TREATMENT INTERRUPTION IN TUBERCULOSIS PATIENTS IN A DISTRICT OF NAMIBIA

By

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To my parents

Student Number: 35-757-299

D E C L A R A T I O N

I declare that **TREATMENT INTERRUPTION IN TUBERCULOSIS PATIENTS IN A DISTRICT OF NAMIBIA** is my own work, 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.

Trust Zaranyika **20 February 2012**

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TREATMENT INTERRUPTION IN TUBERCULOSIS PATIENTS IN A DISTRICT OF NAMIBIA

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ABSTRACT

The purpose of the study was to investigate the factors associated with the interruption of tuberculosis treatment in the Swakopmund district of Namibia. A descriptive cross-sectional survey was conducted. Data was collected using a structured questionnaire administered by interviewers. The population consisted of both treatment interrupters and non-interrupters. The total sample was 143 respondents. The findings revealed that three factors were significantly associated with TB treatment interruption, namely a lack of formal education ($p = 0.032$), lack of access to media ($p = 0.017$), and clinic opening times ($p = 0.000$). Recommendations made include improving the support given to TB patients, increasing their understanding of TB and adopting new research and technology.

KEY CONCEPTS

Treatment interruption; defaulting; directly observed therapy (DOT); Category I; Category II

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

AIDS	acquired immune deficiency syndrome
ART	antiretroviral therapy
ARVs	anti-retrovirals
COMBI	communication for behavioural change
DOT	directly observed therapy
DOTS	directly observed treatment, short course
HIV	human immunodeficiency virus
MDR	multi-drug resistance
MTB	mycobacterium tuberculosis
NTP	National Tuberculosis Programme (Namibia)
PTB	pulmonary tuberculosis
SAT	self-administered treatment
STD	sexually transmitted disease
TB	tuberculosis
WHO	World Health Organisation
XDR	extensively drug-resistant

CHAPTER 1
ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Tuberculosis (TB) is a public health priority as it is the most common cause of curable infectious disease worldwide. In order to avoid the emergence of drug resistance, the cure of sputum positive cases is essential. Adherence to treatment must therefore be ensured.

The Swakopmund district is in the west of Namibia, a country that has one of the highest TB case notification rates in the world. The point estimate African regional case notification rate for TB is estimated at 332 per 100 000 of the population. The Namibian case notification rate stood at 822 per 100 000 of the population in 2004 (WHO 2011:13; Namibia 2006a:i).

The National Tuberculosis Programme (NTP) in Namibia reports that one out of every six TB patients interrupts TB treatment. This is a big problem for both patients and their communities. Drug therapy is the most important intervention for TB control, because it stops transmission. When patients stop their TB drugs, transmission is increased and drug resistance may develop (Namibia 2006a:128).

The reasons for TB treatment interruption have not previously been studied in the Swakopmund district. Chapter 2 presents a literature study looking at what is currently known about the phenomenon of TB treatment interruption.

1.2 BACKGROUND TO THE STUDY

1.2.1 Introduction

The Swakopmund district annual reports from 2005 to 2007 reveal that treatment success for smear positive TB cases was 80% in 2005 and 87% in 2006, while in 2007 it dropped to 78%. At the same time the defaulter rate, which reflects treatment interruption, was 5% in 2005 and in 2006, but increased to 13% in 2007. Defaulter rate is defined as the number of patients who interrupted treatment for two consecutive months or more divided by total cases for the year, expressed as percentage (Namibia 2006a:3). An increase in defaulter rate will reduce the treatment success rate, because

it is a negative outcome for a TB patient and will reduce the total number of patients who are cured or complete a TB treatment course successfully.

The current situation reflected by these figures (refer to Table 1.1) needs investigating (Namibia 2008d:30).

TABLE 1.1: SWAKOPMUND DISTRICT TB TREATMENT SUCCESS AND DEFAULTER RATES 2005–2007

YEAR	TREATMENT SUCCESS	DEFAULTER RATE
2005	80%	5%
2006	87%	5%
2007	78%	13%

In the case of smear negative TB patients in the Swakopmund district, the defaulter rate showed an increase from 3% in 2005 to 5% in 2006 and 6% in 2007. Smear negative patients are TB patients in whom TB sputum microscopy performed, usually on three specimens, does not identify the presence of TB bacilli (as opposed to smear positive TB, where TB microscopy confirms the presence of bacilli). A study in Thailand noted that treatment completion was lower in smear negative TB patients compared to smear positive (Jittimannee, Kateruttanakul, Madigan, Jittimannee, Phatkrathok, Poomichaiya & Panitrat 2006*:*338-44).

At national level, the TB treatment defaulter rate for Namibia was estimated at 13%. This figure represented a big national problem for patients and carers (Namibia 2006a:3). The national target for treatment success is 85%. The current treatment success rate for the African region is 81% (WHO 2011:39). Patient compliance is the key to success, and an effort must be made to solve this problem in the district under consideration.

Drug resistance is a serious negative outcome of interruption of TB drug therapy. This may take the form of multi-drug resistance (MDR), which means resistance to isoniazid and rifampicin, two very effective TB drugs. Previous treatment was recognised as the strongest determinant of MDR, and a detailed study of the reasons for inadequate treatment was suggested as a way of improving control strategies (Faustini, Hall & Perucci 2006:158–63).

The exact number of MDR patients in Namibia is not known, as there was no MDR surveillance system in place at the time of the study. Taking into account the annual utilisation of the second-line drug, amikacin, estimates are that there may be up to 150 MDR patients per year in Namibia (Namibia 2006a:1). The estimated prevalence of resistant TB in the country is 2% in new TB patients and 8% in re-treatment cases, according to data from the 2008 national TB resistance survey (Namibia 2009c:2). The number of prevalent cases of MDR TB has a direct influence on the active transmission of strains of MDR TB (WHO 2011:20). This problem is further compounded by the high HIV prevalence rate (17.8%) in Namibia (Namibia 2008c:14).

1.2.2 Directly observed therapy (DOT)

Directly observed therapy (DOT) means that a trained person observes a TB patient swallowing TB medicines every time as prescribed. In Namibia, DOT is regarded as the best method for ensuring compliance throughout the entire treatment (Namibia 2006a:61). It is impossible to predict who will or will not comply with TB treatment. The use of DOT is particularly important in the intensive phase of treatment, where the bacillary load is highest. A high bacillary load increases the risk of transmission in the community.

According to the World Health Organisation (WHO), DOT is the only proven way of achieving global treatment success targets, especially in developing countries (Namibia 2006a:12). Community volunteers play a crucial role in supporting TB patients in the community. In the Swakopmund district, DOT is provided mostly by relatives or treatment supporters, health workers at the clinics, employers and community health workers. Some patients receive their treatment at their workplaces. However, despite the input of these volunteers, stigma can contribute to non-completion of TB treatment (Suri, Gan & Carpenter 2007:S505–11). It may also be that some patients stop taking their treatment when they feel better.

Namibia has adopted the WHO treatment guidelines, which use five first-line TB drugs, namely rifampicin, isoniazid, pyrazinamide, ethambutol and streptomycin. These TB medicines are given as fixed-dose combination drug formulations packed in blister pack strips. First-line regimens are divided into Category I and II regimens. The initial (intensive) phase of treatment covers the first two months of treatment for patients on

Category I and three months of treatment in patients on Category II. Three to five drugs are given during this critical phase to ensure that the majority of TB bacilli are killed. After this phase, the continuation phase of treatment begins. This less critical phase lasts four months for Category I and five months for Category II patients. Two (in Category I) or three (in Category II) different TB drugs are used in the continuation phase, since the population of live TB bacilli is now smaller and less likely to contain resistant organisms. Each daily dose should ideally be administered as DOT in both the intensive and continuation phases, as the regimens include rifampicin (Namibia 2006a:45–48).

1.3 RESEARCH PROBLEM

The research problem is that it is not clear which factors might affect TB treatment interruption in TB patients in the Swakopmund district, Erongo Region, Namibia. At the time of this study there was no published research on factors contributing to TB treatment interruption in Swakopmund district. The present study will contribute to the body of knowledge of this phenomenon in the Swakopmund district of Namibia.

1.4 PURPOSE OF THE STUDY

The purpose of the study is to investigate and identify factors which may have an effect on TB treatment interruption in TB patients in Swakopmund district, Erongo region, Namibia.

1.5 RESEARCH METHODOLOGY

The research methodology will be discussed in detail in Chapter 3.

1.5.1 Research strategy

This descriptive cross-sectional study is done by means of a survey.

1.5.2 Research setting

The study was done at the TB clinics in the towns of Swakopmund, Arandis and Henties Bay in the Swakopmund district, from January 2007 to December 2008.

The population was made up of patients who started TB treatment in the Swakopmund district from January 2007 to December 2008. All were above 15 years of age; very ill patients and drug resistant cases were excluded from the study.

1.5.3 Sampling

The sampling method used in this study is a non-probability form of sampling, namely purposive sampling.

1.6 RATIONALE OF THE STUDY

This study is essential because TB treatment interruption is known to be related to adverse outcomes. The importance of treatment interruptions, and their effect on outcomes of TB treatment, was shown in a retrospective study in Russia (Jakubowiak, Bogorodskaya, Borisov, Danilova & Kourbatova 2009:362–8). That study noted that treatment interruptions were frequent. In the intensive phase, 63% of the eventual defaulters interrupted treatment, compared to 36% of the patients in the eventual treatment success group. In the continuation phase, 30% of the eventual defaulters and 45% of the eventual treatment success patients interrupted treatment. The period of treatment interruption ranged from 1 to 127 days. The probability of default was greater than or equal to 50% in patients who missed two to three consecutive days of treatment in the intensive phase or at least one day in the continuation phase.

An understanding of treatment interruption and its determinants in settings with a high HIV prevalence is essential to assist in designing effective interventions to limit the development and spread of drug-resistant TB, including extensively drug-resistant (XDR) TB, as defined by the Centers for Disease Control (CDC 2006:2792). High quality directly observed treatment, short-course (DOTS) is affordable and effective, especially in resource-poor settings (USAID 2011).

1.7 DEFINITION OF TERMS

1.7.1 Treatment interruption

For the purpose of this study, treatment interruption will be defined as missing a cumulative total of seven or more days of TB treatment. This term will be used interchangeably with the phrase “did not complete treatment”.

1.7.2 Defaulter rate

For the purposes of this study, the defaulter rate will be regarded as the number of TB patients missing two months or more of TB treatment after completing at least four weeks of TB treatment, divided by the total number of TB patients for a given period (refer to paragraph 1.2.1).

1.7.3 Directly observed therapy (DOT)

DOT means that a trained person observes a TB patient taking and swallowing their TB medicines each time. This is a WHO concept (Namibia 2006a:11).

1.7.4 Category I treatment

Category I treatment consists of a two-month initial phase of rifampicin, isoniazid, pyrazinamide and ethambutol daily followed by four-month continuation phase of rifampicin and isoniazid daily. This six-month regimen has been favoured by the WHO for all settings since 2004 (Wells, Konduri, Chen, Lee, Ignatius, Gardiner & Schwalbe 2010:1538–47).

1.7.5 Category II treatment

Category II treatment has a three-month initial phase which is subdivided into two months of rifampicin, isoniazid, pyrazinamide and ethambutol daily and streptomycin on weekdays followed by one month of rifampicin, isoniazid, pyrazinamide and ethambutol daily. The continuation phase consists of five months of rifampicin, isoniazid and ethambutol daily.

1.8 ORGANISATION OF THE STUDY AND CONCLUSION

This chapter briefly introduced the present study, which is laid out as follows:

- Chapter 1 presents the orientation to the study.
- Chapter 2 covers the literature review.
- Chapter 3 describes the research design and methodology.
- Chapter 4 is the analysis, presentation and description of the research findings.
- Chapter 5 draws together the conclusions and recommendations.

The study seeks to contribute to an understanding of TB treatment interruption and its determinants to assist in the design of effective interventions which will improve outcomes for TB patients.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

Data obtained from the district annual reports in Swakopmund from 2005 to 2007 reveal an increasing defaulter rate in the use of TB medicines in the district (Table 1.1). The national target for treatment success is 85%. Since patient compliance is the key to success, it is important that this problem be solved in the Swakopmund district (Williams, Alarcon, Jittimanee, Walusimbi, Sebek, Berga & Villa 2008; Namibia 2006a:59).

2.2 DIRECTLY OBSERVED TREATMENT SHORT-COURSE (DOTS) AND SELF-ADMINISTRATION

There is an inherent problem of regularity in drug intake with respect to long-term treatments such as TB. Since the period of self-administered treatment is very long, it is viewed as a problem which may lead to treatment interruption. For patients on self-administration, interruption of treatment is more likely in developing countries (Lewin, Dick, Zwarenstein & Lombard 2005:250–9).

In 1993, the WHO introduced the DOTS strategy, which consists of five components, namely:

- political commitment by governments
- improved laboratory services
- a continuous supply of good quality drugs
- a reporting system to document the success or failure of the treatment of the individual patient and the TB programme itself
- effective case management through direct observation of treatment by an independent and trained third party (Frieden & Sbarbaro 2007:30–33).

As was indicated in the first chapter, in Namibia DOT is regarded as the best method for ensuring compliance throughout the entire treatment. The use of DOT is particularly important in the intensive phase, when the bacillary load is at its highest. A high bacillary load increases the risk of transmission in the community.

Community volunteers play a crucial role in supporting TB patients on treatment in the community. For example, they act as TB lifestyle ambassadors who encourage patients to complete their treatment. However, despite the DOTS strategy, stigma remains a factor that can contribute to non-completion of TB treatment (Namibia 2006a:61; Suri et al 2007:S505–11) (See paragraph 2.3.9).

Many other factors can contribute to treatment interruption in the context of a DOT programme. A study in Hong Kong by Chang, Leung and Tam (2004:1492–8) found that current smoking, past TB treatment with default, and poor adherence at the beginning of treatment were strongly associated with treatment interruption. Hospitalisation, on the other hand, was found to be protective.

A systematic review comparing DOT and self-administered treatment (SAT) found no statistically significant difference between DOT and SAT. DOT was found to have no quantitatively important effect on either treatment completion or cure in patients receiving TB treatment (Volmink & Garner 2007:CD003343). According to this systematic review, DOT and SAT lead to similar treatment outcomes. This finding is contradicted by a 2007 national TB prevalence survey in the Philippines showing a significant decline in bacteriologically confirmed TB in 10 the years following the launch of DOT in 1996 in that country. This decline in TB burden occurred despite an increase in the overall magnitude of poverty in the Philippines, and is attributed to treatment of infectious TB patients through DOTS (Tupasi, Radhakrishna, Chua, Mangubat, Guilatco, Galipot, Ramos, Quelapio, Beltran, Legaspi, Vianzon & Lagahid 2009:1224–1230).

A study on DOT identified five major themes that lead to treatment interruption (Noyes and Popay 2007:227–43). These are:

- socio-economic circumstances
- material resources and individual agency
- explanatory models and knowledge systems about TB treatment
- experience of stigma and public discourse on TB
- sanctions, incentives and support, and social relationships of care.

