliance can result in acquired drug resistance, which requires a prolonged period of treatment with more expensive medicines than treatment for drug-susceptible TB (Caminero 2008:869; Chiang, Denn & Caminero 2006:827; Singh, Upshur & Padayatchi 2007:20). Treatment with second line medicines is likely to be less successful than treatment with first line drugs, mainly because the second line medicines are less potent and more toxic, with a longer treatment period that makes it more difficult for patients to complete it (Dye 2009:85; WHO 2008b:3). The reported outbreak of XDR-TB in KwaZulu-Natal in the Republic of South Africa in 2007 raised fears of a larger epidemic to come (Singh et al. 2007:19).

According to Caminero (2003:241), the main objective of TB programmes in all countries is to interrupt the chain of transmission by acting on the human reservoir of TB bacilli. The correct management of patients with TB is therefore crucial, since most patients come for TB treatment with treatable or drug-susceptible mycobacterium and only develop resistance after the health worker has introduced TB medicines which may be in incorrect doses, taken incorrectly or for an insufficient

duration. This study thus aims to explore the factors affecting compliance to TB treatment in Andara district of Kavango region in Namibia.

1.3 PROBLEM STATEMENT

In many countries globally, the adoption of Directly Observed Treatment (DOT) has been associated with reduced rate of treatment failure, relapse and drug resistance. However, its impact in reducing TB incidence has been limited by non-compliance to DOT, which occurs when patients do not turn up for treatment at the health facility or community DOT point (Tessema et al 2009:5). In countries where DOT has had little impact on TB control, poor or non-compliance to self-administered TB treatment is common and has been identified as an important cause of failure of initial treatment, leading to relapse (Sanou, Dembele, Theobald & Marcq 2004:1479; Shargie & Lindtjorn 2007:285).

High defaulter rates observed and documented in Namibia, including Andara district (Namibia 2008c:7) are of concern, especially when it is known that defaulters are a harbinger for drug-resistant TB (DR-TB) (WHO 2008b:3). While few studies on the factors associated with poor compliance and defaulting have been carried out globally and in Sub-Saharan Africa (Baussano, Pivetta, Vizzini, Abbona & Bugiani 2008:1441; Crampin, Glynn, Fine 2009:153; O'Boyle, Power, Ibrahim & Watson 2002:307), there are no published studies of Andara or Namibia as a whole. Therefore, without knowledge of factors associated with defaulting and poor compliance in this district, it will be difficult to address the situation.

1.4 AIMS AND OBJECTIVES OF THE STUDY

The study is conducted with the following aim:

To identify factors affecting compliance to TB treatment in Andara and to make recommendations, according to the findings, on how TB treatment compliance can be improved.

The specific objectives are:

- To identify factors affecting compliance to TB treatment in Andara district Kavango region Namibia.
- To determine factors that contributes to some patients completing TB treatment.
- To recommend to Andara Health authority measures to improve TB treatment compliance.

1.5 SIGNIFICANCE OF THE STUDY

Identifying the factors affecting compliance to TB treatment in Andara district Kavango region Namibia will give insights into the reasons behind high defaulter and subsequently low treatment success rates. This will not only contribute to the existing body of knowledge on factors associated with poor TB treatment adherence in general, but will also bring new knowledge specifically for Andara. Once the factors are identified then targeted strategies to address them can be formulated. The study will benefit the TB patients (current and future) as findings may be used to formulate strategies to improve the quality of care.

The Ministry of Health and Social Services in Namibia will also benefit as the findings of the study can be used as a basis for further generalisable studies. In addition, recommendations could then be made to the National TB Control Programme (NTCP) on how TB treatment compliance could be improved in Kavango and subsequently improve TB control in this area.

1.6 DEFINITION OF KEY CONCEPTS

Particular interpretations of the following concepts will be used to guide the study:

Affecting - making a difference or contributing to something (Oxford University Press 2006:21), in the case of this study to patients taking or not taking their TB treatment.

Compliance - the extent to which patients' behaviour coincides with medical advice on how to take tuberculosis treatment (Pandit & Chaudhary 2006:241).

Tuberculosis - a disease caused by mycobacterium tuberculi infection (Caminero 2003:24).

A "**Defaulter**" in this study is a patient who interrupts TB treatment for at least two months after taking the medications for at least four weeks continuously (Namibia 2006:44).

1.7 THE FOUNDATION OF STUDY

This study will be guided by the self-efficacy model as the theoretical foundation. A brief discussion is given here, with a more detailed one in the next chapter.

The Self- Efficacy model by Shortridge-Baggett and Van der Bijl (1996) will guide this study. Self-efficacy is a person's belief about his/her ability and confidence in performing at a certain level to achieve goals even under difficult circumstances (Bandura 1986:391; Ormrod 2006:367). Thus, self-efficacy is a person's perception of his/her ability to achieve certain goals or outcomes. The basis of this model is Albert Bandura's social cognitive theory, namely assumptions that can determine whether health behaviour change will be started, how much effort one will put in and for how long one can sustain it when facing hindrances and potential failures. The four sources affecting self-efficacy, according to Bandura (1977, in Lenz and Shortridge-Baggett 2002:11) are:

- Performance accomplishments where practice and success create confidence and thus improve self-efficacy. Failure during the early learning process decreases self-efficacy.
- Vicarious experience through observing others who become role models. Usually, the observed person has to be perceived as being at a similar level of performance.
- Verbal persuasion is commonly used by healthcare workers when they try to convince patients to take certain treatments. The credibility or perceived credibility of the person doing the persuasion is important, and is usually derived from expertise and trustworthiness. If the person is convinced of their capabilities they will be more motivated to persevere and less likely to give up easily.

- Self-evaluation of a person's capabilities to perform a given task or behaviour required to achieve particular goals.

Practicing new behaviours through observation and modelling are important components of this theory. Therefore, the TB patient's self-efficacy is likely to increase when he or she perceives that the TB medicine actually works and a cure is possible. If the patient knows of someone, with whom he or she identifies, who has been cured of TB, the self-efficacy can be enhanced. The healthcare workers play a very important role because of their knowledge of TB, and they could encourage the patients to finish their treatments. This model will be discussed further in Chapter 2.

1.8 RESEARCH DESIGN AND METHODOLOGY

Methodology refers to the research design, population and sample, the instrument, research assistant and data analysis.

1.8.1 Research design

A quantitative, cross-sectional, descriptive and comparative study of TB patients who started TB treatment between April 2008 and March 2009 in Andara District was conducted.

1.8.2 Study population and sampling

The study population and sampling will be covered in this sub-section.

1.8.2.1 Population

A target population is the full set of individuals who could be included in the study and around which the researcher would like to generalize the findings (Burns &

Grove 2005:342). The target population consists of all TB patients (Pulmonary and Extra-Pulmonary), adults and children, new and re-treated, defaulted and whose treatment is completed, and all those transferred in and out.

1.8.2.2 Sampling

Sampling is the process of selecting individuals from a population who will be studied (Burns & Grove 2005:341).

The **Sampling frame** is the full list of members of a population from which the study participants are selected (De Vos, Strydom, Fouche & Delport 2007:194). In this study, the sampling frame consisted of all the registered TB patients during the period of the proposed study. The District TB register, which records the patient's name, registration number, date of starting and completion of treatment or outcome, HIV status, demographic details and address and classification or diagnosis, was the sampling frame. The researcher listed all the TB patients registered during the period of the proposed study according to the TB register, and thus established the exact number (sampling frame). The TB registration numbers were used to draw up a simple random sample of those patients who completed TB treatment, while the list of patients who defaulted, their TB registration numbers, names, addresses, and HIV status was also extracted from the register. The names and addresses were useful to follow up the patients in their homes as well as in TB clinics for those who were still receiving TB treatment as retreatment or DR-TB.

The sampling frame for this study consisted of 212 TB patients registered and who had started treatment during the period 01/04/2008 to 31/03/2009 in Andara District. All 26 TB treatment defaulters were included in the study and 30 patients who

completed TB treatment were chosen by use of a simple random sampling technique. Thus, a total of 56 patients were included in the study, representing at least 20% of the sampling frame.

1.8.3 The instrument

A structured questionnaire is a list of predetermined questions for which respondents are asked to make choices among fixed response categories. The administration of the instrument is standardized as far as possible, including a predetermined sequence of asking the questions (Joubert, Katzenellenbourg, Ehrlich & Karim 2008:107; Stommel & Wills 2004:245). These were used to capture data from individuals and were administered by a trained investigator, that is a Registered Nurse (RN) with the knowledge of the geography of the district and fluent in the local languages.

1.8.4 Data collection

Data collection is the gathering of necessary information needed to address a research problem and answer research questions (Polit, Becker & Hungler 2001:460). Once the sample was established, the RN then identified the selected patients in the TB clinics and in their homes and informed consent was obtained from them prior to administering the questionnaire. In order to minimize bias, this RN had never worked in Andara TB clinic. The questionnaire was first pilot tested in a TB clinic in Nyangana district hospital, which is in the same region as Andara, after which minor changes were made to it.

1.8.5 Data analysis

A statistician was consulted for the research design, development of the questionnaire, data collection, capturing and analysis. Statistical analysis was conducted using Statistical Package for the Social Sciences (SPSS) and *MS Excel* in order to describe the data and identify any significant differences between the two groups. Descriptive summary statistics and graphical summaries in charts (pie, bar, line, cross-tabulations) are presented. Chi-square tests of association were conducted to assess dependence relationships among potential factors.

1.9 ETHICAL CONSIDERATIONS

Prior to conducting the study, permission was obtained from the Academic Ethics Committee of UNISA, the Research and Ethics committee of the Ministry of Health and Social Services of Namibia and the Catholic Health Services management.

Written consent was sought from each study participant after prospective participants had been fully informed on how the study would be carried out and how the collected data would be handled to ensure confidentiality and privacy. Each prospective participant had a right to refuse to participate without negative consequences. They were reassured that no treatment due would be withheld from them if they were to refuse to participate in the study.

The nurse's permission to administer the questionnaire and collect data was sought prior to conducting the study. The nurse collected data during his off duty days and a stipend was paid to him as mutually agreed. Permission to collect data from the hospital was sought from the Catholic Health Services Director of Health.

1.10 LIMITATIONS OF STUDY

Limitations are weaknesses or challenges in a study that may compromise the findings to be generalized to other settings (Burns & Grove 2005:40). The following limitations to the study were envisaged.

The cross-sectional design of the study has inherent limitations in that causality cannot be established, rather only associations. The study was only carried out in one district; therefore it will not be easy to generalize to other areas.

1.11 SUMMARY

This chapter provided an introduction and background to the problem, as well as the research purpose and objectives, significance and foundation of the study and a brief section on the research design and methodology. The next chapter will provide a detailed literature review.

CHAPTER 2.

LITERATURE REVIEW

2.1 INTRODUCTION

in keeping with the aim of this study, namely to identify factors associated with poor compliance to TB treatment in the Andara district of Kavango and to make recommendations on how TB treatment compliance can be improved, this chapter reviews relevant literature from previous studies on factors associated with or contributing to TB treatment compliance or non-compliance. The scope of this literature review, therefore, is to synthesize evidence from textbooks, published research, scientific reports and other credible sources of scientific work done globally, mainly on TB treatment compliance issues.

2.2 PURPOSE OF THE LITERATURE REVIEW

A literature review is an organised and systematic presentation of what has already been studied and published on a particular subject, with the purpose of informing the researcher on what is already known about that subject (Burns & Grove 2005:93) and avoid unnecessary replication which wastes resources. Several sources were consulted, including Medical and Research textbooks, the latest relevant journals, WHO publications, District Health quarterly and annual reports, the internet and several Ministry of Health and Social Services (MoHSS) publications.

2.3 CONCEPTUAL FRAMEWORK

The Self-efficacy model (figure 2.1) by Shortridge-Baggett and Van der Bijl (1996:9) is the foundation of this study. Self-efficacy, according to Ormrod (2006:367) is the belief that one is capable of performing at a certain level to achieve certain goals, and is defined by Lenz and Shortridge-Baggett (2002:9) as “peoples’ judgments of their capabilities to organise and execute courses of action required to attain designated types of performances... it is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses”. It is a person’s perception of their ability to achieve certain goals or outcomes.

The basis of this model is Albert Bandura’s social cognitive theory, which recognises that a person’s behaviour, characteristics and environment interact such that change in one component has implications for the others (Bandura 1986:391). According to Lenz and Shortridge-Baggett (2002:6), there is increasing evidence that self-efficacy influences the possibility of an individual to change behaviour. The self-efficacy model is a set of assumptions that can determine whether health behaviour change will be started and how much effort one will put in and for how long they can sustain such efforts in the face of hindrances and potential failures.

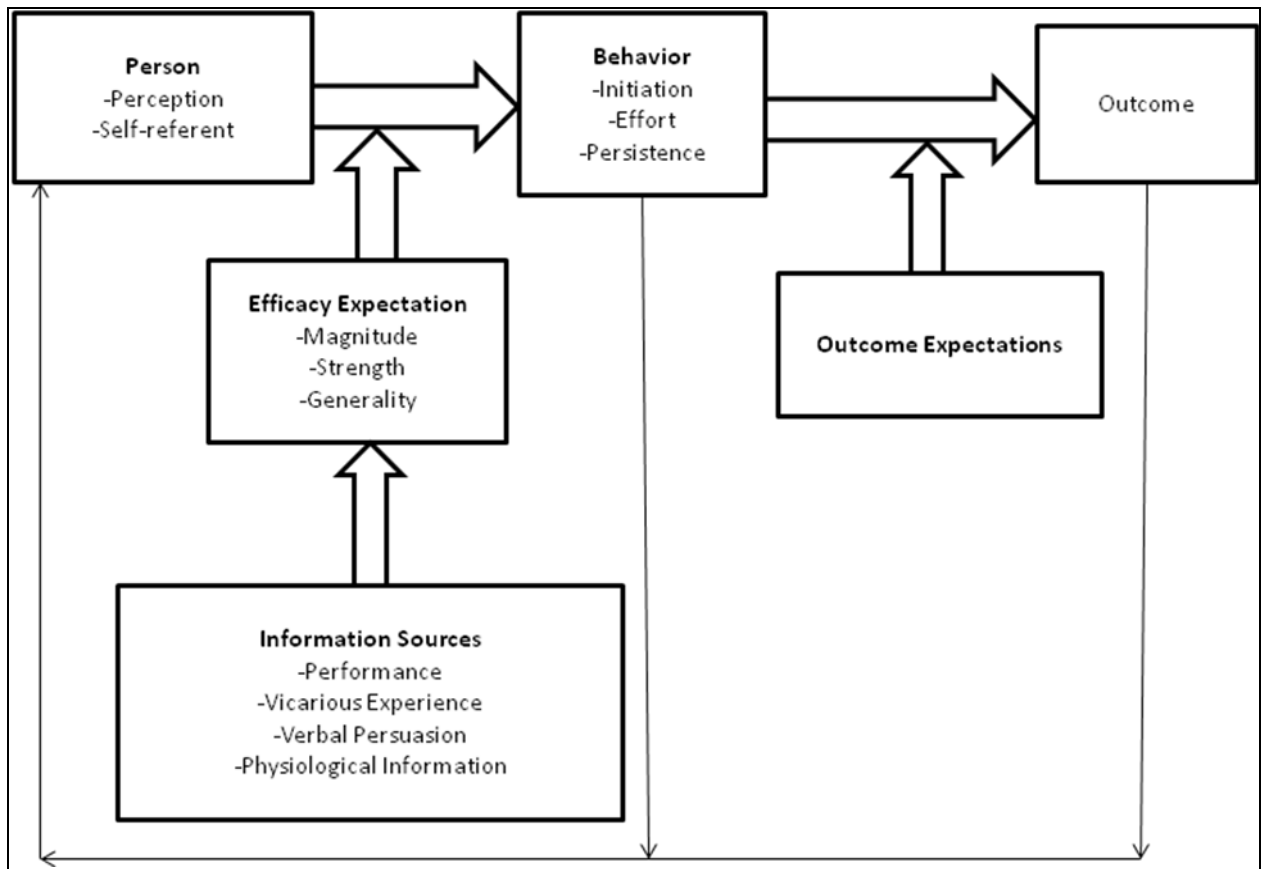


Figure 2.1: Theory and measurement of self-efficacy construct (Adapted from Shortridge-Baggett & Van Der Bijl 1996)

The following concepts under this model will be discussed:

2.3.1 Person

The *Concise Oxford English Dictionary* (2006:1069) defines a 'person' as "a human being regarded as an individual characterized by a preference or liking for a specified thing". A "person" in this model is an individual human being and in this study includes the patient who received TB treatment, whether or not completing it, and the healthcare worker or community or family member who assists the patient to take the medicines.

The person's perception is his/her belief that s/he can perform specific behaviour necessary to achieve the goals to improve the health outcomes (Lenz et al 2002:3). In this study, perception is the individual patient's belief or conviction that s/he can comply with the treatment in order to be cured of TB.

