

**DETERMINANTS OF ADHERENCE TO TUBERCULOSIS TREATMENT
AMONGST CLIENTS WITH TUBERCULOSIS IN ESWATINI**

by

PERCIS PHINDILE KHUMALO

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SUPERVISOR: PROF MC MATLAKALA

October 2020

DECLARATION

Name: Percis Phindile Khumalo

Student Number: 58552588

Degree: Doctor of Philosophy in Nursing

DETERMINANTS OF ADHERENCE TO TUBERCULOSIS TREATMENT AMONGST CLIENTS WITH TUBERCULOSIS IN ESWATINI

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

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

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



SIGNATURE

02 October 2020

DATE

**DETERMINANTS OF ADHERENCE TO TUBERCULOSIS TREATMENT
AMONGST CLIENTS WITH TUBERCULOSIS IN ESWATINI**

STUDENT NUMBER: 58552588
NAME: PERCIS PHINDILE KHUMALO
DEGREE: DOCTOR OF PHILOSOPHY IN NURSING
DEPARTMENT: HEALTH STUDIES, UNIVERSITY OF SOUTH AFRICA
SUPERVISOR: PROF MC MATLAKALA

ABSTRACT

Introduction: Adherence to treatment is an important factor for effective therapy and limiting the emergence of drug resistant tuberculosis. However, the prevalence of TB continues to soar despite the available comprehensive treatment. The study investigated determinants of adherence to TB treatment and the strategies to enhance adherence to TB treatment were designed.

Method: A quantitative descriptive design was used. Data were collected from TB clients in two (2) government hospitals in Eswatini. There were 123 participants in the study. Data were collected through individual interviews using an investigator-designed structured questionnaire. The data were entered into the Statistical Package of the Social Sciences (SPSS, version 20.0), analysed using descriptive and inferential statistics.

Results: The results revealed an association between educational level and adherence to TB treatment ($r = 0.184$, $p = 0.042$). Sixty seven percent (67.5%, $n=83$) preferred western treatment, and 32.5% ($n=40$) of the participants reported that they used other types of treatment for ailments. The data also revealed that illness grants were not distributed to all TB clients. A 76.4%, ($n=94$) of the participants did not get illness grants while on TB treatment, whereas, 23.6%, ($n=29$) received illness grants for being on TB treatment. The absence of illness grants is likely to impede adherence to TB treatment. Receiving health education before initiation on treatment enhanced adherence; where 88.6% ($n=109$) of the participants reported that they received counselling on adherence prior to initiation to TB treatment, and 11.4% ($n=14$) did not get any counselling on adherence. An 80.5% ($n=99$) participants reported that they

experienced side effects while on TB medication. There was a relationship between barriers and adherence to TB treatment ($r = -0.416$, $p = 0.001$).

Conclusion: The data showed that TB clients had challenges with adherence to treatment. Key strategies were developed to enhance adherence to TB treatment; empower clients on effects and side effects of each TB drug; periodical evaluation of clients for side-effects; strengthening of incentive policy for TB clients; and introduction of a one stop centre for all TB clients.

KEY WORDS

Adherence; Determinants; TB clients; Tuberculosis; Health Belief Model; Eswatini; Strategies; TB treatment; Barriers; Facilitators; Government hospitals

DEDICATION

I dedicate this work to the Almighty God for giving me the strength, wisdom and protection for the successful completion of this work. Secondly, I also dedicate it to my entire family for having endured the neglect during this period. Lastly, the dedication also goes to clients and nurses who participated in the study.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ANTCP	Annual National Tuberculosis Control Program
ART	Antiretroviral Therapy
CPT	Cotrimoxazole Preventive Therapy
DOT	Directly Observed Therapy
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
HTC	HIV Testing and Counselling
MDR	Multiple Drug Resistant
MIST	Mobile Interactive Supervised Therapy
NTCP	National Tuberculosis Control Program
SAQ	Self-Administered Questionnaire
SDG	Sustainable Development Goal
SMS	Short Messaging Services
SNTPM	Swaziland National Tuberculosis Programme Manual
SPSS	Statistical Package for the Social Sciences
TB	Tuberculosis
USA	United States of America
USAID	United States Agency for International Development
UNISA	University of South Africa
USD	United States Dollar
WHO	World Health Organization
XDR	Extremely Drug Resistant

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Despite the availability of effective regime, tuberculosis (TB) remains a major global health problem; and it contributes to morbidity and mortality among millions of people each year (Balaky, Mawlood & Shabila 2019:865). TB is a chronic infectious disease that involves a complex treatment regimen with potentially severe side effects. Moreover, it is frequently associated with non-adherence to treatment, which may result in drug resistance (Meda, Lin, Sombie, Mare, Morisky & Chen 2012:223). Adherence to TB drug treatment prevents drug resistance (Kliner, Canaan, Ndwandwe, Busulwa, Welfare, Richardson, Walley & Wright 2015:1). Globally, TB is ranked the second cause of death among the infectious diseases after Acquired Immune Deficiency Syndrome (AIDS), with an estimated 1.4 million TB deaths reported among Human Immunodeficiency Virus (HIV) positive TB patients in 2014 (Tola, Tol, Shojaeizadeh & Garmaroudi 2015:1).

Tuberculosis is a curable disease if treatment is received early and taken appropriately. Tesfahuneygn, Medhin and Legesse (2015:1) indicate that TB can be cured with anti TB treatment if taken over a period of at least six months for new patients and eight months for TB recurring patients. This include a standard treatment initial drug combination comprising of four drugs; Rifampicin, Isoniazid, Pyrazinamide and Ethambutol which are taken daily for 2 months. Thereafter, two drugs (Rifampicin and Isoniazid) are taken for 4 months in the continuation phase (Elden, Lawes, Kudsk-Iversen, Vandelanotte, Nkawanyana, Welfare, Walley & Wright 2011:2; National Tuberculosis Control Programme (NTCP) 2012:49).

1.2 BACKGROUND INFORMATION ABOUT THE RESEARCH PROBLEM

A major challenge to TB cure is poor adherence to the treatment (Balaky, Mawlood & Shabila 2019:865). Gebreweld, Kifle, Gebremicheal, Simel, Gezae, Ghebreyesus, Mengsteab and Wahd (2018:2) reveal that poor adherence increases risks of treatment failure and relapse. Moreover, it is considered to be the most important cause of multiple drug resistant (MDR) and extremely drug resistant (XDR) TB. Adherence to medication regimen is generally the extent to which a client's behaviour coincides with the prescribed health care regimen (Kulkarni, Akarte, Mankeshwar, Bhawalkar, Banerjee, & Kulkarni 2013:67). Therefore, it is important to measure adherence to treatment. This is ensured by evaluating the treatment success rate which must be above 85% (Swaziland Integrated HIV Management Guidelines 2015:88).

Suwankeeree and Picheansathian (2014:4) suggest that complete treatment is usually an independent choice of patients. Thereby, successful TB control is heavily dependent on effective treatment of patients, requiring adherence throughout the full course of treatment. Adverse outcomes of non-adherence include treatment failure, relapse and increased risk of TB spread. Furthermore, drug resistance, increase mobility and mortality, and increase TB control programmes are also effects of non-adherence to TB treatment (Fang, Shen, Hu, Xu, Jun, Zhang, Kan, Ma & Wu 2019:1929; Gebreweld, Kifle, Gebremicheal, Simel, Gezae, Ghebreyesus, Mengstead & Wahd 2018:2).

Failure of TB patients to adhere to medication raises awareness on the issues of drug resistance. Adherence to drug treatment and appointments for TB is critical to prevent drug resistance (Kliner et al 2015:1). In view of this, attempts to control the TB epidemic depend on the client's adherence to anti TB treatment. Globally, up to half of patients on anti-tuberculosis regime do not complete treatment (Silvina, MariaBelen, Adriana & Silvina 2012:66). This behaviour can negatively affect treatment success. It is more than 20 years now after the World Health Organization (WHO) had declared Tuberculosis a global public health emergency (Gao, Lu, Bai, Wang, Xu, Catanzaro et al 2015:310). Even so, the infection remains a major global health challenge. China is the world's second

largest country with TB epidemic, accounting for 12% of the total number of cases (Tang, Zhao, Wang, Gong, Yin, Zhao et al 2015:1). Factors such as limited education, knowledge deficit about TB treatment and longer travelling time to health centres were reported as barriers to TB treatment completion (Tang et al 2015:2).

In South Africa, factors such as health care provider system, treatment relapse, effectiveness of treatment, emergence of MDR-TB were reported to be closely related to poor TB treatment adherence (Kastien-Hilka, Abulfathi, Rosenkranz, Bennett, Schwenkglens & Sinanovic 2016:2; Dladla 2013:1). Moreover, social, economic and client-related factors were also reported to contribute to poor TB treatment adherence.

1.2.1 Tuberculosis in Eswatini

Eswatini is a landlocked country situated in Southern Africa, bordering Mozambique and South Africa (Kliner et al 2015:2). The country has a land surface area of about 17,364 square kilometres, and divided into four administrative regions namely, Hhohho, Manzini, Shiselweni and Lubombo (WHO Country Cooperation Strategy 2014:3). Furthermore, the country has an estimated population of 1,119,975 in 2015 and classified as a low-middle country with an income per capita of USD3, 550 in 2014 (Tuberculosis Control Program (TCP) Annual Report 2016:1). Generally, TB services are distributed across the four regions. According to the National Control Tuberculosis Program (NCTP) (2015:1) Eswatini has about 287 health facilities, and of these 109 (38%) are TB basic management units, with the rest being ordinary units. The ordinary units provide TB services such as screening, sputum collection, preventive therapy and referrals of patients.

All primary health care services are free to patients in all government health facilities in Eswatini. Services such as antiretroviral treatment, tuberculosis treatment and others are included. The TB treatment guideline used in these facilities is the same as those prescribed by the World Health Organization (2009).

The current anti-TB therapies are weighed down with setbacks, predominately because of the long-term treatment and/or poor adherence to the treatment. Regardless of emphasis on treatment completion to eliminate TB and improve adherence in Eswatini, about 7.7% new TB cases emerged, 33.4% retreatment cases developed drug-resistant TB and 13% failure rate reported (WHO, 2012:1). Generally, TB suspected patients in all health facilities in Eswatini are diagnosed with TB on sputum smear and culture (Kliner et al 2015:2). After initiation on TB treatment, if patients do not improve and sputum fails to convert to smear negative, the patient is then referred to the national TB hospital. This hospital is a national TB Control Center and was established in 2009 in response to the emerging threat of MDR-TB and XDR-TB (Ministry of Health Monitoring & Evaluation Report 2011:23).

The magnitude of TB disease in Eswatini is measured in terms of incidence, prevalence and mortality in a given year (Haumba, Dlamini, Calnan, Ghazaryan, Smith-Arthur, Preko & Ehrenkranz 2015:103). Kliner et al (2015:2) report that Eswatini has the highest estimated incidence of TB in the world with at least 565 cases per 100 000 population including HIV positive people. Of note was the increased TB rate by 5-fold over the past 10 years since 2005. This incidence places the country to be amongst the highest burden countries in the world.

As the country made an effort to eliminate the situation it was however, faced with challenges which fuelled the TB incidence. These included issues of poverty and escalating HIV infection. According to the WHO Country Cooperation Strategy (2014:6-7) Eswatini has an estimated 69% of the population living below poverty line, and about 80% of TB patients co-infected with HIV. This instigated TB to be a big health problem to the government and the people of Eswatini as it constituted an estimated 20% of institutional deaths (NTCP 2012:14). Moreover, the mortality rates for TB in 2014 were worse among patients who were co-infected with HIV with an estimated 1.7 per 1000 deaths and 0.65 per 1000 deaths for HIV negative patients.

TB and HIV co-infection is noted in the country as the HIV infection rate increases the risk of TB infection on exposure. This accelerates progression from latent TB infection to highly active TB, risk of death if not treated timely and risk of recurrence even if successfully treated (NTCP 2015:14). The country therefore, engaged itself into the TB/HIV integration model. This model specified that all TB patients to be offered HIV testing and all HIV patients to be screened for TB (Mchunu, van Griensven, Hinderaker, Sikhondze, Manzi, Dlamini & Harries 2016:106). As the country has about 106 health facilities that offer the collaborative TB and HIV services, TB and HIV services were co-localised under the same premises at primary health care level. Although, at higher levels, these services were located on the same premises but in different departments (Mchunu et al 2016:106). Mchunu et al (2016:106) also assert that all TB and HIV co-infected patients are initiated on cotrimoxazole preventive therapy (CPT). In addition, since 2008 all HIV positive TB patients have been initiated on ART, regardless of their CD4 cell count, and within 8 weeks of initiating of anti-tuberculosis treatment.

According to NTCP (2015:14) collaborative TB and HIV services offered in Eswatini include action on improved diagnoses, care and prevention services for people living with HIV and TB, and HIV testing and counselling (HTC). Of note in the report, is that the HTC uptake by TB patients has been increasing over the period with 92% in 2011 to 99% in 2015. This was attributed to the collaboration of HIV and TB services, which aimed to give TB patients proper HIV testing information, counselling, stigma reduction and access to ART. Regardless of the country's effort to reduce TB, the TB and HIV co-infection remains high at 80% (United States Agency for International Development (USAID) Assist Project 2015:1).

The government of Eswatini through the Ministry of Health established the Global Plan to End TB with the vision of "A world free tuberculosis-zero deaths, disease and suffering due to tuberculosis" (NTCP, 2015:5). The vision goals and objectives were aimed at reducing TB-related morbidity and mortality to such an extent that the disease was no longer a public health problem to the Emaswati nation (NTCP Annual Report (2011:23). According to the NTCP (2012:15) Eswatini Government also adopted the Stop TB

strategy as a framework for TB control with emphasis on the high quality directly observed therapy (DOT) expansion and enhancement, TB/HIV integration and MDR-TB. This strategy recommended DOT for all TB patients, and provided patient support and treatment backing such as incentives (Kliner et al 2015:2). The DOT strategy was one of the approaches recommended by the WHO to help cure TB by improving adherence (Elden et al 2011:2; Directly Observed Therapy (DOT) Manual for TB Programs 2016:9). This strategy was also aimed at involving the nurse or supporter observing the patient swallow the TB drug.

The DOT program involved the psychosocial officers, treatment supporters, adherence officers, and TB screening officers, all working together to improve treatment success (NTCP 2012:15). This program has achieved a coverage of 66.7%, which was 3048 patients on DOT out of 4567 registered cases (NTCP 2015:24). It is noteworthy that the DOT program has improved TB screening which resulted in 240 051 cases screened, of these 11641 were presumptive cases and 1139 were diagnosed. Approximately 958 were enrolled on treatment and provided with extensive supervision and support (NTCP 2015:24). The DOT strategy was seen as an achievement in fighting TB in Eswatini. However, challenges affecting adherence to treatment were suspected to be watering down the effort of total elimination of tuberculosis. TB patients were stopping treatment and coming back when they had deteriorated (NTCP 2015:21).

The emphasis of global main concern for development cooperation is guided by national priorities in most countries. To improve treatment success rate and consequently achieve the international target, a number of interventions were established in Eswatini. The country committed itself to ending the TB epidemic by 2030 which was in line with Sustainable Development Goal (SDG) 3; of “good health and well-being” (Kumar et al 2016:2). Despite the SDG intervention, TB treatment success remained at 72%, considerably lower than the international target of 85% (Kliner et al 2015:2). In view of the escalating TB disease, Eswatini also put into practice the new TB Strategic Plan 2015-2019 (NCTP 2015:3). The goal of this plan was to achieve a 35% reduction of TB prevalence rate by the year 2019.

The country's current interventions and strategies were seen as positive progresses in fighting against TB non-adherence. However, they did not meet the implemented WHO recommendation of 85% minimum for treatment success as they were surrounded by many unknown controversies related to its effect compared to self-supervision (Swaziland Ministry of Health Final Report 2011:23- 30). Hence, these strategies were not sufficient to prevent TB treatment non-adherence. Additionally, NTCP (2015:19) assert that Eswatini's cases of MDR-TB were increasing at 7.7% among new TB cases and 33.9% among previously treated cases. This called for the government of Eswatini to strengthen diagnostic and treatment pathways including adherence programs (NTCP, 2015:19).

1.3 RESEARCH PROBLEM

Eswatini has recorded an increase of TB cases over the last decade and is among the highest in the world. This has been attributed to the co-infection of TB and HIV which has risen to an estimated 82% of TB cases who live with the HIV and are on antiretroviral therapy (ART) (Elden et al 2011:2). In 2010 the country recorded an increase of TB case notification rate of 915 per 100,000 populations, new TB cases at about 600 per 100,000 and relapse at 900 per 100, 000 cases. Poor adherence to TB treatment is considered as one of the obstacles for the TB control due to the consequences that arise from the interruption of treatment. This has led to the negative impact on the overall treatment success rate (cured and completed) which stands below 70%, far below the WHO target of >85 % (Swaziland Ministry of Health Final Report 2011:23-30).

In an effort to ensure treatment adherence, the Eswatini Ministry of Health developed the method of DOT and intensified treatment support system as strategies for improving adherence to TB treatment. However, these strategies had some challenges in terms of treatment adherence. Moreover, an evaluation of the strategies in the Swaziland National Tuberculosis Programme Manual (2012:15) and Ministry of Health Final Report (2011:29) showed that a 63% of TB clients abandon their treatment before it has been completed and this has led to an increase risk of drug resistance, relapse, prolonged infectiousness, and death. Hence, the need to investigate determinants of adherence to TB treatment in

Eswatini.

1.4 RESEARCH PURPOSE

Burns and Grove (2011:146) define a research purpose as a clear, concise statement of the specific goal or focus of a study. The purpose of this study was to investigate the determinants of adherence to TB treatment in order to design strategies to enhance adherence to TB treatment among TB clients in Eswatini.

1.4.1 Research objectives

A research objective is a clear, concise, declarative statement that is expressed to direct a study and is focused on identification and description of variables or determination of the relationships among variables, or both (Grove, Burns & Gray 2013:708).

The objectives of this study were to:

- Describe demographic variables of TB clients on TB treatment in Eswatini.
- Identify variables that modify adherence to TB treatment among TB clients in Eswatini.
- Explore barriers to adherence to TB treatment among TB clients in Eswatini.
- Describe factors that facilitate adherence to TB treatment among TB clients in Eswatini.
- Determine an association between factors that facilitate adherence and barriers to adherence to TB treatment.
- Design strategies to enhance adherence to TB treatment among TB clients in Eswatini.