2.3 FACTORS CONTRIBUTING TO TREATMENT INTERRUPTION

The factors that cause treatment interruption are complex and dynamic (Munro, Lewin, Smith, Engel, Fretheim & Volmink 2007a:238; Sagbakken, Frich & Bjune 2008). These factors will be elaborated on in this section.

2.3.1 Health promotion theories as explanation of adherence behaviour

A number of theories have been put forward to try to explain the adherence behaviour of patients in general; these can also be applied to TB patients. Health promotion theories that apply to individual behaviour are: the health belief model, the theory of reasoned action, social cognitive theory, and transtheoretical (stages of change) theory. These theories explain health behaviour at the individual level. It is important to note, however, that a study in South Africa in 2007 reviewed the usefulness of health behaviour theories in developing interventions to promote adherence to TB and HIV medications but found little evidence in support of these theories (Munro, Lewin, Swart & Volmink 2007b:104). Further studies and models to find ways of improving adherence to long-term treatments were suggested by other authors, but the effects of these still need to be evaluated (Nutbeam and Harris 2004:10–23).

A review of 38 systematic reviews on the effectiveness of adherence interventions has also been done. This review of reviews found some adherence interventions to have a theoretical explanation, such as incentives and reminders, but some effective interventions had no theoretical explanation at all. Van Dulmen, Sluijs, Van Dijk, De Ridder, Heerdink and Bensing (2007:55) identified a need for further study in this area.

2.3.2 Support for TB patients on treatment

The responsibility for TB treatment and completion should not be left to the TB patient alone. Patients must not carry the sole responsibility for adherence; this has to be a team effort. In interaction with patients in Namibia, the researcher noted a lack of psychological support from close relatives and the community at large. DOT is not optimal without moral support, bonding and mutual respect (Namibia 2006a:61).

A quantitative study done in India associated treatment interruption with poor interpersonal communication and lack of attention and support. Health care workers'

mistakes and behaviour can lead to discontinuation of treatment (Jaiswal, Singh, Ogden, Porter, Sharma, Sarin, Arora & Jain 2003:625–33). Another study graded the communication ability of TB medication dispensers as good, fair or poor. Respondents rated the way the dispenser communicated use of medication, associated side effects, benefits and risks of non-adherence as well as the respect shown by the dispenser for the patient's autonomy and integrity. It was found that poor or fair grades for communication were associated with non-adherence (Mishra, Hansen, Sabroe & Kafle 2006:29–37).

2.3.3 Access

Access to treatment is an important factor determining treatment interruption. Lack of transportation and large distances from the health centres are associated with non-adherence. Movement to another area and losing contact with the treatment centre is also a factor (WHO 2003).

Some of the reasons given for ineffective DOT implementation are rigidity of clinic time tables, lack of staff motivation, and poor relations between staff and patients (Namibia 2006a:1; Lewin et al 2005:250–9).

2.3.4 Side effects of TB medication

Authors studied noted that unwanted side effects were an important factor contributing to treatment interruption (Jaiswal et al 2003:625–33). Studies comparing fixed drug combinations with free drug components are limited. The term 'free drug components' refers to single dose formulations, which include rifampicin, isoniazid, pyrazinamide and ethambutol. A systematic review finds that fixed drug combinations result in a 26% reduction in non-compliance (Bangalore, Kamalakkannan, Parkar and Messerli 2007:713–19). It is important to note, however, that of the nine studies that met the criteria for inclusion in this review, only two related to TB patients.

The NTP currently uses fixed drug combinations. These are combinations of four drugs (rifampicin, isoniazid, pyrazinamide, ethambutol), three drugs (rifampicin, isoniazid, ethambutol) or two drugs (rifampicin and isoniazid) which are given according to weight categories, diagnostic classification and treatment regimen (Namibia 2006a:48). Fixed drug combinations have the advantage of preventing monotherapy (reducing the

likelihood of TB drug resistance) and also simplify regimens for patients and doctors, procurement and distribution systems. They may increase adherence, but supporting evidence for this scarce (Wells et al 2010:1538–47).

2.3.5 Co-morbidity

A retrospective study shows that all causes of interruption of anti-TB medication occur with similar frequency in HIV positive and HIV negative individuals. This is despite the greater rate of side effects to TB medicines found in HIV positive individuals compared to HIV negative TB patients (Breen, Miller, Gorsuch, Smith, Schwenk, Holmes, Ballinger, Swaden, Johnson, Cropley & Lipman 2006:791–4). The rate of co-morbidity for TB and HIV is 59% in Namibia (Namibia 2009a:14).

2.3.6 Knowledge, beliefs, perceptions and unknown factors

A lack of knowledge of the disease (TB) and its treatment can contribute to interruption. Conversely, the knowledge that TB is curable can be an important factor in encouraging compliance. However, a qualitative study in Limpopo province of South Africa found that knowledge, socio-demographic factors, health-seeking behaviour and health beliefs were not significant factors in TB treatment interruption (Peltzer 2002:55–67).

TB patients may start to feel better and stop taking their medication when they feel that they are cured. Treatment seems to become less important and more inconvenient when one is feeling better. Taking treatment erratically (as opposed to absconding from the treatment programme) is noted as a problem. Erratic medication is associated with the development of drug resistance, whereas stopping all medication is less likely to lead to selection of resistant TB organisms (Namibia 2006a:69–72).

Sometimes a TB patient will not provide the reasons for interruption, opting rather to keep this information to themselves. These are non-spoken issues that influence the phenomenon of treatment interruption (WHO 2003).

Western medicine and traditional medicine coexist in most of Africa. In a personal communication with the researcher, a patient revealed that a traditional healer had asked him to stop his TB medication. This indicates that cultural perceptions of disease

are very important (personal interview with non-identifiable person, August 2008). It is possible that culture may play a more significant role than is realised.

2.3.7 Family, work and migration issues

Family commitments may be another factor leading patients to interrupt treatment. In the perception of the researcher, the inconvenience of having small children at home and having to bring them along to the health centre or clinic may cause some patients to tire of the treatment programme.

Work problems and work commitments may also cause some TB patients to interrupt, for example when employers do not understand the importance of the treatment (Jaiswal et al 2003:625–33; WHO 2003). A study in Malawi reported TB patients being dismissed from work due to illness and being denied continuation of employment after completion of treatment (Somma, Thomas, Karim, Kemp, Arias, Auer, Gosoniu, Abouihia & Weiss 2008:856–66).

2.3.8 Socio-economic factors

A retrospective study in Russia identifies alcohol abuse, homelessness and lack of social support as socio-economic factors that lead to non-adherence (Jakubowiak, Bogorodskaya, Borisov, Danilova and Kourbatova 2007:46–53). Alcoholism, especially, is recognised as a complicating factor when it come to non-adherence (Jaiswal et al 2003:625–33).

In Nepal, unemployment, low-status occupation, low annual income and a high cost of travelling are associated with interruption. However, living conditions, literacy levels and difficulty financing treatment are found not to be associated with treatment interruption (Mishra, Hansen, Sabroe & Kafle 2005:1134–9).

A qualitative phenomenological study using purposive sampling at a primary clinic in South Africa found poverty to be associated with non-adherence, while economic resources were associated with adherence (Naidoo, Dick & Cooper 2009:55–70). This is important because patients with TB and HIV co-infection are considered for disability grants in Namibia via the Social Services department when their disease is advanced.

2.3.9 Factors related to programmes and incentives

The (South African) Public Health Act No 36 of 1919, which was made applicable to what was then South West Africa, is outdated and is currently undergoing revision to make it more relevant to issues such as treatment interruption.

The researcher observed that TB facilities (TB clinics) are not well integrated either with the community of Swakopmund district or with general health services. There were no community-based health workers working within the district. Existing TB DOT promoters operated only at the TB clinic. This implied, in fact, that these DOT promoters were not fulfilling their role as envisaged by the WHO.

Doctors and nurses do not rotate through the TB clinic. Introducing TB lifestyle to ambassadors carry TB messages into the community may improve the link with the community.

The current district TB programme needs to be integrated into general district health services. The activities and information generated in the programme should be coordinated and shared with the rest of the district team (Namibia 2008b:47–9).

2.3.10 Stigma as a factor

Stigma affects the quality of a patient's life and the effectiveness of TB control. TB is a stigmatised disease. Some patients simply do not want it to be known that they are receiving TB treatment (WHO 2003).

Patients with TB suffer from social isolation as a result of unscientific beliefs about TB and its transmission. The prejudice associated with TB may be due to fear of infection and an aversion to the poverty associated with TB (Jaramillo 1999:71).

A multinational study in Bangladesh, India, Malawi and Colombia shows an association between HIV/AIDS and TB-related stigma. It notes an increased delay in health-seeking along with non-disclosure of status. TB-HIV infected patients are less likely to believe positive messages about TB cure in areas where there is no access to anti-retroviral treatment. The TB stigma is also linked to concerns about reduced marital prospects for

women in India and Malawi. This stigma may lead to a patient dropping out of treatment (Somma et al 2008:856–66).

2.4 CONCLUSION

This chapter gave an overview of DOT and factors contributing to treatment interruption. In the opinion of the researcher, DOT will require strong leadership from the Namibian NTP and a significant commitment of resources, especially human resources. The NTP should bear more responsibility than the individual patient. DOT might work if resources are universally employed, persistently and with good leadership. The DOT strategy needs resources, especially in countries where the TB caseload is high. DOT will not work in a rigid, inflexible environment. Issues such as distance to be travelled can be a deterrent (Frieden & Sbarbaro 2007:30-33). However, there is a counter-argument that DOT is only beneficial due to other interventions being implemented simultaneously, rather than DOT itself being an adherence-promoting strategy. Quite clearly, there is a need to understand situations where DOT is beneficial (Volmink & Garner 2007:CD003343).

CHAPTER 3
METHODOLOGY AND RESEARCH DESIGN

3.1 INTRODUCTION

The purpose of the study was to investigate and identify factors that may have an effect on TB treatment interruption in TB patients in the Swakopmund district, Erongo Region, Namibia.

3.2 RESEARCH DESIGN

Epidemiological studies seek to identify the determinants of health as well as the determinants of disease. According to Bailey, Vardulaki, Langham and Chandramohan, "[t]he determinants of health states or events are definable factors that influence the occurrence of health related events" (2005:1).

The research for this descriptive cross-sectional study was done by means of a survey.

3.2.1 Survey

Survey research is a research technique in which a researcher selects a sample of respondents from a large population and administers a standardised questionnaire to each respondent. The individual respondent is usually the unit of analysis. Surveys can be used for descriptive, explanatory and exploratory purposes (Babbie and Mouton 2004:230–32).

3.2.1.1 Descriptive cross-sectional survey

A descriptive cross-sectional survey, as was done in this study, gathers data at a particular point in time, and the data collected provides the description of the study population. The relationship between variables at a point in time can be determined (Brink, Van der Walt & Van Rensburg 2006:105).

3.2.2 Advantages of surveys

Surveys have the following advantages:

- Survey research is less expensive than most other forms of research.
- It saves time and effort.
- Survey research enables a researcher to obtain information from a population that is too large to be observed directly.
- Surveys are useful for describing the characteristics of a large population, including attitude and orientation.
- The survey method can use standardised or newly designed questionnaires.
- Usually the survey method is also very reliable, provided all subjects are exposed to the same carefully worded questionnaire (Babbie & Mouton 2004:262–5).

3.2.3 Disadvantages of surveys

Surveys have the following disadvantages:

- The requirement for standardisation can result in missing some of the unique characteristics of each respondent.
- Some surveys fail to consider the total social life context of an individual.
- They can be inflexible in that the initial study design does not change despite changing field conditions.
- Surveys are also subject to artificiality because the answers a person gives do not necessarily reflect the person's true views. This means that surveys cannot measure social action as they get self-reported data on past or future action.
- Some attitudes under study can be affected by the study itself.
- Survey research, while strong on reliability, is weak on validity (Babbie & Mouton 2004:262–5).

3.3 STUDY POPULATION AND SAMPLING

3.3.1 Population

A population is the theoretically specified aggregation of study units or elements (Babbie & Mouton 2004:173). The theoretical population of the present study

constituted all TB patients in the Swakopmund district. A sample size of 143 patients was used.

The *study population* was all TB patients who started treatment in Swakopmund District, which includes the towns of Henties Bay and Arandis, between January 2007 and December 2008. It is from this study population that the sample was selected.

Swakopmund district is in the Erongo region of Namibia. The district has three clinics, namely Tamariskia, Henties Bay and Arandis. The total population of Swakopmund is about 43 000. A third of the population is under 5 years of age. The literacy rate is 86%, while the unemployment rate stands at 30% (Namibia 2003).

3.3.2 Sampling

A non-probability sampling method, namely purposive sampling, was used. Purposive sampling is sampling which is done on the basis of knowledge of the population and its elements. It is based on one's judgement and the purpose of the study (Babbie & Mouton 2004:166–7). The use of purposive sampling enabled the researcher to select cases that met the criteria of interest for treatment interruption. It was also possible to select those TB patients who had been on treatment for more than four weeks at all three TB clinics in the district. This method of sampling saved time, money and effort.

However, because purposive sampling is a non-probability sampling method, it is possible that the sample may not be representative.

3.3.2.1 Inclusion criteria

In order to be included in this study, TB patients in the Swakopmund district had to:

- be over the age of 15 years
- have been entered in the TB treatment register during 2007 or 2008
- have completed more than four weeks on TB treatment
- *either* have not interrupted their treatment at all, *or* have interrupted their TB treatment for a cumulative seven days or more (for all types of TB).

3.3.2.2 Exclusion criteria

The following were excluded from the study (despite meeting the above criteria):

- patients whose TB treatment was not started in the Swakopmund district
- TB patients who were too sick to be interviewed
- MDR and XDR patients.

3.3.2.3 Ethical issues related to sampling

Because the sampling method was purposive, great caution is required. Data obtained from this study cannot be generalised.

3.4 DATA COLLECTION

3.4.1 Data-collection approach and method

Data was collected by means of a questionnaire administered by field workers (TB DOTS promoters) in a structured interview with each respondent. Each patient was matched to one interviewer; an interviewer could be allocated several patients.

3.4.2 Development and testing of the data-collecting instrument

No existing questionnaire could be found that could be used for this study and this study context.

The literature review was used to construct questions based on factors associated with TB treatment interruption that were identified in the literature. Elements of the health belief model, theory of reasoned action, social cognitive theory and transtheoretical stages of change theory were also used.

These elements included knowledge about TB treatment interruption, some of its serious consequences, perceived susceptibility to those serious consequences and level of support in the patient's environment. Stages of change from pre-contemplation, contemplation, action, maintenance and relapse or termination of behaviour elements were also applied in developing the questionnaire (Nutbeam & Harris 2005:10–23).

The questionnaire was developed in English, which is the official language of Namibia. Interviewers could speak the local languages and translated aspects of the questionnaire to the home language of a respondent where it was found necessary to do so.

3.4.2.1 Pre-testing the instrument

A pilot study is a small-scale study conducted prior to the main study on a limited number of subjects from the population. The purpose of the pilot study is to investigate the feasibility of the proposed study and to detect possible flaws in the data-collecting instrument (Brink et al 2006:166). No official pilot study was done in this research. However, the instrument was pre-tested.