Self-referent in the model makes reference to the person as the originator or creator of the confidence that he or she can perform the necessary tasks required to achieve his or her goals. In the study, the TB patient must have an internal conviction that s/he has to be responsible for managing the health condition (TB) in order to achieve better health outcomes.

2.3.2 Behaviour

'Behaviour' is the way an individual conducts himself or herself, or responds to a situation or stimulus (Oxford University Press 2006:122). "Behaviour" in this model refers to what people do or do not do consciously or unconsciously and it is not something done to them (Shortridge-Baggett & van der Bijl 1996:3). In this study, "behaviour" is used to denote what the TB patients do or refrain from doing to comply or not to comply with treatment.

Lenz and Shortridge-Baggett (2002:16) refer to Bandura's claim (1997) that the behaviour adopted depends on three perspectives of people's understanding: their perceptions of the level of risk, followed by an expectation that the behaviour will reduce the risk and their own expectation of what they can achieve by the change of behaviour. The three perceptions work in combination to effect behaviour intention and influence adoption of behaviour from initiation through to sustaining the behaviour. Initiation is the process or action of starting or introducing something

(Oxford University Press 2006:731). In this study, initiation refers to the patient's motivation to start TB treatment correctly.

Effort is the determination and vigorous attempt (including both physical and mental exertion) to maintain the behaviour initiated in order to achieve the desired goals.

'Persistence', according to the Oxford University Press (2006:1069), refers to steadfastness or an act of firmly continuing on a course of action in spite of difficulties or opposition. In the study, persistence is the patient's determination and continuous effort to adhere to or comply with TB treatment until completion. The patient must be convinced that by steadfastly following instructions and complying with the treatment they will be cured of the TB. In other words, the patient must have strong beliefs in the effectiveness of the TB regimen in curing TB disease (outcome expectations).

2.3.3 Outcome

An 'outcome' in this model refers to a judgment of the likely or possible consequences that a person's behaviour and performance will produce (Lenz & Shortridge-Baggett 2002:10). In this study an outcome is the end result of compliance or non-compliance to TB treatment.

Expectations are strong beliefs that something will happen or be the case (Oxford University Press 2006:501). In the model, expectations or outcome-expectations are beliefs the person has that certain behaviour will result in particular outcomes (Lenz & Shortridge-Baggett 2002:10). People are likely to exert themselves more in such modes of behaviour that they believe will yield certain desired outcomes.

According to Bandura (1997, as cited by Lenz and Shortridge-Baggett 2002:18), how a person behaves mostly determines the outcomes s/he will eventually experience or realize. Similarly, the outcomes people expect largely depend on their judgments of how well they are going to perform in a given situation. Therefore, outcomes are a result of actions.

2.3.4 Efficacy

In this model 'efficacy' denotes the capacity or mastery to produce a desired effect (Lenz & Shortridge-Baggett 2002:10). This study will look at efficacy as the capacity of the patient to comply with taking TB treatment and the behaviour expected thereof. According to Lenz and Shortridge-Baggett (2002:10), 'efficacy expectation' refers to a person's belief or confidence that he or she is or perceives that s/he is capable of performing the required behaviour. Self-efficacy is very situational and task-related (van der Bijl, Poelgeest-Eeltink & Shortridge-Baggett 1999:358). An expression of personal efficacy is an assertion of confidence in one's capability to manage the difficulties inherent in a specified level of behavioural change (Maibach & Murphy 1995:37). The judgment about a specified task or behaviour is based on past experiences, successes and failures, and will vary according to how the following three factors interact: magnitude, strength and generality of the efficacy belief. Lenz and Shortridge-Baggett (2002:16) further define 'magnitude' as consideration of the level of difficulty of the task and the extent to which the person will have to exert him/herself to behave in a certain way. 'Strength' is defined as the conviction the person has that the task can be performed and that he/she has the physical or mental power and ability to perform it.

'Generality' relates to how experiences of self-efficacy can either be specific to one task in one situation or generalisable to new or other challenging situations (Shortridge-Baggett et al 1996:9). Once a person has high self-efficacy, usually from repeated successes, he/she tends to generalize that they are able to perform the next task which might be very different from the former (Lenz et al 2002:11). Therefore, behavioural, cognitive and social skills must be integrated for a person to perform a specified task. Lenz et al (2002:12), assert that while people who have high levels of self-efficacy are more persistent when faced with difficulties than those with lower levels, they also suffer from other negative factors such as stress and anxiety. The difference between the two groups is that those with high self-efficacy are able to mediate the relationship between stress and anxiety or any adverse situation (Bandura 1991:229). They have fewer self-doubts and will recover quickly after an adverse event.

Efficacy expectation refers to a person's confidence in their capability to behave in a certain way, and people are motivated to perform tasks they believe will produce desired outcomes or results. Outcome expectations depend on efficacy expectations and thus the latter predict performance much better than the former (Bandura 1986:391).

2.3.5 Information Sources

According to Lenz et al (2002:10), self-efficacy is influenced by four sources of information, namely performance accomplishments, vicarious experience, verbal persuasion, and physiological information. These all influence a person's self-efficacy in different situations and affect expectations about the magnitude and

strength of one's self-efficacy (Shortridge-Baggett et al 1996:11). The four information sources are elaborated upon as follows:

2.3.5.1 Performance accomplishments

Performance accomplishments involve practicing and experiencing success in achieving goals and are a composite of prior experiences in carrying out the task (Lenz et al 2002:11). Successful achievements will enhance self-efficacy about ability to perform a particular task and generalize to other tasks, while frequent failure, especially if it occurs early in the learning process, decreases self-efficacy (Shortridge-Baggett 2001:183). Successful direct performance of a task results in higher self-efficacy belief than vicarious experience or any other source; therefore performance accomplishments are the most effective in developing one's perception of self-efficacy (Shortridge-Baggett et al 1996:14).

2.3.5.2 Vicarious experience

Vicarious experience occurs when a person gets experience through observing others (who become role models) performing tasks and thus enables judgments to be made based on those observations. Usually, the observed person has to be perceived to be at a similar level of performance and the greater the perceived similarity to oneself the greater the impact of the modelled success or failure. Vicarious learning should be able to convince the observer that the barrier can be overcome and a clear outcome is necessary to convince them that if others can do it, they can do it too (Shortridge-Baggett 2001:183).

2.3.5.3 Verbal persuasion

Verbal persuasion is commonly used by healthcare workers when they try to convince patients to take certain treatments. The credibility or perceived credibility of the person doing the persuasion is important. The credibility is usually derived from expertise and trustworthiness. If the person is convinced of their capabilities they will be more motivated to persevere and not give up easily. However, the weakness of verbal persuasion lies in its not being related to one's own experience or others, but when used in conjunction with other sources it can be effective. It can also be useful when people have reverted to old behaviours after succeeding in new tasks (Shortridge-Baggett et al 1996:14).

2.3.5.4 Physiological information

Self-evaluation of the physiological and emotional effects of sources, particularly when it happens in the early learning phase, provides feedback to the person on how well they are performing the task (Shortridge-Baggett et al 1996:14). People use information about their physiological and emotional status to judge their own capabilities. Emotions such as stress, anxiety and depression may negatively influence self-efficacy, especially for those with low levels of it (Lenz et al 2002:12).

2.4 TUBERCULOSIS AND RELATED CONDITIONS

According to WHO (1999:14), overcrowding, living in poorly ventilated dwellings and being in close contact with an infected individual are some of the risk factors to acquiring TB infection. When one is infected, poor nutrition and immune-suppression predispose an individual to developing active TB disease (WHO 1999:15).

2.4.1 Tuberculosis and HIV

In Namibia, about 59% of all TB patients are HIV positive (Namibia 2008c:16). Caminero (2003:69) recommends that the diagnosis of PTB should be based on the clinical presentation with confirmation by sputum smear microscopy and/or culture. The author further recommends that diagnosis of TB should always include performance of microbiological investigations for confirmation. Making an accurate diagnosis of TB is important as complying with TB medication is a heavy burden for the patient and the family in terms of cost, potential side effects, and stigma. A wrong diagnosis may delay appropriate treatment for the patient and be fatal (Namibia 2006:17). Therefore, greater efforts should be made to ensure early and correct diagnosis, initiation of correct treatment and compliance to treatment to increase the chances of cure or treatment success (Bonilla Crossa, Jave, Mitnick, Jamanca, Henera, Asencios, Mendoza, Bayona, Zignol & Jaramillo 2008: 2957).

2.4.2 Drug resistance tuberculosis

The emergence of DR-TB presents significant challenges to global TB control with an increase in incident cases reaching 489,000 MDR-TB cases by 2006, representing a 65% increase since 2000 (WHO 2008c:13). Research has shown that failure to adhere to principles of TB control causes the development of almost all the DR-TB, and poor or non-compliance to TB treatment is the main predisposing factor for an individual to develop DR-TB. This leads to treatment failure and subsequently may lead to death and further spread of DR-TB (Bonilla et al 2008: 2957; Laloo 2010: 255; Namibia 2006:70).

Given that current treatment success for MDR-TB is about 60%, focus should be on preventing emergence of new DR-TB cases by ensuring proper management of drug-susceptible cases (Orenstein, Basu, Shah, Andrews, Friedland, Gandhi & Moll 2009:153). According to Gandhi, Moll, Sturm, Pawnski, Govender, Lalloo, Zeller, Andrews & Friedland (2006:1575) and Lalloo (2010:258), being infected with HIV is clearly a risk factor for developing DR-TB, most likely due to intermittent TB treatment and poor absorption of anti-TB drugs. The outbreak of XDR-TB in KwaZulu-Natal Tugela Ferry region led saw a 98% mortality rate among HIV-positive patients (Gandhi et al 2010:80).

2.5 FACTORS AFFECTING TUBERCULOSIS TREATMENT COMPLIANCE

Previous studies relating to the factors affecting TB treatment compliance have identified the following factors which will be addressed.

2.5.1 Barriers to tuberculosis treatment compliance

A barrier is a stumbling block or an obstruction in achieving what one wants to achieve. Previous researchers have identified the factors as stated below to be barriers to TB treatment compliance.

2.5.1.1 Patient literacy or educational level

Several studies have tried to look at the relationship of the patient's educational level to their health status, seen as important to gain a better understanding of the causes associated with adverse health outcomes, identifying patients at risk of such adverse outcomes and subsequently developing appropriate interventions (DeWalt, Berkman, Sheridan, Lohr & Pigone 2004:1236).

A study carried out in Thailand aimed at determining the patient factors predicting successful treatment. Out of 1,241 patients studied, 81% with higher educational levels and knowledge of tuberculosis were successfully treated, the argument being that these factors are associated with better compliance to TB treatment and subsequently treatment success (Okanurak, Kitayaporn & Akarasewi 2008:1162). Several other studies have demonstrated educational levels of TB patients as significant predictors of treatment compliance (Balasubramanian, Garg, & Santha 2004:352; Date & Okita 2005:680; Johansson, Long, Diwan & Winkvist 1999:868; Mishra, Hansen, Sabroe, & Kafle 2005:1134). Meanwhile, a Malaysian study demonstrated that, among other factors, non-compliance was associated with completed secondary education (O'Boyle et al 2002: 307). Conversely, a study in Ndola (Zambia), found that age, marital status, and educational levels were not significantly associated with compliance (Kaona, Tuba, Siziya & Sikaona 2004: 68).

2.5.1.2 Alcohol and substance abuse

Alcohol and substance abuse have often been cited as reasons for poor compliance to medication in general. The altered behaviour under the influence of alcohol and other substances is believed to be the reason for such observations. When one is under the influence of alcohol one is likely to forget to take the medicines, and if even if not the chances of developing side effects that may subsequently lead to poor compliance are high (Sansone & Sansone 2008:43). According to a study in Tomsk (Russia), the authors identified substance abuse as a barrier to TB treatment and care as it leads to non-compliance, default and acquisition of MDR-TB

(Gelmanova et al 2007:649), while in Uzbekistan, alcoholism and homelessness were associated with TB treatment default (Hasker et al 2008:97).

Sansone and Sansone (2008:45) assert that physicians and other healthcare workers treating patients need to be wary of the potential impact on treatment compliance of alcohol and substance use. In other words, they should always explore alcohol and substance use in all their patients and any indications of such behaviour would enable the physician to focus their treatment literacy on such patients.

Fry, Khoshnood, Vdovichenko, Granskaya, Sazhin, Shpakovskaya, Zhemkov, Zhemkova, Rowhani-Rahbar, Funk & Kozlov (2007:1027), insist that DOTS programmes are more likely to achieve better TB control outcomes if they include interventions aimed at improving diagnosis of alcohol and substance abuse and treating it concurrently with TB. In Namibia, alcohol use has been identified as a major reason for poor adherence to treatment, with adults drinking an average of 2.39 litres of alcohol per capita (Namibia 2009:10).

2.5.1.3 Knowledge of TB disease and treatment (treatment literacy)

Treatment literacy refers to providing accurate information about the science behind the disease and treatment so that the patients can be more responsible for their own care and be able to demand their rights when proper care is not provided (DeWalt et al 2004:1236). According to Smart (2010:1), knowledge and attitudes about TB and its treatment vary widely due to different cultural, religious or traditional beliefs, and access to education and information about the disease. Smart (2010:1), further states that patients' lack of knowledge of TB symptoms or failure to recognize them

results in delays in seeking healthcare. Denial may be high due to stigmatization amongst misinformed communities. The above become barriers to early diagnosis and treatment, resulting in increased risk of transmitting TB to other close contacts and the general community, as well as poor health outcomes for people with the disease (Afari-Twunamasi 2005:25).

According to DeWalt et al (2004:1238), lack of treatment literacy is associated with poor health outcomes and conversely treatment literacy improves health outcomes and compliance. In Botswana, research found that compliance to treatment was related to the availability of information, material and emotional support from family members (Kgatlwane Ogyeni, Ekezie, Madaki, Moyo & Moroko 2005:6).

Several studies in India, Indonesia, Russia, (Woith, Volchenkov & Larson 2009:1), Kenya, Tanzania, (Wandwalo & Morkve 2000:1041) and South Africa (Afari-Twunamasi 2005:23), have shown that knowledge of TB is generally low in many settings, even among healthcare workers. The study in India (Singla, Sharma & Jain 1998:1005) surveyed 200 nurses and found that only 40% of TB nurses and 10% of general hospital nurses had a satisfactory knowledge of TB, and only 56% of general nurses knew that TB was caused by mycobacterium TB. About 36% thought TB was caused by a virus, while in the Indonesian study only 40% of nurses knew its cause (Wahyuni, Budiono, Rahariyani, Sulistyowati, Rachmawati, Djuwari, Yuliwati & van der Werf 2007:135), In Kenya, Ayaya, Sitienei, Rotich and Odero (2003:83) showed that most private medical practitioners were unaware of the correct methods of diagnosing TB and most used treatment regimens not recommended by the National TB Programme (NTP).

Since most people with TB and their families get to know about TB from their healthcare providers, such poor knowledge of it among the providers will translate to lower knowledge among the patients themselves (Afari-Twunamasi 2005:25).

2.5.1.4 Feeling better

Often, when patients commence treatment they will be very sick and may be inactive. However, as the treatment progresses and their condition improves, and symptoms start to regress, the improvement in itself may become a barrier to continuation of treatment. The patient might not see the need to continue with treatment when they are feeling better or well (Williams, Alarcon, Jittimane, Walusimbi, Sebek, Berga & Villa 2008:731-35). In a Nepal cross-sectional study of 130 compliant and 25 non-compliant TB patients, 48% of the latter were more likely to think that they could stop TB treatment once they were free of symptoms and feeling well, because they thought they were cured (Bam, Chand & Shrestha 2005:51).

Studies in Malaysia and Zambia showed that non-compliance was associated with being free of symptoms (O'Boyle et al 2002:307; Kaona et al 2004:68). Patient's defaulting behaviour occurs when the TB symptoms disappear and they feel well, usually after a few months of TB treatment (Pushpanathan, Walley & Wright 2000:216; Peltzer, Onya, Seoka, Tladi & Malima 2002:55).

Therefore, according to Bam et al (2005:56), the authors conclude that compliance to TB treatment could be improved by providing more information about TB to the patients. Compliance to TB treatment can, therefore, be improved by promoting TB treatment literacy among those with the disease, their families and communities,

through empowering the healthcare provider with knowledge of TB (Ndimande 2009:239).

2.5.2 Socio-economic factors

Socio economic factors will cover employment status and socio-economic status, and cost of transport.

2.5.2.1 Employment and socio economic status

Differences exist as to whether employment and socio-economic status are contributory factors to patient TB treatment compliance (Pandit et al 2006:242). For some researchers, being employed may be associated with better socio-economic status, which enables one to afford cost of transport and healthcare fees, increasing the chances of treatment compliance (Okanurak et al 2008:1160; Tissera 2003:7; Hasker et al 2008:97). However, a study in India did not find socio-economic status to be significantly associated with TB treatment compliance (Pandit et al 2006:242). This study is located in one of the poorest regions of Namibia (Nambia 2008a:22) and therefore it will be important to find out if socio-economic status has or has not any effect on TB treatment compliance.