1.4.2 Research hypothesis

A hypothesis is a formal statement of the expected relationship or relationships between two or more variables in a selected population (Grove et al 2013: 142). Null hypothesis is defined as a hypothesis that state no relationship between the variables under study (Polit & Beck 2014:386). On the other hand, a rival hypothesis is an alternative explanation,

competing with the researcher's hypothesis, for interpreting the results of a study (Polit & Beck 2014:391). The researcher predicted that there was an association between factors that facilitated adherence and barriers to adherence to TB treatment.

The null hypothesis of this study stated that:

There is no association between determinants of adherence (patient-related factors, psychological factors, barriers and facilitators) and TB clients' adherence to treatment.

The rival hypothesis was that:

There is an association between determinants of adherence (patient-related factors, barriers and facilitators) and TB clients' adherence to treatment.

1.5 SIGNIFICANCE OF THE STUDY

The study could contribute to the existing body of knowledge on adherence to TB treatment by providing an insight on the determinants of adherence to TB treatment. The study led to the development of strategies in a bid to enhance adherence to TB treatment. It could also decrease treatment interruption thus improving the quality of life of clients living with tuberculosis. The study could form basis for future research on factors influencing adherence to TB treatment. The study could also assist in monitoring and evaluating adherence to TB treatment to achieve 90% treatment success for all patients diagnosed with TB (NCTP Program Report 2015:16). The result of the study could help in developing programs and interventions that could reduce transmission of TB and improve adherence to TB treatment. Recommendations of this study could assist in improving TB control in Eswatini.

1.6 DEFINITION OF TERMS

A concept is a term that abstractly describes and names an object or phenomenon, thus providing it with a separate identity or meaning (Grove, Burns & Gray 2013:689). Since the study was quantitative, the variables of the study were associated with the concepts.

The following concepts were used in this study to provide a direction to the clear meanings within the study:

1.6.1 Adherence to TB treatment

Adherence is defined by the WHO as “the extent to which a person’s behaviour; taking medication, following a diet, and or executing lifestyle changes, corresponds with agreed recommendations from a health care provider (Gabremariam, Bjune & Frich 2010:1). Therefore, adherence to TB treatment is generally a degree to which clients take TB medications as advised by the health care provider and is measured by evaluating the treatment success rate which must be above 85% (Swaziland Ministry of Health Final Report 2011:23- 30).

1.6.2 Client

A recipient of health care, regardless of the person’s state of health and where the service is delivered (Watson 2003:89). In this study, client referred to a person who received tuberculosis treatment.

1.6.3 Determinant

A factor that decides whether or how something happens (Hornby 2010:398). In this study a determinant meant factor that either increases or decreases adherence to TB treatment.

1.6.4 Tuberculosis (TB)

Is an infectious disease caused by the *Mycobacterium tuberculosis* which is spread primarily by coughing and enters the body through inhalation. It mostly affects the lungs but can spread through lymphatic to other organs (Marieb & Hoehn 2016:867).

1.6.5 TB treatment

Is an anti-TB drug regimen that comprises of three main properties, namely, bactericidal, sterilizing activity and the ability to prevent disease resistance. This includes a combination of Isoniazid, Rifampicin, Pyrazinamide, Streptomycin and Ethambutol (Ministry of Health National Tuberculosis Programme Manual 2012:47). In this study it referred to anti-TB drugs that were prescribed as treatment for TB in clients infected with TB.

1.7 THEORETICAL FOUNDATION OF THE STUDY

The theoretical foundation for this study was based on Becker's Health Belief Model (HBM)1974. According to Shameen, Badiger and Kumar (2017:1160) the HBM is one of the earliest and most effective models in the health promotion to change behaviour. Several researchers (Gao, Nau, Rosenbluth, Scott & Woodward 2000:387; Tarkang & Zotor 2015:3) had used the HBM to guide studies related to change of behaviour and medication compliance. The HBM was first developed in 1950's to explain what made healthy people engaged in preventive behaviour (Tarkang & Zotor 2015:3). This was initiated in response to the failure of a free TB health screening programme in the United States of America (USA). The Health Belief Model was widely used to study and promote uptake of health services and predict health behaviour (Beer, Ali, Eskillson, Jansson, Abdul-Kadir et al 2012:2). This model is popular in issues focusing on patient compliance and preventive health practices (Beer et al 2012:2). Onoruoiza, Musa, Umar and Kunle (2015); Shameen et al (2017) also used this model in the study related to non-compliance with hypertension medication.

The model was relevant for the study because tuberculosis is one of the infectious diseases that needs one to adhere to its treatment, to reduce its transmission and to prevent drug resistance (Kliner 2015:1). The HBM illustrates that an individual has a desire to avoid illness (if ill, he has a desire to get well), and the belief that a specific health action will prevent illness or will reduce a threat (Becker 1976 in Beer et al 2012). The underlying concepts was that adherence to TB treatment was determined by

personal understanding of the disease process. Furthermore, it was determined by the importance of treatment to attain positive outcomes about a disease and strategies to decrease its occurrence. A major feature of this model assumed that a person would take a preventative action if that person has a positive expectation that by taking a recommended action, the negative health condition would be avoided (Tarkang & Zotor 2015:3). This model assisted the study in explaining why some TB clients take action to adhere to TB treatment while others did not.

The HBM also suggests that an individual's motivation to act depends on the perceived threat to their health and their belief that action will mitigate the threat (Mayer 2007:3). Furthermore, the model alludes that whether individuals take action to protect their health depends on whether they believe that they are susceptible to an ill health condition; that they have a course of action to avoid the condition and benefits of taking the action outweigh the costs (Mayer 2007:3). TB patients had choices and were able to make suitable decisions regarding their health when they understood the threat of not adhering to the TB treatment. This idea of the model was used toward reducing or avoiding a disease condition and aimed to explain and predict behaviours. The HBM in this study assisted in providing a framework to understand the factors that facilitated adherence and those that hindered (barriers) adherence to TB treatment.

According to Tarkang and Zotor (2015:3) the HBM has three broad propositions; namely, the individual perceptions about health, the modifying factors which include demographic, socio-psychological and structural variables, and the benefits of taking preventive measures. The HBM is further composed of six key concepts as follows; perceived susceptibility, severity, benefits and barriers, cue for action, and self-efficacy. These propositions and concepts assisted the study in searching for literature in the development of questionnaire and organization of data.

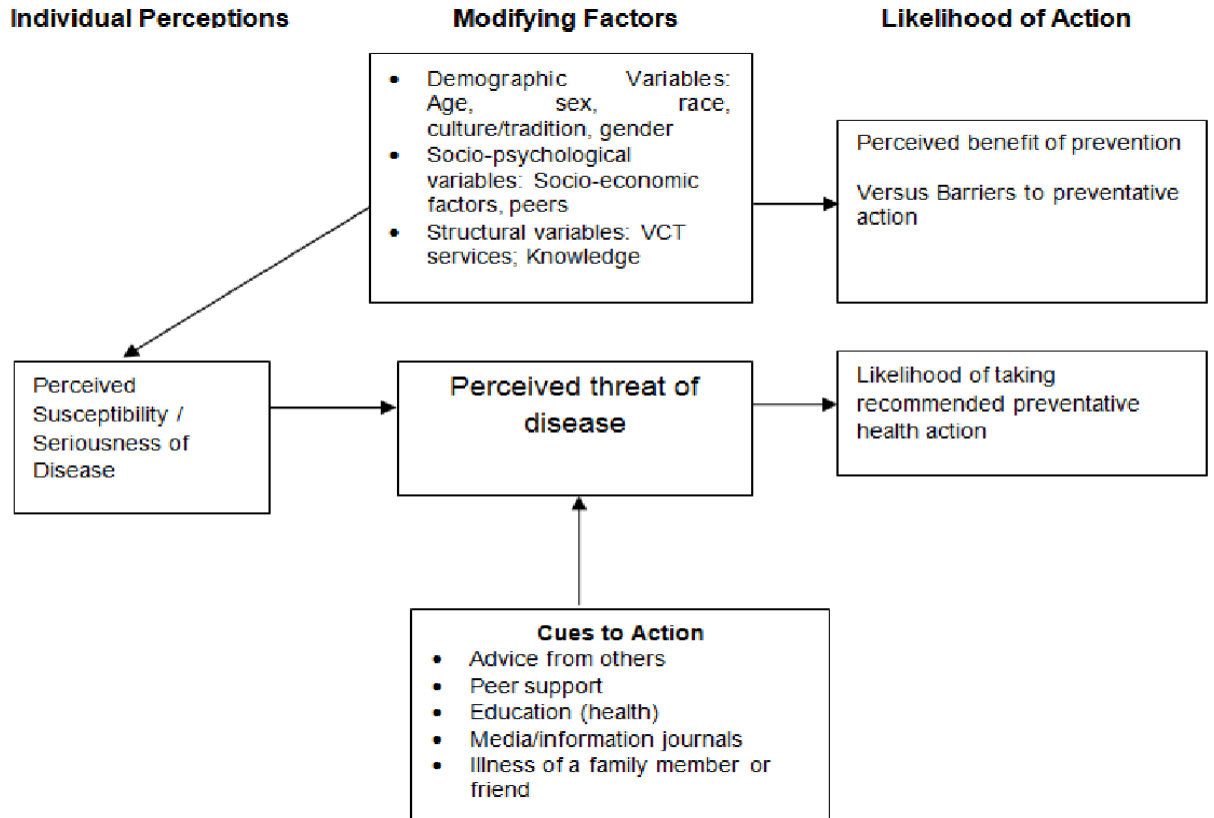


Figure 1:1 Health Belief Model (Adapted from Tarkang & Zotor 2015:4)

1.7.1 HBM propositions and their focus

Individual perceptions: are person’s beliefs about one’s own susceptibility to a disease and the seriousness with which one views the perceived threat of the illness (Tarkang & Zotor 2015:3-4). The HBM in this study assisted in identifying what clients needed in order to understand adherence to TB treatment. Once the clients understood about the new acquired knowledge, this would bring about minimal risk of the disease and reduce drug resistance and complications.

Modifying factors: modifying factors such as demographic, socio-psychological and structural variables may affect an individual’s understanding and indirectly influence health related behaviours (Tarkang & Zotor 2015:4). The HBM assisted in the context of

Eswatini, where culture is mostly practiced. This could help in modifying TB clients' decision to adhere to TB treatment.

Likelihood of action: this refers to the individual's benefits of prevention (Tarkang & Zotor 2015:4). In this study, this proposition facilitated in identifying variables that were perceived as benefits for adhering to TB treatment and those perceived as barriers to taking action to change behaviour.

1.7.2 HBM concepts and their meaning

Perceived susceptibility: refers to the perception of the risk that a condition could happen to individuals (Joseph 2018:2). This model predicts that individuals who perceive that they are liable to a particular health problem will engage in behaviours to reduce the risk of developing the health problem. Whereas, those with low perceived susceptibility may deny that they are at risk for contracting a particular disease (Onoruoiza et al 2015:14). In this study, the HBM assisted in determining if client understood that they had TB and would engage in practices that would change behaviour. If followed well, TB clients would adhere to their TB treatment to reduce complications such as drug resistance. This would help in the development of risk reduction strategies.

Perceived severity: refers to one's feelings of how severe outcomes could be if the condition occurs (Joseph 2018:2). The HBM proposes that individuals who perceive a given health problem as serious are more likely to engage in behaviours to prevent health problems from occurring or reduce its severity (Tarkang & Zotor 2015:5). Therefore, perceived seriousness encompasses beliefs about a disease itself e.g. whether it is life – threatening or may cause disability or pain (Onoruoiza et al 2015:14). In this study, the model assisted in explaining one's susceptibility to the TB disease. If not explained well, it would not motivate the client to change behaviour unless they had serious physical and social implications. TB clients must understand TB as a serious infection that has severe consequences and implications on their lives, before adhering to TB treatment. This may set the stage for contemplating about risk reduction strategies and for enhancing

motivation to avert the threat.

Perceived benefits: refer to an individual assessment of the value or efficacy of engaging in a health- promoting behaviour to decrease risk of disease (benefit of taking a drug) (Onoruoiza et al 2015:14). In this study, this concept of the model helped in identifying variables that acted as benefits including incentives, living longer and others. If a TB client believes that a particular action would reduce susceptibility to a health problem or decrease its seriousness, then the client was likely to adhere to the treatment. It was this belief that would give a TB client confidence to take the action because of the expected health outcomes.

Perceived barriers: refer to individual's assessment of the obstacles to behaviour change (Onoruoiza et al 2015:14). There could be several barriers that affect peoples' decision to take particular actions such as hindrance in taking medication like cost, frequency, side effects, etc (Tarkang & Zotor 2015:5). The model helped in clarifying if TB clients understood the threats and barriers that could prevent adherence to TB treatment. It also assisted in clarifying certain actions that would reduce the barriers to adherence such as reporting side effects. In other words, perceived benefits must outweigh perceived barriers in order for behaviour change to occur. It would, only when the TB clients would realise that they have the capacity to deal with these barriers, that they would be able to take the necessary action.

Cues to action: refers to factors that can initiate an individual to take action like death of a close person due to same disease (Onoruoiza et al 2015:14). This can be events or experiences, physical symptom of a health condition, interpersonal or environmental (media publicity) that motivate a person to take action (Tarkang & Zotor 2015:5). The model assisted in identifying factors that facilitated clients to treatment adherence. Factors such as incentives, having a treatment supporter, counselling and health education were enhancers to TB treatment adherence. This means that TB clients needed motivation to have the desire to adhere with the prescribed TB treatment and to

have concerns about health matters. Furthermore, they needed to be willing to seek and accept health care and to engage in positive health activities.

Self-efficacy: refers to a client's understanding and confidence in one's ability to perform a behaviour (Joseph 2018:2). It is the strength of an individual's belief in one's own ability to respond to difficult situations and to deal with any associated obstacles or setbacks (Tarkang & Zotor 2015:5). This model suggests that a client can believe that he can successfully complete the behaviour of interest despite considered barriers (Jones, Jensen, Scherr, Brown, Christy & Weaver 2015:3). In this study, the HBM helped in identifying the confidence in TB clients' ability to adhere to TB treatment such as remembering to take pills every day. A TB client could believe that he could complete or adhere to TB treatment without defaulting irrespective of challenges which were barriers to TB treatment.

1.8 INTRODUCTION TO RESEARCH DESIGN AND METHODS

The study was conducted in two phases in line with the objectives of the study, which entailed the following:

- Phase 1: Phase 1 involved the research methodology that was applied when eliciting data from TB clients and TB experts. This was to identify and describe demographic variables of TB clients on TB treatment; identify variables that modify adherence to TB treatment among TB clients; explore barriers and facilitators to adherence to TB treatment; and to describe the association between factors that facilitate adherence and barriers to adherence to TB treatment. This phase also comprised of data collection for step 1 and step 2.
- Phase 2: Phase 2 was to design strategies to enhance adherence to TB treatment among TB clients in Eswatini.

A quantitative approach was followed; which was an investigation of phenomenon that systematically adds to precise measurement and quantification and involves rigorous and

controlled design (Polit & Beck 2014:389). The study utilised this approach as the researcher viewed a TB client as integrated with the environment, which shaped the behaviour (adherence to TB treatment). This approach generated an account of the client's reality in adherence to the TB treatment and descriptive determinants of adherence were measured.

A descriptive non-experimental design was used in this study. Polit and Beck (2014:386) define a non-experimental research as a design in which an investigator collects data without introducing an intervention. There was no manipulation of the variables of interest in this study because they were naturally existing attributes. The primary focus was to investigate determinants of adherence to TB treatment. In this study, determinants associated with adherence to TB treatment were identified and described. More information on the methods are described in detail in Chapters 3, 4 and 5.

1.9 STRUCTURE OF THE THESIS

Chapter 1: Orientation to the study

Chapter 2: Literature review

Chapter 3: Research design and methods

Chapter 4: Analysis, presentation and description of the research findings

Chapter 5: Strategies to enhance adherence to TB treatment among TB clients in Eswatini

Chapter 6: Conclusions, recommendations and limitations of the study

1.10 SUMMARY

This chapter gave an overview of the background of the study and the statement of the study problem. The study aim was to investigate determinants of adherence to TB treatment in order to design strategies to enhance adherence to TB treatment. The HBM was incorporated in the study which assisted the researcher to review literature and

develop a questionnaire. The structure of the thesis was developed and categorised in chapters.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviewed literature related to determinants of adherence to TB treatment. The literature review was guided by the Health Belief Model. According to Polit and Beck (2014:384) a literature review is a critical summary of research on a topic of interest, often prepared to put a research problem in context. The purpose of the literature review in this study was to identify and explore factors that determine adherence to TB treatment in Eswatini. Related research studies, articles from professional journals and books were reviewed in order to establish other researcher's findings and views about determinants of adherence to TB treatment. The search engines used to obtain information include EBSCO host, HINARI, Google Scholar and Open Access for Africa (OAA) – PubMed. The words used to search for literature were factors, determinants, adherence, causes, poor adherence, non-adherence, TB, determinants, medication, TB treatment.

Several sources on adherence to TB treatment were consulted (Gabremariam, Gunnar, Bjune & Frich 2010:1; Kastien-Hilka, Abulfathi, Rosenkranz, Bennett, Schwenkglenks & Sinnovic 2016; Dladla 2013:27; Asati, Nayak & Indukar 2017:2759; Deshmukh, Dhande, Sachdeva, Sreenivas, Kumar, Satyanarayana, Parmar, Moonan & Lo 2015:1). The findings on these studies identified health belief systems, side effects, incentives and directly observed therapy (DOT). Furthermore, lack of knowledge, gender, pill burden, feeling better and health worker attitude were also identified as determinants of adherence to TB treatment. These determinants were grouped according to the HBM concepts.

Based on the information above, relevant literature was reviewed confirming some of the cited modifiers, barriers and facilitators of adherence to TB treatment. The literature review was organized according to the study objectives.