The research instrument was pre-tested before the main study commenced. This helped to estimate the time it would take to interview each respondent. Issues like clarity, ease, ambiguities and difficult wording were solved. The pre-testing of the questionnaire was particularly useful in view of the multiple languages and cultures in the study population.

The pre-testing of the instrument took place in the TB ward at Swakopmund hospital. Six TB patients were involved. The respondents in the pre-testing phase were not included in the main study.

3.4.3 Characteristics of the data-collecting instrument

The questionnaire contained closed- and open-ended questions. Closed-ended questions were in a multiple-choice format, where the respondent was asked to select answers from a list of options. This facilitated greater uniformity and easier processing of answers by computer. An effort was made to make the questions exhaustive and mutually exclusive. During the development of the data-collecting tool, measures were taken to avoid double-barrelled questions and to ensure that everything was clear. The ability of respondents to the answer questions was determined through the pre-testing of the data-collecting tool. Answers to some of the questions (for example the patient's HIV status) were obtained from the patient records rather than by interview. The questionnaire is attached as Annexure D.

3.4.3.1 Questionnaire

The questionnaire comprises nine sections. Section A contains the biographical data. Section B is about the support that the TB patient received from other persons. Section C is about the reasons for and perceived consequences of stopping TB medication. Section D is on DOT. Section E investigates the effects and side effects of medication. Section F focuses on access to TB medication. Section G gathers information about the patient–provider relationship, and Section H is on stigma attached to the disease. Lastly, Section I is on substance use.

Table 3.1 briefly describes the contents of each section of the questionnaire and gives the motivation for including each one.

A written consent form accompanied the questionnaire and is attached as Annexure C. The consent form informed the respondent about the research and the principles of voluntary participation and informed consent. This had to be included for ethical reasons.

3.4.4 The data-collection process

TB patients were selected from TB facility registers at the TB clinics by identifying those who met the inclusion criteria. Subsequently the data-collecting instrument (the questionnaire) was administered to obtain data from the selected TB patients. Direct individual interviews were conducted to ensure clear answers. The trained interviewers asked questions orally and recorded the answers on the questionnaires. This method was particularly useful since not all the respondents were able to read or write.

The interviewers were TB DOT promoters from the same community as the respondents. An attempt was made to match interviewers and respondents with respect to language, gender and age, but this was not always possible, due to the diversity of culture and language in Swakopmund district. Interviewers were encouraged to dress appropriately, be thoroughly familiar with the questionnaire and to be neutral at all times. They were instructed to record answers in the respondents' exact words. Interviewers were given a day of training and received 10 Namibian dollars per respondent interviewed as an incentive.

TABLE 3.1: QUESTIONNAIRE SECTIONS, DESCRIPTION AND MOTIVATION OF QUESTIONS

SECTIONS	QUESTIONS – DESCRIPTION AND MOTIVATION
Section A: Biographical data	Respondents were asked to give biographical data. The purpose was to be able to provide a profile of the sample. The data also enabled investigation of the relationship between the biographical data and possible factors associated with treatment interruption.
Section B: Support that TB patients received from other persons	Respondents were asked whether they had completed taking all doses of TB medicines prior to the interview date and to describe the nature of support they had received from health care workers, community and media. This is important since TB treatment interruption can potentially be associated with lack of support. This question also helped the researcher to identify TB treatment interrupters.
Section C: Reasons for and perceived consequences of stopping TB medicines	Respondents were requested to give reasons why they had interrupted their TB treatment, as well as the perceived consequences of such behaviour. This information is important because it gives insight into the reasons for treatment interruption, and essentially this is the purpose of the study. Consequences of behaviour can influence individual behaviour, as explained by the health belief model (Nutbeam & Harris 2004:10–14).
Section D: Directly observed therapy	Respondents were requested to explain how they took their TB medicines. This question was important to determine the exact way DOT is practised, or possibly not practised, in the Swakopmund district.
Section E: Medication and side effects	Respondents were requested to reveal whether they experienced side effects and what action they were taking. This was included because side effects have the potential to influence treatment adherence.
Section F: Access to TB medication	Respondents were asked about physical and financial access to TB treatment. Any change of physical address was also noted. This was crucial in determining whether reduced access to TB treatment was a potential reason for treatment interruption by patients in the district.
Section G: Patient–provider relationship	Patients were requested to describe their experience when visiting health facilities for TB treatment. This is important because patients' experiences and the quality of care might influence TB treatment adherence.
Section H: Stigma	Respondents were asked questions regarding the reactions of their relatives and friends to their having TB, and if they perceived stigma as a problem. Because stigma can influence adherence, it had to be determined whether stigma still contributed to TB treatment interruption by patients in the district.
Section I: Substance use	Respondents were asked about alcohol and cigarette consumption. This was necessary in order to find out whether substance use contributed to treatment interruption.

At the end of the data-collecting process, the interviewers were debriefed on the whole process.

3.4.5 Ethical considerations related to data collection

Permission for the study was obtained from the Swakopmund District Coordinating Committee, the Erongo Regional Management Team, the Chief Medical Officer of Erongo Region, the Regional Director of Erongo Region and the Permanent Secretary of the Ministry of Health in Namibia. A copy of this permission is attached as Annexure B.

Ethical clearance was also obtained from Unisa's Department of Health Studies Research and Ethics Committee. The Clearance Certificate is attached as Annexure A.

Each TB patient had the choice to participate or not to participate in the study. Participation was voluntary, and they could decide independently. Participants under the age of 18 years obtained additional written consent from their parents or guardians. A participant could withdraw at any point in the study. No one was victimised for not being willing to participate in the study. Non-participants still received all the necessary care and treatment they needed from the health services.

The study was explained to the patients in their own languages, and they were free to ask questions if there were issues they did not understand. Verbal and written informed consent was obtained from all respondents.

Confidentiality was ensured as no identifying details were written on the questionnaires to link anyone to the data obtained. The interviews were conducted in private and participants remained anonymous – the completed questionnaires did not give any names.

The study avoided harm to participants. This included emotional, physical, social and financial harm. The interviewers were trained to maintain a non-judgemental attitude towards patients.

To an extent, participation in the study did disrupt normal activities for the respondents. The study asked people to reveal deviant behaviour and personal issues which they might have been ashamed of. It is possible that participants experienced psychological discomfort, and this could be seen as a possible limitation.

The inclusion criteria listed earlier were applied throughout the study.

3.4.6 Data analysis

The completed questionnaires were analysed using the SPSS 15.0 statistical package and Microsoft Excel. Multiple-choice questions were coded and entered into the SPSS database. Numerical variable responses were analysed using summary descriptive statistics (measures of centrality and dispersion). Non-numeric responses were analysed and categories were identified. Frequency distributions and charts were constructed to display patterns of treatment interruption. Relationships between research variables and demographic factors were analysed for some of the data using cross-tabulations and chi-square (χ^2) tests for independence. The open-ended questions were analysed to identify themes in a qualitative way; however, questions of this type were limited in number.

3.5 VALIDITY AND RELIABILITY OF THE STUDY

3.5.1 Validity

Validity as a broad concept refers to the truthfulness or accuracy of research findings (Saks & Allsop 2008:416).

Internal validity refers to the approximate truth of the conclusions regarding a cause–effect relationship. In this respect, internal validity is relevant only to studies that seek to establish causal relationships (Babbie & Mouton 2004:217–19).

External validity relates to the generalisability of the study findings (Babbie & Mouton 2004:219). It refers to the approximate truth of conclusions. The main threat to external validity in this study is the non-random sampling method, namely purposive sampling, that was used to select respondents. This does not guarantee a representative sample.

Since the study was done under national programme conditions in Swakopmund and no intervention was given to participants, the findings could be generalised to a district similar to Swakopmund in the country. The data was collected from the records and patients retrospectively, thus also reducing social desirability.

The place and timing of the study could limit generalisability. New interventions, such as communication for behavioural change (COMBI), have been introduced in the NTP since the study was conducted. Such interventions may change (or may already have changed) the behaviour of TB patients in the country.

Content validity is the outcome measure or finding that includes all issues considered essential by participants and experts in the field (Saks and Allsop 2008:416). Content validity was ensured because the questionnaire measured the factors under study, namely the reasons for TB treatment interruption. The questionnaire was based on an extensive literature review of studies in Namibia and the rest of the world, and also incorporated questions used in previous studies on TB. It was given to the staff in the TB department at district, regional and national level for comment.

As mentioned earlier, the questionnaire was pre-tested on six TB patients in the TB ward at the Swakopmund hospital.

3.5.2 Reliability

Reliability refers to the degree to which a data-collecting instrument can be depended on to give consistent results if used repeatedly over time on the same person or by different researchers. Reliability and validity are closely related, and both qualities should be considered in the selection of a research instrument (Brink et al 2006:163–5).

Reliability was achieved by using short, accurate phrases and avoiding leading questions. Questions asked were relevant to the issue being researched. Negative questions were avoided. Respondents were informed about the purpose of the interview and encouraged to answer truthfully. Because some questions could have induced embarrassment or feelings of irresponsibility, the interviewers were trained to avoid allowing their attitudes and behaviour to influence the answers. In some cases, respondents may have wanted to give socially desirable answers. To minimise this

effect, TB records were used to confirm aspects such as treatment interruption. Interviewers assisted respondents to understand the questionnaire by translating questions where necessary.

The retrospective nature of some of the questions could have resulted in recall bias. Selective memory, along with the desire to give socially desirable answers, may contribute to bias in the study.

Selection bias would have occurred since study participants were obtained using available records at the TB clinics, selected by purposive sampling. This affects the representativeness of the study. Since this was not a case control study, it was not necessary to select subjects according to exposure and outcome.

The way in which patients were requested to participate in the study was the same for all. Patients were approached at the TB clinic and requested to participate. During this interaction, potential participants were given detailed information about the study. Verbal and written consent was obtained before each interview was conducted. The interviews were conducted in private rooms with individual respondents to reduce the tendency to give socially desirable answers. Patients were interviewed Monday to Sunday between 8 am and 5 pm. The researcher obtained official time off from work to conduct this study.

The services of an official bio-statistician were enlisted to enhance the reliability of the study.

3.6 CONCLUSION

Chapter 3 described the research design and methodology of the study. The research design took the form of a descriptive cross-sectional survey. In total, 143 TB patients were interviewed using questionnaires administered by trained interviewers in face-to-face interviews. The next chapter will discuss data analysis.

CHAPTER 4
ANALYSIS, PRESENTATION AND DESCRIPTION OF RESEARCH FINDINGS

4.1 INTRODUCTION

TB records were reviewed at three clinics, namely the Tamariskia clinic, Henties Bay clinic and Arandis clinic, in the period from January 2007 to December 2008 in order to identify possible participants for this study. A sample of 143 participants was obtained, and the data-collecting instrument was used by interviewers on a one-on-one basis in order to collect data.

The study excluded TB patients who had been on treatment for less than a month, children under 15 years of age, very ill patients, patients who were transferred and drug-resistant patients.

4.2 DATA MANAGEMENT AND ANALYSIS

The SPSS 15.0 statistical package and Microsoft Excel were used to analyse the completed questionnaires. A statistician assisted in the final interpretation of results.

Numerical variable responses were analysed using descriptive statistics. Inferential statistical methods were used to analyse the relationships between some of the research variables. The chi-square test was used because it allows two categorical-type datasets to be compared to determine if there is a relationship between them (Maltby, Day & Williams 2007:257). Tables were used to display the data. Reporting on the chi-square test is covered in Chapter 5.

All open-ended questions were analysed manually and individually, using aspects of qualitative methodology where necessary. Non-numeric responses were analysed in a qualitative manner and categories identified.

4.3 RESEARCH RESULTS

The research findings will be related to findings reflected in the literature review where possible. Correlations and contrasts in response to different questions will be indicated. Unexpected findings are also presented, and explanations suggested where possible.

In the data discussion sections below, each question is identified by the section number (letter) as well as the question number. For example, the second question in Section B (Support) is numbered B2- followed by the letter used in the questionnaire, if applicable, in lower case: B2a or B2b.

4.3.1 Demographic data (Section A)

4.3.1.1 Age (Question A1)

Although the sample size is 143, only 137 (95.8%) questionnaires recorded age, and the descriptive statistics were calculated from these cases. The patient record files did not give the ages of the other six respondents.

TABLE 4.1: AGES OF PATIENTS IN TUBERCULOSIS RESEARCH GROUP

	N	RANGE	MINIMUM	MAXIMUM	MEAN	STD DEVIATION
Age data	137	61	15	76	35.7	11.1

The average age of the participants was 35.7 years (minimum age was 15 years and the maximum age was 76 years) with a standard deviation, σ, of 11.1 years. National data indicates that the peak age group for new smear positive TB was 25 to 34 years (Namibia 2009a:4).

4.3.1.2 Gender (Question A2)

The question about gender was completed by all respondents.

TABLE 4.2: GENDER OF RESEARCH GROUP MEMBERS

GENDER	NUMBER (N)	PERCENTAGE (%)
Male	97	65.0
Female	50	45.0
Total	143	100.0

The majority of the respondents in this survey were male (97, or 65%). National data for Namibia shows that 58% of all new smear positive PTB cases reported in 2008 were male; 42% were female. The predominance of males over females was noted to need further investigation in order to guide future interventions (Namibia 2009a:4).

4.3.1.3 Patient's Address (Question A3)

The patients in the research group came from a variety of places in and around the towns of Swakopmund, Henties Bay and Arandis, which are all traditionally served by the three TB clinics.

When commencing TB treatment, respondents were staying in various places such as Build Together, Mondesa, Henties Bay and Tamariskia served by the three clinics.

The last question in section F on access of treatment was included to determine if patients moved during their treatment (see 4.3.6.7). However, it was found that all those patients who moved still remained within the catchment area served by the three TB clinics in Swakopmund district, so they could continue their treatment without interruption.
In a study in Tijuana, Mexico mobility and migration were identified as important factors influencing TB treatment interruption (Deiss, Garfein, Lozada, Burgos, Brouwer, Moser, Zuniga, Rodwell, Ojeda & Strathdee 2009:1491–5).

4.3.1.4 Formal educational level (Question A4)

Only 105 (73.4%) respondents indicated their educational level when answering the questionnaires, and the results are reflected in Table 4.3.

TABLE 4.3: FORMAL EDUCATIONAL LEVEL

FORMAL EDUCATIONAL LEVEL	NUMBER (N)	PERCENTAGE (%)
None	6	5.7
Primary	44	41.9
Secondary	43	41.0
Tertiary	12	11.4
Total	105	100.0

In Namibia, primary level means grade 1 to grade 7, and secondary level means grade 8 to grade 12. Most of the respondents' educational level was primary level (44, or 41.9%) and secondary level (43, or 41.0%) or below. Only a small percentage of TB patients had no school education (6, or 5.7%) or had tertiary education (12, or 11.4%). National data for Namibia indicates that 15% of Namibians have no education, 43% have primary education, 35.4% have secondary education and 4.8% have tertiary education (Namibia 2008a:10–11).

A study done in Yemen (Date & Okita 2005:680–5) found that women were not prevented from accessing TB diagnosis and treatment even though they might lack formal education. The male relatives supported these women and were important in helping them achieve good treatment outcomes.