2.5.2.2 Cost of transport

Studies in Nepal (Bam & Gunneberg 2006:275), Uzbekistan (Hasker et al 2008:97), Malaysia (O'Boyle,, Power, Ibrahim & Watson 2002:307), Swaziland (Pushpanathan, Walley & Wright 2000:218), and Zambia (Needham & Godfrey-Faussett 1998:811) indicated that cost of transport accounts for non-compliance to TB treatment, especially once the patient feels better.

In the Malaysian study, cost and time of travelling to the treatment centre were major contributory factors associated with compliance to treatment, as non-compliant patients paid significantly more for transport than those compliant (O'Boyle et al 2002: 310).

A prospective cohort study in Southern Ethiopia to determine factors predicting treatment adherence among smear positive pulmonary tuberculosis patients found that among 404 TB patients on treatment, 20% defaulted treatment. In addition, 91% of all treatment interruptions occurred in the continuation phase, when the patient felt better and had higher cost of transport to a treatment facility (Shargie et al 2007:285).

2.5.3 Health system factors

Health system factors include correlation between patient and programme needs, structural factors and staff knowledge and attitudes.

2.5.3.1 Correlation between patient and programme needs

In-depth interviews during a study in India, to “assess the needs and perspectives of patients and providers in two chest clinics in Delhi”, showed that reasons for default are linked to poor correlation between patient and programme needs or priorities, and to particular characteristics of disease and its treatment. Some of the patient needs that are still to be met by health systems are convenient clinic timings, arrangements for provision of treatment in family emergencies, and provision for complicated cases such as alcoholics (Jaiswal, Singh, Ogden, Porter, Sharma, Sarin, Arora & Jain 2003:625). In a study in Nepal inconvenient opening times for TB

clinics situated far from patients' homes accounted for defaulting in 28% of non-compliant TB patients (Bam et al 2005:54). Both studies recommended flexible clinic opening times to accommodate patients staying at a distance, so as to improve compliance to treatment.

2.5.3.2 Structural

A systematic review of qualitative research on patient adherence to TB treatment, identified the barriers to completing TB treatment as structural (including poverty and gender discrimination), social, health service-related and personal (Munro, Lewin, Smith, Engel, Fretheim, & Volmink 2007: 238).

2.5.3.3 Staff knowledge and attitudes

A number of studies have shown the importance of the relationship between healthcare workers and the patients as contributing to treatment compliance or non-compliance. Bam et al (2005:55), in a study conducted in Nepal, found that the quality of the healthcare provider and patient interaction and relationship contributed to differences in treatment adherence. Similarly, a South African study (Peltzer, Onya, Seoka, Tladi & Malima 2002:67) established that the quality of healthcare provider and patient communication, coupled with correct causative belief, were associated with TB treatment compliance.

Jaiswal et al (2003:625) demonstrated in a study in India that problems facing patients were poor interpersonal communication with health staff, lack of attention and support at the clinic, difficulties for patients to re-enter the system if they missed treatment, and long distances to the health facilities (inaccessibility). The disease-

related problems were inability of the staff to manage side effects of medicine and patients' perception of equating feeling well or better with being cured.

A Madagascar study also identified quality of relationships of patients with medical staff and staff knowledge and attitudes regarding TB as contributing to compliance or non-compliance to TB treatment (Comolet et al 1998:891). In this study, quality of relationships with and attitudes of healthcare workers had a significant bearing on TB treatment compliance, as they determined whether a patient would return for treatments in the facility.

2.5.4 Compliance and non compliance to TB treatments

In this study, compliance occurs when the patient takes TB treatments without interruption for more than two months and completes the course. Non-compliance occurs when a patient interrupts treatment for more than two months. Compliance to TB treatment is one of the most important factors that determine the outcome of treatment, and the extent to which a patient's behaviour while on TB treatment coincides with medical advice (Pandit et al 2006:241).

Non-compliance to TB treatment has been associated with a number of factors as described. A study conducted in Colombo showed treatment compliance was negatively affected by disease-related problems such as inability of the staff to manage medicine side effects and patients' perception of equating feeling well or better with being cured (Janakan & Seneviratne 2008:214-23). The study suggests that delays in addressing medicines' adverse effects or ignoring patients' complaints about adverse effects of medicines they are taking may thus promote non-compliance to treatment (Janakan et al 2008:222). A Thailand study also

demonstrated an association of poor compliance to TB treatment and adverse medicinal effects (Okanurak et al 2008:1160).

According to the WHO (2008a:3), most TB patients complete treatment without experiencing significant side effects from taking the TB medicines. The few patients who report or develop side effects commonly present with skin rashes, visual and auditory disturbances, jaundice, burning sensations in the limbs and painful limbs. These side effects or fear of side effects may cause patients to comply poorly with their treatment. Therefore, attention should be paid to diagnosis and prompt treatment of side effects, as well as educating patients about the possible side effects.

According to Namibia (2007:108), some of the barriers postulated to be contributing to poor TB treatment compliance are:

- communication difficulties
- low literacy levels
- inadequate knowledge and low awareness of TB disease
- patient attitudes and beliefs in treatment efficacy
- depression and other psychiatric illnesses
- alcohol and substance abuse
- unstable living conditions
- negative health provider attitudes
- stigma and discrimination
- overcrowding and access to medicines.

The following factors will be discussed as contributing to compliance or non-compliance to TB treatment: patient attitudes towards treatment, adverse or side effects, feeling better, stigma and discrimination; and co-morbidities.

2.5.5 Patient attitude towards treatment

Self-efficacy, which is the belief that one can perform at a certain level to achieve certain goals, can determine a patient's attitude towards treatment (Ormrod 2006:367). If contextualised in the treatment for TB, the self-efficacy model could be a method for TB control focusing on motivating the patient to take treatment until completion. Healthcare providers, treatment supporters or family members, other patients currently taking treatment or those who took treatment previously and completed it, would act as motivators through verbal persuasion. Patients need to believe that if they comply with TB treatment they can achieve the desired outcome, which is to be cured (outcome expectations).

2.5.6 Stigma and discrimination

The presence or perceived presence of stigma and discrimination in a community may act as barriers to patients disclosing their disease to family or community members, who may provide the much needed psychosocial support to the patient (Eastwood & Hill, 2004:70). The same authors in a Gambian qualitative study to explore gender differences in care seeking behaviour demonstrated that patients often consulted traditional healers initially due to perceived stigma from health workers and the community. The study interviewed health workers and TB patients (male and female). Stigma therefore may result in delays in seeking treatment or taking treatment consistently and correctly. Furber, Hodgson, Desclaux and Mukasa (2004:1281) also concluded that stigma and discrimination of TB and HIV patients result in patients delaying seeking testing and treatment and thus poorer health outcomes. In most African societies, TB and HIV are associated with immoral

behaviour and patients suffering from these conditions would be hesitant to disclose their status to their family members, a situation which may result in these patients not complying with their treatments as they do not want to be seen taking the medicines (Kaona, Tuba, Siziya & Sikaona 2004:68).

2.5.7 Co-morbidities

Co-morbidities are illnesses occurring together, usually with one of the medical conditions or illness leading to the occurrence of the other (ITECH 2008:s59). Psychiatric illnesses and HIV infection are co-morbidities which will be discussed. Psychiatric patients are not only at risk of getting TB infection, as they are often homeless or have unstable housing conditions and lack food security, but they also frequently fail to comply with treatment for the same reasons (Fullilove, Young, Panzer & Muskin 1993:324-31). A study in India however seemed to contradict the above findings as psychiatric disorders were not found to affect TB treatment compliance, whereas smoking tobacco did (Manoharam, John, Joseph & Jacob 2001:77). While there is no doubt that HIV predisposes an individual to developing TB, there is no consensus on whether HIV is associated with poor TB treatment compliance (WHO 2002:2). However, possibilities of increased pill burden if the patient is on Anti-Retroviral treatment (ART), increased incidences of side effects and other co-morbid conditions which result from the HIV such as depression and dementia, may increase the likelihood of poor compliance (Namibia 2006:91).

2.6 STRATEGIES USED TO CONTROL TUBERCULOSIS

The World Health Assembly (WHA) passed a resolution that recognized TB as a major global public health problem followed by the launch of DOTS as the internationally recommended TB control strategy in 1994 (WHO 2006b:6). Most National TB Control Programmes (NTCP) experienced major progress in TB control when they implemented the DOTS strategy (WHO 2006b:6). The DOTS strategy was later expanded to form the Stop TB strategy, which seeks to build on the successes of the DOTS strategy (WHO 2006b:5), and which will be discussed as a TB control strategy.

2.6.1 Stop TB strategy

Most of the successes in TB control globally have been attributed to the DOTS strategy, especially in high TB burden countries (WHO 2006b:6). In order to address the remaining challenges, especially in areas where the TB epidemic has been worsening (such as sub-Saharan Africa and Eastern Europe), and to achieve the Millennium Development Goal (MDG) and related Stop TB partnership targets by 2015, a new strategy was developed, namely the Stop TB Strategy (WHO 2006b:6; Dye & Weil 2005:2767). According to WHO (2006c:9), with DOTS as the central component, the Stop TB strategy set out steps which national TB control programmes, their partners and stakeholders needed to take to improve TB control. It expanded the DOTS strategy with six additional components, as follows:

2.6.1.1 Pursue high quality DOTS expansion and enhancement

To achieve TB control requires a comprehensive and persistent response that complements other measures aimed at addressing social and environmental factors

that increase the risk of individuals to develop TB (WHO 2006b:11). Thus, further DOTS strengthening is required in the following areas, namely: political commitment with increased and sustained financing; case detection through quality assured bacteriology; standardized treatment with supervision and support; effective drug supply and management systems; monitoring and evaluation systems; and impact assessment (WHO 2006b:9).

2.6.1.2 Address TB/HIV, MDR-TB and other challenges

The HIV epidemic has worsened the global burden of TB and increased the need to focus attention on strengthening the global TB and HIV programmes in order to tackle the two public health problems effectively (WHO 2004:3). TB has become the leading cause of death among people living with HIV, while infection with HIV is a large risk factor for latent and recent TB infection to convert to active TB disease (WHO 2006c:24). The international standards for TB/HIV as set out by WHO are aimed firstly at decreasing the burden of TB among people living with HIV by strengthening intensive TB case finding, provision of Isoniazid preventive therapy (IPT) for TB/HIV co-infected patients and TB infection control in healthcare and congregate settings. Secondly, the standards aim at decreasing the burden of HIV among TB patients through offering them HIV counselling and testing, HIV prevention and Cotrimoxazole prophylaxis, and HIV care and support, including provision of ART for eligible patients (WHO 2004:2). Therefore, collaborative activities between the TB and HIV programmes using the above strategies should be implemented as they can help control TB among HIV patients (Maher, Floyd & Raviglione 2002:3; WHO, 2006b:13).

The WHO (2006d:12) describes MDR-TB as a threat to global TB control, worsened by inadequate treatment for those suffering from it; increase in MDR-TB patients due to misuse of second line anti-TB medicines; and absence of new effective anti-TB medicines. NTCPs should ensure early detection and correct treatment of all forms of DR-TB and patient adherence to this treatment.

TB control programmes also need to pay attention to special population groups such as prisoners, refugees and other high-risk groups associated with high TB transmissions due to overcrowding and poverty (WHO 2006b:13).

2.6.1.3 Contribute to health systems strengthening

Improving access to quality healthcare services will benefit TB control, therefore TB control programmes should actively improve system-wide policy, human resources, financing, management, service delivery and information systems (WHO 2006b:13).

2.6.1.4 Engage all care providers, Public-Private Mix (PPM)

Many patients with early symptoms of TB do actually consult private healthcare providers first and many such providers diagnose and treat TB (WHO 2006b:14). The diagnosis of TB needs to be made without delay and once done the right treatment with adequate dosing needs to be instituted with proper follow up of such patients. Thus, engagement of all healthcare providers (both private and public) is of paramount importance. Evidence suggests that failure to engage all care providers used by TB suspects and patients hampers TB case detection, delays diagnosis, leads to incorrect diagnosis as well as inappropriate and incomplete treatment,

increases drug resistance and places unnecessary financial burden on the patients and health systems (Uplekar, Pathania, Raviglione 2001: 912).

International Standards for Tuberculosis Care (ISTC)

In order to standardize the diagnosis and treatment of TB both in the public and private sector, the Tuberculosis Coalition for Technical Assistance (TBCTA) developed a tool known as the International Standards for Tuberculosis Care (ISTC) to guide these sectors (WHO 2006c:6). The tool was designed with the idea of having the healthcare provider at the centre of TB control activities and the patient at the centre of care (WHO 2006b:15). The document has seventeen standards of care which are grouped into six standards of diagnosis, nine standards for treatment and two for addressing public health responsibilities (Migliori, Hopewell, Blasi, Spenevello, & Raviglione 2006:687). It places special emphasis on prompt diagnosis of TB with bacteriological examination where possible, correct treatment at the right doses and monitoring treatment with bacteriological examination, as well as evaluation of close contacts (TBCTA 2006:5). To achieve the maximum use of this tool there has to be “buy in” and collaboration with and from the NTCPs, with a deliberate attempt to promote public-private mix using the DOTS approaches.

2.6.1.5 Empower people with Tuberculosis and communities

To achieve greater commitment to fight TB, Advocacy Communication and Social Mobilisation (ACSM) embraces the following: advocacy to influence policy changes and ensure sustained financial and political commitment; facilitation of communication between health care providers, TB patients and their communities in order to improve knowledge of TB and subsequently compliance to treatment; and

social mobilization to engage the communities, partners and stakeholders in the fight against TB (WHO 2006b:15).

2.6.1.6 *Enable and promote Tuberculosis research*

Conducting locally relevant operational research can identify challenges and practical solutions that can be tested in the field before scaling up the activities (WHO 2006b:16). NTCPs can thus develop new and effective strategies for TB control. The WHO (2006b:16) advocates TB programmes to facilitate and actively support research to develop new diagnostics, drugs and vaccines.

2.7 SUMMARY

Tuberculosis can be cured if patients take the correct treatment for a sufficient and recommended period of time. However, the treatment takes a minimum of six months and thus patients may experience pill fatigue, or stop treatment once they feel better, even though the treatment has not been completed. As such, it is important for patients taking treatment to be supervised and encouraged to continue taking their treatments either by a healthcare worker, family member or any other community member. Compliance to TB treatment has been shown to reduce mortality, recurrence, and relapse and treatment failure. The greatest concern for poor compliance to TB treatment is emergence of drug resistance, which requires longer and more complex regimens with poor outcomes. A self-efficacy model has been used to explain some factors that would influence a patient to comply with TB treatment. Patients would perceive themselves as able to take correctly and complete TB treatment (self-efficacy) if they have confidence that the medicines will cure them.

In the next chapter, the research design and methodology of this study will be presented.

CHAPTER 3.

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

Chapter Two was a literature review of previous studies related to the topic under discussion. In this chapter the research design and methodology will be discussed in detail, covering population and sample, the instrument, research assistant, data collection and analysis, ethical considerations and reliability and validity.

3.2 RESEARCH DESIGN

A quantitative, cross-sectional, descriptive, contextual and comparative design will be followed. A statistician was consulted in development of the questionnaire, data capturing and analysis.

3.2.1 Quantitative studies

Quantitative studies follow a systematic process to test and describe associations or relationships, and may also be used to examine and determine causality, though not in cross-sectional studies (Burns & Grove 2005:747). According to Stommel and Wills (2004:442), quantitative researchers study phenomena that can be measured and described in standardized numerical scales and allow for statistical analysis. The research is a deliberate attempt to control (experimental or statistical) variables and to use statistical and numerical summaries to report results (Stommel & Wills

2004:178). This study will examine any associations between compliance and non-compliance to TB treatment and variables in numerical terms.

3.2.2 Cross-sectional studies

According to Burns and Grove (2005:236), cross-sectional study designs examine participants simultaneously, irrespective of their stage of development but with an aim to describe differences in phenomena across stages. Data is collected at a point in time but with different study participants, as opposed to different points in time for the same participant (Brink 2007:10). Thus the study is conducted in the present to determine what already exists and exposure and disease status are measured simultaneously (Joubert et al 2008:225). Data was collected from the TB patients using a structured questionnaire at one point in time for each of the patients, until all efforts to access the sampled patients were exhausted. While the data collection was at different times for the different patients it was only collected once for each of them.

3.2.2.1 Advantages of using cross sectional studies

Cross-sectional studies have several advantages:

- Relatively easy and not very expensive to conduct, since they involve data collection at one point in time only (Polit, Beck & Hungler 2001:184). This study involved collection of data over a short period of time and was thus very economical.
- They are useful for evaluating the relationship between exposures and outcomes (Gordis 2004:174). Associations were tested for various exposures, such as sex, educational level, distance from facility and cost of transport,

socio-economic status, alcohol and substance abuse, DOT status, co-morbidities and health system factors with the two outcomes (compliance and non-compliance).