2.2 ADHERENCE TO TUBERCULOSIS TREATMENT

Treatment adherence is a complex phenomenon comprising patient behaviour with regard to the prescribed interval, dose and dosing regimen and appropriateness of how treatment is taken (Kastien-Hilka, Abulfathi, Rosenkranz, Bennett, Schwenkglenks & Sinanovic 2016:42). With complete adherence, TB is curable with a six-month anti-TB treatment. The association between adherence and therapeutic success has been demonstrated across a variety of anti-tuberculosis therapy (Elden, Lawes, Kudsk-Iversen, Vandelanotte, Nkawanyana, Welfare, Walley, & Wright, 2011:2; Swaziland National Tuberculosis Programme Manual (SNTPM) 2012:49).

Adherence is measured by evaluating the treatment success rate of 85% at 12 months for all new culture positive TB cases and 90% for all new smear positive TB cases (Holden, Lillebaek, Seersholm, Andersen, Wejse & Johansen 2019;12995). Treatment adherence is the key factor for treatment success and improves patients' quality of life. Contrary, poor adherence leads to adverse outcomes, resulting in disability, drug resistance, relapse and risk of death (Suwankeeree & Picheansathian 2014:4). Furthermore, other factors such as increased health cost, increased transmission rates of tubercle bacilli, prolonged infectiousness, treatment failure, relapse and drug resistance were reported to be causes of poor adherence.

2.3. MODIFYING FACTORS THAT DETERMINE ADHERENCE TO TUBERCULOSIS TREATMENT

Modifying factors such as demographic, psychological and structural variables can affect an individual's understanding and thus indirectly influence health related behaviours (Tarkang & Zotor 2015:4). These variables can create a positive or negative influence towards adherence to TB treatment. In this study, the modifying variables that were discussed included demographic, psychological and structural factors.

2.3.1 Demographic factors and adherence to TB treatment

Demographic factors could determine adherence to TB treatment. Factors discussed in this category included age, gender and marital status.

2.3.1.1 Age and adherence to treatment

Patients on TB treatment are of different age categories. Non-adherence to medication is a common problem among the elderly as they are prone to multiple comorbidities and at risk of polypharmacy (Yap, Thirumorthy & Kwan 2016:64). A study by Gellad, Grenard and Marcum (2011:11) revealed that cognitive function were among potential barriers to adherence in the elderly patients. Similarly, a study done in Ethiopia by Tesfahuneygn, Medhin and Legesse (2015:503) reported that being older than 55 years was associated with unsuccessful TB treatment outcomes. The study concluded that this group required utmost assistance when taking medication as they may forget their treatment due to aging. Taken together, these studies indicate that age could be a determinant of adherence to TB treatment.

2.3.1.2 Gender and adherence to treatment

Treatment use may be affected by gender differences, and the response to the treatment can affect patients' adherence to the prescribed treatment. According to Mlilo-Chaibva (2007:23) women in many African societies are accorded an inferior status that enhances their powerlessness and vulnerability to health problem leading to inadequate health care seeking behaviours. Daly (2001:45) asserted that women were more controlled by the socioeconomic and cultural factors into seeking medical care. Therefore, sex differences could be viewed as gender bias because of the degree to which women and men filled their prescriptions.

A study by Manteuffel, Williams, Chen, Verbrugge, Pittman and Steinkellner (2014:112) evaluated the differences between women and men in medication use, medication adherence and prescribing alignment with clinical guidelines. The study revealed that women were less likely than men to be adherent in their use of chronic medication. Similarly, Garcio-Basteiro, Respeito, Augusto, Lopez-Varela, Sacoor, Sequera et al (2016:214) in a retrospective observational study on TB patients in Mozambique, revealed a high proportion of female patients considered to have treatment failure. Issac (2018:12) found that women were faced with greater barriers financially, physically, and longer delays in seeking treatment than men in as far as accessing TB services from symptom onset to initiation. This indicates that gender could be viewed as a strong determinant of adherence to TB treatment.

2.3.1.3 Marital status and adherence to treatment

Marital status can be a determinant factor of TB treatment adherence. According to Mlilo-Chaibva (2007:23) both unmarried and married women are less likely to seek health services due to lack of economic and social support, from parents, guardians or spouses. This had an influence in their health seeking behaviour. In line with this, Wu, Lennie, Chung, Frazier, Dekker et al (2012:107) revealed that unmarried patients were more likely to be non-adherent to their treatment. This indicates that marital status is a contributor to non-adherence to treatment.

On another note, a single parent or divorced could be a risk factor for adherence to TB treatment. Zhou, Chu, Liu, Tobe, Gen, et al (2012:5) reported that patients who had divorced or bereft of spouse were more likely not to adhere to TB treatment due to more economic and social burdens after suffering from TB.

In the context of Eswatini, a wife has to get permission from the husband to seek health care services. There are a number of factors influencing the way in which Swazi women were treated in this society including culture, tradition, political, legal and economic values (Daly 2001:46). Furthermore, Swazi society has become accustomed to male control and

decision-making over family, traditional and societal issues. As a result, the autonomy of married women around treatment taking is undermined through societal position which could compromise the ability to adhere to treatment.

2.3.2. Psychological factors and adherence to TB treatment

The psychological factors discussed in this study included the use of traditional health system, spirituality and religion, stigma and discrimination, and social support.

2.3.2.1 Traditional health system and adherence to TB treatment

Eswatini like other African countries relies on the use of traditional healing systems to address minor infections and spiritual cleansing. This is evident as more than 85% of the population of Eswatini were reported that they used a mixture of Western and Traditional medicine to cure ailments (Sibandze 2009:1). This practice could affect TB clients' understanding of the illness resulting to treatment default. Moreover, traditional healing is linked to the cultural beliefs of the Swazi people as well as their belief about the cause of illness to satisfy the spiritual, mental and physical needs (Sibandze 2009:1). This situation has led to a search for possible alternative and /or complementary treatment options (Sibandze 2009:1). According to Nyasulu, Kambale, Chirwa, Umanah, Singini, Sikwese et al (2016:122) Botswana reported 34% of TB patients seeking care from traditional or faith healers before initiation of TB treatment at a health care facility. Whereas, in Malawi 32% visited a traditional healer before the diagnosis of TB.

Parsons, Cruise, Davenport and Jones (2006:97) in their exploratory study in Southern United States reported that certain religious beliefs were negatively related to treatment adherence. Likewise, Boru, Shimels and Bilal (2017:3) revealed that a belief in traditional healing for curing TB was associated with non-adherence to TB treatment. This was observed when TB patients reported the use of traditional healing system before starting anti-TB medications, during treatment and when their health condition did not improve.

On the contrary, a study by Piltzer, Friend-du-Preez, Ramlagan, Fomundam, Anderson and Chanetsa (2011:337) indicated that patients used traditional medicines prior to initiating of ART. This indicates that patients who are on chronic illness are more likely to discontinue traditional herbs during the course of their treatment. Further consideration of traditional herbs during treatment of chronic disease needs to be considered during adherence management. Similarly, Dehkordi (2013:95); Diefenbach-Elstob, Plummer, Dowi, Wamagi, Gula, Siwaeya, Pelowa, Siba & Warner 2017:1) revealed that clients with high beliefs in traditional medicine and a positive influence of religious beliefs, their adherence to medication were increased. The results show that certain traditional practices are positively associated with adherence to treatment. This indicates that effective integration of alternative therapies is required during counselling to maximize health and increase adherence to TB treatment.

Poor adherence by tuberculosis patients to treatment contributes not only to the worsening of the TB situation but also paves a way for incidence of drug resistance, relapse, deaths and prolong infectiousness (Gabremariam, Bjune & Frich 2010:1). On the other hand, a phenomenological study by Boru et al (2017:3) revealed that patients used traditional healing systems before starting anti-TB medications. The logic was that it was easily accessible than western medicine. This implies that traditional healing system has an influence in adhering to TB treatment. This finding indicates that there is a need for policy makers and health care system to collaborate with traditional health care workers in an attempt to find ways of combining the two health systems in the management of tuberculosis.

2.3.2.2 Spirituality and religion in treatment adherence

Both spirituality and religion could have an influence on client's behaviour to health care services especially when coping with life stress and illness (Miller & Thoresen 2003:24). Therefore, spirituality beliefs could be linked with the treatment decision-making and treatment adherence in people with tuberculosis. A study by Kremer, Ironson and Porr (2009:127) revealed that about 95% of the United States population believed in God. This

belief was a central guiding force in their lives as prayer could influence recovery from their illness and influence their medical decisions should they become gravely ill.

Furthermore, the study revealed that patients believing in God to control their health were likely to refuse use of treatment for their chronic illnesses. On the other hand, Osamor, Bernard and Owumi (2011:619) indicated that beliefs about the cause of chronic illness were not associated with adherence to treatment. This indicates that spirituality could have a relationship with adherence to treatment.

2.3.2.3 Stigma and discrimination as determinants of adherence to TB treatment

Despite the fact that TB is curable; it is still a stigmatized disease. TB patients not only suffer from TB clinical manifestation, but also the societal prejudice, embarrassing situations and even self-discrimination. The co-existing socio-cultural barriers and taboos associated with chronic illness are associated with adherence to TB treatment (Tadesse 2016:2). This behaviour could cause significant challenges to the public health. According to the Annual National TB Control Program (ANTCP) (2015:14) Eswatini has about 72% of TB patients who are co-infected with HIV. Thus, stigma remains the major obstacle in controlling the TB disease because of its association with HIV.

Due to perceived presence of stigma and discrimination in the community, patients hide their disease to their friends, families or community members (Boru et al 2017:5). For that reason, stigma often contributes to psychological problems and emotional suffering which could hinder treatment adherence. Tadesse (2016:2) revealed that the stigmatized individual often internalized the sense of devalue and adopted a set of self-regarding attitudes about the trait including shame, disgust and guilt. Similarly, Dias, Falcao de Oliveria, Turato and Maralez de Figueiredo (2013:595) stated that patients with TB were isolated from friends and colleagues in fear of contagion and/or prejudice. This behaviour could affect TB clients emotionally. As a result, counselling on problem solving, emotional skills and being culturally sensitive need to be attended to when initiating a client on TB treatment

Stigma is known as a hidden killer in patients with chronic illnesses. TB related stigma occurs when TB in an individual is devalued and its consequences have a considerable impact on TB patients. A study by Chowdhury, Rahman, Mondal, Sayem and Billah (2015:461) showed revealed that TB patients did not take part in social programs due to stigma. The study concluded that stigma was one of the most important barriers to TB treatment adherence in India. Likewise, Kipp, Punggrassami, Stewart, Chongsuvivatwong, Strauss and Rie et al (2011:1) revealed that there was an association between stigma and missed doses.

On the contrary, Cremers, Manon de Laat, Kapata, Gerrets, Klipstein-Grobusch and Grobusch (2015:1) in a mixed methods study with TB patients in Zambia revealed that stigma was provoked by TB conceptions associated with HIV infection. This resulted to increased immoral behaviour, perceived incurability and traditional myths about TB aetiology. This study indicates that a strong collaboration between the healthcare worker and the patients is essential to increase adherence to TB treatment.

TB dimensions have indicated that besides its physical impact, it has a strong emotional impact on patient's lives. Makanjuola, Taddese and Booth (2014:5) asserted that HIV positive patients posed a risk towards adherence to Isoniazid prophylaxis treatment as they were discouraged to take two regimens at the same time. In addition, denial, fear of rejection and stigmatization, preventing people from disclosing or coming out for treatment were common concerns in patients taking anti-TB treatment.

In support, Paz-Soldan Alban, Jones and Oberhelman (2013:6) reported that despite the fact that drug-susceptible TB patients have to take 6 weeks or more to be virtually non-contagious, there was a strong stigma attached to being treated for TB. A study by Craig and Zumla (2015:107) revealed that immigrants failed to disclose their TB disease in fear of eviction and rejection by the community, which could result in loss of material and social support. The study concluded that during counselling session healthcare workers needed to talk about stigma and discrimination as these could be barriers to adherence to TB treatment.

2.3.2.4 Social support and adherence to treatment

Good relationships between family, friends or community and patients could determine whether patients would feel comfortable about taking treatment or not. Paz-Soldan, Alban, Jones and Oberhelman (2013:2) asserted that social support denoted social interactions that led the subject to believe that he/she was cared for and loved. This then influenced health-seeking behaviour, treatment adherence and health outcomes. A study by Ong'ang'o, Mwachari, Kipruto and Karanja (2014:1) revealed that patients utilized community health care workers for their TB treatment support. The study concluded that utilization of community health care worker as a treatment supporter enhanced TB treatment adherence.

A study conducted by Craig and Zumla (2015:107) revealed that patients received support from close friends and family for their medication. Similar finding by Makanjuola, Taddese and Booth (2014:1) also revealed that patients received support from family and other networks and thus they were able to take their medication in time. Therefore, the value of emotional support provided by families, mainly in a form of encouragement give patients a reason to live, as means to finish their medication Paz-Soldan, Alban, Jones and Oberhelman (2013:4). These findings indicate that social support contributes to TB treatment adherence.

2.3.3 Structural factors that could determine adherence to TB treatment

Structural factors could affect an individual's understanding and thus indirectly influenced health related behaviours (Tarkang & Zotor 2015:4). The structural variables discussed in this section included attitude of patients towards health care workers and adherence, and knowledge of illness and adherence.

2.3.3.1 Attitude of patients towards health care workers and adherence

The reception received by patients when attending health services can influence patient's adherence to treatment. A study by Boru et al (2016:3) revealed that non-adherent patients had experienced poor communication with the healthcare workers. Likewise, across sectional study by Ibrahim, Hadjia, Nguku, Wazir, Akhimien, et al (2015:8) showed that poor interpersonal relationship and communication with patients had negative effects on patients' adherence to the long duration of TB treatment. This indicates that a friendly relationship between a healthcare worker and patients is an important contributor for good treatment adherence.

On a different note, Widjanarko, Gompelman, Dijkers and van de Werf (2009:236) found that patients were positive about the health care staff. As a result, they developed confidence in them. However, a marginal one third of these patients (non-adherent) mentioned to have experienced problems in communication with the hospital staff. They cited unfriendliness as the major contributor to their non-adherence to TB medication. This was comparable to the study by Paz-Soldan, Alban, Jones and Oberhelman 2013:5) that supportive interactions with the health care providers result to frequent utilization of the healthcare services.

2.3.3.2 Knowledge of TB illness and adherence to treatment

Understanding a patient behaviour before and during TB treatment is a foundation for adherence to the treatment. According to Tola et al (2016:3) patients require to have some minimal level of the TB disease knowledge and motivation towards staying free of TB to influence adherence to TB treatment. Similarly, Woimo, Yimer and Gesesew (2017:269) revealed that TB patients had poor knowledge towards TB disease and its treatment. This was because most patients interrupted their TB medication since they lacked knowledge about the disease itself.

Comparably, Horter, Stringer, Greig, Amangeldiev, Tillashaikhov, Parpieva, Tigay, and Phillip du Cros (2016:5) found that limited TB knowledge and understanding, and not being aware of the disease prior to diagnosis, were relevant determinants of adherence to TB medication. These findings indicate that attaining good knowledge about TB could be a motivation for adherence to TB treatment. Hence patients need to know about the importance of finishing and adhering to the prescribed treatment course.

2.4 FACILITATING FACTORS TO TUBERCULOSIS TREATMENT ADHERENCE

Facilitating factors could be a determinant to TB treatment adherence. In this section, facilitating variables discussed included perceived susceptibility and perceived benefits.

2.4.1 Perceived susceptibility and adherence to treatment

Perceived susceptibility defines an individual's beliefs about the chances of contracting a health condition (Tarkang & Zotor 2015:5). This concept predicts that individuals who perceive that they are liable to a particular health problem can engage in behaviours to reduce the risk of developing the health problem., Whereas, those with low perceived susceptibility can deny that they are at risk for contracting a particular disease (Onoruoiza, Musa, Umar & Kunle 2015:14). Therefore, clients with TB disease and who understand that they have the TB could engage in practices that could change their behaviour. This could help in the development of risk reduction strategies.

Findings by Zhou et al (2012:5) revealed that subjects experienced non-adherence to TB treatment because they lacked knowledge about TB and they had not received TB related health education. This indicates that TB patients perceived themselves as non-susceptible to developing resistance. A comparative study by Widjanarko, Gompelman, Dijkers and van de Werf (2009:236) reported that in Zambia, adherence behaviour was largely influenced by the knowledge of the patients about their disease and treatment. Woimo, Yimer, Bati and Gesesew (2017:1) found that poor knowledge towards TB and its treatment, and lack of health education at every visit were major barriers for adherence.

These studies confirm the importance of providing patients with adequate information about the TB disease to ensure adherence.

Contrary, a study by Khan, Hutchison and Coker (2017:1) found that patients had some knowledge about how TB was transmitted and were aware of some negative consequences of missing treatment. This study indicated that patients did not perceive themselves as susceptible to TB, hence they lacked knowledge about the disease. Therefore, disease knowledge could determine adherence to TB treatment.

2.4.2 Perceived benefits

Perceived benefits refer to an individual assessment of the value or efficacy of engaging in a health- promoting behaviour to decrease risk of disease (benefit of taking a drug) (Onoruoiza et al 2015:14). According to Tarkang and Zotor (2015:5) a person (patient) needs to believe that by taking a certain action, it might help one to avoid or prevent a problem from occurring. It is this belief that gives a person confidence to take action because of the expected outcomes (Tarkang & Zotor 2015:5). This means that if a TB client believes that a particular action could reduce susceptibility to a health problem or decrease its seriousness, then the client is likely to adhere to the treatment. Gabremariam, Bjune and Frich (2010:1) also revealed that beliefs in curability of TB positively influenced adherence to TB treatment despite the presence of concomitant HIV infection.

2.5 CUES TO ACTION

The presence of an internal or external stimulus, refers as cue to action could trigger health behaviour of patients in taking TB medication (Onoruoiza et al 2015:14). An individual could be initiated to take action to adhere after seeing death of a close person due to same disease (Onoruoiza et al 2015:14). Cues for action could be events or experiences, personal (physical symptom of a health condition), interpersonal or environmental (media publicity) that motivate a person to take action (Tarkang & Zotor

2015:5). According to Tulskey, White, Young, Meakin & Moss (1999:531) early recognition of TB through screening and effective treatment through compliance with therapy depend on health actions by persons at risk. These health actions are based on the knowledge about TB and cues to actions such as education actions. This signifies that a TB client needs motivation to have the desire to adhere with the prescribed TB treatment. Moreover, to have concerns about health matters, to be willing to seek and accept health care and to engage in positive health activities could be stimulus to adherence to TB treatment.