Findings from a study in a rural TB unit in South India indicated that 39% of the 558 non-adherent TB patients in a retrospective study were reported to be illiterate (Gopi, Vasantha, Muniyandi, Chandrasekaran, Balasubramanian & Narayanan 2007:66–70).

4.3.1.5 Employment status (Question A5)

Respondents were asked to indicate only whether they were employed or not. The employment status of the 103 (72.0%) who responded is indicated in Table 4.4.

TABLE 4.4: EMPLOYMENT STATUS OF TB PATIENTS

EMPLOYMENT STATUS	NUMBER	PERCENTAGE (%)
Employed	45	43.7
Unemployed	58	56.3
Total	103	100.0

The results indicates a high level of unemployment (56,3%) among TB patients in the Swakopmund district. In the Erongo region, specifically, unemployment stood at 16.8% in males and 56% in females. Compared to the national data, the respondents in the study had a higher than average level of unemployment. Nationally, the level of unemployment in the 15 to 49 year age group is 37.6% (Namibia 2008a:35–6).

In a case control study in Manila, Philippines, unemployment was found to be a significant factor predicting treatment completion. The Manila study was set in a

predominantly urban setting similar to the Swakopmund district (Lagrada, Uehara & Kawahara 2008:765).

4.3.1.6 Income bracket (Question A6)

Of the 143 respondents, only 97 (67.8%) provided data on their income bracket. The number of individuals per household was not taken into account. The income bracket classification of low, medium and high was based on the Republic of Namibia 2001 population and housing census and was available at the end of the questionnaire for the field worker's reference (Namibia 2003). Results are reflected in Table 4.5.

TABLE 4.5: INCOME BRACKETS OF TUBERCULOSIS RESEARCH GROUP

INCOME BRACKET	NUMBER (N)	PERCENTAGE (%)
Low (< N$400 per month)	52	53.6
Medium (N$400–1500 per month)	39	40.2
High (> N$1500 per month)	6	6.2
Total	97	100.0

Most of the respondents were in the low income bracket, with 53, 6% earning less than N$400 per month. In the survey, it was sad to note that of those that were employed, only six (6%) earned above N$1500 per month and more than half (52, or 53.6%) earned below N$400 per month.

A cross-sectional study in a low-income area of Rio de Janeiro, Brazil, indicates that the provision of financial support to TB patients for food and transport leads to reduced treatment interruption. The financial support is especially helpful in the poor and marginalised TB populations (Belo, Seliq, Luiz, Hanson, Luna, Teixeira & Trajman 2006:PH1–5).

4.3.1.7 People sharing home with the patient (Question A7)

This question (A7) was asked to determine with whom respondents stayed during the course of their TB treatment. This was an open-ended question and was analysed in a qualitative manner.

The respondents were staying either on their own or with any of the following:

- *a friend*
- *mother*
- *aunt*
- *daughter*
- *daughter's son*
- *alone*
- *sister*
- *uncle's daughter*
- *children*
- *brothers*
- *girlfriend*
- *boyfriend*
- *son*
- *parents.*

Some stayed with a group of people, as indicated by the following responses:

- *my brother, his girlfriend and my children*
- *grandmother and sisters*
- *at a lodge with my children*
- *husband and children*
- *relatives*
- *sister's family*
- *wife and children*
- *mother and 3 brothers.*

Quite clearly, TB patients stayed with a variety of people and not only with close family. This question was included because the researcher reasoned that the way people took their medication could be influenced by who the patient stayed or lived with at home.

The role of sufficiently trained family members for supporting TB patients in remote areas was noted in a study in a study in Shaanxi province of China (Ai, Men, Guo, Zhang, Zhao, Sun, Zhang, He, Van der Werf & Van den Hof 2010:112).

4.3.1.8 HIV status according to TB records (Question A8)

For this question, the field worker had to consult the patient record in order to determine HIV status of the respondents. Respondents were therefore not asked directly about this. Of the 143 respondents, 138 (96.5%) had their HIV status recorded, and the results are reflected in Table 4.6.

TABLE 4.6: HIV STATUS OF TUBERCULOSIS RESEARCH GROUP

HIV STATUS	NUMBER (N)	PERCENTAGE (%)
Positive	49	35.5
Negative	52	37.7
Unknown	37	26.8
Total	138	100.0

Of the patients with known HIV status, 49 patients (35.5%) had tested positive and 52 (37,7%) negative. However, the HIV status of 37 (26.8%) of the respondents in this research group was unknown.

The bigger picture looks as follows: the HIV prevalence in the Swakopmund district stood at 14.2% in 2008, and the national HIV prevalence rate in that year was 17.8% (Namibia 2008c:14).

Of the 1470 new TB patients reported with TB in the Erongo region in 2008, 912 (62.0 %) knew their HIV status. Four hundred and eighty eight TB patients in Erongo region tested positive which is 53.5%. Namibia tested 13737 TB patients in 2008 of which 66.9% knew their HIV status and 59% tested positive.

The target HIV testing rate for TB patients in the country is set at 95% (Namibia 2009a:14).

In contrast to the findings in this study, a qualitative study in South Africa, which explored factors associated with TB treatment non-adherence, found HIV co-infection to be a contributory factor to treatment interruption (Naidoo et al 2009:55–70).

4.3.2 Support (Section B)

4.3.2.1 Completion of treatment (Question B1a)

Of the 143 respondents, only 102 respondents revealed whether or not they had completed their TB treatment at the time of the interview. Results are reflected in Table 4.7.

TABLE 4.7: TREATMENT INTERRUPTION AMONG PATIENTS IN THE STUDY

TREATMENT INTERRUPTION	NUMBER (N)	PERCENTAGE (%)
YES (did not complete)	74	73.0
NO (completed)	28	27.0
TOTAL	102	100.0

Only 28 (27%) of the TB patients took their medication without interrupting treatment; 74 (73%) interrupted treatment. Treatment interruption, in this study, was defined as not taking medication for a cumulative seven days or more.

This high rate of interruption or partial non-completion is also noted by Mateus-Solarte and Carvajal-Barona (2008:520–26), who noted a rate of 65.6% non-completion in Valle del Cauca in Columbia. The timing of patient default would be also be an important variable to investigate, though this variable was not analysed in the present study.

4.3.2.2 People who influenced discontinuation of TB treatment (Questions B1b and B1c)

To an extent, Questions B1b and B1c investigated the same issue, namely who it was that influenced patients in stopping their treatment. The first of the two questions was open-ended, and participants mentioned the same group of people listed in B1c. From the qualitative analysis, many of those indicating “other” said no one had influenced them to interrupt treatment. They had interrupted because they had felt better or they had been too busy to continue.

All 74 respondents who indicated that they had interrupted treatment completed the second question (B1c), and the results are presented in Table 4.8.

TABLE 4.8: SOURCE OF INFLUENCE RELATED TO INTERRUPTION

SOURCE	NUMBER (N)	PERCENTAGE (%)
Friends	27	37.0
Health care workers	13	17.0
Relatives	2	3.0
Other	32	43.0
Total	74	100.0

Of those who interrupted treatment, people who had influenced them ranged from friends (27, or 37%) and relatives (2, or 3%) to health care workers (13, or 17%) and “others” (32, or 43%). One respondent, for example, said her boyfriend had influenced the stopping of TB treatment. As in Question B1c, “other” often meant “no one”.

It is alarming to note from this study that a number of TB patients were influenced by health workers to stop their treatment. This is important because health workers are noted to be in a power category in communities and are able to influence attitudes, beliefs and perceptions within a particular community. They are supposed to promote adherence.

The stigma which may be attached to TB may influence adherence to TB treatment (Dodor & Afenyadu 2005:827–32).

A qualitative study in Addis Ababa, Ethiopia, by Sagbakken et al (2008) using 50 in-depth interviews indicated that treatment interruption was due to dynamic processes involving lack of financial and practical help from relatives. This help would have been in the form of food, encouragement and money for transport.

The complexity and dynamism of the treatment interruption phenomena is further shown by a systematic review conducted by Munro et al (2007a:238). The review looks at 7 184 citations and 44 articles between 1966 and February 2005 using predetermined inclusion criteria and identifies family, community and household support as important factors in determining treatment interruption.

4.3.2.3 People who influenced resumption of TB treatment after disruption (Questions B1d and B1e)

Similarly to the previous two questions, Questions B1d and B1e investigated who it was that influenced participants to resume their treatment (after stopping). The first of these two questions was open-ended. The same group of people listed in B1d was mentioned. The analysis indicated that the following were listed as people who influenced the resumption of treatment:

- *Family including Mother*
- *Aunt*
- *Daughter*
- *Sister*

- *Uncle's daughter*
- *Wife and relatives*
- *Friends*
- *Health workers*
- *No one*
- *Nurses at the Clinic*
- *Employer*
- *Volunteer.*

In some cases, more than one person was responsible for persuading the patient to continue treatment.

Of the 74 respondents who disrupted treatment, only 41 responded to Question B1e. The results are presented in Table 4.9.

TABLE 4.9: PEOPLE INFLUENCING CONTINUATION OF TB TREATMENT AFTER DISRUPTION

PERSON/S	NUMBER (N)	PERCENTAGE (%)
Relatives	23	56.0
Health care workers	9	22.0
Others	7	17.0
Friends	2	5.0
Total	41	100.0

Those who continued with their TB treatment said they had been influenced to continue mostly by relatives (23, or 56%), health care workers (9, or 22%), and to a lesser extent by other factors (7, or 17%) and friends (2, or 5%). It could be that those who did not answer this question took the decision by themselves.

TB patients with limited financial and practical help from relatives and friends experienced that the total costs of treatment exceeded their available resources while those who were supported were more likely to continue their treatment (Sagbakken et al 2008:11).

4.3.2.4 Visitation by health worker (Questions B2a and B2b)

Of the 143 respondents, only 112 responded to the question on visitation, and from these valid cases descriptive statistics were calculated.

TABLE 4.10: VISITATION BY HEALTH CARE WORKER

RESPONSE	NUMBER (N)	PERCENTAGE (%)
Yes	26	23.2
No	85	75.9
Don't know	1	0.9
Total	112	100.0

A very low number 23 (23%) of the patients had been visited by a health worker while on TB treatment.

The analysis of the question following this one showed that these people had been visited by TB clinic volunteers, nurses and a community counsellor; only in one instance was the frequency given as "2 times a week". In two cases the health care workers were family members, for example, "wife, because she is a nurse" and "aunt, because she is a nurse". TB clinic volunteers assist at TB clinics providing mainly DOT and other functions like provision of supplementary food. Community counsellors in the district provide mainly HIV counselling services.

A community randomised trial in Ethiopia showed improved treatment success when health extension workers were utilised. These extension workers are particularly helpful in settings with reduced health care coverage and access (Datiko & Lindtjorn 2009:5443).

4.3.2.5 Learning about TB (Question B3a)

Respondents were asked where they had learnt most about TB. A variety of answers were reported.

The qualitative analysis revealed that respondents had heard about TB from a parent who had TB; sisters; through cellphone messages; at school, a clinic or health centre; books, newspapers and magazines, and even while in prison.

4.3.2.6 Media helpful in understanding TB (Question B3b)

Of the 143 respondents, only 110 identified media that were helpful in understanding TB.

TABLE 4.11: MEDIA HELPFUL IN UNDERSTANDING TB

MEDIA	NUMBER (N)	PERCENTAGE (%)
Radio	83	75.5
TV	12	10.9
Print	6	5.5
Cellphone	3	2.7
Other	6	5.5
Total	110	100.0

According to the respondents, the radio (83, or 75.5%) was the most helpful medium to teach them about TB, followed by television (12, or 10.9%), print media (6, or 5.5%), to a much lesser extent cell phones (3, or 2.7%) and “other” (6, or 5.5%).

4.3.2.7 Exposure to TB messages in the media (Question B3c)

This question, asking specifically about TB exposure in the media after starting TB treatment, was answered by 111 respondents.

TABLE 4.12: EXPOSURE TO MEDIA AFTER STARTING TB TREATMENT

RESPONSE	NUMBER (N)	PERCENTAGE (%)
Yes	90	81.1
No	20	18.0
Don’t know	1	0.9
Total	111	100.0

Most of the respondents (90, or 81.1%) had been exposed to TB messages in the media after starting TB treatment. At the time of the study, various media were constantly putting out messages on TB as part of an ongoing media campaign.

A study in India (Gupta, Gupta & Behera 2011:11–17) noted the importance of continuous health education through various media to emphasise the need for continuation of treatment despite early improvement in symptoms.

4.3.2.8 Media with TB messages specified (Question B3d)

A bit of a discrepancy was picked up in this question, because 90 respondents indicated "yes" in the previous question, but two more, namely 92, answered this question.

TABLE 4.13: MEDIA WITH TB MESSAGES SPECIFIED

MEDIA	NUMBER (N)	PERCENTAGE (%)
Radio	61	66.3
TV	13	14.1
Print	2	2.2
Cellphone	10	10.9
Other	6	6.5
Total	92	100.0

Of the respondents who were exposed to media it was mainly through radio (61, or 66.3%) and television (13, or 14.1%) broadcasting. In addition to the above media, in the analysis done in a qualitative way, respondents had heard about TB from a father or mother who had TB, from a sister, through cellphone messages, school, clinic or health centre, books and newspapers, magazine, or while in prison.

Information, education and communication (IEC) was recognised as an important component of a national TB control programme in a cross-sectional descriptive study in Delhi, India. This particular study states that IEC has an influence on treatment completion and treatment seeking. It targeted both patients and the general population (Sharma, Nath, Taneja & Ingle 2009:321–32). While radio was the most popular medium in Swakopmund, television was recognised as the most effective media approach in Delhi. The Delhi study further states that effective media choices should depend on the particular sub-population targeted.

4.3.3 Reasons for and perceived consequences of stopping TB treatment

4.3.3.1 Reasons for stopping TB treatment (Questions C1a and C1b)

Questions C1a and C1b investigated reasons for stopping TB treatment. Question C1b provided specific reasons from which the respondents could select, but in Question C1a they could list their own reasons. Respondents gave a variety of reasons, among them:

- *Running after boyfriend from Henties Bay to Arandis*
- *Arrived at clinic after closure because of work*
- *Stopped by friends, also drinking alcohol*
- *Change of shifts at work causing me to miss the timetable*
- *Employer came late and hence I failed to take treatment*
- *Staying far at "DRC" squatter area*
- *Feeling better after treatment*
- *Not aware of time to complete*
- *Wanted to be with boyfriend*
- *Went to Keetmanshoop to visit boyfriend.*

From this section it is clear that there were more reasons than just those offered as options in the next question. What is interesting is that side effects were not mentioned in this section, but they were indicated as a reason in the next question (Question C1b).

Of the 74 treatment interrupters, only 34 selected reasons from those offered in Question C1b as to why they had stopped their TB treatment. The remaining 40 respondents who interrupted treatment did not answer the question, or their responses were not recorded. Table 4.14 reflects the results.