- They are an important step in first assessing the possibility of a relationship between an exposure and a disease before more difficult or expensive studies are undertaken, such as case-control and cohort (Gordis 2004:174; Stommel & Wills 2004:127). Identifying the factors associated with TB treatment compliance and non-compliance in Andara district would pave the way for other studies that could identify the actual causes of treatment non-compliance.
- Attrition is only limited to non-response by sampled patients who may refuse to give consent to participate, as opposed to longitudinal studies which may be exposed to high dropout of study participants due to death, being lost to follow-up, or changing their minds at a later stage (Stommel & Wills 2004:128). However, there were four non-responses due to death and respondents having left the district and therefore not being identified.

3.2.2.2 Disadvantages of using cross sectional studies

The main disadvantage of cross-sectional studies, however, is their failure to establish causation and the temporal relationship between exposure and disease or outcome as the two are measured simultaneously (Gordis 2004:174; Stommel & Wills 2004:127; Polit et al 2001:184; Joubert et al 2008:225). This was not a major

limitation as this study aimed to identify associated factors and not necessarily the causes.

3.2.3 Descriptive studies

Descriptive studies are designed to obtain more information within a particular field about characteristics as they naturally happen, and may also be used to develop theory, identify gaps in current practice or justify what is currently being practiced. They do not attempt to manipulate or control the participants (Burns & Grove 2005:232).

For Polit et al (2001:19) these designs are aimed at describing phenomena with their associated factors. The study explores significant differences between the two groups (compliant and non-compliant patients) and provides a detailed analysis of the factors associated with poor TB treatment compliance and those contributing to treatment compliance in Andara district of the Kavango region. There was no manipulation of study participants but only a description of how the factors are associated with compliance or non-compliance of the study participants with TB treatments.

3.2.4 Comparative studies

Comparative studies are used to examine existing differences between variables in two or more groups in their natural uncontrolled setting, and the results are not usually generalisable (Burns & Grove 2005:730). A non-experimental comparative study was conducted between the non-compliant and compliant respondents. Those

patients who had started TB treatment between 01/04/2008 and 31/03/2009, and who had either completed their treatment or defaulted, were interviewed.

3.2.5 Context

The context of the study was a TB control programme in Namibia, more specifically the Andara district.

3.2.5.1 National TB Control Programme

The TB programme in Namibia has been integrated into other Public Health programmes at the service level, where nurses and doctors are responsible for diagnosing and treating TB. The NTCP under the Directorate of Special Programmes (TB/HIV/Malaria) controls TB programme nationally. The TB subdivision is headed by a Chief Medical Officer and it is responsible for the overall planning, coordination, implementation, monitoring and evaluation of TB control (Namibia 2006:5). The 13 Regional Management Teams (RMTs) are responsible for coordinating and supporting TB control activities in their respective districts, and a Chief Health Programme Administrator (CHPA) who reports to the Regional Chief Medical Officer is responsible for the TB control activities (Namibia 2006:5).

Diagnosis of TB is made at the lowest entry point, which is the clinic where a nurse diagnoses simple sputum smear positive pulmonary TB cases. The rest are referred to a district hospital for investigation and treatment (Namibia 2006:6). DR-TB cases are supposed to be referred to a regional hospital for management, but currently the facilities at most regional hospitals are overwhelmed and unable to take them all.

Thus, a number of these cases are still being managed at the District Hospital (Namibia 2008c:1).

3.2.5.2 Andara district

Andara district is located in Kavango region in the north-eastern part of Namibia, with Andara District Hospital one of four Catholic Health Services (CHS) hospitals in the country. It has 120 beds and is a referral centre to eight clinics in the district. Patients presenting with symptoms of TB are investigated in any one of these health facilities and referred to the district hospital for initiating treatment. Once a diagnosis has been made, the names and details of the patient are entered into a TB register and a TB treatment card opened. Follow-up for those patients who are stable can be done at their nearest health facility.

The catchment population is approximately 35,000 (CHS 2008:2) and according to Namibia (2008:13) the HIV prevalence in the district is 14.2%. In 2007, the TB Case Notification Rate (CNR) for the district, defined as the number of TB patients diagnosed and notified per 100,000 population during a specified period (Namibia 2006:198), was 740/100,000, which was more than both the regional and national CNRs (Namibia 2006:53). Therefore, because of the high CNRs, high TB treatment defaulter rates (12%), and easier access to the data (since the researcher was the CHS Programme Manager and Chief Medical Officer), Andara was chosen for this study.

3.3 STUDY POPULATION AND SAMPLE

A study population is that specific aggregate of elements from which the sample is actually selected, and is sometimes referred to as the 'accessible population' (Stommel & Wills 2004:299; Burns & Grove 2005:342).

3.3.1 Population

The population is a group whose members possess specific attributes which a researcher is interested in studying. The population may consist of events, places, objects, animals, or individuals (Burns & Grove 2005:342). In research, two populations are described, the target population and the accessible population. The former is the ideal full set of individuals with a particular condition to be studied and for which the researcher would like to generalize the findings (Stommel & Wills 2004:297), in this study all the TB patients on treatment. Stommel and Wills (2004:299) and Burns and Grove (2005:342) concur that the target population is not always accessible for studying, where the accessible population is a set of individuals from which the actual sample is drawn. The accessible population in this study consists of those TB patients on treatment who have defaulted (non-compliant) and those patients who have completed it (compliant).

3.3.2 Sampling

Sampling is the process of selecting individuals from a population who will be studied (Burns & Grove 2005:341). A sampling frame is the full list of members of a population from which the study participants will be selected (De Vos 2007:194). The District TB register was used to establish the sampling frame. The register has records of the registered patient's name, registration number, date of starting and

stopping treatment, treatment outcome, HIV status, demographic details and address and classification or diagnosis. The sampling frame for this study was the district TB register, which had a total of 212 TB patients notified during the period 01/04/2008 to 31/03/2009. De Vos (2007:195) cites Stoker's (1985) guidelines for sampling and sample size as between 20%-32% for populations of 200-500. Thus, using a minimum sample size of 20%, a total of 56 patients were sampled. These were distributed as follows: all 26 TB treatment defaulters and 30 patients who completed treatment. They were chosen by using a simple random sampling method forming the comparison group.

The list of all patients who defaulted on TB treatment with their names and location was extracted from the TB register. Simple random sampling is a technique in which elements are selected for the study in a random manner (Burns & Grove 2005:342). A total of 161 patients were not defaulters (compliant), and all had an equal chance of being chosen for the compliant group.

Each one of these patients had their TB registration number (extracted from the TB register) written on a small piece of paper, and these numbers were placed in a non-transparent container. Without looking, a numbered piece of paper was drawn from the container and the number pulled out was recorded on a paper for the respective patient to be included in the study. To ensure the same level of chance for each patient's number to be picked, the number previously picked was then replaced in the container after recording. The process was repeated until all the 30 participants were picked. When a number which was already recorded was picked it was then simply returned to the container and another participant drawn up. Once the 56

patients had been identified using the TB registration number and name, the registered nurse followed them up in the TB clinics and at their homes, and asked for consent to be participants in the study. All the patients who agreed and gave written consent to be interviewed constituted the obtained sample, that is the individuals in the accessible population who were approached and consented to and actually participated in the data collection (Stommel & Wills 2004:299).

3.4 RESEARCH ASSISTANT

A registered nurse (RN) who is well conversant with the local languages was identified and trained to administer the questionnaire and help with data collection. The RN was well acquainted with the geography of the district and had knowledge of TB and its treatment. However, in order to minimize bias, in the event of nurses being part of the system problems with compliance of TB treatment, an RN was chosen who had not worked in the TB clinic in Andara. In addition, one was chosen who would make it easier to gain access to the medical records. Permission to administer the questionnaire and collect data was sought from the RN prior to conducting the study. He collected data during his off-duty days, and for a stipend that had been mutually agreed.

3.5 THE INSTRUMENT

A questionnaire is a printed form with a list of questions designed to gain information through responses from a study participant (Burns & Grove 2005:398). The same authors argue that questionnaires tend to have less depth than interviews, though since these questions can be presented in a systematic manner the opportunities for

introducing bias are limited. The use of open-ended questions may bring depth, however responses from such questions are difficult to analyze.

A structured questionnaire was used to capture data from individuals, designed with the assistance of a statistician and comprising mostly closed-ended questions that made it easier to analyze the data. The questionnaire was divided into seven sections (A up to G), covering demographic information, patient-related factors, socio-economic variables, healthcare system-related factors, default factors, stigma and discrimination, and disease- and medicine-related factors. There are 39 questions, responses to each of which were coded. A coding box, where the coding number for each of the responses would be entered, was inserted for each question. A list of variables was arrived at after a review of relevant existing literature (annexure 1). The questionnaire was administered by the RN, who was well-versed with the geography of the district and fluent in the local language, but who had not worked in the TB clinic of this hospital. The questionnaire was pilot tested in a TB clinic in Nyangana Hospital, which is in the same region as Andara, and appropriate adjustments were made afterwards.

3.6 DATA COLLECTION

Data collection, according to Burns and Grove (2005:733), is a systematic process of gathering information relevant to the study, and should be used to address the research purpose and objectives, and answer the research questions.

After the sampling process was completed, a list of possible study participants was made using the names and their contact details. The RN then visited them at their homes, but those on second line treatment were interviewed at the TB clinics when

they came for the medicines. The RN would introduce himself to the prospective participant and read through the individual participant consent form that detailed the title and purpose of the study as well as the rights of the participant and details of the person to be contacted for future questions (annexure 2). Whenever a participant agreed to be interviewed he/she was asked to provide written consent by signing or fingerprinting. If they refused to participate the interview would not proceed.

After obtaining the written consent, the RN entered the questionnaire serial number and date of interview and proceeded from the first up to the last question using a language understood by the participant. The RN entered responses given by the participant by circling the appropriate response number and entering the same number in to the coding box. This was done to ensure data quality as the response number circled was supposed to be the same as the one entered in the coding box. If the numbers were different it would not be a valid response. The researcher reviewed the questionnaires on a weekly basis to ensure they were being completed correctly and any errors were discussed with the RN to avoid them being repeated. The process of data collection continued until every effort to contact every study participant in the sample had been exhausted. All completed questionnaires were kept in a safe lockable cupboard in the Andara TB clinic, and the keys kept by the RN until the researcher picked them up.

3.7 DATA ANALYSIS

De Vos et al (2007:218) describe data analysis as the process of categorizing, putting into order, manipulating and ultimately summarizing data in order to be able to answer the original research questions. The purpose is to reduce data collected to

a format that can give meaning and allow one to draw conclusions (Burns & Grove 2005:754). The services of a statistician were utilized and after all the participants had been interviewed the researcher reviewed all the questionnaires for completeness and performed appropriate data cleaning. Data was then entered on spreadsheets using *MS Excel* and later transported to either SPSS to describe the data and identify any significant differences between the two groups. Descriptive summary statistics and graphical summaries in charts (pie, bar, cross-tabulations) are presented. Chi-square tests of association were conducted to assess dependence relationships among potential factors. A 5% level of significance was used.

3.8 RELIABILITY AND VALIDITY

Reliability and validity of a measuring instrument are very important (De Vos et al 2007:160). To obtain valid and reliable data from the measuring instrument it is important to ensure before administering the instrument that it can be replicated and provide accurate information for the researcher to make acceptable conclusions (Stommel & Wills 2004:209).

3.8.1 Reliability

Reliability arises from the stability and consistency of the measurement and provides an indication of the random error in the measurement (Burns & Grove 2005:374). In order to ensure reliability of the measuring instrument, closed-ended questions are used in most cases. Thus, if the same questions are administered to the same study participant at different times, the chances are very high that one would get the same or a similar response. Therefore, introduction of bias is reduced.

3.8.2 Validity

Validity is a “measure of the truth or accuracy of a claim” (Burns & Grove 2005:214) and, according to Babbie (2004:143), it refers to how far a data collection instrument actually measures what it is suppose to measure. Validity has two aspects: firstly that the instrument does in fact measure the concept it is intended to measure and secondly that it is measures accurately.

3.8.2.1 Content validity

It is the extent to which the method of measurement includes all major and important elements (De Vos, Strydom, Fouche & Delport 2007:160). Content validity is achieved by all the important constructs that are identified in the literature that has been included.

3.8.2.2 Threats to external validity

External validity is concerned with the generalisability of the study findings and depends largely on the research design (Burns & Grove 2005:218-19). This is an indication of the sampling adequacy. Sampling is a means to ensure external validity or generalisation of the study to the wider population. In this study the threat is minimized by virtue of the study being cross-sectional, thus reducing the possibility of attrition of study participants, which would have otherwise compromised validity, as measurement is made at one point in time only. In addition, the use of the 20% sampling recommended for the size of the sampling frame under study would help improve external validity by improving sampling adequacy and ensuring all important elements are included.

3.9 ETHICAL CONSIDERATIONS

In order to ensure the rights of study participants are not violated, researchers have to adhere to strict ethical standards (Burns & Grove 2005:176). The 'Principle of Beneficence' requires the researcher to "do good and above all, do no harm" (Burns & Grove 2005:180). There was no manipulation of individuals and no treatment would have been withheld from any individual who might have refused to participate. This was clearly explained to prospective participants prior to obtaining the written consent or refusal to participate.

The 'Principle of Respect for Persons', sometimes referred to as 'Respect for Human Dignity' holds that persons have the right to determine whether they wish to participate in a study or not (Burns & Grove 2005:180), and the process stated above will be maintained. obtaining informed consent not only involves providing adequate information to the study participant but also ensuring that they comprehend the information given (Burns & Grove 2005:194). The prospective participants in this study had the information given to them in their local language, including the purpose of the study, the expected benefits of the study, and the process of data collection. The prospective participants were assured of their rights to agree or refuse to participate in the study without being prejudiced. The contact details of the researchers were also provided to them.

The 'Principle of Justice' holds that study participants should be treated fairly (Burns & Grove 2005:180) and, as mentioned above, there was no prejudice for refusing to participate and study participants were selected randomly from those who completed

treatment, while all those who defaulted TB treatment were included in the study, unless they had declined.

Prior to conducting the study, permission was obtained in the form of a 'Clearance Certificate' from the Academic Ethics Committee of UNISA (annexure 3) and from the Research and Ethics committee of the Ministry of Health and Social Services of Namibia (annexure 4), as well as from the Catholic Health Services Director (annexure 5).

3.10 SUMMARY

The chapter focused on the research methodology, that is, the research design, population and the sampling techniques used, methods of data collection (the instrument and how it was administered, how the data was analyzed and the ethical standards that guided the study.

In the next chapter, the results of the study will be presented.

CHAPTER 4.

DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

In this chapter the research findings are presented as data analysis and interpretation, including the demographic data of the research participants.

The specific objectives for this study were to:

- identify factors affecting compliance to TB treatment in Andara district, Kavango region, Namibia.
- determine factors that contributes to some patients completing TB treatment.
- recommend to Andara Health authority measures to improve TB treatment compliance.

The questionnaire was divided into the sub-sections and data was analysed in the same order:

Section A: Demographic information

Section B: Patient related factors

Section C: Socio-economic factors

Section D: Healthcare System-Related factors

Section E: Default factors

Section F: Stigma and discrimination

Section G: Disease- and Medicine-related factors

4.2 REALISATION OF THE SAMPLE

The sample size consisted of 56 study participants; all the 26 defaulters (non-compliant) and 30 who completed treatment (compliant). After the sample was drawn, a list of the study participants with all their contact details was developed and each study participant followed up by the RN at their homes and villages. Of the 26 non-compliant participants, 22 were already being retreated for TB either as return after default (two for DR-TB). Four patients from the non-compliant group were located during the period of study and were eventually restarted on TB treatment. The compliant study participants were more difficult to locate as some had left the area to return to work or look for employment in other regions of the country. Only 23 of the 30 compliant participants could be located and were eventually included in the study. Six of the study participants were reported to have left the district, and one had died after completing TB treatment. None of the participants refused to participate in the study.

4.3 DEMOGRAPHIC FACTORS

The socio-demographic factors included age, gender, and marital status, level of formal education, language and religion. A total of 49 respondents were interviewed: 23 completed TB treatment and 26 did not complete TB treatment. The demographic factors are presented below.

Age in years (N=49)

The questionnaire grouped the respondents into age groups. The age distributions were as shown in Figure 4.1 (below).