2.5.1. Reminders to promote adherence to treatment

Electronic reminders could be used to promote adherence to TB treatment. According to Liu, Lewis, Zhang, Lu, Zhang, Zheng et al (2015:2) electronic reminders were devices used to remind patients to take medication on time, monitor time of drug intake, and alert health care workers to patients who have missed doses. Furthermore, these mobile text messaging reminders had been revealed to improve adherence to ART but not yet evaluated in TB patients (Liu et al 2015:3). Pop-Eleches, Thirumurthy, Habyarimana, Zivin, Goldstein, Walque et al (2011:825) also revealed that short messaging services (SMS) reminders were important tools to achieve optimal treatment response. These assisted clients with comorbidity to facilitate adherence in resource limited settings. This means that the use of mobile health technology could help improve adherence to TB treatment.

According to Molton, Pang, Wang, Qui, Wu, Rahman-Shepherd, Ooi and Paton (2016:2) smart phone subscriptions in Africa are predicted to increase by more than 200% by 2022. These phones are capable of recording and transmitting high-quality video to distant healthcare facilities, with potential benefits for public health (Lester, Ritvo, Mills, Kariri, Karanja, Chung, Jack et al 2010:1). A study by Molton et al (2016:1) also revealed that there was a good relationship in participants' adherences in those using smart phones for Mobile Interactive Supervised Therapy (MIST). This indicates that smart phones could

have a potential to replace DOT for TB and could be used as a positive measurement for adherence.

Furthermore, Kliner, Knight, Mamvura, Wright and Walley (2013:2) revealed that Mobile phone had gained popularity in low-and middle-income countries including Eswatini. Eswatini has over 70% of patients owning a mobile phone (Kliner et al 2013:4). Consequently, many health facilities in Eswatini use phone calls to follow-up and re-engage with TB patients who has missed appointments. Nglazi, Bekker, Wood, Hussey and Wiysonge (2013:2) also stated that Mobile phone text messaging (SMS) was frequently used as a tool to improve medication adherence.

TB patients who take medication for at least 6 months or more could not adhere to the treatment as prescribed due to forgetfulness. Mobile phone messages have therefore, a potential to remind patients to take their treatment in order to promote TB treatment adherence (Nglazi et al 2013:2). In argument, Kliner et al (2013:1) conducted an operational study to investigate the use of a no-cost alternative mobile phone technology using missed calls (buzzing) to act as a patient reminder to HIV positive patients in rural Eswatini. The study revealed that in all patients there was no difference in attendance to follow-up at the clinic before and after the technology was implemented. This indicates that the mobile phone technology (buzzing) do not improve adherence to appointments and medication as part of an enhancer package to improve adherence.

2.5.2 Patient incentives and treatment support for treatment adherence

Incentives for provision of treatment support, such as food and travel cost for refills could be imperative to support patients on treatment. A study by Kliner, Canaan, Ndwandwe, Busulwa, Welfare et al (2015:29) reported that incentives provided to TB treatment supporters improved TB treatment outcomes to TB patients. On the other hand, Lutge, Wiysonge, Knight, Sinclair and Volmink (2015:2) revealed that the incentives given to TB patients as a daily hot meal was not well received by the patients due to the inconvenience of attending the clinic at midday. Additionally, the study revealed that nurses distributing

the vouchers chose to ration their distribution among eligible patients. Furthermore, the study showed that even if incentives were available for TB patients, other factors such as travelling cost and availability acted as barriers to adherence (Lutge et al 2015:2).

According to NTPM (2012:11) Eswatini has about 66% of the population who lived below the poverty line with high rural-urban disparities in access to basic services. In this country, most of the TB patients reside in the rural areas where there are no jobs and are far away from the nearest health care facility. Therefore, incentives are the one way of motivating them to comply with the treatment (NTPM 2012:11). However, only those with resistant TB and those with ordinary TB with malnourishment are offered incentives in a form of ration food and money for travelling to nearest health care facility. These incentives are given to patients on a monthly basis. Those with ordinary TB and not malnourished are not given incentives. In view of these, those who do not get incentives could default their treatment. In support, a study by Zhou, Chu, Liu, Tobe, Gen, Wang, Zheng and Xu (2012:1) revealed that weak incentives for treatment adherence were contributing factors for treatment default. This means that incentives given to TB patients could be a motivating factor and an obstacle to TB treatment adherence

A patient cannot take drugs on an empty stomach. Intake of inadequate food is related to more side effects and difficulty to tolerate the drugs. This behaviour could result to poor adherence to treatment if not attended to. This is true, as a study conducted by Gabremariam et al (2010:4) revealed that lack of food was a factor adversely affecting treatment adherence in patients with insufficient income. This finding was in support of a qualitative study by Boru et al (2016:3) that nine of their participants reported to had experienced food shortage during treatment and that food played a pivotal role in complimenting TB treatment. Furthermore, with food shortage, patients, failed to comply with medications. This indicates that food ration could be a contributing factor to TB treatment adherence. Therefore, it is important to examine food availability when initiating TB patients to treatment.

2.6 PERCEIVED BARRIERS

Perceived barriers refer to individual's assessment of the obstacles to behaviour change (Onoruoiza et al 2015:14). Several barriers could affect peoples' decision to take particular actions. These include hindrance in taking medication in terms of frequency, and treatment related effects (Tarkang & Zotor 2015:5). A TB client could understand that the TB disease is threatening and believe a particular action could reduce the threat. In that way, some barriers could prevent engagement in adherence to TB treatment (health promotion behaviour). Tarkang and Zotor (2015:5) further mentioned that in perceived barriers to health actions, there were possible blocks or hindrances to engage in preventive behaviours. These comprised of travelling cost, duration, unpleasantness, phobic reaction, physical barriers and complexities. In addition, pill burden, feeling better, side effects and directly observed treatment could be barriers to adherence to TB treatment.

2.6.1 Travelling and costs burden to adherence

Access to TB treatment could be a determinant for effective TB control services. Woimo, Yimer, Bati and Gesesew (2017:5) reported that distance and cost of transport were barriers for adherence to treatment. Moreover, in most cases TB was prevalent in resource constraint countries where patients had to pay their travel cost to the clinic to access the service (Woimo et al 2017:2). Similar study by Widjanarko, Gompelman, Dijkers and van der Werf (2009:231) revealed that non-adherent patients mentioned costs as an important role in determining adherence to their treatment. In support, Zhang, Ehiri, Yang, Tang and Li (2016:1) reported that patients continued to interrupt their treatment due to long distance of DOTs centres from individual home. These findings indicate that traveling cost is a barrier to treatment adherence.

2.6.2 Pill burden and adherence to TB treatment

According to the Annual National Tuberculosis Control Program (ANTCP) (2015:14) TB incidence continue to rise in Eswatini where most patients (72%) are also affected by HIV epidemic. Swaminathan and Narendran (2008:527) asserted that HIV was the most known risk factor that promoted progression to active TB in people with *Mycobacterium tuberculosis* infection. Therefore, co-infected patients on concomitant treatment could be at risk for decreased adherence. This could result to pill burden, drug toxicities, drug to drug interaction and paradoxical reactions (Swaminathan & Narendran (2008:527).

A study by Gabremariam et al (2010:651) revealed that there was an association between poor adherence and the pill burden due to a regimen complexity and the extent to which a regimen impacts on the patient's daily life. In the context of Eswatini, patients who are co-infected with HIV/AIDS are required to be initiated on anti- TB therapy first, then followed by ART within 8 weeks to prevent complications (SNTPM 2012:52). However, some TB patients have comorbidities such as diabetes, hypertension, cancer, hepatitis, and renal insufficiency amongst others which need to be treated together with TB (Schnippel, Berhanu, Black, Firnhaber, Maitisa, Evans & Sinanovic 2016:4). Likewise, a study by Nachega, Parienti, Uthman, Gross, Dowdy, Sax, Gallant et al (2014:1297) revealed that higher pill burden was associated with lower TB treatment adherence rates. This indicates that pill burden is associated with adherence to TB treatment.

2.6.3 Feeling better and adherence to treatment

The therapeutic regimen given to TB patients needs to be completed to eradicate the TB bacteria. However, a study by Kaona, Tuba, Siziya and Sikaona (2004:5) revealed that patients stopped their TB treatment when they started to be feeling well with a belief that they had been cured. Similarly, Mathew, Kurian, Mathew, Senan, Kumar and Sivakumar (2015:986) in their quantitative study revealed that the common reason for default were feeling better and eventually stopped treatment. This means that factors that could cause patients to withdraw from treatment required frequent monitoring during the patient's visits

to a health centre. Likewise, Widjanarko, Gompelman, Dijkers and van de Werf (2009:234) also revealed that the main reason why TB patients quitted and stopped their medication was feeling better. Furthermore, a belief that the medication would then make them feel worse if they continue with medication was another reason for quitting.

2.6.4 Side effects and adherence to TB treatment

Side effects could be a barrier to treatment adherence. In support of this statement, Schnippel et al (2016:593) revealed that patients with at least one adverse effect experienced, HIV positive patients, and those newly initiating on ART were more likely to experience severe unpleasant effects. This indicates that patients with co-infecting could have the highest hazard from severe side effects which could result to risk of death and loss of treatment. Similarly, a study by Mathew et al (2015:986) revealed that the common reason for TB patients to default their treatment was side effects following medications and fear of adverse reaction. This indicates that side effects of TB treatment could be a barrier to TB treatment adherence. Therefore, patients on anti-TB treatment need to be monitored for side effects as they could be lost during the treatment due to severe side effects (Mathew et al 2015:986).

In a study by Boru et al (2016:5) side effects were revealed as major causes for discontinuing TB treatment, mainly at the beginning of TB treatment or upon initiation of concomitant treatment. This is compared to a study by Horter, Stringer, Greg, Amangeldiev, Tillashaikhov, Parpieva, Tigay and Phillipp du Cros (2016:8) that patients viewed side effects as being worse at the beginning of treatment, becoming more tolerable after 2 to 3 months when the body has adjusted to the drugs. However, side effects are considered to become worse over time, as the body starts refusing the drugs (Horter et al 2016:8). This means that side effects could occur anytime during the treatment period and could be a strong determinant of adherence as patients could stop their treatment during the treatment phase.

2.6.5 Directly Observed Therapy (DOT)

To address issues of poor adherence for TB, the World Health Organization adopted Direct Observed Therapy (DOT) as a means to help cure tuberculosis (DOT Manual 2011:9). Therefore, DOT is the short course strategy which is used by health care providers as a primary approach to ensure TB treatment adherence (NTPM 2012:56). DOT aims to improve adherence to TB treatment by observing patient while swallowing each dose of anti-TB medication (DOT Manual 2011:9).

In Eswatini, the DOT program has achieved a coverage of 66.7% which was 3048 patients on DOT out of 4567 registered cases, (NTCP 2015:24). DOT could be beneficial for prevention, diagnosis, support and care with its primary aim being an improvement in medication adherence (Zhang, Ehiri, Yang, Tang & Li 2016:2). This initiative primarily involves direct observation of adherence. This usually requires a patient to travel to a clinic daily where the health care worker directly observes the patient taking or swallowing the tablets (Molton, Pang, Wang, Qiu, Wu, Rahman-Shepherd, Ooi & Paton 2016:1). Furthermore, the DOT strategy is seen as an achievement in fighting TB in Eswatini. However, patients are stopping treatment and coming back when they had already deteriorated (NTCP 2015:21).

A study by Yin, Yuan, Hu and Wei (2016:1) revealed a significantly higher treatment success rates to patients on full DOT and to those with self-administration therapy. This indicates that DOT provided to all TB patients during their full course of treatment can improve treatment success rate thus improving adherence to TB treatment. On contrary, Karumbi and Garner (2015:2) in their randomized control trial found that DOT did not provide any solution to poor adherence in TB treatment citing financial and logistics as barriers to effective DOT strategy.

2.7 PERCEIVED SEVERITY

Perceived severity refers to one's belief of how serious a condition and its consequences are (Tarkang & Zotor 2015:5). This concept states that individuals who perceive a given health problem as serious are more likely to engage in behaviours to prevent health problems from occurring or reduce its severity (Jones, Jansen, Scherr, Brown, Chrisy & Weaver 2016:3). Furthermore, perceived severity includes beliefs about a disease itself; for example, whether it is life-threatening, or may cause disability or pain (Onoruoiza et al 2015:14). When a TB patient recognized one's susceptibility to the TB disease, it could not motivate him to change behaviour unless he realizes that getting TB could have serious physical and social implications. For that reason, patients need to first perceive TB as a serious infection that could have severe consequences on their health and social lives. Thereafter, they could be commenced on treatment in order to adhere.

A study by Gabremariam et al (2010:651) reported that beliefs in the curability and severity of TB could positively influence adherence to TB treatment. Contrary, Makanjuola, Taddese and Booth (2014:5) asserted that individual personal beliefs such as fear of Isoniazid (INH) side effects, understanding of ITP and its importance, and belief in INH safety were core factors that negatively affect adherence. However, Naidoo, Peltzer, Louw, Matseke, Mchunu and Tutshana (2013:2) asserted that adherence to anti-TB treatment was positively influenced by beliefs in the curability of TB and beliefs in the severity of TB in the presence of HIV.

2.8 SUMMARY

In this chapter literature review was presented. Specific determinants of adherence to TB treatment were identified as guided by the HBM. This chapter also attempted to explain some of the factors that influenced adherence and those that acted as barriers to adherence to TB treatment from related literature sources. The determinants discussed in this chapter were grouped as follows:

- Demographic variables including gender, age and marital status.
- Modifying variables such as psychological and structural factors.
- Facilitating factors included perceived susceptibility about tuberculosis, perceived benefits, and cues to action.
- Barriers to adherence such as perceived severity and perceived barriers

The next chapter presents the research design and methods.

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

This chapter presents the research design and methods employed for this study. The study was done in two phases. Phase 1 described the research methodology that was applied when eliciting data from the participants. This was done in line with the objectives of the study as summarised in table 3.1. Phase 2 was to design strategies to enhance adherence to TB treatment among TB clients in Eswatini, as reflected in the table 3.1.

Table 3.1 Summary of the two phases

Phase 1	Phase 2
Compilation of evidence in preparation for the development of strategies to improve TB treatment adherence	Design of strategies to enhance adherence to TB treatment
Objectives of phase 1 <ul style="list-style-type: none">• Describe demographic variables of TB clients on TB treatment in Eswatini• Identify variables that modify adherence to TB treatment among TB clients in Eswatini• Explore barriers to adherence to TB treatment among TB clients in Eswatini• Describe factors that facilitate adherence to TB treatment among TB clients in Eswatini• Determine an association between factors that facilitate adherence and barriers to adherence to TB treatment	Objective of phase 2 <ul style="list-style-type: none">• Design strategies to enhance adherence to TB treatment among TB clients in Eswatini

3.2 RESEARCH APPROACH AND DESIGN

A research design is an overall plan for addressing the question, including strategies for enhancing the study integrity (Polit & Beck 2012:390). Furthermore, it is a blue print for

conducting a study and maximizes control over factors that could interfere with the validity of the findings (Grove, Burns & Gray 2013:195). In this study, a quantitative, exploratory and descriptive non-experimental design was used.

3.2.1 Quantitative approach

A quantitative research is the process of testing relationships, differences, and cause and effect interactions among and between variables (LoBiondo-Wood & Haber 2010:584). Grove et al (2013:706) define quantitative research as a formal, objective, systematic study process to describe and test relationships and to examine cause and effect interactions among variables. The study utilized this approach as the researcher viewed a client as integrated with the environment, which shaped the behaviour of adherence. Therefore, the only reliable source of information was the client. This method generated an in-depth account that presented a lively picture of the client's reality in adherence to the TB treatment, and descriptive determinants of adherence was measured.

3.2.2 Exploratory design

Exploratory research is designed to increase the knowledge of a field of study and not intended for generalization to large populations (Grove et al 2013:694). Polit and Beck (2012:727) define exploratory design as a research that explores the dimensions of a phenomenon or that develops or refines hypotheses about relationships between phenomena. The study explored the full nature of the phenomenon of adherence to TB treatment as well as related factors that could influence or impede adherence. The researcher chose this approach to gain a better understanding on what could make clients adhere and not adhere to their treatment. Items such as 'identification of factors that act as barriers to adherence to TB treatment' were included in the questionnaire.

3.2.3 Descriptive design

A descriptive research design was used in which the primary focus was to identify and describe determinants of adherence to TB treatment. According to Grove et al (2013:692) a descriptive design is used to identify a phenomenon of interest, identify variables within the phenomenon, develop conceptual and operational definitions of variables, and describe variables in a study situation. In this study, determinants associated with adherence to TB treatment were identified and described. The researcher did not manipulate the variables of interest because they were naturally existing attributes. The descriptive design was appropriate in the sense that the findings of the study were expected to provide detailed information about the variables under study.

3.2.4 Non-experimental research

Non-experimental research is a study in which the researcher collects data without introducing an intervention; also called observational research (Polit & Beck 2014:735). LoBiondo-Wood and Haber (2010:582) also defines a non-experimental research design as a design in which an investigator observes a phenomenon without manipulating the independent variable(s). Non-experimental research design was used to investigate determinants of adherence to TB treatment on TB clients to understand barriers and facilitators of TB treatment adherence.

3.3 ORGANISATION OF THE STUDY IN TWO PHASES

The study was conducted into two phases. Phase 1 was the research methods used for collection of evidence in relation to the objectives of the study. Furthermore, Phase 1 comprised of steps 1 and 2 due to different populations for the study. The evidence was used to design the strategies in phase 2. Phase 2 would be the design of the strategies.

3.4 RESEARCH METHODS PHASE 1 STEP 1: TB CLIENTS

Research methods refer to the techniques used to structure a study and to gather and analyse information in a systematic fashion (Polit & Beck 2012:741). The study followed a series of steps according to the plan of action and gathered evidence from clients by using a questionnaire. The findings of the study were then measured and analysed statistically to provide detailed information about the variables under study.

According to Grove et al (2013:700) methodological designs are used to develop the validity and reliability of instruments in order to measure research concepts and variables. The study methods were used to describe the data collection process from the TB clients in two government hospitals in Eswatini. Opinions of the clients about determinants of adherence to TB treatment assisted in validating findings from the TB experts. Findings of the study from the TB experts could help provide detailed information about the variables under study.