TABLE 4.14: REASONS FOR HAVING INTERRUPTED TREATMENT

REASON	NUMBER (N)	PERCENTAGE (%)
Lack of physical access	1	2.9
Lack of family support	1	2.9
Side effects	6	17.6
Co-morbidity	1	2.9
Lack of knowledge	9	26.5
Work related issues	3	8.8
Mobility and migration	11	32.4
Other	2	6.0
Total	34	100.0

Interestingly, the most important reasons cited for stopping TB treatment were mobility and migration (11, or 32.4%), lack of knowledge (9, or 26.5%), side effects (6, or 17.6%) and work-related issues (3, or 9.0%). Lack of a physical access, lack of family support, co-morbidity and other reasons constituted the remainder (14.7%). The researcher

picked up that some of the addresses changed during the treatment, but they were still in the same treatment area (see 4.3.1.3). No respondents marked the following responses: lack of financial access (No. 2), beliefs and perceptions (No. 7) and programmatic factors and incentives (No. 10).

4.3.3.2 Reasons why TB treatment should be continued (Question C2a)

In answer to the question, "Why do you think you need to continue to take TB treatment for six months?", the following responses were given:

- *to be healed*
- *to avoid the sickness getting worse*
- *so that she can be healthy to live for the children*
- *don't know*
- *to be cured and not infect others.*

From these responses it is clear that not all participants understood why they needed to complete their treatment.

4.3.3.3 Consequences of stopping TB treatment (Question C2b)

Of 143 respondents, 106 answered this question on the most important perceived consequences of stopping TB treatment.

TABLE 4.15: PERCEIVED CONSEQUENCES OF STOPPING TB TREATMENT

CONSEQUENCE	NUMBER (N)	PERCENTAGE (%)
Nothing	8	7.5
Will become more sick	24	22.6
Death	58	54.7
Transmission to others	8	7.5
Multi-drug resistance	6	5.7
Other	2	1.9
Total	106	100.0

According to the respondents, the most important consequences of stopping TB medicines were death (58, or 54.7%), becoming more sick (24, or 22.6%), transmission

to others (8, or 7.5%), and multi-drug resistance (6, or 5.7%). A few respondents felt that “nothing happens” (8, or 7.5%).

Health promotion theories such as the health belief model refer to consequences of a condition having an influence on behaviour. This is also largely dependent on the person’s environment (Nutbeam & Harris 2004:10–23). Respondents in the study did perceive themselves to be at risk of serious consequences as a result of treatment interruption. Despite this, 73% of respondents in this study interrupted their treatment.

4.3.4 DOTS

4.3.4.1 Location where TB treatment had been taken initially (Question D1a)

The data for this question could not be used, as it was clear that respondents had misunderstood the question.

4.3.4.2 Location where TB treatment had been taken recently (Question D1b)

Again, the data for this question could not be used, respondents had clearly misunderstood the question.

4.3.4.3 Preferred location for taking TB treatment (Question D1c)

Question D1c asked the respondents to indicate where they would prefer to take their treatment, because this could be a factor in promoting adherence. Of the 143 respondents, only 108 answered the question.

TABLE 4.16: PREFERRED LOCATION FOR TAKING TB TREATMENT

LOCATION	NUMBER (N)	PERCENTAGE (%)
Home	69	63.9
Health centre	26	24.1
Hospital	11	10.2
Other	2	1.8
Total	108	100.0

The majority of respondents preferred to take their TB treatment at home (69, or 64%), at a health centre (26, or 24, 1%), hospital (11, or 10.2%) and other location (2, or 1.8%).

A comparative cohort study in the Omaheke region of Namibia shows a preference for community-based treatment. Family members are regarded as best placed to provide DOT to patients. Better cure rates were achieved in patients who had the community-based approach. However, the authors note that it is not possible to establish a causal link between the community-based approach and the outcome of better cure rates (Zvavamwe & Ehlers 2009:302–9).

4.3.4.4 Supervision of taking medicines by a second person (Question D2a)

Only 97 respondents answered this question on status of supervision by a second person.

TABLE 4.17: SUPERVISION BY A SECOND PERSON

SUPERVISION	FREQUENCY (N)	PERCENTAGE (%)
Yes	68	70.1
No	21	21.6
Don't know	8	8.2
Total	97	100.0

Most of these respondents (68, or 70.1%) had been supervised each time they took their TB treatment.

DOT is a strategy that is used by many national TB programmes. A study in Thailand actually concluded that DOT was the only modifiable factor associated with defaulting of TB treatment. This was an observational cohort study under programmatic conditions. After controlling for the likelihood of being assigned to DOT, those not assigned to DOT remained with an increased risk of default (Kapella, Anuwatnonthakate, Komsakorn, Moolphate, Charusontonsri, Limsomboon, Wattanaamornkiat, Nateniyom & Varma 2009:232–7).

4.3.4.5 Other person supervising the taking of medicines (Question D2b)

According to the strict definition, DOT is provided by an independent and trained health worker. In the survey, respondents were asked to answer whether a second person supervised them taking medication. If they answered yes, they were then asked to give details regarding the supervision.

This was an open-ended question and was therefore analysed in a qualitative manner. Descriptions of those who supervised and how they supervised the taking of TB medicines included:

- *Nurse and friend*
- *Mother giving food and tablets*
- *Aunt cooking food and giving tablets*
- *Nurse and aunt*
- *Sister*
- *Daughter*
- *Volunteer*
- *Uncle's daughter*
- *No supervision the patient takes tablets on his own*
- *My children and health workers*
- *Wife and children*
- *Sister and daughter*
- *Mother, health workers and community counsellors*
- *My brother, a DOT health worker and community counsellors*
- *Grandmother and health workers*
- *Doctor*
- *Employer*
- *Boyfriend*
- *Health care workers and volunteers*
- *Nurses at the clinic*
- *No one*
- *Nurse and girlfriend.*

From the above it is evident that the supervision of TB treatment in the district is not limited strictly to trained, independent observers. A variety of people or combinations of people assisted.

It is important to note that the ethical and legal obligation to ensure treatment completion lies with the health system and community, not with the individual patient (Frieden & Sbarbaro 2007:30-33).

4.3.4.6 Perception of being supervised in taking medicines (Question D2c)

This question was also an open-ended question and was analysed in a qualitative manner.

Respondents' feelings regarding being supervised in taking medicines were mostly positive, as follows:

- *Feel it is fine and have no problem with that*
- *Very very good*
- *Very important since sometimes one forgets to take the tablets at home.*

No very specific negative responses were recorded.

4.3.5 Medication and side effects

4.3.5.1 Side effects experienced on TB medicines (Question E1a)

The first question in this section (E1a) was open-ended and asked the respondents about the effect of the medication on them. It was analysed in a qualitative manner.

Respondents' answers included the following:

- *Red pill caused dizziness, sweating and nausea*
- *Painful legs and swelling of feet*
- *No side effect*
- *Change of urine at the beginning*
- *Itching*
- *Nausea and vomiting*
- *Heart beating excessively*
- *Headache*
- *Weakness*
- *Skin rash and vomiting*
- *Sore hands*
- *Joint pains.*

The reported side effects are all in line with known side effects to first-line anti-TB medication. Rifampicin is the medicine referred to as the “red pill” above and is known to cause nausea, dizziness and sweating (Namibia 2006a:48).

4.3.5.2 Action taken after experiencing side effects (Question E1b)

Question E1b was also open-ended and analysed in a qualitative manner. Respondents mentioned the following (among others) as actions taken because of the effects:

- *consulting the nurses*
- *seeing the doctor*
- *did nothing*
- *continued on medication*
- *came to the clinic*
- *Rest a bit then resume after a while as I feel better*
- *went to the hospital*
- *consulted boyfriend.*

The tendency was to consult with someone, in many cases a health care professional.

4.3.5.3 Person informed about the medication problems (Question E2a)

This open-ended question gave the respondent the opportunity to mention any person that they informed, and responses included the following:

- *the doctor*
- *Nurses*
- *No one*
- *TB Volunteer*
- *sisters.*

It is interesting to note that family members were not mentioned here. It therefore seems as if the persons trusted with this information had something to do with the health system.

4.3.5.4 Action taken by person informed of medication problems (Question E2b)

Again an open-ended question was asked, so that the respondents themselves could indicate what actions were taken. Responses included the following:

- *Referred to the doctor but did not go to the doctor*
- *treated with pain medication*
- *did not do anything*
- *Motivated by the doctor to see a nurse after the week*
- *given medication.*

Minor and major side effects are managed according to Namibian TB treatment guidelines (Namibia 2006a:48).

4.3.5.5 Most unwanted side effects of TB medicine (Question E3)

In this item the respondents had to choose, from a given list, the worst side effect they had experienced. Of the 143 respondents, 33 reported experiencing side effects.

TABLE 4.18: MOST UNWANTED SIDE EFFECTS OF TB MEDICINE

SIDE EFFECT	NUMBER (N)	PERCENTAGE (%)
Skin problems	6	18.2
Yellow eyes	4	12.1
Nausea and vomiting	11	33.3
Joint/limb pains	4	12.1
Dizziness and headaches	3	9.1
Other	5	15.2
Total	33	100.0

The most unwanted side effects from TB treatment were nausea and vomiting (11, or 33.3%), skin problems (6, or 18.2%), joint/limb pains (4, or 12.1%), yellow eyes (4, or 12.1%) and dizziness and headaches (3, or 9.1%). The other side effects made up the remaining 5 responses (15.2%).

A study in new Dehli noted side effects during DOTS as nausea and vomiting (53%), aches and pains (27%), skin rash (17%), arthralgia (11%)and hepatotoxicity (1%). The majority of these side effects occurred in the first four weeks of treatment. In this study only 0.25% of patients treated under DOTS had interrupted for short periods (Dhingra, Rajpal, Aggarwal, Aggarwaln, Shadab & Jain 2004:251–9).

4.3.6 Access to TB treatment

4.3.6.1 Problems experienced on receiving TB medicines on a monthly basis (Question F1a)

The section on access to TB medicine started with an open-ended question (F1a) about the biggest problem experienced while getting TB medicines.

The following responses were obtained when analysed in a qualitative manner:

- *No problem*
- *When she could not go to the clinic, she sent someone else who was ill-treated by nurses at the clinic*
- *Because of work, he has no one to send to the clinic for the checkups and medication*
- *Staying far in DRC informal settlement*
- *The work because of late shifts*
- *Place is too far and no food*
- *At the beginning of travelling, I feel very weak*
- *Tired, but because of my health, I go*
- *Money for hitch hiking*
- *Make her tired weak*
- *Only allowed to take them for a few day*
- *During holidays when clinics may be closed and I forget*
- *sometime find the clinic close*
- *busy and hence forget to take time*
- *too weak to go to the clinic*
- *Tired and very weak*
- *Wasting.*

From these responses it is clear that many problems were experienced by these patients who had to get medication on a monthly basis. These are mostly problems that can be solved. From some of the responses it seems that distance was problematic for some respondents. Community-based care has been noted to improve access to TB treatment. It is recognised that successful initiatives are built on community knowledge, input and motivation, and not centralised health care bureaucracy (*WHO 2008*).

4.3.6.2 Cost of getting to the health centre monthly (Question F1b)

Only 82 respondents answered this question on their travelling costs for treatment. The cost of travelling is reflected in Table 4.19.

TABLE 4.19: PATIENTS' COSTS OF TRAVELLING TO HEALTH FACILITY IN SWAKOPMUND DISTRICT

	N	RANGE	MINIMUM	MAXIMUM	MEAN	STD DEVIATION
Cost (N$)	82	290	0	290	16.8	54.5

Monthly travelling costs to get to the health centre ranged from N$0 to N$290, with a mean monthly cost of N$16.83 and a standard deviation of N$54.49. For people without an income this amount can be a lot of money.

A qualitative study in Gambia showed that, regardless of the gender of the TB patient, problems related to transport affordability led to reduced access to TB treatment (Eastwood & Hill 2004:70–75).

4.3.6.3 Time taken from home to health centre and back (Question F1c)

In this question, the participants were asked how long it took for them to get their TB treatment. A hundred and two respondents out of 143 answered .

TABLE 4.20: TIME TO GET TB TREATMENT

	N	RANGE	MINIMUM	MAXIMUM	MEAN	STD DEVIATION
Time (min)	82	295	5	300	62.42	58.1

The time taken to travel to the health centre, receive treatment, and travel back home ranged from 5 minutes to 5 hours (300 minutes), with a mean of 62.4 minutes and a standard deviation of 58.1 minutes.

Around an hour once a month is not much time to get medication, and if this is a true reflection of the current situation, it could be used as a positive factor to motivate patients to access medication. They could be told that on average it should take just over an hour to get it.

4.3.6.4 Perception of travelling cost to health centre (Question F2)

The monetary price of anything is a relative concept in any situation: each person interprets it in terms of his or her income or wealth. The respondents were therefore asked in Question F2 whether they considered the travelling to be expensive or not. This question was answered by 94 respondents.

TABLE 4.21: PERCEPTION OF COST

PERCEPTION	NUMBER (N)	PERCENTAGE (%)
Not expensive	76	73.1
Expensive	15	14.4
Very expensive	13	12.5
Total	104	100.0

The cost of travelling to the health centre was generally regarded as “Not expensive” by most respondents (60, or 73.1%).

4.3.6.5 Means of transport used to get to TB clinic (Question F3)

The participants were asked to indicate their means of transport, and 97 responded to the question. Results are reflected in Table 4.22.

TABLE 4.22: MEANS OF TRANSPORT

MEANS OF TRANSPORT	NUMBER (N)	PERCENTAGE (%)
Foot	87	81.3
Bicycle	4	3.7
Taxi	15	14.0
Other	1	0.9
Total	107	100.0

Of note is that there were no respondents who used a donkey cart or employer's car.

The most popular means of transport to the TB clinic was on foot (87, or 81.3%), which explains why most did not consider the travelling cost to be high.

4.3.6.6 Estimated distance between home and health centre (Question F4)

The respondents had to indicate their distance from the health care centre, choosing one of five options. The results of 108 respondents that answered are reflected in Table 4.23.

TABLE 4.23: ESTIMATED DISTANCE BETWEEN HOME AND HEALTH CENTRE

DISTANCE (KM)	NUMBER (N)	PERCENTAGE (%)
0–5	100	92.6
6–10	8	7.4
11–15	0	0.0
16–20	0	0.0
More than 20	0	0.0
Total	108	100.0

The majority of patients (100, or 92.6%) lived less than 5 km from the health centre.

A cohort study in Ethiopia (Shargie & Lindjorn 2007:37), using predetermined risk factors that were followed up, shows that the need to use public transport and the distance from home to the treatment centre are associated with treatment interruption. In the Ethiopian study, physical access to the treatment centre is a factor independently associated with treatment interruption. In Swakopmund, however, it is important to note

that almost all patients (81.3%) accessed the health centre on foot and did not rely on public transport. The majority (92.6%) were living within 5 km of the health facility.

4.3.6.7 Change of address during TB treatment (Questions F5, F6 and F7)

Questions F5 and F6 specifically asked participants what their addresses were when they started and when they discontinued TB treatment. However, the issue of importance here, and asked directly in Question F7, is whether the respondent's residence changed during the course of TB treatment. This question was answered by 104 participants.

TABLE 4.24: CHANGE OF PLACE OF RESIDENCE DURING TB TREATMENT

CHANGE OF RESIDENCE	NUMBER (N)	PERCENTAGE (%)
Yes	21	20.2
No	83	79.8
Total	104	100.0

Most of the patients (83, or 79.8%) had not changed their place of residence during TB treatment.