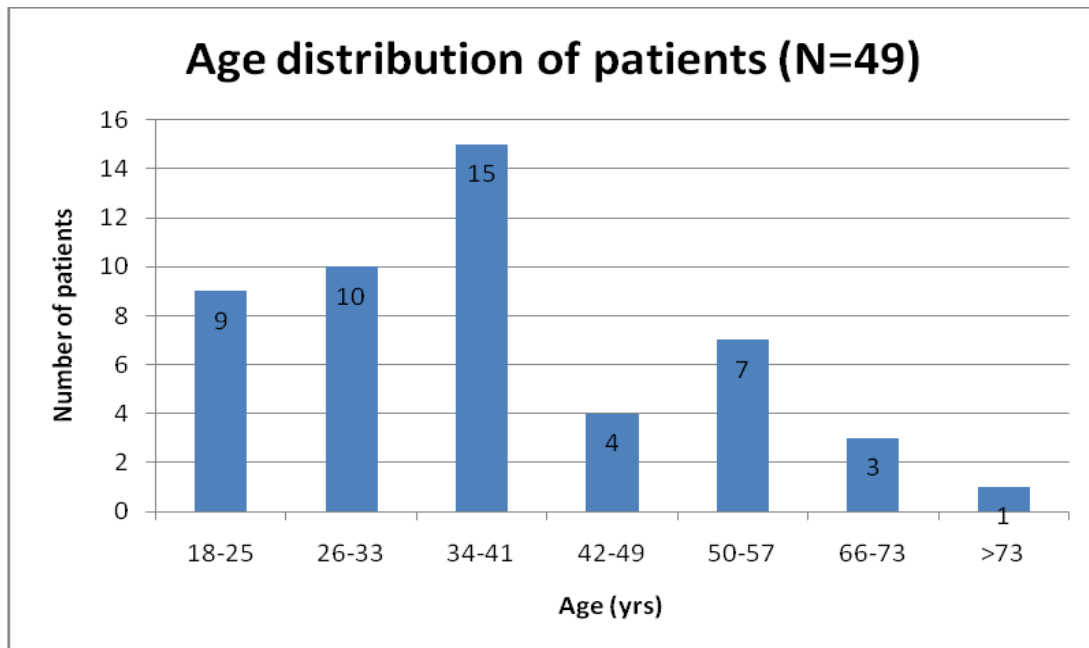


Figure 4.1: Age distribution of all the respondents

The graph shows that 25 (51%) of respondents were between 26 and 41 years of age. The younger age groups, between 26 and 33 years, were less compliant, 3(13%) compliant and 7(27%) non-compliant, than the older age groups.

Religion (N=49)

A total of 44 (90%) respondents reported they were Christian. Two reported they were Islam and three were other religions. Christians were equally distributed in both the compliant and non-compliant groups. The religion practiced did not account for any significant difference between the two groups ($P=0.243$).

Gender (N=49)

Respondents were asked to state their gender. Of all the 49 respondents, 23 (47%) were male and 26 (53%) female. Though no significant differences were noted between the two groups ($P=0.393$), there was a higher proportion of females 14(61%) than males 9(39%) in the compliant group while males were more predominant 14(54%) in the non-compliant group than females 12 (46%).

Marital status (N=49)

Each respondent was asked their marital status (married, widowed, separated, single or cohabiting). Over half, 25 (51%) of all study participants reported being married. A significant proportion, 17 (35%) of respondents were single and most 10(43%) of them were in the compliant group. There was a higher proportion 14(54%) of those married in the non-compliant group compared to 11(48%) in the compliant group, even though these differences were not significant ($P=0.549$). It was difficult to differentiate between cohabiting and married since culturally no lobola or bride price is required for one to be married. A couple are considered married if parents of both partners give consent. No legal documents are also necessary to be conferred the married status.

Language (N=49)

Respondents were asked what their predominant language was. Andara is inhabited by mostly the Thimbukushu speaking people. The other languages spoken in the area are Rucqiriku, Barakwena, Oshiwambo and Rukwangali. The majority, 39 (80%) of the respondents interviewed were Thimbukushu-speaking, which is

expected as this is the native language in the district. The Barakwena language, predominantly spoken by the San people, was second with five (10%). There was no significant difference between the compliant and non-compliant groups with respect to the spoken language ($P=0.229$).

Highest level of education attained (N=49)

The respondents were asked the highest level of education they had attained. Figure 4.2 (below) shows the majority, 26 (53%) of the respondents only attained primary education level. In addition, nine (18%) had no education at all.

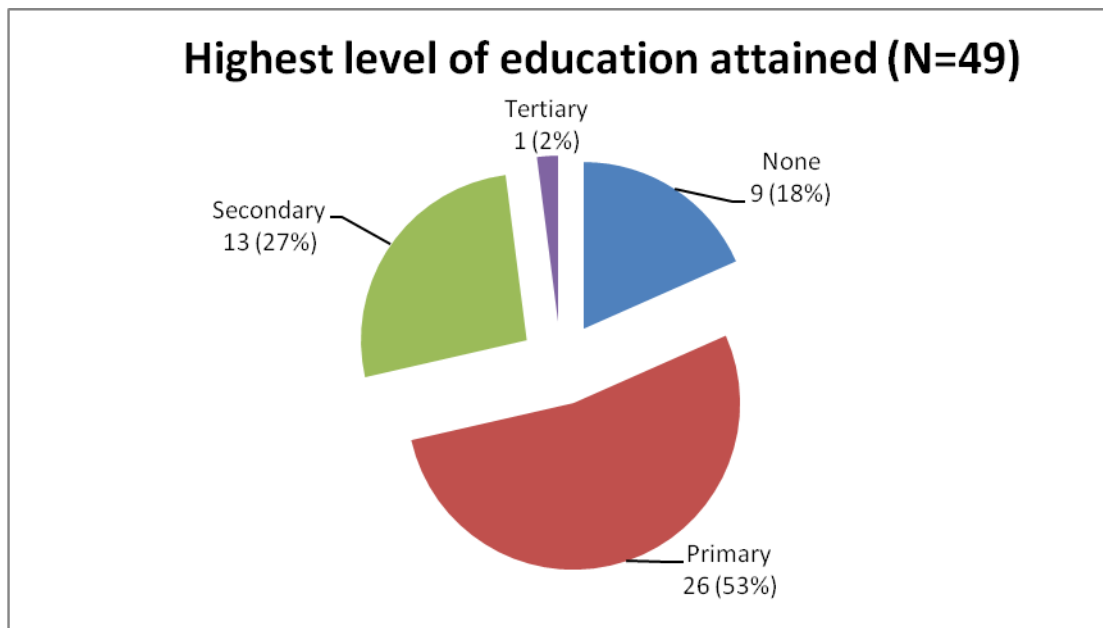


Figure 4.2: Highest level of education attained

Seven out of the nine respondents with no formal education did not complete TB treatment. Similarly, 11 out of 25 respondents with primary education, seven out of 14 with secondary education and the only patient with tertiary level of education, did

not complete TB treatment. The level of education attained was not a significant factor influencing TB treatment compliance ($P=0.265$).

Table 4.1 (below) summarizes the comparison of some of the demographic characteristics of the compliant and non-compliant groups.

Table 4.1: Demographic factors for compliant and non-compliant respondents

N = number; χ^2 = Chi square statistic, P = P value.

Factors	Compliant N (%)	Non-compliant N (%)	Total N (%)	Significance	
				χ^2	P
<u>Gender:</u> Female Male	14 (61) 9 (39)	12 (46) 14 (54)	26 (53) 23 (47)	1.061	0.393
<u>Age groups (in years):</u> 18-25 26-33 34-41 42-49 50-57 66-73 >73	5 (22) 3 (13) 8 (35) 2 (9) 3 (13) 1 (4) 1 (4)	4 (15) 7 (27) 7 (27) 2 (8) 3 (12) 1 (4) 2 (8)	9 (18) 10 (20) 15 (31) 4 (8) 6 (12) 2 (4) 3 (6)	1.935	0.926
<u>Marital Status:</u> Married Widowed Separated Single Cohabiting	11 (48) 0 (0) 1 (4) 10 (43) 1 (4)	14 (54) 2 (8) 1 (4) 7 (27) 2 (8)	25 (51) 2 (4) 2 (4) 17 (35) 3 (6)	3.051	0.549
<u>Language:</u> Thimbukushu Rukwangali Rucqiriku Barakwena Oshiwambo	20 (87) 0 (0) 1 (4) 2 (9) 0 (0)	19 (73) 1 (4) 2 (8) 3 (11) 1 (4)	39 (80) 1 (2) 3 (6) 5 (10) 1 (2)	1.447	0.229

<u>Religion:</u>					
Christian	22 (96)	22 (85)	44 (90)	2.827	0.243
Islam	1 (4)	1 (4)	2 (4)		
Other	0 (0)	3 (11)	3 (6)		

4.4 PATIENT-RELATED FACTORS

The following were assessed as patient related factors; smoking, drinking alcohol and treatment supporter.

Smoking cigarettes (N=49)

A total of 14 (29%) of the respondents reported having smoked cigarettes during the previous six months, while 36 (71%) had not done so. There were a higher proportion of respondents who had smoked in the previous six months in the non-compliant compared with the compliant group (31% compared with 26%). Smoking cigarettes in the previous six months was however not associated with any statistical difference between the compliant and non-compliant groups ($P=0.717$).

Drinking alcohol (N=49)

The respondents were asked if they had drunk alcohol in the last six months. The six months timing was expected to coincide with the time the respondent had been taking TB treatment. A total of 28 (57%) drank alcohol in the previous six months while 21 (43%) had not done so. Of those who had drunk alcohol, 15 (58%) did not complete TB treatment or were non-compliant, compared to 11 (42%) patients in the same compliant group who had not drunk any alcohol. There was no significant difference between those who had drunk alcohol in the previous six months and those who had not done so with respect to TB treatment compliance.

Treatment supporter (N=49)

Most, 46 (94%), of the patients had a treatment supporter while they were taking treatment and three (6%) did not have one. However, only 22 (48%) of the respondents who had a treatment supporter were compliant, while 24 (52%) were non-compliant. In this study, having a treatment supporter was not associated with any significant difference between compliant and non-compliant groups, neither was not having a treatment supporter ($P=0.626$).

Smoking, drinking alcohol and availability of a treatment supporter were not associated with any significant differences between the compliant and the non-compliant groups, as summarized in table 4.2 (below).

Table 4.2: Patient related factors

Factors	Compliant N (%)	Non-compliant N (%)	Total N (%)	Significance	
				χ^2	P
<u>Smoking:</u> Yes No	6 (26) 17 (74)	8 (31) 18 (69)	14 (29) 35 (71)	0.131	0.717
<u>Alcohol:</u> Yes No	13 (57) 10 (43)	15 (58) 11 (42)	28 (57) 21 (43)	0.007	0.934
<u>Treatment Supporter:</u> Yes No	22 (96) 1 (4)	24 (92) 2 (8)	46 (94) 3 (6)	0.238	0.626

4.5 SOCIO-ECONOMIC FACTORS

The socio-economic factors described include the employment status, level of income and availability of food during the period the patient was on TB treatment.

Employment status (N=49)

The respondents were asked whether they were employed, self employed or unemployed. Of the 49 interviewed, only 13 (27%) were employed, 35 (71%) were unemployed and one (2%) reported being self employed. Respondents who were employed and unemployed were more or less equally distributed in both the compliant and non-compliant groups. Employment status was not a significant factor contributing to compliance or non-compliance to TB treatment ($P=0.573$).

Income (N=13)

For the respondents who were either employed or self employed, a follow up question was asked to determine their level of income per month in Namibian dollars (N\$). Nine (64%) of those employed earned N\$800 per month or more, while five (36%) earned less than N\$800 per month. Five of the nine respondents who earned N\$800 or more per month were non-compliant. The level of income was not associated with any significant difference between the two groups ($P=0.250$). The question however, did not find out whether the respondent was actually working and receiving a salary while on treatment. Due to the long duration of TB treatment, there is a possibility that some of the respondents were not on a salary anymore.

Food availability (N=48)

Respondents were asked to rate the availability of food while they were on treatment. A total of 48 responses were recorded with one non-response. Only 12 (25%) of the respondents reported that food was always available to take with their medicines, 33 (69%) said food was not always available and for three (6%), food was available most of the time. A total of 19 (40%) respondents who reported that they did not always have food to take with medicines subsequently did not complete their TB treatment, while 14 (29%) who also did not always have food nevertheless completed their treatment. A total of 19 (76%) in the non-compliant group said food was not always available, compared to 14 (61%) in the compliant group. The difference between the compliant and non-compliant groups for availability of food was significant ($P= 0.035$). Table 4.3 (below) presents a summary of the socio-economic factors.

Table 4.3: Socio-economic factors

Factors	Compliant N (%)	Non-compliant N (%)	Total N (%)	Significance	
				χ^2	P
<u>Employment Status:</u>					
Employed	6 (26)	7 (28)	13 (27)	1.113	0.573
Self employed	1 (4)	0 (0)	1 (2)		
Unemployed	16 (70)	19 (73)	35 (71)		
<u>Income (N\$/ month):</u>					
<800	2 (33)	3 (38)	5 (36)	2.771	0.250
800-2000	3 (50)	1 (12)	4 (28)		
>2000	1 (17)	4 (50)	5 (36)		

<u>Availability of Food:</u>					
Always available	9 (39)	3 (12)	12 (25)	6.686	0.035*
Available most times	0 (0)	3 (12)	3 (6)		
Not always available	14 (61)	19 (76)	33 (69)		

**-Significant

4.6 HEALTHCARE SYSTEM-RELATED FACTORS

The healthcare-system related factors assessed include the convenient TB clinic opening times, waiting time at the TB clinic, the attitude of the health worker at the clinic, distance and cost of getting to the clinic, availability of medicines at the clinic and the DOT status (Table 4.4, below).

Convenient TB clinic opening times (N=49)

Respondents were asked which TB clinic opening times were most convenient for them. The options they were given are <08h00- 17h00, 08h00- 17h00 and 08h00->17h00. Of the 49 respondents, 19 (39%) said 08h00-17h00 would be the most convenient opening times for the TB clinic, followed by 16 (33%) who wanted the clinic to be open before 08h00 until 17h00 and 14 (28%) to open from 08h00 and close after 17h00. There was no significant difference between the compliant and non-compliant groups with regards to convenient clinic opening times (P=0.238).

Waiting times at clinic (N=49)

Respondents were asked how long they usually waited at the TB clinic before they were attended. A total of 49 responses were recorded. Forty-three (88%) of the respondents said they usually waited for less than an hour at the TB clinic before they were attended to, while four (8%) had to wait between one and two hours and

two (4%) usually waited for more than two hours. None of the six patients who had to wait for more than an hour at the clinic completed their TB treatments. Waiting time at the clinic was significant between the compliant and non-compliant groups, that is, longer waiting times were associated with non-compliance ($P= 0.049$).

Where respondents collected medicines (N=49)

As shown in Figure 4.3 (below), most (18) patients interviewed collected their medicines from Andara District Hospital, followed by Bagani Clinic with 12.

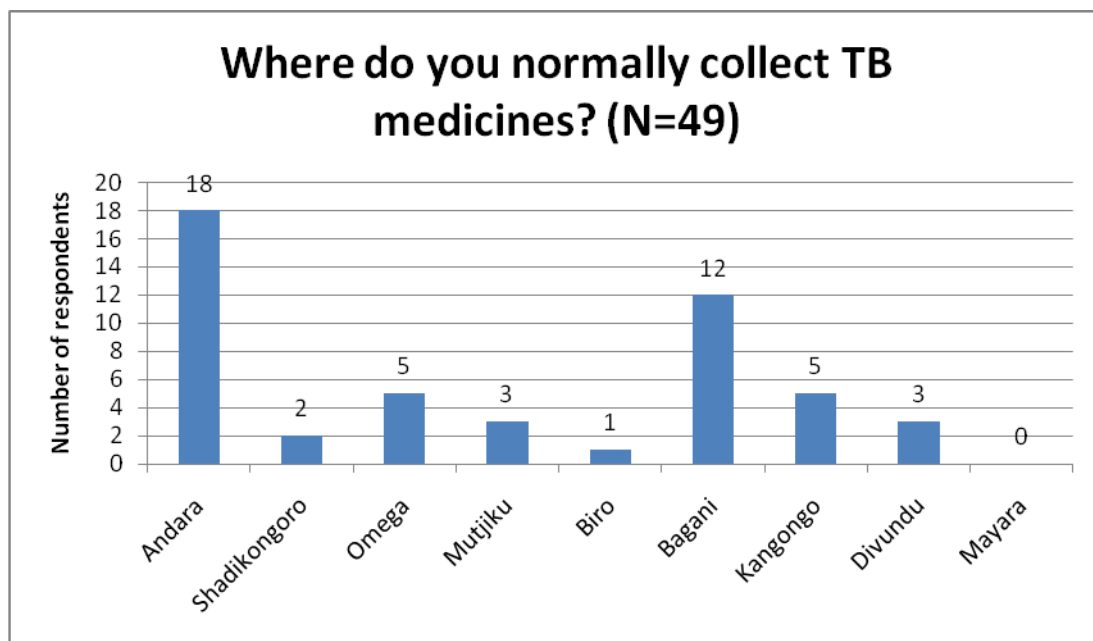


Figure 4.3: Statistic record of the eight TB clinics in Andara

Distance travelled (N=49)

The respondents were asked to indicate how much distance they travelled to go and pick up their medicines. The majority of patients, 31 (63%), travelled less than five kilometres, while eight (16%) travelled between five and ten kilometres, two (4%) between 11 and 15 kilometres, three (6%) between 16-20 kilometres and five (10%)

still had to travel more than 20 kilometres. Though distance travelled to the clinic was not a significant factor between the compliant and non-compliant groups ($P=0.664$), 16 (61%) of the patients who did not complete their TB treatment stayed within five kilometres, considered to be a walking distance, from the clinic.