3.4.1 Purpose of step 1

The purpose of the phase 1 was to investigate the determinants of adherence to TB treatment in order to compile evidence to design strategies to enhance adherence to TB treatment among TB clients in Eswatini.

3.4.2 Objectives of step 1

The objectives were to; identify and describe demographic variables of TB clients on TB treatment in Eswatini, identify variables that modify adherence to TB treatment, to explore barriers to adherence to TB treatment, and describe factors that facilitate adherence to TB treatment in TB clients in Eswatini. In addition, to determine an association between factors that facilitate adherence and barriers to adherence to TB treatment and to design strategies to enhance adherence to TB treatment among TB clients in Eswatini were other objectives of this phase.

3.4.3 Setting for the study

A setting in a study is defined by Grove et al (2013:709) as a location for conducting research; it may be natural, partially controlled, or highly controlled. The research was conducted in two major government hospitals in Eswatini; Mbabane and Hlatikulu hospitals. Eswatini has four main administrative regions. Each region has one referral hospital. Government owns the two regional referral hospitals and the others are owned by the missionaries.

Mbabane government hospital is situated in the capital city of Mbabane which has a population of about 61.940 (City Baseline Report 2015:1). This hospital is the country's main referral and also a regional hospital (Hhohho region). This region has a population of 282,734 (Swaziland Population Projection 2007-2030:8). The Mbabane government hospital was chosen because it has a TB Clinic where most TB patients residing within the city and surrounding places were treated.

On the other hand, Hlatikulu government hospital is situated in the southern part of Eswatini in the Shiselweni region. This region has a population of about 208.454 in 2010 (Swaziland Population Projection 2007-2030:8). The reason for choosing this hospital was because it is the main regional hospital and has a TB clinic where a lot of TB patients from the region were referred to and treated.

In addition, each of these hospitals has a TB clinic with TB nurses, doctors and other TB officers, who in this study were referred to as TB experts. These experts found in the TB clinics assisted with knowledge of the determinants to adherence in TB treatment.

3.4.4 Population

Population is the entire set of individuals or objects having some common characteristics (Polit & Beck 2012:738). Grove et al (2013:703) also define population as all elements that meet the sample criteria for inclusion in a study; sometimes referred to as a target

population. The population for the study in step 1 were all clients with TB and attended to TB clinics in the two major government hospitals. TB clients who came for refill of treatment, those who defaulted, or reinitiated made the population of the study provided they satisfied the inclusion criteria. TB clients who accessed treatment in both hospitals were those residing in close proximity to the hospitals or were referrals from other health care facilities for either reinitiating to TB treatment or defaulted treatment.

The researcher visited the two hospitals on separate days in a week between mid-June to mid-July 2018; 3 days in Mbabane government hospital and 2 days in Hlatikulu government hospital. Mbabane government hospital was the most visited because it had a large flow of TB patients and very busy than the other hospital.

The average daily attendance of TB clients who came for refill of TB treatment in Mbabane government hospital as reflected in the TB register book was 12 clients, making a weekly total of 36 clients for 3 days, with an estimated monthly population of $(36 \times 4) = 144$ TB clients. On the other hand, Hlatikulu government hospital's register book reflected an average daily attendance of about 7 TB clients, making a weekly total of about 14 TB clients for 2 days, with an estimated monthly population of $(28 \times 4) = 112$ TB clients. Therefore, the estimated population in both institutions in a period of 4 weeks (a month) was $256 \times 4 = 1024$ TB clients.

3.4.5 Sample and sampling method

Sample is defined as the subset of the population that is selected for a study (Grove et al 2013:708). The sample comprised of TB clients that came for treatment or refill in the TB clinics during the data collection process provided they met the selection criteria. The inclusion criteria were clients:

- on TB treatment for at least 3 months
- who completed treatment in the past 12 months and the TB recurred and were put on retreatment course

- who defaulted TB treatment and were on retreatment course

Sample size is defined by Polit and Beck (2012:742) as the number of people who participate in a study; an important factor in the power analysis and in statistical conclusion validity. A procedure called power analysis can be used to estimate a sample size (Polit & Beck 2012:283). In this study, the researcher used the parameters by Lipsey (1990: 92); study power of 0.88, effect of 0.35 and significance level of 0.05, the sample size was 123 participants.

Sampling method is the process of selecting a group of people, event, behaviour or other elements that are representative of the population being studied (Burns & Grove 2011:548). Probability sampling was used with strength based on the inclusion criteria to select available TB clients. Probability sampling involves the selection of sampling units from a population using random procedures (Polit & Beck 2014:388).

The researcher randomly selected TB clients using a systematic sampling method. Systematic random sampling was used because it ensured that every TB client had a chance to be selected from the sample. Sampling interval was considered when selecting TB clients. This method includes the standard distance between sampled elements and involves selecting every *k*th person from the list (Polit & Beck 2012:282-3). In this study *k*th was the sampling interval width which was established by dividing the population size (N) which was 248 by desired sample size (n) which was 123. The following formula adopted in Polit and Beck (2012:283) was used for sampling interval:

$$kth = \text{population size (N)} \div \text{desired sample size (n)}$$

$$kth = 248 \div 123$$

$$kth = 2$$

The researcher then selected every second (2th) TB client, provided they met the inclusion criteria until a total of 123 was achieved. The monthly register was reviewed to give a picture of the population of the TB clients. The study anticipated the use of client's

records as sampling frame. However, due to protection of the client's health information, a register book was then utilised.

3.4.6 Recruitment method

Recruiting prospective participants involved identifying eligible participants (Polit & Beck 2012:286). The researcher developed an eligibility criterion for TB clients as reflected in Section 3.4.5. A prospective participant was identified by the researcher while waiting to be seen by TB nurses. The researcher introduced herself and requested the client to be interviewed after consultation. The client was explained that participation was voluntary. The intention and benefits of the study were also stated (see ANNEXURE F). Thereafter, if agreed to participate, the researcher showed the client the original letter of permission from the hospital to conduct the study (see ANNEXURE D & E). The client was also assured that he/she was free to withdraw anytime from the study without incurring any penalties.

The client was also promised that the information he/she would share would be kept confidential. Then the researcher read the consent form (see ANNEXURE F) and the client signed it, if agreeable. The signed consent form was then kept into a folder. This folder was different from that of questionnaires in order to disassociate it with a particular questionnaire. The client was then invited to be interviewed in a private corner where it was quieter. Those who gave a hesitant answer to participate, the researcher requested them to come after consultation with either the nurse or doctor.

3.4.7 Data collection method

Data collection method is the precise, systemic gathering of information relevant to the research purpose or specific objectives, questions or hypothesis of a study (Burns & Grove 2011:52). Data from the TB clients were collected between June to July 2018 in both settings. Data were collected on weekly basis in the two government hospitals until the required samples size was met. Interviews were conducted in the morning as most

clients were booked between 8am -13:00pm. The interview continued until the researcher reached a sample size for the specific site.

3.4.7.1 Data collection tool

A self-designed structured questionnaire was used to collect data from TB clients in both hospitals (see ANNEXURE H). A structured questionnaire was a form of instrument that allowed participants to respond to the questions to provide data for this study. The researcher designed the questions based on the literature review in Chapter 2 (HBM’s major tenets) and the study objectives. This was done to identify and describe determinants of adherence to TB treatment among TB clients in Eswatini. The study sought to measure adherence to TB treatment among TB clients. According to Gabremariam et al (2010:2) adherence to medication is a concept that allows for a comprehensive assessment of factors related to medication intake. This included characteristics of the regimen, attitudes of providers, socio-economic, cultural and environmental factors. The tool was designed in English and translated to Siswati to accommodate both languages.

Table 3.2 Items in the tool: TB clients

Aspects in the Tool	Literature Review	Objectives
Demographic details	Demographic variables (section 2.3)	To describe demographic variables of clients who are on TB treatment in Eswatini (section 1.4.1.1)
Structural factors to adherence Psychosocial factors and adherence	Modifying factors that determine adherence to TB treatment (sections 2.4)	To identify variables that modify adherence to TB treatment among TB clients in Eswatini (section 1.4.1.2)
Facilitators of adherence to TB treatment	Perceived susceptibility (section 2.5.1) Perceived benefits (section 2.5.2) Cues to action (section 2.6)	To describe factors that facilitate adherence to TB treatment among TB clients in Eswatini (section 1.4.1.3)

Barriers of adherence to TB treatment	Perceived barriers (section 2.7) Perceived severity (section 2.8)	To explore barriers to adherence to TB treatment clients among TB in Eswatini (section 1.4.1.4)
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3.4.8 Data collection process

The researcher administered questionnaires in both English and Siswati; and the researcher used the participant’s choice of language for the interview and completion of the questionnaire. Items in both English and Siswati tools were the same as participants differed in their reading levels, and in their ability to communicate in writing. The researcher asked the questions orally in a face-to-face interview, by reading the questions and ticking the responses on behalf of the participants. The researcher and the language expert checked both versions of the questionnaire to ensure language adequacy, correctness, clarity and lack of confusion. The language expert agreed that the meaning of each question was the same in both languages.

The questionnaires had both close-ended and open-ended questions in order to accommodate some ideas that might be missed in both types of questions. Polit and Beck (2012:721) define closed-ended questions as questions that offer participants a set of specific response options. Additionally, open-ended questions are questions in a questionnaire that do not restrict participants’ answers to pre-established alternatives (Polit & Beck 2012:736). Each participant responded to closed-ended and open-ended questions.

The closed-ended questions had dichotomous data (yes or no) responses where factual data was required and answers were selected by the researcher. Other closed-ended questions required the participants to select answers from multiple-choice questions. The multiple-choice questions enabled the researcher to measure the intensity and direction of determinants of adherence to TB treatment among the participants (Polit & Beck 2012:298). There was only one open-ended question in the tool. The open-ended question required the participants to add information that were not stated in the closed-

ended questions. The researcher being the one administrating the questionnaire by ticking the responses, had to write the responses for the open-ended question verbatim.

- **Advantages/strengths of the questionnaire**

Questionnaires used in the study enabled the researcher to encode instead of writing names of the participants. This made participants to be comfortable and willing to give information, which resulted in higher response rate.

The researcher was able to develop and gather information in a standardized manner, as the questions were the same in the questionnaires. This helped the researcher to ask the same questions to all the participants without introducing new questions.

The collection of data using the structured questionnaire was faster, and asking questions was done within a limited period. This made participants to participate freely as questioning was done within a specified time.

- **Disadvantages/weaknesses of the questionnaire**

The questionnaire limited participants to explain about some other determinants to TB adherence, which were not in the item.

The participants did not respond to the last question which was open-ended.

3.5 VALIDITY AND RELIABILITY OF THE DATA COLLECTION INSTRUMENT

Validity and reliability of a research study are forms of evaluating the quality of data obtained in structured instruments.

3.5.1 Validity

Validity is defined by Polit and Beck (2014:394) as a quality criterion to the degree to which inferences made in a study are accurate. To enhance validity of this study, the following were done:

- **Content validity**, which is the degree to which the items in an instrument adequately represent the content for the concept being measured (Polit & Beck 2012:723). To enhance validity of this study,
 - the questionnaire was designed in relation to the study objectives as illustrated in Table 3.1.
 - a TB expert and TB hospital manager were consulted to examine the appropriateness of the tool.
 - Self-designed questions were based on the objectives of the study and the literature review, see Chapters 1 and 2.

- **Construct validity**, examines the fit between conceptual and operational definitions of variables and determines whether the instrument actually measures the theoretical construct that it purports to measure (Grove, Burns & Gray 2013:690).
 - The researcher developed a hypothesis regarding the determinants of adherence to TB treatment (see Chapter 1).
 - Literature was examined to identify variables to be delineated (see Chapter 2: (Gabremariam, Gunnar, Bjune & Frich 2010:1; Kastien-Hilka, Abulfathi, Rosenkranz, Bennett, Schwenkglens & Sinnovic 2016; Dladla 2013:27; Asati, Nayak & Indukar 2017:2759).
 - Questions used for data collection were in line with the theoretical framework (HBM) of the study (see Chapter 1)
 - Data were collected to test the hypothesis and to make inferences based on the findings (see Chapter 4).

- **Face validity**, verifies that the instrument looks as though it is measuring what it purports to measure (Polit & Beck 2014:380).
 - A statistician (see ANNEXURE J) was consulted with the design of the questions in the tool to ensure that data analysis was congruent with the method of analysis.
 - The structured questionnaire was pretested on four TB clients who were not part of the main study.

3.5.2 Reliability

Reliability relates to the degree to which a measurement is free from measurement error –its consistency and accuracy (Polit & Beck, 2014; 390). Reliability is a pre-requisite for tool validity.

Reliability of instrument was enhanced through pre-testing it on four TB clients who were not part of the main study.

- Items in the questionnaires were the same to all participants and measured the determinants of adherence to TB treatment.
- In this study, English or Siswati was the language of instruction depending on the participant’s choice. This enabled the participants to express themselves better in the language that they understood.
- The researcher was the only one who collected data from participants. This made it possible for the researcher to make a follow-up on the responses and maintained consistency in the data collection process,

3.6 PRE-TESTING THE DATA COLLECTION INSTRUMENT

A pre-test is defined by Polit and Beck (2012:738) as a collection of data prior to the trial administration of an instrument to identify problems or assess time requirements. After

the approval (see ANNEXURE A & C) of the research proposal the researcher with the help of Clinic Managers in the TB clinics identified prospective participants to form part of the sample provided they met the inclusion criteria. The pretesting was done on 4 TB clients with similar characteristics to those who were in the actual study sample in order to test if the tool measured the study variables.

The questionnaire used in the pre-test were the same as those in the main study. The results of the pre-test assisted the researcher in refining the tool and familiarization with the interview technique for data collection.

In the TB client questionnaire (see ANNEXURE H), changes that were made were as follows:

In section 1.0: in question 1.1, age categories were replaced with an open-ended question, and in 1.2 “bisexual” was removed as it was a sensitive, yet insignificant variable to include.

In section 2.0: in 2.0 “related” factors was replaced with “structural” factors, in 2.1 “6-8 months” was replaced with 7-8 months, “above 8 months” was replaced with “above 9 months...”, “more than one” was added in relevant questions , in 2.2 the question was cut short to read “what is your HIV status? In 2.3 “treatment” was replaced with “ART”, in 2.5: “illicit/illegal drugs” was replaced with “alcohol”, in 2.6 the question was replaced with “do you have a family member with TB?”

Section 3.0: in 3.0 “psychosocial” was replaced with “psychological, “more than one” was added in relevant questions, questions 3.3 and, 3.4 were deleted, in 3.5 “don’t know”, low immunity”, “related to HIV” and “smoking” were added

Section 4.0: “More than one” was added to relevant questions, in 4.7 “counselling on adherence” was added

Section 5.0: ‘more than one” was added to relevant questions, in 5.11 responses were reshuffled to look like; 1. “Lack of food”, 2. “Sick continuously”, 3. “Living alone” and “4. Lack of social support”, in 5.10 the question was modified and began with “are there any other social barriers which...”, in 5.11 “more than one” added, in 5.14 “stop” was replaced

with “forget”, in 5.15 “stop treatment” was added, in 5.17 in the question “stopping” was replaced with “forgetting”, “don’t know” and “more than one” response were also added, in 5.19(3) “mellitus” was added and “more than one response” was added, in 5.23 the responses were changed to 1. “Poor”, 2. “Good”, and 3. “Excellent”, in question 5.24 “not good” was replaced with “poor”

Section 6.0: the question was deleted and replaced with “any additional barrier to TB treatment adherence”?

In TB experts, pretesting was done on 2 experts with similar characteristics to those who were in the actual study sample in order to test if the tool measured the study variables. Changes made included:

In section 2.0 “related” factors was replaced with “structural factors”, in 2.3 “more than one” was added, in 2.9 (4) “daily” was replaced with “monthly”, in 2.11(3) “good” was deleted, in 2.12 “more than one” was added.

Section 3.0: in 3.4 additions included “more than one method, don’t know, low immunity, related to HIV and smoking”

Section 4.0: in 4.1 in the question “treatment” was added, in the responses, all were deleted and replaced with; 1. “No” and 2. “Yes”, in 4.5 the responses were reshuffled to look like; 1. “Switch to another regimen if side effects are severe”, 2. “Give medication to treat side effects”, 3. “Report to the TB clinic manager”, 4. “Advise to stop taking tablets”, 5. “More than one” was added, in 4.7 “on adherence” was added in the question. In 4.9 in the table; line no. 5 “lacking” was deleted, in line 6 “time’ was deleted, in line 7 “occurrence of” was deleted, in line 8 “un” was deleted, in line 9 “deficit” was deleted.

Section 5.0: the whole question was deleted and replaced with “any additional hindrance to client’s adherence to TB treatment”?

3.7 ETHICAL CONSIDERATIONS

The researcher ensured that ethical considerations were followed, and participants' rights were protected. To collect data from the participants, the researcher first sought and obtained ethical approval from Health Studies Research Ethics Committee, University of South Africa (see ANNEXURE A) and permission was granted by the Swaziland National Health Research and Ethics Council (see ANNEXURE C). After the approval, the researcher sought permission to conduct the study from the hospital managers of the two proposed government hospitals (see ANNEXURES D & E). Written and informed consents (see ANNEXURE F) were sought from the TB clients attending the TB clinics before interview.

The researcher followed the three following fundamental ethical principles which were applied:

- Respect for persons (Burns & Grove 2011:547) is a principle that indicates that each person has the right to self-determination and the freedom to participate or not participate in research. In this study, participants voluntarily participated without incurring any negative consequences whatsoever. Participants were assured that they had the right to ask questions, to refuse to give information and to withdraw from the study at any time if they so wished. Full disclosure of information was maintained. The risks and benefits of the study were explained before the interview began (see ANNEXURES F & G). It was explained to the participants that the possible risks in participating were fatigue and some inconvenience. There were no immediate benefits in participating in the study. However, future TB patients may benefit from the implementation of the adherence strategy based on the findings. Confidentiality was maintained in all the phases of data collection. To maintain anonymity, the questionnaires were coded with numbers, and no participant's name was written on the tool. Those who agreed to participate were requested to sign a consent form which was then clipped to a folder that was different from that of the questionnaire.