4.3.7 Patient–provider relationship

4.3.7.1 Problems experienced during clinic attendance (Question G1)

This open-ended question enquired in a general way about problems experienced in attending clinics. The responses were analysed in a qualitative manner and included the following:

- *No problems*
- *Busy and unwell at home, therefore sending brother who later refused to go*
- *Work pressures*
- *Too far and age too old to walk (58 years)*
- *No money to get a taxi*
- *Employer threatens to fire*
- *Arriving late from work*
- *Taking treatment from the hospital*
- *Injured on leg and cannot walk long distance*.

The problems reported as experienced by individuals varied from person and did include responses that indicated that the clinic was far or that the hours were not convenient.

4.3.7.2 Preferred clinic opening times (Question G2)

Respondents could choose between five options of suggested clinic opening hours. A total of 112 respondents answered the question and the results are reflected in Table 4.25.

TABLE 4.25: PREFERRED CLINIC OPENING TIMES

OPENING TIME	NUMBER (N)	PERCENTAGE (%)
Earlier than 8 am and up to 5 pm	86	76.8
8 am to 5 pm	23	20.5
Earlier than 8 am until later than 5pm	2	1.8
Other	1	0.9
Total	112	100.0

The most popular clinic opening times were “Earlier than 8 am and up to 5 pm”, chosen by 76.8% of the respondents. Actual clinic opening times in this research setting were from 8 am to 5 pm. This time opening was thus not in line with the preference of the majority of respondents.

The rigidity of clinic opening times increases barriers to accessing TB treatment. This is supported by a qualitative study in Ethiopia, where it was found that the problems of access due to a lack of financial and practical help were reinforced by rigid clinic opening times (Sagbakken et al 2008:11).

4.3.7.3 Preferred opening days (Question G3)

Respondents were given a choice of three options to indicate their preferred TB clinic days. This question was answered by 110 respondents and the results are reflected in Table 4.26.

TABLE 4.26: PREFERRED OPENING DAYS

OPENING DAYS	NUMBER (N)	PERCENTAGE (%)
Monday to Friday	88	80.0
Monday to Friday plus weekends	21	19.1
Special days for TB	1	0.9
Total	110	100.0

The most popular opening days were “Monday to Friday” (88, or 80%). Clinics in the research setting operated from Monday to Friday. About 20% of the respondents preferred other opening days.

4.3.7.4 Reception experienced at TB Clinic (Question G4)

The final question in this section gave respondents the opportunity to describe the reception they got at the TB clinic. They had a choice of three options. This question was answered by 110 respondents. The results are reflected in Table 4.27.

TABLE 4.27: RECEPTION EXPERIENCED AT HEALTH CENTRES

RECEPTION	NUMBER (N)	PERCENTAGE (%)
Friendly	103	93.6
Unfriendly	2	1.8
Indifferent	5	4.5
Total	110	100.0

The majority of respondents (103, or 94%) indicated that they experienced the reception as friendly.

A case control study in a hilly Western district of Nepal (Mishra et al 2005:1134–9) found poorly graded communication between the patients and dispensers to be a significant factor in causing treatment interruption. A survey in Pakistan found provider attitudes to be poor, with health care workers expressing unsupportive views (Khan, Walley, Witter, Shah & Javeed 2005:354–65). The negative attitude of health workers is also noted in a qualitative study in Southern Nigeria, where health workers demanded money from TB patients for a service which was advertised as free, and also showed a hostile attitude (Okeibunor, Onyeneho, Chukwu & Post 2006:23–27 54).

4.3.8 Stigma

4.3.8.1 Feelings with regard to sharing TB diagnosis with others (Question H1)

This open-ended question investigated disclosure of a particular diagnosis, in this case TB. Responses were analysed in a qualitative manner and were as follows:

- *No problem*
- *Felt better with aunt and not boyfriend*
- *Friends**;** family and church members*
- *Bad**;** Very bad because the community thought that I had AIDS*
- *Some people do not know the difference between STD and TB*
- *Feel very embarrassed because people will think that they have AIDS*
- *Difficult*
- *Relief*
- *Family and friends*
- *Ashamed to tell people the TB results*
- *Not easy, except the family members.*

From these responses it seems that disclosure could be a problem for patients in this research context. Experience of stigma was noted to be common and might have contributed to treatment interruption. For effective TB control, closer attention must be paid to stigma (Abioye, Omotayo and Alakija 2011:S100–04).

4.3.8.2 Persons informed by patient about TB diagnosis (Question H2)

Following the disclosure question above, an open-ended question was asked (H2) to determine whom the respondents were able to tell that they were suffering from TB.

Responses were analysed in a qualitative manner and included the following:

- *Friends and relatives*
- *Mother and friends*
- *Aunt*
- *Relatives at home and in the south*
- *Uncle and his wives*
- *Family and friends*
- *Wife*
- *My children and friends*
- *Grandmother and aunts*
- *Friends*

- *Anyone in the community*
- Several mentioned *Sister*
- *Mother and Brother*
- *No-one*
- *Brother*
- *Family members*
- *friends and managers*
- *Husband*
- *Doctors and nurse*
- *Girlfriend*
- *Boyfriend.*

These examples show that patients had informed a variety of individuals, or groups of individuals.

4.3.8.3 Friends/relatives informed about TB diagnosis (Question H3)

Respondents were asked to indicate if they informed a friend or a relative about the diagnosis (Q H3), and 109 completed the question. The results are reflected in Table 4.28.

TABLE 4.28: DISCLOSURE OF TB STATUS TO FRIEND/RELATIVE

INFORMED	NUMBER (N)	PERCENTAGE (%)
Yes	108	99.1
No	1	0.9
Total	109	100.0

Most of the respondents (108, or 99.1%) informed their friends or relatives about the TB treatment, as was clear from the previous section (4.3.8.2).

In a study in Jogjakarta, Indonesia, it was noted that patients sought advice from family and friends, and this influenced their care-seeking behaviour (Rintiswati, Mahendradhata, Suhama, Susulawati, Purwanta, Subronto, Varkevisser & Van der Werf 2009:158).

4.3.8.4 Reasons for not informing friends/relatives about TB diagnosis (Question H4)

Respondents who indicated that they did not tell friends and family about their TB diagnosis were asked to choose one of three possible reasons (Q H4).

The respondent who did not tell friends and relatives feared a negative response from those close to him.

4.3.8.5 Form of assistance received from friends/relatives (Question H5)

Respondents were asked to indicate if assistance or support had been received from family members or friends (Question H5). Four options were available to choose from. Results from the 97 respondents who completed this question are reflected in Table 4.29.

TABLE 4.29: FORMS OF ASSISTANCE RECEIVED BY TB PATIENTS

ASSISTANCE	NUMBER (N)	PERCENTAGE (%)
Food	72	74.2
Money	11	11.3
Other	14	14.4
Total	97	100.0

Assistance from relatives and friends was in the form of food (72, or 74.2%), money (11, or 11.3%), and other forms of practical help (14, or 14.4%).

Transport was not mentioned by any respondent, and in the light of section 4.3.3.6 it is not surprising, since it was found that the majority of respondents in this study context stayed fairly close to the TB clinics.

4.3.8.6 Employee disclosure of TB diagnosis to employer (Question H6)

Respondents were specifically asked if their TB diagnosis had been disclosed to their employers (Question H6). Only 70 respondents answered this question, and the results are reflected in Table 4.30.

TABLE 4.30: DISCLOSURE OF TB STATUS TO EMPLOYER

DISCLOSURE	NUMBER (N)	PERCENTAGE (%)
Yes	58	82.9
No	12	17.1
Total	70	100.0

Most of the respondents (58, or 82.9%) told their employer about their TB treatment, and some were able to access TB treatment at work. In a study in South Africa, public–private workplace partnerships were found to have the highest quality of care compared to public sector TB clinics and non-governmental organisation community-based TB care. This was noted to be particularly crucial where the public sector did not have the capacity to monitor the quality of care of TB patients (Sinanovic & Kumaranayake 2006:795–801).

4.3.8.7 Reasons for not disclosing TB diagnosis to employer (Question H7)

The respondents who did not tell their employer about the TB diagnosis were requested to indicate the reason for not doing so (Question H7). They had four options to choose from. Of the 12 respondents who had answered negatively in the previous question, only seven answered this question. Responses are reflected in Table 4.31.

TABLE 4.31: REASONS FOR NOT DISCLOSING

REASON	NUMBER (N)	FREQUENCY (%)
Fear of losing job	1	14.3
Fear of isolation at work	2	28.6
Other	4	57.1
Total	7	100.0

Those who did not disclose to employers either feared isolation at work (2, or 28.6%), feared losing their jobs (1, or 14.3%) or had other unstated reasons (4, or 57.1%).

A study in Addis Ababa, Ethiopia, noted that lack of employment, or the possibility of getting work, led to various interrelated barriers for TB patients (Sagbakken et al 2008:11).

4.3.9 Substance use

4.3.9.1 Cigarette smoking (Question I1a)

The first question (I1a) in this section investigated whether the respondents were smokers or not. The question was answered by 97 respondents and the results are reflected in Table 4.32.

TABLE 4.32: PATIENTS WHO SMOKE

SMOKER	NUMBER (N)	PERCENTAGE (%)
Yes	23	23.7
No	74	76.3
Total	97	100.0

The majority of patients in this study did not smoke.

4.3.9.2 Cigarette smoking during prior seven days (Question I1b)

The second question (Question 1b) determined if any respondent had smoked in the past seven days. This question was answered by 92 respondents, and results are reflected in Table 4.33.

TABLE 4.33: SMOKING DURING PAST SEVEN DAYS

SMOKING	NUMBER (N)	PERCENTAGE (%)
Yes	23	25.0
No	69	75.0
Total	92	100.0

The majority of patients had not smoked during the past seven days.

4.3.9.3 Period taken to smoke a pack of 20 cigarettes (Question I1c)

The third question (I1c) asked how long a smoker generally took to smoke a pack of 20 cigarettes. This question was answered by 20 out of the 23 smokers, and the results are reflected in Table 4.34.

TABLE 4.34: PERIOD TO SMOKE A PACK OF 20 CIGARETTES

	N	RANGE	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
Period to smoke 20 cigarettes (days)	20	28	2	30	7.6	6.1

For those who smoked, a packet of 20 cigarettes lasted a minimum of two days and a maximum of 30 days, with a mean of 7.6 days and a standard deviation of 6.1 days.

4.3.9.4 Alcohol consumption (Question I2a)

The first question determined whether a respondent consumed alcohol or not. This question was answered by 107 respondents and the results are reflected in Table 4.35.

TABLE 4.35: ALCOHOL CONSUMPTION

ALCOHOL CONSUMED	NUMBER (N)	PERCENTAGE (%)
Yes	34	31.8
No	73	68.2
Total	107	100.0

The majority (73, or 68.2%) indicated that they did not consume alcohol.

4.3.9.5 Consumption of alcohol in past week (Question I2b)

The second question asked if any respondent had consumed alcohol in the past seven days. This question was answered by 88 respondents and the results are reflected in Table 4.36.

TABLE 4.36: ALCOHOL CONSUMPTION IN THE PAST WEEK

ALCOHOL CONSUMED	NUMBER (N)	PERCENTAGE (%)
Yes	17	19.3
No	71	80.7
Total	88	100.0

Seventeen (19.3%) of the respondents reported having consumed alcohol in the previous week.

4.3.9.6 Quantity of alcohol consumed in the past week (Question I2c)

Question I2c determined the amount of alcoholic drink, in pints, taken by a respondent. The question was answered by 17 respondents and the results are reflected in Table 4.37

TABLE 4.37: QUANTITY OF ALCOHOL CONSUMED IN THE PAST WEEK

	N	RANGE	MINIMUM	MAXIMUM	MEAN	STD DEVIATION
In the last week, how many pints of alcohol have you consumed?	17	6	0	6	2.4	1.9

Of those who had drunk alcohol in the last week, consumption in pints ranged from 0 to 6 pints, with an average of 2.4 pints and a standard deviation of 1.9 pints. Where alcoholic drinks other than beer were consumed, the equivalent amount of alcohol in terms of pints of beer was estimated.

4.4 OVERVIEW OF RESEARCH FINDINGS

The average age of participants was 35.7 years, with a predominance of male participants (65%). Most of the respondents were unemployed (56.3%) and in the low income bracket (53.6%). From the study, 35.5% of the respondents were HIV positive, while the HIV status of 26.8% was unknown.

Very few of the respondents had reached a tertiary level of education (11.4%), while 5.7% had no formal education.

A total of 73% of the respondents interrupted their treatment for seven days or more. Mobility, lack of knowledge, and treatment side effects were the most important reasons for 34 of the 74 participants who interrupted treatment. Friends were most influential in causing discontinuation of treatment, while relatives were most influential in supporting continuation after disruption.

Only 23.2% of the respondents were visited by health care workers during their treatment.

Most of the respondents (81.1%) were exposed to some form of media, and the radio was the most popular of the media (75.5%).

Respondents cited death as the most feared adverse outcome of treatment interruption.

Most respondents preferred DOT at home (63.9%), and 70.1% indicated that they did not mind being supervised by a second person during treatment. The reception at the clinics was regarded as friendly by most respondents (93.6%). The respondents preferred the clinic to open before 8 am and remain open until 5pm from Monday to Friday.

Nausea and vomiting was the major side effect of TB treatment reported.

The average monthly cost of treatment was N$16.83, and most regarded this as “Not expensive” (73.1%). The low cost could be ascribed to the fact that most respondents (81.3%) went to the TB clinic on foot. The majority of respondents did not change their place of residence during treatment, and those who did move still remained within the district.

The majority of respondents (99%) disclosed their TB status to relatives and friends.

Some respondents consumed alcohol (19%) and smoked (25%) during the seven days prior to the survey.

4.5 CONCLUSION

The majority of respondents in the study interrupted their TB treatment for seven days or more. The significance of different factors possibly influencing treatment interruption is reported in Chapter 5.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The purpose of the study was to investigate and identify factors associated with the interruption of TB treatment in Swakopmund district, Erongo Region, Namibia. The researcher undertook a cross-sectional study by which he investigated and identified the reasons why patients interrupted TB treatment in the study context, and was thus able to achieve the objective of the study.

This study was essential because TB treatment interruption is related to adverse outcomes such as the development of drug resistant strains of mycobacterium tuberculosis (MTB) and ultimately death. An understanding of treatment interruption and its determinants is further essential to assist in designing effective interventions to limit mortality and morbidity and the development and spread of drug resistant TB.

This chapter summarises and discusses the findings. The chi-square statistic (χ^2), degrees of freedom (df) and p value will be reported where applicable.

5.2 STUDY FINDINGS

5.2.1 Respondents socio-demographic factors

5.2.1.1 Influence of age

The average age of participants was 37.5 years. Ages of participants ranged from 15 years to 76 years. TB in Swakopmund district affected a wide age group. Globally around two thirds of TB cases are noted to occur in the 15–59 year age group (WHO 2011:3).

5.2.1.2 Influence of gender

The majority of TB patients in the study, namely 65%, were male. National TB data indicated that 58% of all new smear positive TB patients in Namibia are male. The predominance of males over females in the study is therefore consistent with national

data. Globally, it has also been noted that TB is more common among men than women (WHO 2011:3).