Cost of transport (N=49)

The respondents were asked to indicate how much they had to pay for transport to get to the clinic, in Namibian dollars (N\$). Of the 49 respondents, 29 (59%) did not have to pay anything, 10 (21%) had to pay less than N\$10, seven (14%) between N\$10 and N\$20, and three (6%) had to pay more than N\$20 each time they went to the clinic. Fourteen (54%) of the respondents in the non-compliant group did not have to pay anything to get to the clinic while only six (23%) had to pay N\$10 or more. There was no significant difference between the compliant and non-compliant groups with respect to the cost of getting to the clinic to collect medicines ($P=0.598$)

DOT status (N=49)

The respondents were asked who was supervising them while they had to take their TB medicines. The options they had to choose were either health worker, family member, community member or none. Of all the respondents, 40 (82%) were supervised by a family member, five (10%) were supervised by a health worker, four (8%) had no one supervising them and none of the respondents were supervised by a community member. Four of the five respondents who were supervised by a health worker did not complete treatment and three of the four respondents who did not have a supervisor also did not complete treatment. Those supervised by a family

member were almost equally distributed between the compliant and non-compliant groups. DOT status did not contribute to any significant difference between the two groups ($P=0.256$).

Health worker attitudes (N=49)

The respondents rated the attitude of health workers who attended them at the TB clinic as follows: 25 (51%) very friendly, 23 (47%) friendly and one (2%) not friendly. The only patient who rated the attitude of those who attended to them at the clinic as unfriendly did not complete TB treatment, in addition to 25 non-compliant patients who ranked the attitude of health workers from friendly to very friendly. The health worker attitude was not statistically significant ($P=0.138$). The administration of the questionnaire by a RN who is a health worker, could have created bias in responses to this question though the RN was not at the time working in any one of the TB clinics. The previous question where four of the five respondents who were supervised by a health worker did not complete their treatment could be indicative of a problem with the patients' perception of health worker attitudes.

Medicine availability (N=49)

All the 49 respondents said medicines were always available at the clinic when they went to pick them.

Table 4.4: Health care system related factors

Factors	Compliant N (%)	Non- compliant N (%)	Total N (%)	Significance	
				χ^2	P
<u>Health worker attitude:</u> Unfriendly Friendly Very friendly	0 (0) 8 (35) 15 (65)	1 (4) 15 (58) 10 (38)	1 (2) 23 (47) 25 (51)	3.962	0.138
<u>Waiting time (hrs):</u> <1 1-2 >2	23 (100) 0 (0) 0 (0)	20 (77) 4 (15) 2 (8)	43 (88) 4 (8) 2 (4)	6.048	0.049**
<u>Cost of travel (N\$):</u> 0 <10 10-20 >20	15 (65) 4 (17) 2 (9) 2 (9)	14 (54) 6 (23) 5 (19) 1 (4)	29 (59) 10 (21) 7 (14) 3 (6)	1.877	0.598
<u>Distance to clinic (Kms):</u> <5 5-10 11-15 16-20 >20	15 (65) 4 (17) 0 (0) 2 (9) 2 (9)	16 (61) 4 (15) 2 (8) 1 (4) 3 (12)	31 (63) 8 (16) 2 (4) 3 (6) 5 (10)	2.391	0.664

** - Significant

4.7 KNOWLEDGE OF TUBERCULOSIS AND TREATMENT

Knowledge of TB and treatment was assessed with questions checking the knowledge of the respondents of the common TB symptoms as well as treatment duration.

Knowledge of symptoms (N=48)

Respondents were asked if the following were symptoms of TB; coughing, night sweats, loss of weight and chest pains. They had to respond with a “yes” or “no” for

each of the symptoms. All patients who responded correctly identified coughing, chest pains, night sweats and loss of weight as symptoms of TB. There was one non-response for each of the questions.

Treatment duration

In order to assess the respondents' knowledge of treatment duration, the following questions were asked and responses were supposed to be a "yes" or "no":

TB treatment should be taken for six months only? (N=49)

Of the 49 respondents, 44 (90%) said "yes" and five (10%) said "no". All the five respondents who said "no" did not complete their treatment in addition to the 21 of the 44 who said "yes". Responding "no" to this question was associated with not completing TB treatment or non-compliance ($P=0.026$).

TB treatment should be taken until one feels better and then stop treatment? (N=46)

Only 46 (94%) out of a possible 49 responded to this question; there were three non-responses. Eight responded "yes" and 38 responded "no". Seven of the eight who said "yes" did not complete TB treatment and 18 out of 38 who responded "no" also did not complete treatment. Responding "yes" to this question was a statistically significant contributing factor to non-compliance to treatment ($P=0.038$).

TB treatment to be taken for six months and health worker tells you to stop? (N=46)

Forty-six responded to this question while three did not. Forty-two responded "yes" while four responded "no". Of the 42 who responded "yes", 23 (55%) did not complete treatment. There was no difference between the compliant and the non-

compliant groups with regards to a “yes” or “no” response to this question. Table 4.5 (below) summarizes the knowledge factors.

Table 4.5: Knowledge of TB and treatment

Factors	Compliant N (%)	Non-compliant N (%)	Total N (%)	Significance	
				X ²	P
<u>Treatment for 6 months and health worker stops:</u>					
Yes	19 (90)	23 (92)	42 (91)	0.33	0.855
No	2 (10)	2 (8)	4 (9)		
<u>Treatment for 6 months:</u>					
Yes	23 (100)	21 (81)	44 (90)	4.926	0.026**
No	0 (0)	5 (9)	5 (10)		
<u>Treatment until feel better:</u>					
Yes	1 (5)	7 (28)	8 (17)	4.290	0.038**
No	20 (95)	18 (72)	38 (83)		

** - significant

4.8 DEFAULT FACTORS

The findings on default factors are presented.

Who do you live with? (N=49)

Forty-eight (96%) of the respondent lived with their family and only one lived alone. The only respondent who lived alone did not complete treatment in addition to the 25 out of 48 who lived with family who did not complete treatment. There was no significant difference between the two groups with respect to who the respondent lived with (P=0.531).

How many other people do you live with? (N=49)

One person lived alone; five lived with one to three others, 10 with four to six and 33 (68%), with more than seven others. This factor was not statistically significant ($P=0.731$).

How big is your dwelling place? (N=47)

Respondents were asked how many rooms their dwelling place or house had. Of the 47 who responded to this question, 13 (28%) stayed in a house with one to two rooms, 16 (34%) had three to four rooms and 18 (38%) stayed in a house with more than five rooms. Out of the 26 respondents who were non-compliant, 16 (64%) stayed in house with at least three rooms. The number of rooms was however not a significant factor contributing to a difference between the two groups ($P=0.289$).

Length of stay in the current place? (N=49)

The length of stay in the current place was meant to be a measure of some stability for the respondents. Forty-two (86%) of the patients had lived in their current house for more than 12 months, thus most of the respondents were fairly stable or non-mobile. However, the reasons for being non-mobile could have been due to illness and as soon as they felt better, the patient could move. Twenty-two (84%) of the respondents in the non-compliant group had lived in the current place for more than 12 months compared with 20 in the compliant. The length of stay was not a significant factor contributing to non-compliance of TB treatment ($P=0.884$). Table 4.6 (below) summarizes the default factors.

Table 4.6: Default factors and disclosure

Factors	Compliant N (%)	Non-compliant N (%)	Total N (%)	Significance	
				X ²	P
<u>Length of stay (months):</u> <3 3-12 >12	1 (4) 2 (9) 20 (87)	2 (8) 2 (8) 22 (84)	3 (6) 4 (8) 42 (86)	0.246	0.884
<u>Size of house (rooms):</u> 1-2 3-4 >5	4 (18) 10 (46) 8 (36)	9 (36) 6 (24) 10 (40)	13 (28) 16 (34) 18 (38)	4.980	0.289
<u>Number of people living with:</u> 0 1-3 4-6 >7	0 (0) 3 (13) 5 (22) 15 (65)	1 (4) 2 (8) 5 (19) 18 (69)	1 (2) 5 (10) 10 (20) 33 (68)	1.294	0.731
<u>Disclosed TB Status:</u> Yes No	23 (100) 0 (0)	25 (96) 1 (4)	48 (98) 1 (2)	0.903	0.342

4.9 STIGMA AND DISCRIMINATION

To assess the levels of stigma and discrimination, the respondents were asked if they had disclosed their TB status to anyone. Non-disclosure could point to presence of stigma and or discrimination.

Disclosed TB status (N=49)

Forty-eight (98%) of the patients had disclosed their TB status to either a family member or friend. The only respondent who had not disclosed their status did not

complete treatment (Table 4.6, above). The disclosure of TB status was not associated with any significant difference between the compliant and the non-compliant groups ($P=0.342$).

Reasons for non-disclosure (N=1)

The only patient who did not disclose gave 'no one to trust' and 'fear of being isolated by friends and relatives' as the reasons for not doing so.

4.10 DISEASE AND MEDICINE RELATED FACTORS

Respondents were asked a number of questions to assess various disease and medicine related factors that could contribute to compliance or non-compliance to TB treatment.

Experienced side effects to TB medicines? (N=49)

The respondents were asked if they had experienced any side effects while taking TB treatment. Twenty-three (47%) of the patients had experienced some side effects while taking medicines while 26 (53%) had not.

What side effects were experienced? (N=23)

Those who reported having experienced side effects were asked to specify the main side effects they had. Some of the respondents may have had more than one side effect but the question did not capture these. The commonest side effects reported were headaches and dizziness (eight, 35%), followed by seven (30%) with diarrhoea and vomiting. (Figure 4.4, below). Ten (43%) out of the 23 respondents who had experienced side effects did not complete TB treatment though there was no

significant difference between the compliant and non-compliant groups with respect to side effects ($P=0.191$).

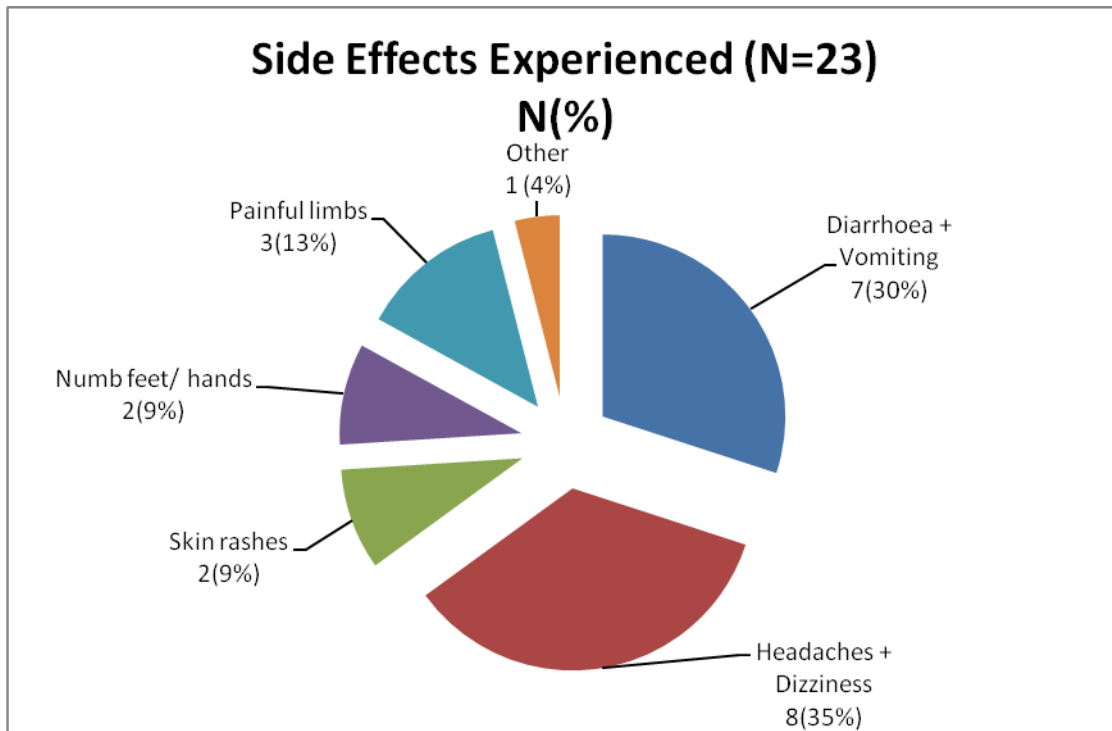


Figure 4.4: Side effects experienced by respondents while taking treatment

Time it took before you felt better? (N=49)

Respondents were asked how long it took them to start feeling better on TB treatment. Twenty-two (45%) of the patients took less than two months to feel better, 21 (43%) took between two and four months, two (4%) between five to six months, while four (8%) reported they never felt better at all. All the four who never felt better did not complete treatment. The time it took the respondents to feel better had no statistical significance with respect to compliance or non-compliance to treatment. There could have been recall bias and respondents who knew they had not

completed treatment could have used not feeling better to justify why they did not complete treatment.

Was TB treatment completed? (N=49)

Of the 49 respondents, 23 (47%) completed TB treatment while 26 (53%) did not.

What were your reasons for not completing TB treatment? (N=26)

The 26 respondents who were non-compliant and did not complete their treatment, gave 'feeling better' 7(27%), 'distance' 8(31%) 'lack of family support' 4 (15%), no food 2 (8%), side effects 2 (8%), other reasons 2 (8%) and medicines not working 1 (4%), as their reasons for not completing TB treatment (Figure 4.5, below).

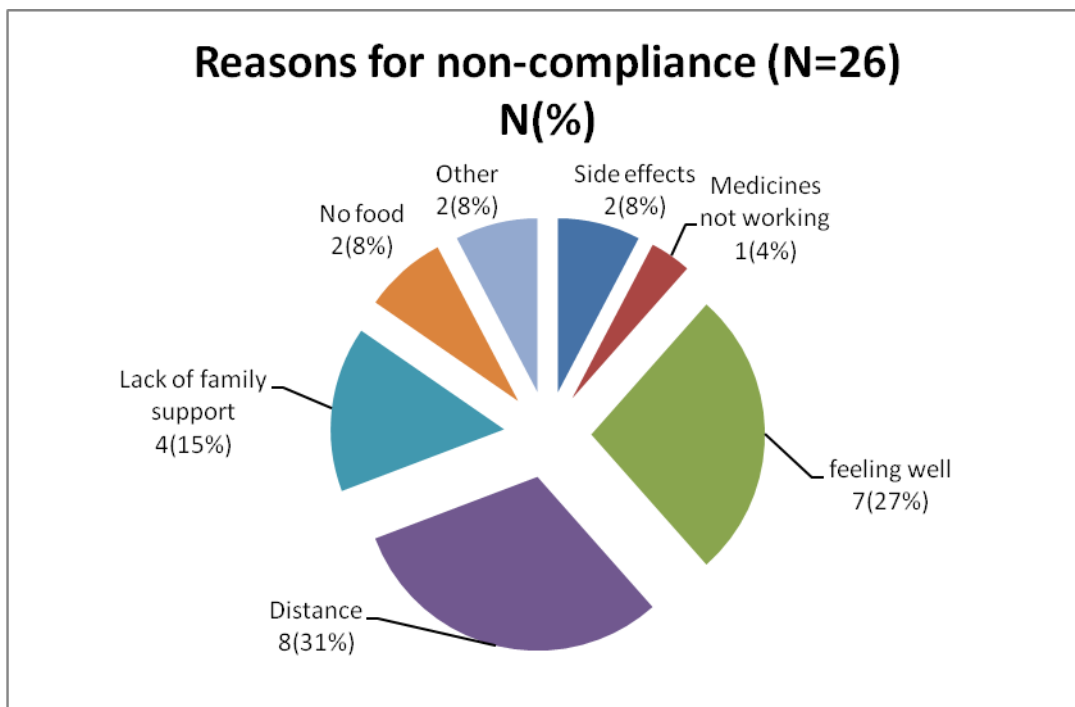


Figure 4.5: Reasons given for non-compliance

TB disease classification (N=49)

Of the 49 respondents, 48 (98%) had disease classification indicated. Thirty (61%) of these respondents had smear positive pulmonary TB (PTB SM+). The graph below (Figure 4.6) shows the distribution of disease classification. There was no significant difference between the two groups with respect to TB classification ($P=0.295$) although a higher proportion of those with PTB SM-, 7 (27%), were non-compliant compared with 3 (13%) who were compliant.