- Beneficence is defined by Polit and Beck (2012:720) as “a principle that seeks to maximize benefits for study participants and prevent harm”. Since the study was non-intervention, there were indirect benefits. The participants were explained to that their participation in the study was very important to generate and refine nursing knowledge for practice as their responses would help others with similar condition in future. They were also ensured that participating in this research would help in developing strategies to enhance adherence to TB treatment.
- Justice is a principle stating that human subjects should be treated fairly (Burns & Grove 2011:540). The selection of the population, and the risks and benefits of this study were fairly disseminated based on the participants’ needs and rights. The researcher treated the participants who declined to participate and/or those who withdrew during the interview process in a non-prejudicial manner. Participants were selected for reasons that they were directly related to the problem being studied and not for their easy availability. The researcher also honoured all agreements made with participants; the researcher terminated the data collection process at the agreed-on time. Data collected was kept in a private place, where only the researcher and the supervisor had access.

3.8 DATA ANALYSIS

Data analysis is the systematic organization and synthesis of research data and, in quantitative studies the testing of hypothesis using those data (Polit & Beck 2012:725). Data gathered through closed-ended questions from TB clients were first coded then entered into the computer for analysis. Quantitative data were analysed by descriptive statistics using the Statistical Package for the Social Sciences (SPSS) version 20.0. Association between variables were examined using inferential statistics and the help of a statistician was sought throughout the data process. Data solicited from open-ended questions were analysed using simple descriptive analyses. The statistician was sought for assistance throughout the data management process.

3.9 RESEARCH METHODS PHASE 1 STEP 2: TB EXPERTS

Step 2 in this study, followed a stage according to the plan of action and gathered evidence from TB experts by using a self-administered questionnaire. The findings of the study were measured and analysed statistically to provide detailed information about the variables under study. The study methods were used to describe the data collection process from TB experts in two government hospitals in Eswatini. Opinions of the TB experts about determinants of adherence to TB treatment among TB clients assisted in validating findings from the TB clients. The findings of the study also helped in providing detailed information about the variables under study.

3.9.1 Purpose of step 2

The purpose of the step 2 was to investigate the determinants of adherence to TB treatment in order to compile evidence to design strategies to enhance adherence to TB treatment among TB clients in Eswatini.

3.9.2 Population for step 2

The population comprised of all TB experts working in different TB clinics sections in the two major government hospitals. TB experts included doctors, nurses and TB experts in DOTS or/and TB development of strategy, provided they satisfied the inclusion criteria. In these TB clinics, TB experts worked from 8am-5pm on weekdays only, and no night shift duty. Therefore, the target population was the TB experts on duty on the day the researcher collected data provided they satisfied the inclusion criteria. In Mbabane Hospital TB clinic, the duty roster reflected approximately 11 TB experts, while Hlatikulu had 8 TB experts during June to July 2018. Therefore, an estimated population was $11 + 8 = 19$ TB experts.

3.9.3 Sample and sampling

In this study, the researcher used the parameters by Lipsey (1990:92) to calculate the sample size from the two hospitals. The study power of 0.86, effect of 1.00 and significance level of 0.05 resulted in a sample size of 12 participants. The sample size comprised of TB experts who were found in the TB clinics during the time of data collection and they had to satisfy the selection criteria. The inclusion criteria in this category were those TB experts who had worked in the TB clinics for more than 2 months, as they would understand adherence to TB treatment.

Purposive sampling was employed because the researcher had to use own judgement to select TB experts that met the inclusion criterion.

3.9.4 Recruitment method

The researcher developed the eligibility criterion for TB experts as reflected in Section 3.9.3. Prospective participants were identified in the duty station using a duty roster. The researcher approached the prospective participant and stated the intention of the study. The researcher also showed the participant the original letter of permission from the hospital to conduct the study (see ANNEXURES D & E). When agreed to participate, the purpose and benefits of the study was then explained, and a consent form was signed (see ANNEXURE F). The form was then clipped to a folder that was different from that of the questionnaire. The self-administered questionnaire (see ANNEXURE I) was then given to the TB expert to fill at his/her appropriate time. When the TB expert gave a hesitant answer to participate, the researcher requested another time when would be ready to sign the consent. Each TB expert set a suitable date for the submission of the questionnaire. The TB expert was assured of confidentiality of information.

3.9.5 Data collection method

Data collection method is the precise, systemic gathering of information relevant to the research purpose or specific objectives, questions or hypothesis of a study (Burns & Grove 2011:52). Quantitative approach of data collection was followed in this step, using a self-administered questionnaire.

3.9.6 Data collection tool

Self-administered questionnaire (SAQ) was used to collect data from TB experts (see ANNEXURE I). Polit and Beck (2012:740) define a self-administered questionnaire as a document used to gather self-report data via self-administration of questions. The self-administered questionnaire was written in English as TB experts were literate and were able to read the questions on the form and responded to the questions independently. The questionnaires were hand delivered by the researcher. The researcher designed the questions in the questionnaire based on the literature review in Chapter 2 (HBM's major tenets) and the study objectives. This was done to identify and describe determinants of adherence to TB treatment among TB clients in Eswatini.

Table 3.3 Items in the tool: TB experts

Aspects in the Tool	Literature Review	Objectives
Demographic details	Demographic variables(section 2.3)	To describe demographic variables of TB clients and experts working in TB clinics in Eswatini (section 1.4.1.1)
Structural factors to adherence	Modifying factors that determine adherence to TB treatment (sections 2.4)	To identify variables that modify adherence to TB treatment among TB clients in Eswatini (section 1.4.1.2)
Determinants enhancing adherence to TB treatment	Perceived susceptibility (section 2.5.1) Perceived benefits (section 2.5.2) Cues to action (section 2.6)	To describe factors that facilitate adherence to TB treatment among TB clients in Eswatini (section 1.4.1.3)
Barriers of adherence to TB treatment	Perceived barriers (section 2.7) Perceived severity (section 2.8)	To explore barriers to adherence to TB treatment among TB clients in Eswatini (section 1.4.1.4)

3.9.7 Data collection process

Self-administered questionnaires (SAQs) designed in English were hand delivered by the researcher to collect data. Items in the tools were the same. Questions were written in English which was checked by a language expert. The participants read the questions in the tool and gave their answers in writing. Questions were completed anonymously and independently minimising chances of the researcher bias.

The self-administered questionnaires were coded and no participant's names were written on them. The questionnaires had both close-ended and open-ended questions. This was done to accommodate some ideas that might be missed in both types of questions. Polit and Beck (2012:721-736) define closed-ended questions as questions that offer participants a set of specific response option, and open-ended questions as questions that do not restrict participants' answers to pre-established alternatives.

Each participant replied to closed-ended questions and an open-ended question. There was only one open-ended question in the tool. The closed-ended questions had dichotomous data (yes or no) responses where factual data was required and answers were selected by the participant. Other closed-ended questions required the participants to select answers from the multiple choice which enabled the researcher to measure the intensity and direction of phenomenon under study (Polit & Beck 2012:298). A Likert Scale was also used to measure TB expert's hindrances to TB treatment adherence. Polit and Beck (2014:384) define a Likert scale as a composite measure of attribute involving the summation of scores on a set of items that participant's rate for their degree of agreement or disagreement. Data collection was done simultaneously on weekly basis in the two government hospitals until the required samples size was met.

- **Advantages/strengths of the self-administered questionnaire**

Self-administered questionnaires used in the study enabled participants to independently fill the questionnaire at their own pace and time. This helped in the increase of the response rate.

The researcher was able to develop and gather information in a standardized manner as the questions were the same in the questionnaires. This helped the researcher to ask same questions to all respondent without introducing a new question, thus increased validity and reliability of the study.

The collection of data using the self-administered questionnaire reduced researcher bias as the presence of the researcher might had forced the participant to tick untruthful responses in fear of being intimidated.

- **Disadvantages/weaknesses of the questionnaire**

Closed-ended questions limited participants to give a clear picture of the determinants of adherence to TB treatment. Some of the participants did not answer the open-ended question, which requested them to add any other hindrance of TB client's adherence.

3.10 SUMMARY

Chapter 3 described the research approach, design, sampling and sample size, data collection tools and their psychometric properties. In addition, the data collection process, analysis, and ethical issues were presented. The next chapter discussed the findings of the study.

CHAPTER 4

ANALYSIS, PRESENTATION AND DESCRIPTION OF THE RESEARCH FINDINGS

4.1 INTRODUCTION

In this chapter, analysis, presentation and description of the research findings for Phase 1 were presented. The chapter begins with the presentation of research findings from TB clients, and followed by findings from TB experts respectively. For each category, data were presented according to research objectives. Each objective was analysed using descriptive and inferential statistics, including Pearson's Correlation and Chi-square. Finally, the researcher's hypothesis was tested.

The study's objectives were to:

- Describe demographic variables of TB clients on TB treatment in Eswatini
- Identify variables that modify adherence to TB treatment among TB clients in Eswatini
- Explore barriers to adherence to TB treatment among TB clients in Eswatini
- Describe factors that facilitate adherence to TB treatment among TB clients in Eswatini
- Determine an association between factors that facilitate adherence and barriers to adherence to TB treatment

4.2. DATA MANAGEMENT, ANALYSIS AND PRESENTATION OF PHASE 1 STEP 1: TB CLIENTS

In total 125 questionnaires were administered by the researcher. However, 2 participants withdrew from the study. The study remained with 123 questionnaires, which were entered into SPSS for analysis. During data entry there were no challenges (e.g. outliers, incomplete questionnaires) noted in the data. The sample therefore, comprised of N =

123 participants. In presenting and analysing the data N depicts the whole sample and n reflects a subset of the whole sample.

4.2.1 Demographic variables of clients on TB treatment

For the demographic variables the statistical analysis of this data fell into two main categories, namely, descriptive statistics for continuous variables and the calculation of frequencies and or percentages for the categorical variables. A categorical variable is made up of categories and is one that names distinct entities. It names just two types of things for example male or female and this is known as binary variable.

Table 4.1 Frequency distribution of the demographic variables of participants (N=123)

Variable		Frequency (f)	Mean (m)	Percentage (%)	Standard deviation (SD)
Age (years)		73.2	37.2	10.5	10.5
Gender	Male	66		53.7	
	Female	57		46.3	
Marital status	Single	62		50.4	
	Married	49		39.8	
	Divorced	3		2.4	
	Separated	4		3.3	
	Widowed	5		4.1	
Residential place	Rural	63		51.2	
	Urban	11		8.9	
	Peri- urban	49		39.8	
Educational level	Never- attended school	3		2.4	
	Primary level	28		22.8	
	Secondary level	34		27.6	
	High school level	42		34.1	
	Tertiary level	16		13.0	
Employment status	Unemployed	53		43.1	
	Employed	51		41.5	
	Self employed	19		15.4	
Religion	None	4		3.3	
	Ancestral	2		1.6	
	Christianity	117		95.1	

Age is a continuous variable and the composition of age revealed different generational groups of patients. Accordingly, there are more patients of middle age who are affected by TB.

Gender is a categorical variable. The results indicate that there is a fair representation of the population, as males have been over-represented in the study. The distribution of males over females is significant as in the table 4.1.

Marital status is another categorical variable. The marital status of the participants characterised the possible marital categories. The possible marital status categories were represented in the study. However, the participants who were single or not married were significantly higher compared to the other marital status categories, as reflected in table 4.1.

The participant's place of residence was a categorical variable. A considerable proportion of participants resided in the rural area and very few were from the urban setting. Evidence (WHO Country Cooperation Strategy Swaziland 2015:3) supports that the 77% of the populace in Eswatini reside in rural areas.

The educational level of participants was also a categorical variable. The data denotes that participants of different educational level were included in the study. The distribution of participants who had attained secondary education was significant compared to the other educational level categories, as shown in table 4.1.

Employment status is a categorical variable. A considerable proportion of the clients are not employed as indicated in table 4.1.

Religion is a categorical variable. A significant proportion of the participants were Christians and the minority worshipped ancestors.

4.2.1.1.1 Association between demographic variables and adherence to TB treatment

Table 4.2 Association between demographic variables and adherence (N=123)

Variables	Pearson's Correlation (r)	Significance level (p)
Gender and employment	-0.303	0.001**
Marital and employment	0.212	0.018*
Age and educational level:	-0.207	0.022*
Marital status and age	0.435	0.001**
Educational level and adherence	0.184	0.042*

Table 4.2 reveals that there was a significant association between gender and employment status ($r = -0.303$, $p = 0.001$), indicating that males were less likely to be employed. There was an association between marital status and employment ($r=0.212$, $p = 0.018$), reflecting that those that were single were more likely to be employed. Furthermore, the table reveals an association between age and employment ($r = -0.207$, $p = 0.022$) meaning that with advancing age the participants were less likely to be employed.

The table also shows an association between marital status and age ($r=0.435$, $p = 0.001$), indicating that those that were single were older. There was also a significant association between educational level and adherence to TB treatment ($r = 0.184$, $p = 0.042$). This means that with increased educational level, there is an increase in adherence to TB treatment.

4.2.2 Variables that modify adherence to TB treatment among TB clients

The following were the variables identified.

4.2.2.1 Participant's structural factors and adherence to TB treatment

The information representing modifying factors was organized into structural and psychological categories. Each category is discussed separately.

4.2.2.1.1 Structural variables and adherence to TB treatment

Most participants had been on TB treatment for 3 – 4 months. With reference to Figure 4.1 forty-three percent (43%, n=53) of the participants reported to be on TB treatment for about 3-4 months, 18% (n=22) 5-6 months, and 16% (n=20) had been on treatment for 7-8 months. In addition, 10% (n=12) of the participants reported to have been on TB treatment for 9 months and above but were still on retreatment, 8.9% (n=11) finished treatment course, but reinitiated, and lastly 4.1% (n=5) defaulted treatment, and re-initiated. The participants had been on treatment for a mean period of 2.4 months with a standard deviation of 1.5 months.

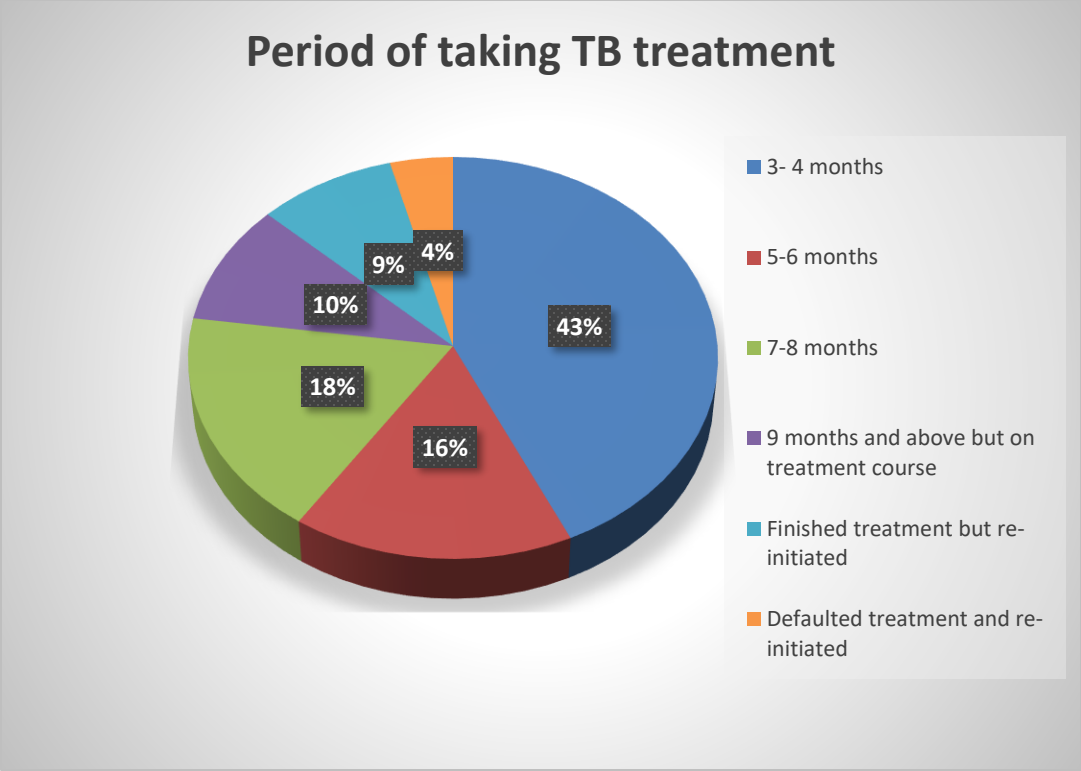


Figure 4.1: Period of taking TB treatment (N=123)

With reference to Figure 4.2, 74%, (n=91) of participants reported that they were HIV positive, 24% (n=29) HIV were negative, and 2.4%, (n=3) reported that they did not know their HIV status. The HIV status of the participants is likely to influence adherence to TB treatment. This indicates that taking both ART and TB treatment could increase the pill-burden. However, in the current study the data did not support an association between HIV status and adherence to TB treatment ($F = 1.649, p = 0.201$). This reflected that HIV status was not a predictor of adherence to TB treatment.