5.2.1.3 Patient address

The study showed that although patients moved and changed addresses during their TB treatment, all remained within the catchment area of the district.

5.2.1.4 Influence of educational level

While most of the TB patients had received primary and secondary education, very few (11.4%) had been exposed to tertiary education. This finding is consistent with national data which shows that only 4.8% of Namibians have tertiary education (Namibia 2008a:10–11).

There was a significant association between treatment interruption and level of education. $\chi^2 = 13.81$, df = 6, p = 0.032. A study in Ndola, Zambia (Kaona, Tuba, Siziya & Sikaona 2004:68) found educational level not to be significantly associated with treatment interruption. Factors that were found to be related to non-compliance in this study were feeling better, lack of knowledge, running out of drugs at home and TB drugs which were too strong.

Educational status was found to be negatively correlated with drug resistant TB in a study in south East Turkey (Tanrikulu, Hosoglu, Ozekinci, Abakay & Gurkan 2008:91–3). Drug resistance is a possible outcome of treatment interruption.

5.2.1.5 Influence of employment status

TB patients in Swakopmund District showed a much higher rate of unemployment (56.3%) than the general population in Namibia (37.6%). In the study, employment status was not significantly associated with treatment interruption. $\chi^2 = 0.855$, df = 2, p = 0.652.

In a case control study in Manila, Philippines, unemployment was found to be a significant factor in predicting treatment completion. The Manila study was set in a predominantly urban setting similar to that of Swakopmund (Lagrada et al 2008:765).

5.2.1.6 Influence of income bracket

The study showed that most of the TB patients were in the low income bracket, earning less than N$400 per month. This particular contextual study suggests that the poorer sector of the population is more vulnerable to TB than are the richer groups.

Income bracket, surprisingly, was not a significant factor associated with treatment interruption: $\chi^2 = 0.792$, df = 4, p = 0.940. Findings of a study in Addis Ababa, Ethiopia, indicate that long-term lack of income is related to treatment interruption, especially in the later stages of the TB treatment (Lagrada et al 2008:765, Sagbakken et al 2008:11).

5.2.1.7 Influence of people sharing home with the respondent

TB patients in the study stayed with a wide variety of people during their treatment. It is not possible to say, from this study, whether the people one stays with have any significant influence on treatment interruption or not.

5.2.1.8 Influence of HIV status

The percentage of patients who tested HIV positive was 35.5% (49), while 37.7% (52) tested negative. In the research group, 26.8% (37) of the respondents had an unknown HIV status. HIV status had no influence on TB treatment interruption in this study. $\chi^2 = 3.797$, df = 4, p = 0.434. Breen et al (2007), looked at 312 TB patients, 156 of whom were co-infected with HIV, and came to the conclusion that interruption of TB treatment occurred with similar frequency in HIV co-infected patients and those not co-infected with HIV. This was despite a higher rate of side effects in those who were HIV co-infected.

5.2.2 Support

Only 28 patients (27%) took their medication without interrupting treatment. Those who interrupted revealed that they were mostly influenced by friends to stop treatment (37%) and quite surprisingly 17% were influenced by health workers to stop treatment. Relatives were most influential in getting patients to continue their TB treatment after interruption, through financial and practical help.

A very low number of TB patients (23%) were visited by health workers in this particular study. Visitation by a health worker was, however, not a significant factor associated with continuation of treatment in this study. $\chi^2 = 3.797$, df = 4, p = 0.434. In contrast to these findings, a randomised controlled study of 408 smear positive TB patients in Baghdad, Iraq, showed a significant reduction in treatment interruption by the participants who were visited by trained health personnel. The intervention group had a default rate of only 0.8% compared with 10.0% in the control group (Mohan, Nassir & Niazi 2003:702–8).

Radio was undoubtedly the most helpful of the media in this study, and the majority of TB patients (81%) were exposed to TB messages during their treatment.

There was a significant association between exposure to media and treatment interruption in this particular study. $\chi^2 = 12.11$, df = 4, p = 0.017.

A case control study in New York found that lack of awareness and homelessness were significantly associated with treatment interruption. However, after further multivariate analysis, only lack of awareness of the severity of the disease was found to be significantly associated. The study emphasised the importance of increasing patient understanding of TB at the beginning and throughout TB treatment (Driver, Matus, Bayuga, Winters & Munsiff 2005:361–8). That study, however, had multiple types of interruptions as cases and recorded a 6% interruption rate overall.

5.2.3 Reasons for and perceived consequences of stopping TB treatment

Of the 74 respondents in this study who interrupted treatment, only 34 gave reasons why they interrupted. The majority cited mobility and migration issues as being their most important reason for interrupting, followed by lack of knowledge, side effects and work-related issues, yet it is interesting to note that those who moved stayed within the catchment area of the TB clinics. Lack of physical access, lack of family support, co-morbidity and other reasons constituted the remainder. Most of the respondents revealed that they realised that death was the ultimate consequence of not taking their treatment.

5.2.4 DOTS

TB treatment medication was taken from a variety of locations in the district. Most patients (64%) preferred to take medication from home. The preference of where to take treatment was not a significant factor in this study. $\chi^2 = 8.683$, df = 8, p = 0.370.

Most of the supervision in the district was not done by trained independent observers. Most participants indicated that they had no problem with being supervised while taking treatment. Observation of treatment by a second person was found not to be significantly associated with treatment interruption. $\chi^2 = 3.911$, df = 4, p = 0.418.

5.2.5 Medication and side effects

TB patients in the study experienced a variety of side effects of medication, especially nausea and vomiting. However, the side effects experienced were not significantly associated with treatment interruption in the study. $\chi^2 = 4.943$, df = 5, p = 0.423.

In a large study on side effects in India (Dhingra et al 2004:251–9), 8.37% of 1125 TB patients presented with side effects, and only 0.25% of these interrupted treatment for short periods while on DOT. By contrast, however, a study in Hong Kong (Chang et al 2004) finds a strong association between treatment side effects and treatment defaulting. In this study, 4 (1.3%) out of 306 controls experienced side effects compared to 10 (9.8%) out of 102 defaulters.

5.2.6 Access to TB treatment

Patients experienced a wide variety of problems in trying to access TB medication on a monthly basis. The mean monthly cost to get to the health centre was N$16.83. Most respondents did not consider the cost of travel to the centre to be expensive. It is important to note, however, that (81%) of respondents were living within walking distance of the TB clinic, so did not have to pay for transport.

The cost to travel to the health centre was not a significant factor associated with treatment interruption in this study. $\chi^2 = 7.097$, df = 4, p = 0.131.

A survey done in Rio de Janeiro State, Brazil, found that patients who defaulted therapy were more likely to choose health support incentives than other patients. These incentives included transport and food aid. Of note, however, is that this study was done among the poorest in a marginalised community in the Duque de Caxias county of Rio de Janeiro. The study noted that among the poorest TB patients, financial support may be necessary to reduce treatment interruption (Belo et al 2006).

The means of transport used was also not a significant factor in the study. $\chi^2 = 4.527$, df = 6, p = 0.606. In contrast, a cohort study in Southern Ethiopia reports that the need to use public transport is an important factor related to treatment interruption. In this study of 404 TB patients, 20% (81) defaulted treatment due to transport difficulties (Shargie & Lindtjorn 2007:e37).

Distance was also not a significant factor ($\chi^2 = 0.166$, df = 2, p = 0.920). Most of the respondents (93%) lived within 5 km of the health centre.

Most respondents (79.8%) in the study did not change their place of residence. Change of residence was not a significant factor associated with treatment interruption in this study ($\chi^2 = 0.488$, df = 2, p = 0.783), although it was mentioned by some as the reason for their interruption of treatment (see 5.2.3).

However, contrary to the findings in this study, mobility of TB patients was found to be a factor influencing treatment interruption and diagnosis in injection drug users in a prospective cohort study in Tijuana, Mexico. Mobility was responsible for 50% of the treatment interruption, which occurred in 8% of that study population (Deiss et al 2009:1491–5). An observational cohort study done in four provinces of Thailand finds that age, lack of DOT and mobility are significantly associated with treatment interruption (Kapella et al 2009:232–7).

5.2.7 Patient–provider relationship

Respondents mentioned various problems with regard to clinic attendance. Most (76.8%) preferred that the clinic open before 8 am. The clinic opening times in the research setting were 8 am to 5 pm. Monday to Friday were the preferred opening days for 80% of the respondents. Most (94%) of the respondents experienced a friendly

reception at the TB clinic and perceived the attitude at the clinics to be positive and caring during the time of the study.

5.2.8 Stigma

Most of the respondents in the study informed their relatives and friends about their diagnosis. Similarly, most respondents (83%) informed their employer; the few who did not disclose feared a negative response.

Informing the employer was not significantly associated with treatment interruption. $\chi^2 = 0.385$, df = 2, p = 0.825.

5.2.9 Substance use

About 25% of the respondents reported that they had smoked during the week before the interview. However, smoking was not significantly associated with treatment interruption ($\chi^2 = 2.476$, df = 2, p = 0.290).

In contrast, a study in Sri Lanka found that regular smokers were more likely to default compared to patients who did not smoke regularly (Pinidiyapathirage, Senaratne & Wickremasinghe 2008:1076–82). Another study in a rural area in Northwest Turkey found that the adherence rate in non-smokers was higher than in smokers, (81.4% and 52.4% respectively), (Balbay, Annakkaya, Arbak, Bilgin & Erbas 2005:152–8). A study in Hong Kong found current smoking to be a risk factor for treatment interruption (Chang et al 2004).

Those who consumed alcohol constituted 32% of respondents. Alcohol consumption was not significantly associated with treatment interruption ($\chi^2 = 1.128$, df = 2, p = 0.569).

In contrast, a study in South India of 676 patients showed that male alcohol consumers were at particularly high risk of treatment interruption (Santha, Garg, Frieden, Chandrasekaran, Subramani, Gopi, Selvakumar, Ganapathy, Charles, Rajamma & Narayanan 2002:780–8).

Substance use is also noted as strongly associated with non-adherence in Tomsk, Russia, in a retrospective study (Gelmanova, Keshavjee, Golubchikova, Berezina, Strelis, Yanova, Atwood & Murray 2007:703–11).

5.3 RECOMMENDATIONS

5.3.1 Recommendations for TB programme improvement

5.3.1.1 Support for TB patients

The problem of TB should be addressed in a holistic way. Greater focus should be given to poor and vulnerable populations like the study population in the Swakopmund district, as they are disproportionately affected by TB, both as patients and as TB contacts. Poverty and job creation should be addressed.

Relatives should be used as treatment supporters in preference to non-relatives if at all possible. The community participation in TB care and prevention must be fostered at all times. Community health workers should work as adherence supporters in the district and receive appropriate incentives. These community health workers must be offered screening for HIV and TB, as they may be at a higher risk of HIV and TB than the general population (Kranzer, Bekker, Van Schaik, Thebus, Dawson, Caldwell, Hausler, Grant & Wood 2010:224–6).

Health workers should be trained to be a positive influence to TB patients at all times. The alarming finding that health workers influenced treatment interruption in Swakopmund district should alert programmes to the existence of such a phenomenon. Measures should therefore be taken during training to deal effectively with misconceptions health workers may have regarding TB treatment. Improvement of staff morale must be a priority of district management.

5.3.1.2 Improve patients' understanding of TB

The radio remains a good accessible medium of communication for TB patients and should be exploited to its fullest potential in all health promotion strategies. Appropriate health promotion messages on TB treatment should be addressed to all age groups. Other media types such as the cell phone should be exploited, as many people have access to this technology.

The formal education system should be harnessed as a vehicle to deliver TB messages within the overall country goal of universal access to education. Since health workers did not stand out as the primary source of information of TB in this study, an initiative could be launched in order to empower them to educate TB patients.

5.3.3.3 Implementation of the Stop TB strategy at district level

In line with the NTP, the district must adopt and strictly implement the DOTS/Stop TB strategy. This is a strategy whose vision is “a TB-free world”. One of the components is the pursuit of high-quality DOTS expansion and enhancement. This needs political support with adequate financing to pursue the goal of early case detection and diagnosis, and the provision of standardised treatment with proper supervision and support throughout. It is also important to ensure the effective supply and management of drugs and to put in place quality monitoring and evaluation systems to assess performance and impact (WHO 2011:35).

Similar efforts to minimise treatment interruption should be directed to both HIV positive and HIV negative TB patients. Employers of TB patients are a potential resource to be engaged in supporting TB patients on treatment. In this study, most patients informed their employers of their TB status, with only a minority fearing a negative response.

In terms of diagnosis, all new cases of TB considered to be at risk for MDR TB should be tested for drug susceptibility. This group is estimated to be 20% of all new cases and 100% of re-treatment cases. Current data indicates that only 2% of new cases and 6% of re-treatment cases were tested for MDR TB globally. Strengthening laboratory capacity and introducing rapid diagnostic tests will assist in reaching these targets (WHO 2011:35).

5.3.1.4 Improved access

The Stop TB strategy objective of universal access to high quality care for all people with TB must be pursued in the district. Factors reducing access at the local district level must be eliminated (WHO 2011:35). In this study context, these will be factors such as clinic opening times and days, cost of travel and walking distances.

5.3.1.5 Research and new technology

The NTP and the district should embrace new technology in the fight for TB. Operational research should continue to be conducted and results used to improve TB control. The district must participate in research directed at new TB drugs, vaccines and diagnostics. Shorter-duration TB regimens are currently being tested, and these are likely to increase adherence, reduce default, attract more TB patients, increase cure rates and reduce new cases of MDR TB (Wells et al 2010:1539).

There are currently 10 new or repurposed TB drugs that are undergoing clinical trials and have the potential to reduce the duration of treatment of drug susceptible TB. Results from three phase III trials of 4-month regimens containing gatifloxacin or moxifloxacin for drug susceptible TB are expected by 2013. Patients must be given sufficient information should such a regimen change occur in the future (WHO 2011:71–3; Wells et al 2010:1544).

Xpert MTB/RIF is a fully automated, cartridge-based nucleic acid amplification test that can diagnose TB and drug resistant TB. This test can be used at district and subdistrict level. It is important to note, however, that the use of technologies such as Xpert MTB/RIF should be accompanied by rapid expansion of, and access to, treatment services. Hence the technology should be rolled out in phases, taking into account national plans for care and treatment of TB (WHO 2011:55).

5.3.1.6 Treatment interruption definition

The majority of patients in this study interrupted their treatment for seven days or more. The WHO defines treatment interruption as not taking medication for a period of one month but less than two months (Namibia 2006a). The existence of such a definition being used by TB programmes is important, but opens the door for tolerance of shorter periods of treatment interruption by patients, which cumulatively may pose a problem for both patient and community.

A retrospective study based on records in Taipei found that visiting other health facilities during treatment was associated with TB treatment interruption of at least two months (Chiang, Lee, Yu, Enarson, Lin & Luh 2009:105-11). In fact, mobility of this kind was the only significant factor found in the study to be associated with treatment interruption. It

is important to note, however, that the interruptions as defined in that study differed from the “seven days cumulative” interruptions used in the present study, which focuses on shorter periods of interruption.