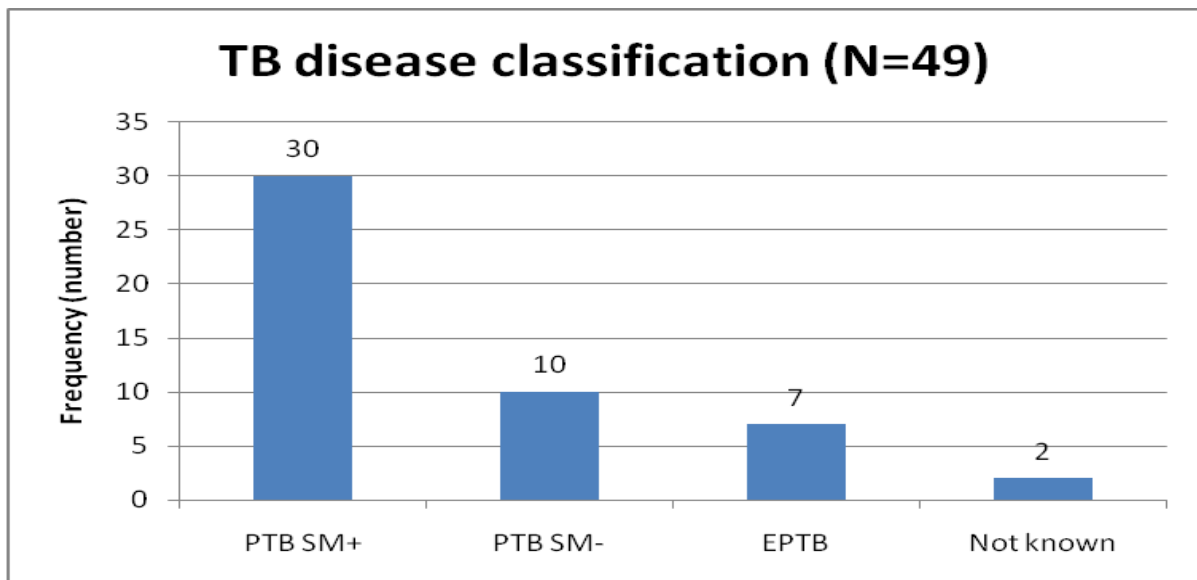


Figure 4.6: TB disease classification according to treatment card or TB register

HIV status (N=49)

Forty-five (92%) of the patients had an HIV test result, while 26 (58%) of all the respondents with an HIV test result were HIV positive. Seventeen (65%) of the 26 HIV positive respondents did not complete TB treatment compared to 8 (31%) HIV negative respondents. HIV status was not a significant factor contributing to compliance or non-compliance ($P=0.152$).

Was patient taking other medicines? (N=48)

Respondents were asked if they were taking other medicines besides TB treatment. A total of 48 responded and there was one non-response. Nineteen (40%) said they were taking other medicines while 29 (60%) said they were not. Taking other medicines was not significantly associated with compliance or non-compliance (P=0.863)

What other medicines were taken? (N=19)

All the 19 respondents who said they were taking other medicines were asked what they were taking. Sixteen (84%) were taking Highly Active Anti-Retroviral Therapy (HAART) and three were taking other unspecified medicines. Ten (60%) of the seventeen patients on HAART did not complete TB treatment, though being on HAART was not a significant factor affecting compliance or non-compliance (P=0.289). Table 4.7 (below) summarizes the disease and medicine factors.

Table 4.7: Disease and medicine related factors

Factors	Compliant N (%)	Non-compliant N (%)	Total N (%)	Significance	
				X ²	P
<u>Taking other medicines:</u> Yes No	9 (41) 13 (59)	10 (38) 16 (62)	19 (40) 29 (60)	0.30	0.863
<u>Which other medicines:</u> HAART Other	6 (75) 2 (25)	10 (91) 1 (9)	16 (84) 3 (16)	4.980	0.289

<u>HIV status:</u>					
Positive	9 (39)	17 (65)	26 (53)	3.766	0.152
Negative	11 (48)	8 (31)	19 (39)		
Not known	3 (13)	1 (4)	4 (8)		
<u>Disease classification:</u>					
PTB SM+	16 (70)	14 (54)	30 (61)	3.706	0.295
PTB SM-	3 (13)	7 (27)	10 (21)		
EPTB	4 (17)	3 (11)	7 (14)		
Not known	0 (0)	2 (8)	2 (4)		

Patient's opinion on what could make TB patients complete treatment (N=42)

This was an open question to the respondents seeking their opinion on what could make TB patients complete their treatment. Several varied responses were given including. Forty-two (86%) responded to these questions and seven did not. Eighteen (42%) of the respondents wanted food to be made available for patients taking treatments, six (14%) wished medicines they could access medicines for their other medical conditions at the same time (in the same clinic) rather than having to either queue again or go to a different facility (the hospital) for these, five (12%) said more staff should be availed at the TB clinic and another five said patients could be kept in hospital until they complete treatment. The rest of the responses ranged from patients advising other patients to listen to health workers and take their medicines as prescribed to asking for grants for patients on treatment to assist with travelling expenses.

4.11 SUMMARY

This chapter focused on presenting the research findings as data analysis and interpretation. The study revealed that the majority of the respondents defaulted

because of long queues at the clinic, lack of food in order to take medication and feeling better before completing the medication.

The next chapter will discuss these findings and conclusions and make recommendations based on them.

CHAPTER 5.

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents a discussion, the conclusion and recommendations made by the researcher. The discussion will focus on the research objectives of the study and compare the research findings with existing literature.

5.2 DISCUSSION OF FINDINGS

The present study has been one of the very few research endeavours to identify factors associated with compliance to TB treatment in Namibia. The researcher set out to identify factors affecting compliance to TB treatment in Andara district in Namibia and to determine those that contribute to some patients completing their TB treatments. Based on the findings, recommendations are then made to the Andara district management measures to improve TB treatment compliance.

Data was collected from respondents through structured questionnaires, all of which were then checked for completeness and appropriate cleaning performed. A statistician was consulted, entering data onto *MS Excel* spreadsheets and later exporting it to SPSS for analysis. SPSS was used to describe the data and identify significant differences between the compliant and non-compliant groups. Both SPSS and *MS Excel* were utilized to provide descriptive and graphical summary statistics in the form of pie charts, bar graphs and cross-tabulations. Chi-square tests of association were conducted to assess dependence relationships among potential factors. The following is a discussion of the findings in line with the study objectives.

5.2.1 Factors affecting compliance to TB treatment

TB treatment non-compliance is recognized as one of the major challenges in achieving TB control. Some of the most often cited factors contributing to non-compliance in developing countries include TB treatment illiteracy; the impression of being cured once medicines begin to take effect and the patient feeling better; medicinal side effects; economic problems; and transport challenges (Needham et al 1998:811; O'Boyle et al 2002:307; Peltzer et al 2002:55; Pushpanathan et al 2000:291). The factors discussed include those that are socio-demographic and economic, as well as those related to the patient (including knowledge of TB disease and treatment), to the health system, to default, disease and medicine, and to stigma and discrimination.

5.2.1.1 *Socio-demographic characteristics*

The socio-demographic factors included age, gender, and marital status, level of formal education, language and religion. Though there were more females (61%) than males (39%) in the compliant group, and more males (54%) in the non-compliant group, age was not a significant factor affecting compliance to TB treatment. Gender, marital status, language, religion and formal education level attained did not contribute to any significant difference between the two groups, though seven out of the nine patients with no formal education did not complete TB treatment. Most studies had similar findings with respect to gender, marital status, language and religion, but level of education has been found to contribute to treatment compliance (Balasubramanian et al 2004:352; Date et al 2005:680; Johansson et al 1999:868; Mishra et al 2005:1134).

5.2.1.2 Economic-related

Employment status, income and availability of food may affect TB treatment compliance. Only 27% of the patients were employed while 71% were unemployed, even though 64% of those employed were earning more than N\$800 per month. Only 25% of patients reported that food was always available to take their medicines with, while 69% did not always have food available and 40% who did not always have food did not complete their TB treatment. Availability of food was a significant factor affecting TB treatment compliance ($P=0.035$), while employment status and level of income were not associated with any significant difference between the compliant and non-compliant groups. Employment status and income did not significantly affect compliance to TB treatment, probably because most of the patients stayed within a walking distance of the TB clinic and thus no monetary cost was involved.

The findings are consistent with one conducted in India which did not find employment status and income to be significant factors affecting compliance to TB treatment (Pandit et al 2006:242). While the teaching, according to the Namibia TB guidelines, has always been that patients can still take their TB treatments, even if they have not eaten (Namibia 2006:59), TB patients in this district have often cited lack of food as a reason for discontinuing treatment. Therefore, the study findings show that this concern from patients should be taken seriously and addressed as it contributes to non-compliance. The implication is that unemployment results in food scarcity and lack of enthusiasm to take medication.

5.2.1.3 Patient-related

Smoking, drinking alcohol and availability of a treatment supporter are patient-related factors that will be discussed. The Namibian TB guidelines recommend that patients taking TB treatment should not smoke or drink alcohol, though doing so are not contraindications to treatment (Namibia 2006:91). The same guidelines also recommend that patients on TB treatment should where possible have a treatment supporter. A total of 29% of the patients had smoked in the previous six months, while they were still taking TB treatments, while 57% of the patients drank alcohol during treatment and about 58% who did so did not complete TB treatment.

The implications of patients taking alcohol while on treatment are twofold. Firstly, patients may forget to take their medicines when drunk, and secondly there may be more side effects to TB medicines, particularly when patients are taking other medicines, which may result in their being non-compliant. Smoking may result in delayed healing from treatment, in turn giving the patients the false impression that the TB medicines are not working and cause them not to be compliant. Almost all of the patients had a treatment supporter while they were taking treatments, though only 48% were compliant. Treatment supporters are expected to play the role of a DOT supporter, observing the patient swallowing the TB medicines. In reality this may not be the case as some of the treatment supporters do not even live with the patient and are therefore unlikely to observe the patient taking medicines all the time. Smoking, drinking alcohol and availability of treatment supporter were not associated with any significant differences between the compliant and the non-compliant groups.

5.2.1.4 Treatment literacy related

Patient knowledge about their disease and its treatment enhance treatment compliance. The patients' knowledge of symptoms of TB was very high as all respondents managed to identify coughing, chest pains, loss of weight and night sweats as presenting symptoms of TB. Knowledge of TB symptoms was however not associated with any significant difference between the compliant and non-compliant groups.

Knowledge of TB treatment duration was significant, as those patients who said TB treatment should not be taken for six months were more likely to be non-compliant ($P=0.026$), while 17% of all the TB patients said TB treatment should be taken until one feels better or well. Patients who said TB treatment should be taken until one felt better were more likely to be non-compliant and thus not complete TB treatment than patients who responded negatively ($P=0.038$). Lack of health education may result in patients not understanding the importance of complying with treatments and the ramifications of not completing treatments. It is important for all patients who have started on TB treatment to complete treatment as prescribed by the health worker according to the national guidelines. Failure to do so is associated with treatment failure and development of drug resistance. Bam et al (2005:51), in a Nepal cross-sectional study, found that 48% of non-compliant TB patients would discontinue TB treatment once they felt better and were free of symptoms, as they thought they were cured. Several other studies had similar findings about feeling better being associated with stopping TB treatment and non-compliance (Kaona et al 2004: 68; O'Boyle et al 2002: 307-12; Peltzer et al 2002:55; Pushpanathan et al 2000:216;).

5.2.1.5 Healthcare system

Health worker attitudes, clinic opening times, availability of medicines, and accessibility issues (distance and cost of getting to the health facility) have been shown in other studies to be important factors affecting TB treatment compliance. This is because health worker attitudes, such as being unfriendly to patients, tend to deter patients from seeking treatment or coming to collect medicines once they are finished. All the respondents in this study ranked the health worker attitudes from 'friendly' to 'very friendly', except one who ranked them as 'unfriendly'. Despite this, more than 50% of those who ranked the attitude as 'friendly' to 'very friendly' were non-compliant. The fact that the interviewer (RN) was a health worker could have been a limitation in getting accurate responses to this question. There is a possibility that respondents might have been influenced and may not have given honest responses. I tried to minimize this bias by having an RN who had not worked in the TB clinic previously.

Clinic opening times may be inconvenient, particularly to patients who are also employed, as the clinic times are often the same working hours of the patients. More than 60% of the respondents would prefer the clinic to have flexible opening hours, that is opening before 08h00 and closing after 17h00. Therefore, flexible hours may be necessary to cater for the employed patients.

All the respondents in the study reported that medicines were available each time they went to collect them. The supply chain system for medicines was therefore satisfactory. Medicine unavailability may mean that even if the patient comes on time

to pick up their medicines, if they are unavailable patients will inevitably be forced to interrupt treatment.

Distance and cost of travelling to the clinic were not significant factors affecting treatment compliance and it was interesting to note a significant proportion (63%) of patients who did not complete treatment were staying within five kilometres of the TB clinic and did not have to pay any money to travel there. This could mean that while distance and medicine availability may not be deterring factors for patients to come to pick up their medicines on time, other healthcare system factors such as health worker attitudes, clinic opening times and waiting times at the clinic could be influencing compliance to treatment. Other studies found that the further the clinic was from the patient the more chances the patient would be non-compliant (Bam et al 2005:54; Jaiswal et al 2003:625). Similarly, clinic opening times were not a significant factor affecting TB treatment compliance. This finding may be due to most of the patients being unemployed and therefore the usual clinic opening times being adequate for them. The time patients had to wait at the clinic before being attended to was however a significant factor contributing to treatment compliance, as the patients who waited longer than an hour were more likely to be non-compliant with treatment ($P=0.049$).

More than 82% of the respondents were supervised by a family member when taking their treatment. However, the high number of patients not complying with treatment but having a family member supervise the taking of medicines makes it doubtful that they were actually being observed doing so. If they were providing DOT properly, the family member would then have quickly notified the clinic, once they noticed the

patient was not taking treatments properly or once medicines were finished. DOT would ensure the patient does actually swallow their medicines at the right time and in the correct dosage. DOT status was not associated with any difference in treatment compliance.

5.2.1.6 Default factors

Default factors described include size (number of rooms) of the current dwelling, number of inhabitants and length of stay in the present dwelling. In this study a higher proportion of patients in the non-compliant group had stayed in their present residence for less than twelve months, had fewer rooms and a higher number of people living in the same house, though there was no significant difference between the compliant and non-compliant groups. The implications are that when patients have less stable living conditions they may not comply with treatments. Overcrowding may be a barrier to patients taking their medicines, as there may be no privacy. A study in Colombia however showed that the more unstable the patient in terms of a place to stay, the more likely those who stayed alone or in overcrowded environment (>2 per room) were to be non-compliant with TB treatment (Mateus-Solarte & Carvajal-Barona 2008:525).

5.2.1.7 Disease- and medicine-related

The disease and medicine-related factors include the TB disease classification, HIV status, co-morbidities and other medicines taken. Extra-pulmonary TB disease and patients taking other medicines are often associated with non-compliance due to longer treatment period, higher pill burden and higher incidence of medicine side effects (Tessema et al 2009:6). A total of 92% of all the TB patients were tested for

HIV and 58% were HIV positive. The HIV and TB co-infection rate among the patients is consistent with the Namibia co-infection rate of about 60% (Namibia 2008c:16). Of all patients taking HAART, 60% did not complete their treatment, though this was not statistically significant. According to the TB treatment guidelines, patients who are HIV positive and having TB are usually initiated on TB treatment first and only started on HAART once they are stabilized on TB treatment, depending on their level of immune-suppression (Namibia, 2006:61). Patients on HAART and TB treatment will have a higher pill burden than those not on HAART, which may affect treatment compliance negatively. In addition, the same patients may also experience more side effects to the medicines. Both these factors require health workers to intensify health education in patients co-infected with TB and HIV, to ensure they comply with all their treatment, because if they are not cured of TB, HAART will not work.

About 47% of all the patients had experienced at least one side effect of TB medicine, the commonest being headaches and dizziness (35%) and diarrhoea and vomiting (30%), even though side effects were not a significant factor affecting treatment compliance. Medicine side effects may discourage the patients from taking their treatments, particularly during the first weeks as they may actually feel worse on treatment. It is therefore important that side effects are managed as soon as they occur, as well as providing health education to the patients so that they anticipate them. This finding is not consistent with other studies (Janakan et al 2008:222; Okanurak et al 2008:160) which identified medicine side effects as factors affecting TB treatment compliance. In this study, patients' health status in the form of feeling

better once they started treatment was a significant factor associated with non-compliance. It was found that 45% of the patients took less than two months to feel better, while 43% took between two and four months, and 8% reported not feeling better at all. A patient feeling better on treatment is a sign that medicines are working well and the expectation is that the patient would be internally motivated and confident (self-efficacy) to continue taking their medicines until completion (performance accomplishments). This finding could be attributable to lack of health education that would inform the patient to continue until the treatment period is completed and until they are discharged by the health worker. Some 26 respondents did not complete their TB treatment, and they cited the following as the main reasons for non-compliance: distance from the facility (31%); feeling better (27%); lack of family support (15%); no food (8%); and side effects (8%). While only 'feeling better' and 'no food' were significant factors contributing to non-compliance, patients still perceived 'distance to the clinic', 'lack of family support' and 'side effects' as having contributed to their non-compliance to treatment.