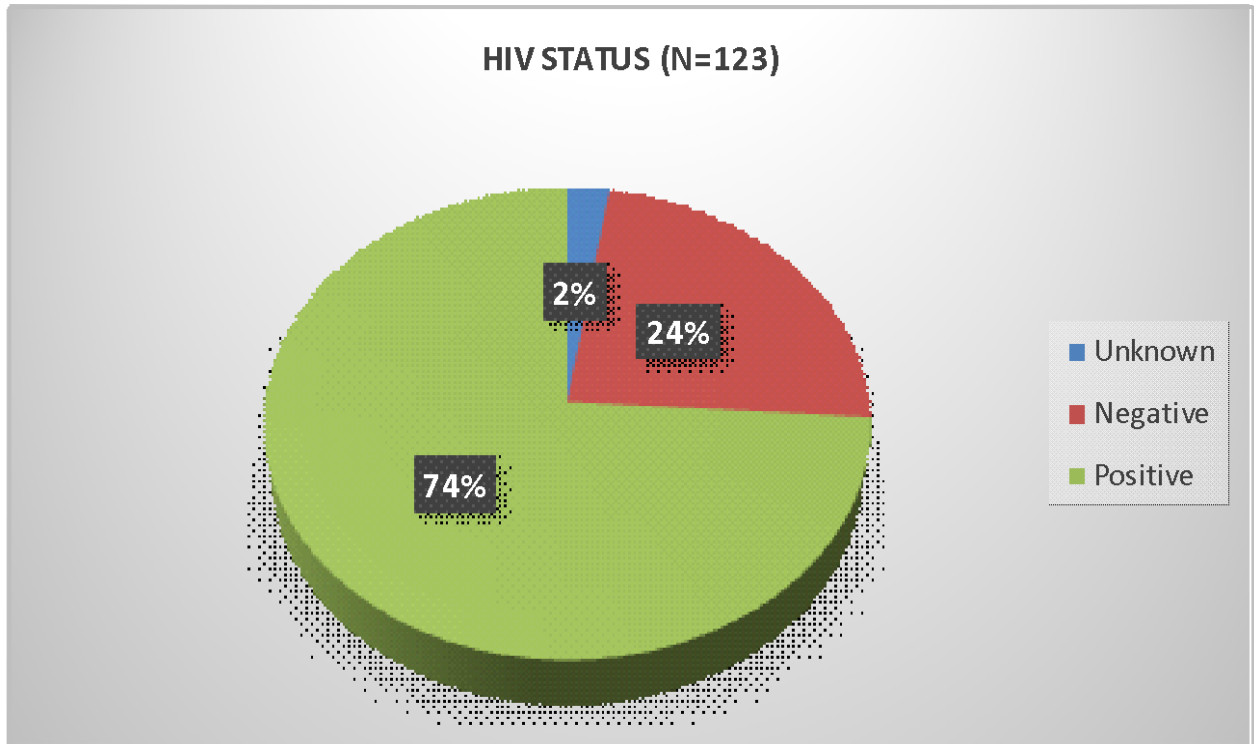


Figure 4.2: Participant's HIV status (N=123)

Out of the 74.8% (n= 92) of the participants who reported that they were HIV positive, 70.7% (n=87) were on antiretroviral therapy (ART), while 4.1% (n=5) were not on ART.

Seventy-seven percent (77.2%, n=95) of the participants reported that they did not smoke, and 22.8% (n=28) were smoking.

On the other hand, when participants were asked if they took alcohol, 79.7% (n=98) reported that they did not take alcohol, and 20.3% (n=25) took alcohol.

A majority (73.2%, n=90) of the participants reported that they did not have any family member with TB, and 26.8% (n=33) had a family member who had TB. Moreover, out of the 26.8% (n=33) participants who reported to have a family member with TB, 12.2% (n=15) reported that the family member was a sibling, 4.9% (n=6) parent, 4.1% (n=5) reported more than one relationship which included sibling, uncle and parent, 2.4% (n=3) aunt or uncle, and an equivalent 1.6% (n=2) reported a spouse and friend respectively.

4.2.2.1.2 Associations between patient structural factors to adherence and other variables.

The associations between patient structural factors on adherence to TB treatment and other variables were examined, findings are presented below.

The data revealed a relationship between current HIV status and antiretroviral therapy ($r = 0.437$, $p = 0.001$), meaning that, those that were HIV positive were more likely to be on antiretroviral therapy. Noteworthy is that taking TB treatment and ART is likely to increase the pill burden which could adversely affect adherence to medication.

There was an association between smoking and alcohol ($X^2 = 66.920$, $p = 0.001$). The 25 out of 123 participants who smoked provide enough evidence that there is an association between smoking and taking alcohol at $p \leq 0.05$. This relationship can affect adherence to TB treatment.

Data showed an association between smoking and antiretroviral therapy ($X^2 = 4.549$, $p = 0.033$), reflecting that the 87 out of 123 participants who were on ART provide enough evidence to conclude that there is an association between smoking and being on ART, at $p \leq 0.05$.

The data supported a relationship between being HIV-positive and taking ART ($F = 21.277$, $p = 0.001$). This reflects that the HIV-positive is a good predictor of being on ART, at $p \leq 0.05$.

The findings revealed an association between patient –related factors and barriers to adherence to TB treatment ($F = 9.019$, $p = 0.003$). This reflected that patient-related factors were a good predictor to adherence barrier to TB treatment at $p \leq 0.05$.

4.2.2.2 Psychological factors related to adherence to TB treatment

The data representing psychological factors were organized into treatment modality, understanding the meaning of TB, beliefs about TB, causes of TB and its transmission. Each of these factors was analysed using descriptive statistics.

Most participants preferred western treatment for any disease. Sixty seven percent (67.5%), (n=83) of the participants reported that they preferred western treatment, and 26% (n=32) reported that they liked better a combination of traditional and western treatment. In addition, 3.3% (n=4) preferred traditional treatment, 2.4% (n=3) favoured mixing western, traditional, and spiritual treatment. Lastly, only 0.8% (n= 1) reported to favour merely the spiritual modality. The preference of other treatment modalities by a minority of the participants may have negative effects on adherence to TB treatment.

Forty one percent (41.5%), n=51) of the participants reported that adherence meant taking tablets as instructed, 30.1% (n=37) taking tables every day, 25.2% (n=31) taking tables until recovery. Moreover, 3.3% (n=4) reported that adherence meant a combination of taking tables as instructed and until recovery.

A majority of the participants were informed about TB. Ninety-five percent (95.9%, n=118) of the participants believed that TB was curable, 2.4% (n=3) was both a killer and curable disease, lastly 1.6% (n=2) believed that TB was only a killer disease. The findings reflect that TB patients are likely to adhere to treatment because they are informed about the TB disease.

Table 4.3 Causes of TB (N=123)

Causes of TB	Frequency (f)	Percentage (%)
Witchcraft	2	1.6
Just occurs naturally	39	31.7
Micro-organisms	55	44.7
More than one above	10	8.1
Don't know	10	8.1
Low immunity	2	1.6
Related to HIV	2	1.6
Smoking	3	2.4
Total	123	100.0

Table 4.3 shows that forty-four percent (44.7%, n=55) of participants reported that TB was caused by a micro-organism, 31.7% (n=39) occurred naturally, 8.1% (n=10) did not know, and another 8.1% (n=10) reported that TB was caused by many factors including micro-organism, smoking, and natural factors. Two percent 2.4% (n=3) reported smoking as a cause for TB. In addition, 1.6% (n=2) reported that TB was caused by low immunity, 1.6% (n=2) related to HIV, another 1.6% (n=2) of participants reported that TB was related to witchcraft. This indicates that the participants need to be empowered on the causes and risk factors of TB.

The participants reported various modes for TB transmission. Eighty-two percent (82.1%, n=101) of participants reported that TB was transmitted through coughing only, and 15.4% (n=19) reported a combination of transmission modes which included coughing and exposure to tobacco smoke. An equivalent amount of 0.8% (n=1) reported that TB was transmitted through sharing linen, and exposure to tobacco smoke respectively. Only 0.8% (n=1) of the participants did not know what transmitted TB from one person to another. The participants need to be empowered on the modes of TB transmission to reduce the risk of TB-recurrence.

4.2.2.2.1 Associations between psychological variables related to adherence to TB

Associations found between the variables are presented in this section.

There was an association between beliefs on TB and adherence to TB treatment ($r=-0.280$, $p = 0.002$), reflecting that those who believed that TB was a killer were less likely to take their treatment every day.

The data supported a relationship between beliefs on TB and knowledge on transmission of TB ($r = 0.278$, $p = 0.002$). This means that those who believed that TB was a killer thought that TB was transmitted from one person to another through sharing of utensils.

There was a significant association between TB clients' psychological variables and adherence ($r = 0.100$, $p = 0.01$). With increasing psychological variables, there was an increase in adherence to TB treatment.

There was a significant association between age and treatment modality ($r = 0.196$, $p = 0.030$). This indicates that with increasing age, clients preferred spiritual treatment for any disease. Such preference may have a negative impact on adherence to TB treatment.

4.2.3 Variables that facilitate adherence to TB treatment among TB clients

Factors that enhanced adherence to TB treatment among participants were analysed using descriptive statistics.

Most of the participants did not receive illness grants while on TB treatment. Seventy six percent (76.4%, $n=94$) of the participants reported that they did not receive illness grants while on TB treatment, 23.6%, ($n=29$) received incentives for being on TB treatment. The absence of illness grants is likely to impede adherence to TB treatment.

Participants reported various forms of illness grants, including food rations or food vouchers and money. When participants were asked on the type of illness grants they

received, 19.5% (n=24) reported that they received food rations/food vouchers as grants, while 4.1%, (n=5) reported that they received both food rations and monetary illness grants. The illness grants may need to be expanded to include all TB patients.

The wish to have a longer life expectancy motivated most participants to take TB treatment. A majority (91.9%, n=113) of the participants reported that the desire to live longer motivated them to take the treatment, 3.3% (n=4) were motivated by support from families, 2.4% (n=3) wished to return to work, and another 2.4% (n=3) reported that they wanted to see their children finishing school. Living each day for various reasons motivated the participants to take treatment. It's a stand-alone question still under facilitators (what motivates you to take your TB treatment?)

Table 4.4 Treatment supporter (N=123)

Treatment supporter	Frequency (f)	Percent (%)
Had no treatment supporter	7	5.7
Had treatment supporter	116	94.3
Total	123	100.0

With reference to table 4.4, 94.3% (n=116) of the participants reported that they had a treatment supporter, and 5.7% (n=7) reported that they did not have a treatment supporter. Evidence (Gebreweld, Kifle, Gebremicheal, Simel, Gezae, Ghebreyesus, Mengstead & Wahd 2018:7) has revealed that the absence of a treatment supporter has adverse effects on adherence to TB.

Family members were found to be key treatment supports. Out of the 94.3% (n=116) of the participants who reported that they had a treatment supporter, 83.7% (n=103) reported that the treatment supporter was a family member, 2.4% (n=3) neighbours, 2.4% (n=3) adherence officer, and another 2.4% (n=3) reported a combination of family

members. One percent (1.6%, n=2) reported that the treatment supporter was a rural health motivator, and another 1.6% (n=2) a health care provider. The presence of a treatment support is vital to adherence to TB treatment.

Table 4.5 Participants' counselling and health education (N=123)

Variable		Frequency (f)	Percentage (%)	Variable		Frequency (f)	Percentage (%)
Counselling on Adherence	No	14	11.4	Health education on TB	No	18	14.6
	Yes	109	88.6		Yes	105	85.4
Total		123		100		123	100

With reference to table 4.5, 88.6% (n=109) of the participants reported that they received counselling on adherence prior to initiation to TB treatment, 11.4% (n=14) did not get any counselling on adherence. Lack of counselling before initiation to treatment may hinder adherence. On the other hand, a majority (85.4%, n=105) of the participants reported that they received health education on TB before initiation on treatment, 14.6% (n=18) did not receive any health education before initiation to TB treatment. Knowledge empowers participant which in turn facilitates adherence to TB treatment.

Various sources of counselling on adherence were reported by the participants. A majority (85.4%, n=105) of the participants reported that counselling on adherence was offered by the health care provider, 2.4% (n=3) by family members, lastly 0.8% (n=1) reported that counselling on adherence was provided by TB expert clients.

Health care providers play an active role in health education on TB. When participants were asked on who gave health education on TB, 83.7% (n=103) reported the health care provider, and 1.6% (n=2) reported that a client expert offered health education. Health education enlightens the participants, which may promote adherence to treatment.

Table 4.6 How health education helped participant (n =105)

How health education helped	Frequency (f)	Percentage (%)
Made me feel better that TB is curable	34	27.6
Helped me recognize the dangers of non- adherence to TB treatment	33	26.8
Helped me to teach others about TB	9	7.3
Empowered me with knowledge about TB and its treatment	25	20.3
Combination of responses	4	3.3
Total	105	85.4

With reference to table 4.6, most (26.8%, n=33) participants reported that health education helped them to recognize the dangers of non-adherence to TB treatment. The participants reported various benefits from receiving health education. These benefits may promote adherence to treatment.

4.2.3.1 Associations between facilitating factors

These are indicated in Table 4.7.

Table 4.7: Association between facilitating factors and adherence to TB treatment

Variables	R	P
Incentives and community support	-0.414	0.026
Community support and health education benefits	0.200	0.011
Health education on TB and adherence counselling	0.721	0.001
Person offering health education and counselling	0.948	0.001
Person offering counselling and those who receive health education	0.429	0.001

Table 4.7 reveals a relationship between incentives and community support ($r = -0.414$, $p = 0.026$). Those who received incentives were less likely to receive support from the

community. There was a relationship between community support and health education ($r = 0.200$, $p = 0.011$). Participants who received community support were motivated to take TB treatment through health education on TB, hence they were more likely to adhere to treatment.

Furthermore, the table also reveals an association between person offering health education on TB and counselling on adherence ($r=0.948$, $p=0.001$). Health care providers offered both counselling on adherence and health education on TB in an effort to promote adherence to treatment. The table also showed an association between health education on TB and counselling on adherence ($\chi^2= 63.893$, $p = 0.001$). The 105 out of 123 participants who received health education on TB provide enough evidence to conclude that there is an association between health education on TB and counselling on adherence at $p \leq 0.05$.

4.2.4 Barriers to adherence to TB treatment among TB clients

Variables on barriers to TB treatment adherence were analysed using descriptive statistics. Figure 4.3 reveals that a majority (36.6% , $n=45$) of the participants reported that they travelled about 5 km to the health care facility to receive TB treatment, 28.5%, ($n=35$) more than 10 km, 22.8% ($n=28$) about 6-8 km, and lastly 12.2%, ($n=15$) travelled about 9-10 km to the health care facility to receive treatment. The longer distance travelled by participants to the health care facility to receive treatment could be a barrier to adherence, since it has cost implications.

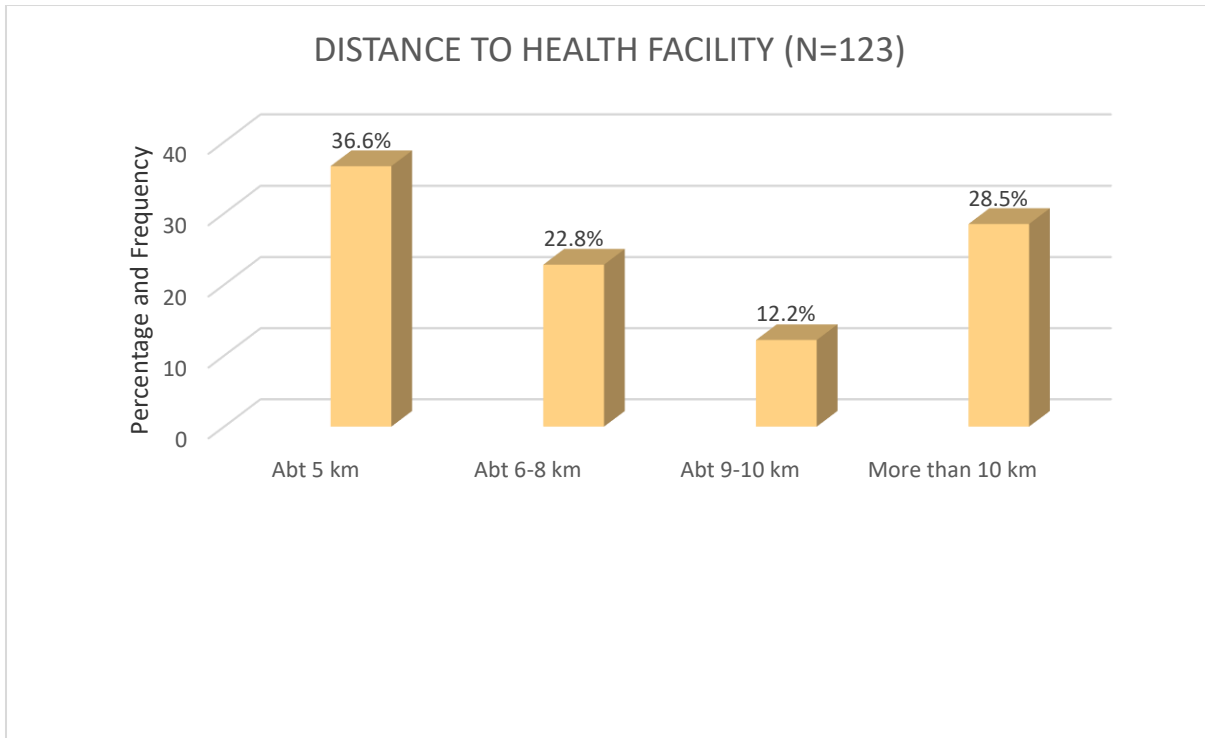


Figure 4.3 Participants distance to health care facility (N=123)

Figure 4.4 reveals that a majority (87%, n=107) of the participants reported that they honoured treatment refill appointment dates, and only 13% (n=16) did not honour dates. The minority that did not honour dates were at risk of developing MDR related to poor adherence.