TB programmes should not tolerate any treatment interruption. As the current WHO recommendation is that ART should be given to all TB patients living with HIV, irrespective of their CD4 count, provision of ART to TB patients should become the responsibility of the national TB control programme. The same level of adherence expected in HIV treatment should also apply to TB treatment (WHO 2011:63).

Brief periods of treatment interruption can predict defaulting from TB treatment and should not be acceptable in TB programmes. See section 1.6.

5.3.1.7 Patient preferences

This researcher observed that in rolling out TB programmes, the economic, human resources and other logistic aspects often dictated the structure of the district programme. Patient preferences should also be considered here.

A pilot study was done in Durban, South Africa, to test the feasibility of combining a once-daily triple combination of ARVs with a fixed-dose four-drug TB treatment regimen, with all drugs being given at the TB clinic as directly observed treatment first thing in the morning. Experiences from a cohort of 17 patients suggested that the context of directly observed therapy had the added benefit of creating a safer space for starting anti-retroviral therapy in patients who would benefit the most but were not prepared to disclose their HIV status to others (Gebrekristos, Lurie, Mthethwa & Karim 2009:1–6).

5.3.1.8 Improving the performance of the district health system

A focus on overall strengthening of the whole district health system will benefit TB control. This can be done through providing more human resources for TB control, strengthening infection control, and upgrading laboratory capacity and efforts directed at the underlying determinants of health in the district.

The WHO performance model outlines the functions and objectives which are important in turning around a poorly functioning health system. The functions include stewardship,

creating resources through investment and training, financing through collecting, pooling and purchasing and service delivery. The objectives are responsiveness, fairness in financial contribution and improved health (Engelbrecht & Crisp 2010:195–203).

In the study context, good stewardship should ensure unity among private, public and non-governmental organisations in the fight against TB treatment interruption, with a joint strategy and common vision. Fragmentation and competition should be avoided in TB control. All stakeholders should be involved through public–private partnership approaches.

In order to be ensure responsiveness, TB clinics must open as early as 7 am. Waiting time must be reduced. The district manager must be given authority to tailor service delivery in response to the local circumstances in Swakopmund district. The positive and caring attitude demonstrated by health care workers in this study should be maintained and improved on. Service delivery should take into account the cultural context of the individual and community.

Patient representatives in decision-making bodies should be made integral to any planning and decision-making process in the district regarding TB care (Wells et al 2010:1538–47).

There will be a need to increase the number of TB nurses and community TB DOT promoters gradually, depending on available resources.

The promotion of good reporting is essential for monitoring and evaluation of TB control. Performance targets are needed for all levels of staff.

The prevention and management of multi-drug resistant TB must be scaled up in the district (WHO 2011:4)

TB and HIV services should be integrated in the district. HIV drives the TB epidemic, and TB drives HIV disease progression and mortality. Integration can be achieved by creating a coordinating body at district level for collaborative TB and HIV activities, intensifying efforts at TB case finding in HIV patients and promoting HIV testing and

counselling, cotrimoxazole prophylaxis and early introduction of ART in TB patients (Matjila, Hoosen, Stoltz & Cameron 2008:89–95).

5.3.2 Recommendations for further research

The following further research is recommended:

- A similar study can be done in other districts of Namibia to give a national perspective of the phenomenon of treatment interruption.
- A study on the nature and quality of information obtained from health workers would be helpful in view of the disturbing finding that some respondents claim to have been influenced by health workers to stop TB treatment.
- The questionnaire can be refined and the study repeated in the same context to ascertain if any change has taken place.
- A study could be done to explore the role of the media in TB education and the level of understanding of such media messages by patients.
- A further study looking further into the actual timing and number of days of TB treatment interruption by patients would assist the TB programme in focusing resources appropriately.
- A case control design comparing the characteristics of TB treatment interrupters and non-interrupters is also suggested.
- A study on patient preferences for a TB programme could be done.
- Finally, there could be a qualitative study to explore the reasons for TB treatment interruption in the study context.

5.4 LIMITATIONS OF THE STUDY

5.4.1 Context

The study was conducted under the programmatic conditions of the NTP. The NTP has since introduced other interventions, such as the communication for behavioural change (COMBI), which may change the behaviour of patients.

5.4.2 Study design

The use of a questionnaire for the survey meant that some unique characteristics of each respondent were missed. It is also difficult to say with confidence whether the answers given by the TB patients reflected their true views (see 5.4.5).

The survey is a descriptive cross-sectional study. If the research had measured confounding variables in a case control design, the effects of the confounding could have been found. The confounders, such as age, are related to both exposure and outcome.

5.4.3 Sampling

The purposive non-probability sampling method in the study means that the sample may not be representative, although every effort was made to include all patients meeting the inclusion criteria in all TB clinics during the study period.

The lack of representativeness of the sample reduces the ability to generalise the results. No binary logistic regression was done to assess either confounding or the independent effect of each factor on treatment interruption.

5.4.4 Data-collecting instrument

There was a diversity of language and culture in the Swakopmund district which made it difficult match interviewers with respondents with respect to age, gender and language. It became clear during the study that the data-collecting instrument would need further refinement. Some of the questions were not interpreted correctly by the respondents and field workers.

5.4.5 Ethics

The study asked respondents to reveal deviant behaviour and personal issues. It is possible that some respondents would have held back their answers due to psychological discomfort.

5.5 REFLECTION ON THE STUDY

This study on TB treatment interruption revealed to the researcher that patients experience a variety of positive and negative influences within their own individual context and environment, which determine their health behaviour. It further showed that a TB programme and indeed a health system must take full responsibility for the health of the population and not leave it to the individuals affected. Lastly, the researcher perceived that patients should always be involved in decisions relating to the way their programme was structured and run.

5.6 CONCLUSION

Treatment interruption in TB patients is a phenomenon that exists and that undermines the performance of the district TB programme. The study examined a number of factors to assist in clarifying the determinants of this major problem. DOTS remains the basic package that underpins the Stop TB strategy (WHO 2011:iv).

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ANNEXURE A: RESEARCH & ETHICS COMMITTEE CLEARANCE CERTIFICATE

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

Date of meeting: 5 July 2007. Project No: 35757299

Project Title**:** **TREATMENT INTERRUPTION IN TUBERCULOSIS PATIENTS IN A DISTRICT OF NAMIBIA**

Researcher: **Dr T Zaranyika**

Supervisor/Promoter**:** Dr A D Botha
Joint Supervisor/Joint Promoter: Dr S Knight
Department: Health Studies
Degree: Master of Public Health

DECISION OF COMMITTEE

Approved ☑ **Conditionally Approved** ☐

Date: 10 Sept 2007

Prof L de Villiers
RESEARCH COORDINATOR: DEPARTMENT OF HEALTH STUDIES

Prof SM Mogotlane
ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES

PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRES

ANNEXURE B: PERMISSION FROM THE MINISTRY OF HEALTH, NAMIBIA

9 - 0 / 0001

REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198 **Ministerial Building** **Tel: (061) 2032562**
Windhoek **Harvey Street** **Fax: (061) 272286**
Namibia **Windhoek** **E-mail: hilmanangombe@yahoo.com.na**

Enquiries: Ms. H. Nangombe **Ref.:** 17/3/3/AP **Date:** 18 February 2008

OFFICE OF THE PERMANENT SECRETARY

Dr. Trust Zarayika
Principal Medical Officer
Swakopmund District
Private Bag 5004
Swakopmund

Dear Dr. Zarayika,

RE: Treatment interruption in Tuberculosis Patients in a District of 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 your Masters degree;

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.

Wishing you success with your project.

Yours sincerely,

MINISTRY OF HEALTH AND SOCIAL SERVICES REPUBLIC OF NAMIBIA

Mr. K. Kahuure
PERMANENT SECRETARY

Forward with Health for all Namibians by the Year 2005!

ANNEXURE C: INFORMED CONSENT BY RESEARCH PARTICIPANT

I, ... , confirm that I was fully informed of the research project.

I am aware that my privacy will be safeguarded and that all information I share with the researcher will be confidential.

I am aware that I can withdraw from participation at any time and that this will not influence the health care given to me.

I have been informed that I will not suffer any injury or harm during the research process.

The information that I will give the researcher should not be used against me in future.

Name .....

Signature .....

Date .....

Place .....

ANNEXURE D: QUESTIONNAIRE

SECTION A – PATIENT CHARACTERISTICS (DEMOGRAPHIC DATA)

1. Age … …

2. Gender: 1. Male … 2. Female …

3. Present address of patient .....

.....

4. Formal Educational Level

1. None … 2. Primary … 3. Secondary … 4. Tertiary …

5. Employment status

1. Employed … 2. Unemployed …

6. Income bracket[1]

1. Low … 2. Medium … 3. High …

7. Who did you stay with during your TB treatment? .....

.....

8. HIV status (from TB records)

1. Positive … 2. Negative … 3. Unknown …

SECTION B – SUPPORT

TB patients are often influenced to continue or stop treatment by another person.

1a. **Did you complete TB treatment?**

1. Yes … 2. No … 3. Don't know …

1b. **If "No", who** in the community **influenced** you to stop your TB treatment?

.....

.....

1c. Which of the following were most influential in your stopping of TB treatment?

1. Friend … 2. Relative … 3. Neighbour …

4. Health care worker … 5. Traditional healer … 6. Other …

Specify other .....

1d. **If yes, who** in the community **influenced you to continue** your TB treatment?

.....

---

[1] **Note:** Income categories:
low < N$400/month; **medium** N$400–1500/month; **high** > N1500/month

1e. Which of the following were most influential in you continuing your TB treatment after you stopped taking it?

1. Friend … 2. Relative … 3. Neighbour …

4. Health care worker … 5. Traditional healer … 6. Other …

Specify other .....

2a. Were you ever visited by a health worker while on TB treatment?

1. Yes … 2. No … 3. Don't know …

2b. Who was the person, and **how often did they visit you?** .....

.....

3a. People hear about TB from different people in different places. Since starting TB treatment where did you learn the most about TB?

.....

3b. Which of the following was most important to help you to understand about TB?

1. Radio … 2. TV … 3. Print … 4. Cellphone message …

5. Other (specify) .....

3c. Have you ever been exposed to any TB messages in the media after starting TB treatment?

1. Yes … 2. No … 3. Don't know …

3d. If yes, what media?

1. Radio … 2. TV … 3. Print … 4. Cellphone …

5. Other (specify) .....

SECTION C – REASONS FOR AND PERCEIVED CONSEQUENCES OF STOPPING TB MEDICINES

1a. Why did you stop taking your TB treatment? .....

.....

1b. Which of the following reasons would you say are most important for you having stopped your TB treatment?

1. Lack of physical access … 2. Lack of financial access …

3. Lack of family support … 4. Side effects …

5. Co-morbidity … 6. Lack of knowledge …

7. Beliefs and perceptions … 8. Work related issues …

9. Mobility and migration … 10. Programmatic factors & incentives …

11. Other (specify) .....

.....

2a. Why do you think you need to continue to take TB medicines for six months?

.....

.....

2b. What do you think are the most important consequences of stopping your TB medicines?

1. Nothing … 2. Will become more sick … 3. Death …

4. Transmission to others … 5. Multi-drug resistant TB …

6. Other (specify) .....

SECTION D – DIRECTLY OBSERVED THERAPY

1a. Where did you take your TB treatment in the beginning?

1b. During the last month you are on treatment where did you take your treatment?

1c. Where would you prefer to take your TB treatment?

1. Community … 2. Health centre … 3. Home …

4. Hospital … 5. Someone else's home …

6. Other (specify) .....

2a. Did a second person supervise you taking your medicines each time?

1. Yes … 2. No … 3. Don't know …

2b. Please describe who supervised you and how they supervised you taking your TB medicines

.....

.....

2c. Some people like being supervised to take their medicines and others don't like it. How did you feel about having to be supervised to take medicines?

.....

.....

SECTION E – MEDICATION AND SIDE EFFECTS

1a. What effect did the medicine have on you? .....

.....

.....

1b. What did you do about this problem? .....

.....

2a. Who did you show (talk about) this problem to? .....

.....

2b. What were they able to do about it? .....

.....

.....

3. What were the worst unwanted side effects from the TB medicines?

1. Skin problems … 2. Yellow eyes … 3. Nausea and vomiting …

4. Joint/limb pains … 5. Dizziness & headaches …

6. Other, specify .....

.....

SECTION F – ACCESS

1a. What were the biggest problem you experienced getting your TB medicines from the clinic on a monthly basis? .....

.....

1b. How much did it cost you to get to the health centre monthly? .....

1c. How long did it take you from the time that you left home to the time that you are right back with your TB treatment? .....

2. The cost of travelling to the health centre is:

1. Not expensive … 2. Expensive … 3. Very expensive …

3. What means of transport do you use to get to the TB clinic?

1. Foot … 2. Bicycle … 3. Taxi …

4. Donkey cart … 5. Employer's car … 6. Other …

Specify other

4. Estimate the distance between your home and the health centre.

1. 0–5 km … 2. 6–10 km … 3. 11–15 km …

4. 16–20 km … 5. More than 20 km …

5. Where were you staying when you started taking your TB treatment? .....

.....

6. Where were you staying at the time you discontinued taking your treatment?

.....

7. Did you change your place of residence during your TB treatment?

1. Yes … 2. No … 3. Don't know …

SECTION G – PATIENT–PROVIDER RELATIONSHIP

Some patients discontinue treatment because of problems with attending the clinics.

1. Did you have any problems attending the clinics? Describe the problems: …

.....

.....

2. What are your preferred clinic opening times?

1. Earlier than 8am and up to 5pm … 2. From 8 am to 5pm …

3. From 8 am till later than 5pm … 4. Earlier than 8 am till later than 5pm …

5. Other (specify) .....

3. What are your preferred opening days?

1. Mon–Fri … 2. Mon–Fri plus weekends … 3. Special days for TB …

4. How would you describe the reception you got at the health centre?

1. Friendly … 2. Unfriendly … 3. Indifferent …

SECTION H – STIGMA

1. These days it is not always easy to tell people you have got TB. How did you feel about sharing that you had TB with other people?

.....

.....

.....

2. Whom are you able to tell that you are suffering from TB? .....

.....

.....

3. **Did you inform your friends or relatives about your TB treatment?**

1. Yes … 2. No … 3. Don't know …

4. If no, why? 1. Fear of negative response … 2. Have no friends/relatives …

3. Other (specify) .....

5. Did your friends and relatives assist you in any way with:

1. Food … 2. Transport … 3. Money …

4. Other (specify) .....

6. If employed, did you tell your employer that you are on TB treatment?

1. Yes … 2. No …

7. If NO, why?

1. Fear of losing job … 2. Fear of isolation at work …

3. Fear of losing income … 4. Other reason (specify) .....

.....

SECTION I – SUBSTANCE USE

1a. Do you smoke cigarettes?

1. Yes … 2. No … 3. Don't know …

1b. If yes, in the last week have you smoked cigarettes?

1. Yes … 2. No … 3. Don't know …

1c. How long does a pack of 20 cigarettes last you? .....

2a. Do you consume alcohol?

1. Yes … 2. No … 3. Don't know …

2b. In the last week, have you consumed alcohol?

1. Yes … 2. No … 3. Don't know …

2c. In the last week, how many pints of beer have you consumed? .....

THANK YOU.