5.2.1.8 Stigma and discrimination

Stigma and discrimination will cover disclosure issues. Some 98% of all patients had disclosed their TB status to a family member or friend. Only one respondent had not disclosed their TB status to anyone, giving 'no one to trust' and 'fear of being isolated by family and friends' as the reasons. The same respondent did not complete the TB treatment. Although disclosure status did not show any significant difference between the compliant and non-compliant group, the implications of non-disclosure, the patient perhaps not taking medicines on time, and DOT are difficult, as no family

or community member can observe the patient taking treatments. Kaona et al (2006:68) reported stigma and discrimination of TB patients as affecting treatment compliance.

5.2.1.9 Patient's opinion on improving treatment compliance

There were several responses from the patients when they were asked their opinion on what could be done to help TB patients complete their treatments. Forty-two (86%) responded to these questions and seven did not. Eighteen (42%) of the respondents wanted food to be made available for patients taking treatments, followed by six (14%) who wanted medicines to be provided in one place for those with other medical conditions requiring treatments, and five (12%) each for providing more staff at TB clinic and patients to be kept in hospital until they complete treatment. The patient responses reinforced the need to address food shortages and also to reduce waiting times at the TB clinics. It was also interesting to note that patients did not want only the waiting for a long time to be attended to but also queuing many times. Efforts should therefore be made to provide most services under the same roof or in the same room.

5.2.2 Self-efficacy

The discussion draws on the conceptual framework which is based on the self-efficacy model. Self-efficacy influences the possibility of an individual patient being motivated to comply with treatment. Patients can be verbally persuaded to take their treatments by either health workers through health education at the start of the treatment and reinforcement throughout treatment period and follow-up, or the treatment or DOT supporters. In this study it is clear that health education could be

strengthened as lack of knowledge of TB and treatment was a significant factor contributing to non-compliance to treatment. The treatment supporter role could also be improved by ensuring treatment supporters do observe the actual swallowing of medicines by the patients, and where a patient has missed their doses the supporter can encourage the patient to resume and continue taking their medicines. Verbal persuasion however does not provide the strongest self-efficacy as the motivation is derived externally. Health workers who have seen other patients complying with and completing their TB treatment could include these success stories in health education sessions, thus motivating them (vicarious experience). Performance accomplishments through taking treatment correctly and getting better on treatment should provide the strongest self-efficacy, as the patient will be internally motivated. However, feeling better had the opposite effects, probably more due to lack of education or information on why they need to complete treatment than to lack of belief in the TB treatment efficacy.

5.3 CONCLUSION

Patient compliance to TB treatment in Andara District, Kavango region of Namibia is associated with the availability of food with which to take medicines, patient waiting times at the TB clinic, and feeling better on treatment. One of the important areas for TB control programmes is to improve or enhance TB treatment compliance. This study suggests that reducing patient waiting times at the TB clinic, making food available to patients on TB treatment through linkages with social services and community programmes, and improving patient TB treatment literacy would improve

TB treatment compliance in Andara district. The focus of TB treatment literacy should be at four levels, namely patient, health worker, family and community.

5.4 LIMITATIONS OF THE STUDY

The limitations of this study were that only twenty-three (77%) of all TB compliant patients out of 30 patients in the random sample drawn could be located, as some had already left the area after completing their treatment. However, almost 88% of all the patients included in the study were located and thus included in the analysis.

5.5 RECOMMENDATIONS

Based on the findings from the study, the following recommendations are made:

5.5.1 Recommendations for further research studies

- Further research is needed to identify the comparison between male and female non-compliance to TB treatment in Andara district.
- Further research on non-compliance by respondents on HAART treatment should be conducted.

5.5.2 Recommendations to decrease non-compliance to tuberculosis treatment

The following recommendations are for the Andara district health management team to decrease non-compliance to TB treatment:

- Intensify health education to communities and all TB patients, particularly at the beginning of treatment, with reinforcement at each visit using the language locally used. The information should be complete encompassing

duration of treatment, and possible side effects and how to deal with them, in order for patients to make their own judgments on their capabilities. This will be in line with the foundation of this study.

- Reduce patient waiting times at the TB clinic by providing more nurses. Health professionals should be trained on customer service.
- Initiate income-generating activities to improve food provision for patients on TB treatment. Also, link TB patients to social services and community programmes that provide food.
- Initiate flexible hours for TB clinics to cater for the patients needs.
- Strengthen facility DOT for patients staying close to the health facility. This would enable as many patients as possible to be observed by a health worker when swallowing their medicines.
- Strengthen follow-up of patients who interrupt TB treatment before they actually default treatments.
- Involve TB patients in developing strategies to improve treatment compliance.
- As much as possible, try to provide a “one-stop-service” at the health facilities so that patients with multiple medical conditions can be attended to once and not have to queue several times to access different services in the same hospital or clinic.
- Promote task shifting of the nurses’ roles, such as dispensing medicines to lay counsellors and TB promoters assisting at the TB clinics. This would alleviate

the burden of work that is often experienced by nurses at the health facilities and improve efficiency. Patients may then not necessarily have to wait for long hours just to collect their medicines.

5.6 SUMMARY

This chapter has discussed the research findings, drawing on the research objectives and the conceptual framework. The Self-Efficacy model by Shortridge-Baggett and Van der Bijl formed the foundation of this study. Self-efficacy is the belief that one is capable of performing at a certain level to achieve certain goals. It is defined as “peoples’ judgments of their capabilities to organize and execute course of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses”. The conclusion then is that the respondents need to be taught in order to be able to make judgments of what they can do for them.

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Annexure 1: QuestionnaireIndividual Patient's Questionnaire Number:

Date of Interview: _____

Instructions:

ENTER THE OPTION IN THE BOX for all the questions using figures except for Qn.1 and Qn.35 for which you should enter text in the space providedSECTION A: DEMOGRAPHIC INFORMATION

Qn.1. Village: _____

Qn.2. Age in Years: 1. (18-25) 2. (26-33) 3. (34-41) 4. (42-49) 5. (50-57)
6. (58-65) 7. (66-73) 8. (>73)

Qn.3. Religion: 1. Christian 2. Islam 3. Other

Qn.4. Gender 1. Male 2. Female

Qn.5. Marital Status 1. Married 3. Separated 5. Cohabiting
2. Widowed 4. SingleQn.6. Language 1. Thimbukushu 3. Rukwangali
2. Rucqiriku 4. Barakwena 5. Oshiwambo 6. Other

Qn.7 How much formal education did you get?

1. None 3. Secondary
2. Primary 4. TertiarySECTION B: PATIENT RELATED FACTORS

Qn.8. Have you smoked cigarettes in the last 6 months?

1. Yes 2. No 3. Cannot remember

Qn.9. Did you drink alcohol in the last 6 months?

1. Yes 2. No 3. Cannot remember

Qn.10. Do you have a Treatment Supporter?

1.Yes 2. No

SECTION C: SOCIOECONOMIC VARIABLES

Qn.11. Employment Status 1. Employed 3. Unemployed

2. Self-employed

Qn.12. What is your income (N\$ per month)?

1.Low (<800) 2. Medium (800-2000) 3.High (>2000)

Qn.13. During the time you were taking TB medicines, what would say was your situation in terms of food availability?

1.Always available to take with medicines 3.Not always available

2.Available most of the time 4. Never available

SECTION D: HEALTH-CARE SYSTEM RELATED

Qn.14. What would be the most convenient TB clinic opening times for you?

1.[<8am- 5pm] 3.[8am- >5pm]

2. [8am- 5pm] 4.[<8am- >5pm]

Qn.15. How much time do you usually wait at the TB clinic before being attended?

1.[<1hr] 2.[1-2 hrs] 3.[>2hrs]

Qn.16. Where do you normally collect your TB medicines?(Name of facility)

1.Andara 3. Omega 5. Mutjiku 7. Bagani 9. Divundu

2.Shadikongoro 4. Mayara 6.Biro 8. Kangongo

Qn.17. How much distance do you travel to collect your TB medicines (Km?)

1.[<5] 2.[5-10] 3.[11-15] 4.[16-20] 5.[>20]

Qn.18. How much does it cost you to get to the health facility (N\$)

1.Nothing (walking distance) 2.[<10] 3.[10-15] 4.[>20]

Qn.19. Who supervised you when you were taking your TB medicine? (DOT Status)

1.None. 3. Health Worker at the facility.

2. Family member 4. Community member

Qn.20. How would you rate the attitude of staff who attended you at the health facility?

1.Very friendly 2. Friendly 3.Indifferent

4.Unfriendly 5. Very unfriendly

Qn.21. When you went to pick your medicines at the TB clinic, what would you say about the availability of medicines there?

1.Always available 2. Sometimes not available

Qn.22. I just want to take some time to find out what you know about TB. The following is/ are symptoms of TB

a) Coughing [1.Yes 2. No]

b) Night sweats [1.Yes 2. No]

c) Loss of Weight [1.Yes 2.No]

d) Chest Pains [1.Yes 2.No]

Qn.23. TB treatment should be taken until [Yes or No]

a) 6 months [1.Yes 2.No]

b) One feels better then stop on your own [1.Yes 2.No]

c) 6 months completed and health worker tells you to stop [1.Yes 2.No]

SECTION E: DEFAULT FACTORS

Qn.24. Who do you live with?

1.Family 2. Friends 3. Alone 4. Other

Qn.25 How many other people live with you? 1.(0) 2.(1-3) 3.(4-6) 4.(>7)

Qn.26. How big is your dwelling/ house (number of rooms)?
1.(1-2) 2.(3-4) 3.(>5)

Qn. 27. How long have you stayed in your current dwelling/ house?
1. (<3 months) 2. (3-12 months) 3. (>12 months)

SECTION F: STIGMA and DISCRIMINATION

Qn.28.a. Did you inform your family of friends that you were on TB treatment?
1. Yes 2.No

Qn.28.b. If no, why?
1. Fear of being isolated by friends or relatives 3. Other
2. No one to trust

SECTION G: DISEASE AND MEDICINE RELATED

Qn.29.a. Did you experience any side effects when you were taking TB treatment?
1.Yes 2. No

Qn.29.b If Yes to above question, which side effects did you experience?
1.Diarrhoea & Vomiting 3. Skin rashes
2.Headaches and dizziness 4.Numb feet or hands
5. Yellow eyes 6. Painful limbs 7.Other

Qn.30. From the day you started taking your TB medicines, how long
did it take you before you felt better? (months)
1.[<2] 2.[2-4] 3.[5-6] 4.[Did not feel better]

Qn.31.a Did you complete your TB treatment?
1.Yes 2.No

Qn.31.b. If the response to the above question is No, what were the reasons for you
to stop treatment? 1.Side effects 2.Feeling well 3.Too many tablets

4.Stigma 5.Distance 6.Cost of travel 7.Lack of family support 8.No food

9.Inadequate supply of medicines 10. Medicine not working

12.Not feel better on medicines 13.No reason l) Other

Qn.32. Disease Classification (Tick appropriately according to treatment card or TB register) 1.PTB-SM+ 2. PTB-SM-3. EPTB 4. PTB and EPTB 5.Not Indicated

Qn.33. HIV Status (as indicated on TB treatment card or TB register)

1.Positive 2. Negative 3. Not Known/indicated

Qn.34.a. Was the patient taking other medicines besides TB treatment

1.Yes 2.No

Qn.34.b. If yes to the above question, which medicines was the patient taking?

1.HAART 3.Psychiatric (antipsychotic, antidepressants)

2.Anti-hypertensives 4.Other

Qn.35. In your opinion, what could make patients complete their TB treatments?

-----THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION-----

Annexure 2: Patient consent

PATIENT CONSENT FORM

Study title: Factors Affecting Compliance to Tuberculosis Treatment in Andara District, Kavango, Namibia.

Investigator : Dr Kudakwashe Chani

Dear Sir/ Madam

Dr Kudakwashe Chani is conducting a study to identify factors contributing to patients taking or not taking their TB medicines correctly. The findings of the study will be used to improve TB patient care management and thus reduce further spread of TB in the community.

The study and its procedures have been approved by the Ministry of Health and Social Services as well as the Unisa ethics committee. A trained interviewer will administer a questionnaire in order to collect data and it should take about 30 minutes to complete. There are no foreseeable risks associated with the interview and you can contact me on the following cell phone number, 0812329369 or to contact the Principal Medical Officer of Andara Hospital, if you have any further questions after the interview?

Your participation in this study is voluntary. I therefore request you to assist with answering the questions included in this questionnaire. The information you may give us today could help us achieve this. Please note that any information which may identify you will be kept

strictly confidential and your responses will in no way lead to any adverse effect on you and no medical care will be withheld from you because of the responses you may provide.

If you agree to this interview, you may sign below but if you do not agree, you can let me know at this point and I will not proceed with the interview.

Signature/ Thumb print of respondent.....

Date.....

Annexure 3: Clearance certificate from UNISA

**UNIVERSITY OF SOUTH AFRICA
Health Studies Research & Ethics Committee
(HSREC)
College of Human Sciences
CLEARANCE CERTIFICATE**

Date: 20 August 2009 Project No: 3733 444 1

Project Title: **FACTORS AFFECTING COMPLIANCE TO TUBERCULOSIS
TREATMENT IN ANDARA DISTRICT KAVANGO REGION OF
NAMIBIA**

Researcher: **Chani Kudakwashe**
Supervisor/Promoter: **Dr BL Dolamo**
Joint Supervisor/Joint Promoter:
Department: **Health Studies**
Degree: **MPH (Master's degree in Public Health)**

DECISION OF COMMITTEE

Approved Conditionally Approved

Date: 20 July 2009

Dr BL Dolamo (supervisor
gshers
Prof VJ EHLERS
RESEARCH COORDINATOR: DEPARTMENT OF HEALTH STUDIES

Annexure 4: Permission letter from Ministry of Health

12-NOV-2009 14:37 From:

To: 245239

P. 1 / 1



9.0/0001

REPUBLIC OF NAMIBIA

Private Bag 13198
Windhoek
Namibia

Ministry of Health and Social Services

Ministerial Building
Harvey Street
Windhoek

Tel: (061) 2032562

Fax: (061) 272286

E-mail: hilmanangombe@yahoo.com

Date: 19th October 2009

Enquiries: Ms. H. Nangombe Ref.: 17/3/3/AP

OFFICE OF THE PERMANENT SECRETARY

Dr K. Chani
P. O. Box 22780
Windhoek
Namibia

Dear Dr. Chani,

Re: Factors affecting compliance to TB treatment in Kavango Region Namibia.

1. Reference is made to your application to conduct the above-mentioned study.
2. The proposal has been evaluated and found to have merit.
3. Kindly be informed that approval has been granted under the following conditions:
 - 3.1 The data collected is only to be used for academic purpose,
 - 3.2 A quarterly progress report is to be submitted to the Ministry's Research Unit;
 - 3.3 Preliminary findings are to be submitted to the Ministry before the final report,
 - 3.4 Final report to be submitted upon completion of the study;
 - 3.5 Separate permission to be sought from the Ministry for the publication of the findings.

Yours sincerely,


MR. S. KAHULU
PERMANENT SECRETARY



"Health for All"

Annexure 5: Permission letter from CHS Director

**CATHOLIC HEALTH SERVICES**

17 Jan Jonker Road, PO Box 11525, Windhoek, Namibia
 Tel: (061) 224798 / 225265 / 259554 / 259847. Fax: (061) 248126.
 eMail: info@chs-namibia.org , Website: www.chs-namibia.org

Andara, Nyangana, Oshikuku, Rehoboth, Aroab, Bunya, Okatana, Sambyu, Tondoro, Anamulenge, Iyateko, Mayara, Mbambi, Old Bagani, Oshitutuma, Shinungwe

ASSOCIATION INCORPORATED UNDER SECTION 21

19 August 2009

To Dr Kudakwashe Chani
 PM/ CMO
 CHS
 Windhoek

Dear Dr Chani

Re: APPROVAL OF CONDUCT OF PROPOSED STUDY

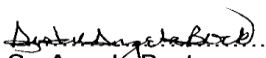
This is a response to your proposed study entitled: "The Factors affecting Compliance to TB Treatment in Andara District, Kavango, Namibia".

I am pleased to inform you that the Catholic Health Services (CHS) has no objection in the conduct of the proposed study. However, it will still be forwarded to the MoHSS Research Unit for consideration.

Please ensure that any major alterations to the methodology are communicated to the CHS before proceeding, and adhere to all ethical principles as stated in the current proposal. Although the research is for academic purposes, CHS would appreciate to receive a copy of the final report approved by your University.

Finally, by a copy of this letter, the PMO of Andara District Hospital is informed of the approval of the conduct of this study.

Yours sincerely,


 Sr. Angela Bock
 Director of Health
 Catholic Health Services

Cc: Dr K. Bunjira, PMO Andara District Hospital

Directors: Archbishop L. Nshanda, Bishop J. Shikongo, Bishop P. Pöllitzer, T. Solomon, Sr. L.G. Thengumthottathil, Sr. M. Haila, Sr. M. Magdalena Shetunjenga, Sr. B. Bohetile, Sr. Angela Bock (Dir. Health)