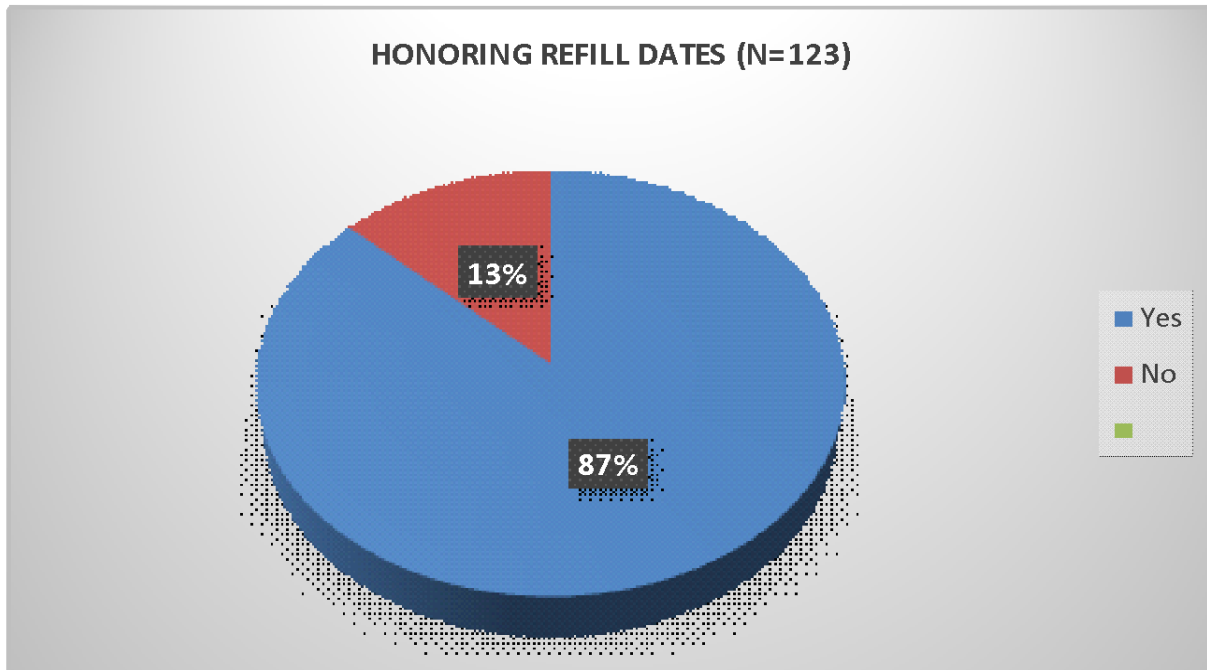


Figure 4.4 Honouring treatment refill appointment dates (N=123)

The participants reported various reasons for not honouring refill appointment dates. Out of 13.0% (n=16) of participants who reported that they did not honour the refill appointment dates, 5.7% (n=7) reported that they were usually sick, 2.4% (n=3) lacked money for transport, and 1.6% (n=2) reported that the unavailability of transport hindered them from honouring refill appointment dates. Furthermore, 3.3% (n=4) of the participants reported a combination factors including being usually sick, lack of money for transport, and unavailability of transport in their communities as barriers to honouring refill appointment dates. Regardless of the reason for not honouring the refill appointment date, these are indicative of poor adherence to treatment.

Most health facilities met their obligation, that is, provision of medication to TB clients. Ninety four percent (94.3%, n=116) of the participants reported that medication was always available, and only 4.9% (n=6) reported that medication was not always available at the health care facility. On the other hand, 0.8%, (n=1) reported that they were not sure if TB medication was always available in the TB clinic. The sporadic availability of TB medication predisposes the client to poor adherence, and consequently MDR.

Most participants took medication as required. Fifty five percent (55.3%, n=68) of the participants reported that they took their pills as advised in the health care facility, 36.6% (n=45) as written on the pill container, while a minority of 8.1%, (n=10) took tablets as both advised and written on the pill container. However, collecting data from verbal reports by participants is a subjective measure of adherence, an objective measure of adherence is ideal.

Figure 4.5 shows that most participants reported that they experienced side effects from the medication. Eighty percent (80.5%, n=99) participants reported that they experienced side effects, and 19.5% (n=24) reported that they experienced no side effects while on TB medication. This is in reference to figure 4.5. The experience of side effects is a possible barrier to adherence.

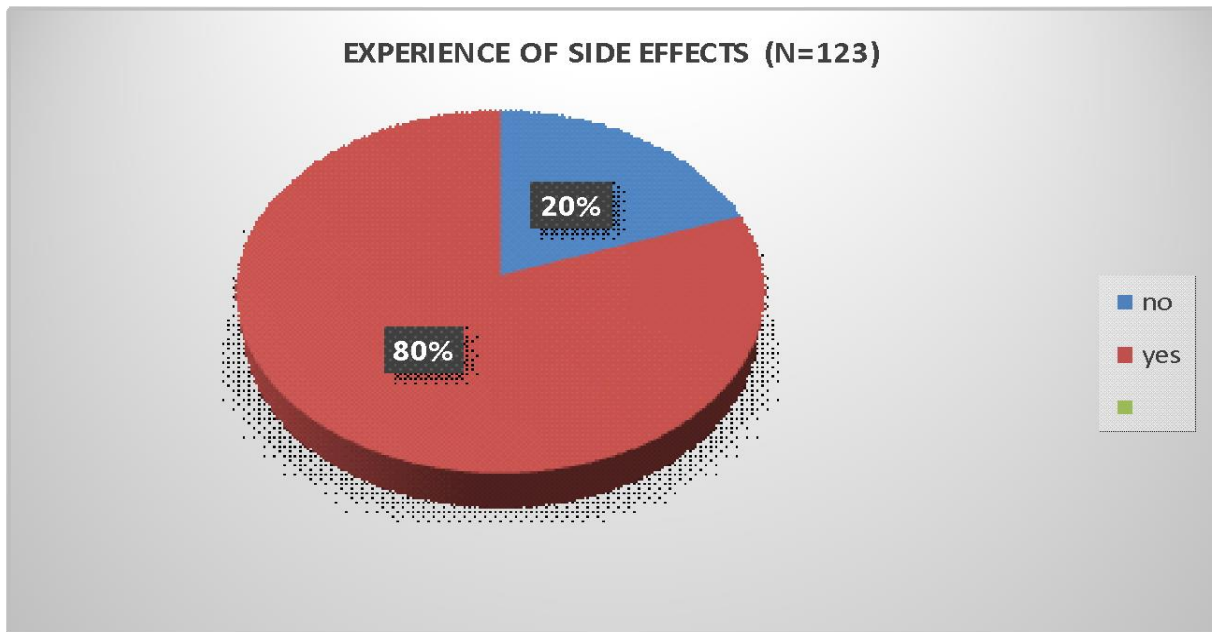


Figure 4.5 Participants' experience of side effects (N=123)

Table 4.8 Type of side effects experienced by the participants (n =99)

Type of side effect	Frequency (f)	Percentage (%)
Fever	2	1.6
Ringing ears	2	1.6
Nausea and Vomiting	11	8.9
Skin disorders	7	5.7
Fatigue	4	3.3
Tingling, burning or numbness of hands and feet	12	9.8
More than one response	61	49.6
Total	99	80.5

Table 4.8 reveals that the participants reported various side effects related to the medication. Forty-nine percent (49.6%, n=61) of participants experienced a combination of more than one side effects, which included tingling, burning or numbness of hands and feet, nausea and vomiting, 9.8% (n=12) reported tingling, burning or numbness of hands and feet only. Moreover, 8.9% (n=11) reported that nausea and vomiting were experienced, 5.7% (n=7) reported skin disorders, 3.3% (n=4) reported fatigue, and an equivalent amount of 1.6% (n=2) participants reported fever and ringing in their ears respectively. Despite of the type of effect, side effects are a threat to adherence to treatment.

Participants reported that they took varied steps after experiencing side effects from the medication. Out of 80.5% (n=99) participants who reported to experience side effects from TB medication, 52.4% (n=65) reported that they continued with the medication and 14.5% (n=18) notified the health care provider of the side effects. However, 8.9% (n=11) reported that they stopped taking the medication for a while and then resumed when side effects subsided. Lastly 4.0% (n=5) reported that they took more than one steps as they experience side effects, including continuing to take the medication, notifying the health

care provider and stopping to take the medication temporarily. Most participants reported social barriers to adherence. Sixty-two percent (61.8%, n=76) of participants reported that they had social barriers that disrupted adherence to TB treatment, while 38.2%, (n=47) reported that they did not have any social barriers to adherence.

Key barrier to adherence was lack of food. Twenty two percent (22.8%, n=28) of the participants reported and lack of food, 17.9% (n =22) lack of social support, and 11.4% (n = 14) reported more than one (1) social barrier, including, being sick continuously, lack of food and social support. In addition, 9.8%, (n=12) reported being sick continuously as a social barrier to adherence.

Table 4.9 Feeling better since started TB treatment (N=123)

Variable	Frequency (f)	Percent (%)
Not sure if treatment had any effect	9	7.3
Not feeling better since started treatment	14	11.4
Feeling better since started treatment	100	81.3
Total	123	100

With reference to table 4.9, a majority (81.3%, n=100) of the participants reported that since they started taking medication on TB they felt better, 11.4%, (n=14) did not feel any better, and 7.3%, (n=9) reported that they were not sure because the illness was intermittent. Improved wellbeing could promote adherence. However, not feeling better could be a deterrent to adherence.

Out of 18.7% (n=23) participants who reported that they did not feel any better since initiated on TB treatment; 11.4%, (n=14) reported that they had other comorbidities besides TB, and lacked food, and 7.3%, (n=9) reported that they frequently fell sick despite being on TB treatment. Suffering from comorbidities could be related to drug-drug interaction, making the client to be persistently sick and may hinder adherence.

Table 4.10 Forgetting taking medication (N=123)

Variable	Frequency (f)	Percent (%)
Not forgetting to take medication	75	61
Forgetting to take medication	48	39
Total	123	100

Table 4.10 reveals that a majority (61%, n=75) of participants reported that they did not forget taking their medication, while 39% (n=48) sometimes forgot to take medication. Forgetting to take medication is a risk for drug resistance resulting to MDR.

The participants revealed that they took different measures after forgetting to take medication. Out of the 39% (n=48) participants who reported that they sometimes forgot to take TB medication; 28.4% (n=35) took the medication immediately they remembered, 8.1%, (n= 10) waited for the next dose period, 1.6%, (n=2) stopped taking medication completely, and 0.8% (n=1) took a double dosage. The different strategies used by participants, are cause for concern because they were all risks for developing resistance to treatment.

Table 4.11 Participants consequences of forgetting to take medication (n=46)

Consequences of stopping TB medication	Frequency (f)	Percentage (%)
I will develop resistant to the treatment	4	3.3
I will acquire other diseases	6	4.9
I will not be cured of TB	36	29.3
Total	46	37.4

Noteworthy is that the participants were aware of the consequences of forgetting to take medication. With reference to table 4.11, out of 37.4% (n=46) participants who reported

to forgot to take medication on time, 29.3% (n=36) reported that they knew that forgetting to take medication would not cure TB, 4.9% (n=6) would acquire other diseases, while 3.3% (n=4) reported that by forgetting to take medication they would develop drug resistance. It seems there is need for health care providers to emphasize on strategies that serve as reminders for taking medication.

A majority of the participants took medication as prescribed. Out of 61% (n=75) participants who reported that they always remembered to take medication, 31.7% (n=39) reported that they set time as a reminder, 13.8% (n=17) had a natural feeling, and 12.2% (n=15) had a family member who reminded them to take medication. Likewise, 2.4% (n=3) reported that they had a combination of reminders, which included setting the time, family members and natural feelings, and lastly 0.8%, (n=1) reported that friends reminded them to take treatment. The various sources that serve as reminders could promote adherence to treatment.

With reference to Figure 4.6, a majority (83.7%, n=103) of the participants reported that they were also treated for other diseases besides TB, while 16.3% (n=20) were not on treatment for any other disease except TB. Being on treatment for comorbidities could be a barrier to adherence since the pill burden is increased.

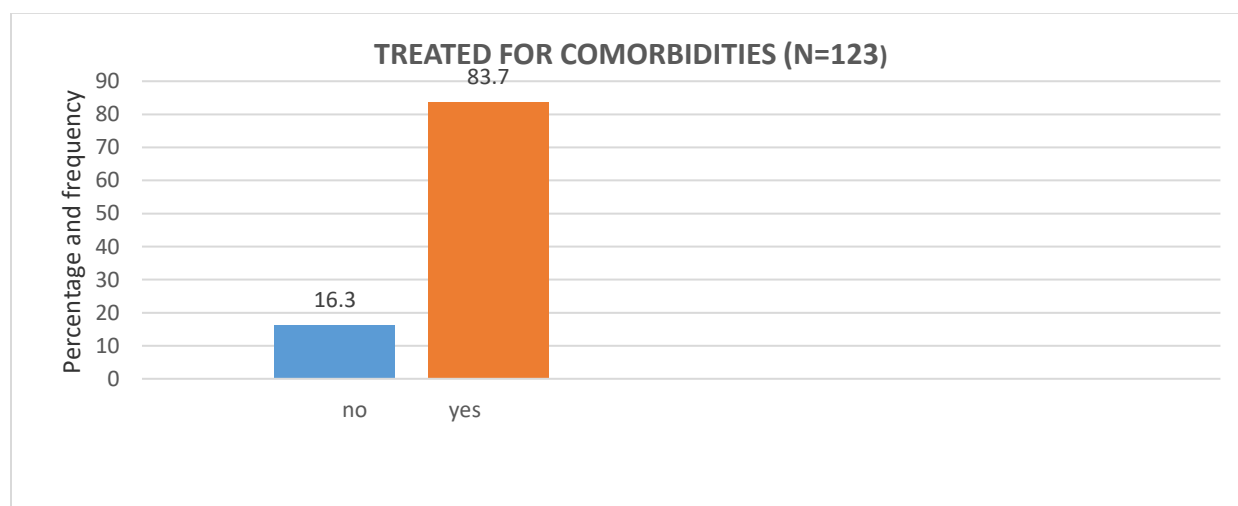


Figure 4.6 Treated for comorbidities (N=123)

Table 4.12 Type of disease treated for besides TB (N=123)

Type of Diseases	Frequency (f)	Percent (%)
No disease	20	16.3
Gastrointestinal Problem	1	0.8
Diabetes mellitus	4	3.3
Hypertension	5	4.1
HIV/AIDS	85	69.1
More than one (1)	8	6.5
Total	123	100.0

TB is an opportunistic infection. With reference to Table 4.12, sixty-nine percent (69.1%, n=85) of the participants reported that they were also on treatment for HIV and AIDS related disorders, and 6.5%, (n=8) were being treated for more than one condition including HIV, diabetes mellitus and hypertension. Moreover, 4.1%, (n=5) were also on antihypertensive therapy, 3.3%, (n=4) were taking hypoglycaemic medication, and 0.8%, (n=1) were on gastrointestinal disorders medication in addition to the TB treatment. Taking treatment for comorbidities in addition to that for TB could be a barrier to adherence. A one shop strategy is mandatory to increase adherence.

Table 4.13 Number of pills taken per day (N=123)

Number of pills per day	Frequency (f)	Percent (%)
More than 5 pills	94	76.4
5 pills	15	12.2
4 pills	6	4.9
3 pills	4	3.3
Less than 3 pills	4	3.3
Total	123	100.0

Most participants were taking more than three (3) tablets per day. This is revealed in Table 4.13. Seventy-six percent (76.4%, n=94) of participants reported that they took more than five (5) pills per day, 12.2% (n=15) took five (5) pills per day, 4.9% (n=6) consumed four (4) pills per day, 3.3% (n=4) reported that they took three (3) pills, and another 3.3% (n=4) took less than three (3) pills per day. Taking more than three (3) tablets per day could be a risk for poor adherence.

A majority of the participants took tablets as prescribed. Eighty three percent (83.7%, n=103) of participants reported that they were able, while only 16.3% (n=20) reported that they were not able to take the tablets as prescribed. The minority participants who were not able to take tablets as prescribed were at high risk for developing drug resistance.

The study sought from the participant's reasons for not taking the tablets as prescribed. Out of the 16.2% (n=20) participants who reported difficulty in taking their prescribed tablets, 7.3% (n=9) had more than one reason for not taking the tablets as prescribed, which included side effects, pill burden and long period of TB treatment. Moreover, 6.5% (n=8) reported pill burden only, and 2.4%, (n=3) were bothered by side effects only from medication as rationale for the inability to take tablets as prescribed. This subgroup may benefit from daily visits by expert clients, reducing the likelihood of developing drug resistance.

Table 4.14 Relationship between participant and health care provider (N=123)

Relationship	Frequency (N)	Percent (%)
Poor	3	2.4
Good	100	81.3
Excellent	20	16.3
Total	123	100.0

With reference to Table 4.14, a majority (81.53%, n=100) of the participants reported that they had good relationship with the health care providers, 16.3% (n=20) excellent

relationship, 2.4% (n=3) poor relationship with health care providers. The rapport between participants and the health care provider is likely to increase adherence to TB treatment.

There was one open-ended question which was asked from participants if there was anything to add on what they had already reported on barriers to adherence. A majority (84.5%, n=104) reported that there had no additional information to share and 15.4% (n =19) emphasized on a combination of barriers to adherence, such as lack of food, side effects and lack of money. There seems to be a need for policy to address poverty among TB patients who are on treatment.

Table 4.15 Association between perceived barriers and adherence

Variables	R	P
Taking pills as prescribed and feeling better	-0.447	0.001
Reason for not taking treatment as prescribed and feeling better	-0.627	0.003
Reason for not taking treatment as prescribed and cause of not feeling better	0.883	0.004
Relationship with care provider and side effects	-0.215	0.017
Relationship with care provider and adherence	0.191	0.035
Stop taking pills and other barriers	0.252	0.005
Feeling better since commenced treatment and honour appointment	0.325	0.001
Feeling better since commenced treatment and other illnesses	0.552	0.027
Not feeling better since commenced treatment and side effects	0.432	0.40
Stop treatment and honour refill appointment	-0.335	0.001
Consequences of stopping treatment and side effects	0.344	0.046
Reason for not taking treatment as prescribed and side effects	0.570	0.009

With reference to table 4.15, there was an association between taking pills as prescribed and feeling better ($r = -0.447$, $p = 0.001$), reflecting that participants who felt better were less likely to take treatment as prescribed. The data support a relationship between reason for not taking treatment as prescribed and feeling better ($r = -0.627$, $p = 0.003$).

This means that those who were not taking treatment as prescribed were less likely to feel better.

Furthermore, the table reveals that there was also a significant correlation between stopping to take pills and other barriers ($r= 252$, $p= 0.005$). This means that participants who stopped taking pills had other barriers to adherence. The data support a relationship between rapport with health care provider and adherence ($r=0.191$, $p=0.035$). Participants who had good rapport with the health care provider adhered to treatment. A majority of the participants took medication as prescribed.

4.2.4.1 Hypothesis testing

Null hypothesis: There is no association between determinants of adherence (patient-related factors, psychological factors, barriers and facilitators) and TB clients' adherence to treatment.

4.2.4.1.1 Patient-related factors and adherence to TB treatment:

The data did not support a relationship between patient-related factors and adherence to TB treatment ($r = -0.035$, $p = 0.701$). We therefore accept the null hypothesis.

Null hypothesis 2: There was no association between psychological factors and adherence to TB treatment.

4.2.4.1.2 Psychological factors and adherence to TB treatment:

The data did not support a relationship between psychological factors and adherence to TB treatment ($r = 0.079$, $p = 0.387$). We therefore accept the null hypothesis.

4.2.4.1.3 Barriers and adherence to TB treatment:

There is a relationship between barriers and adherence to TB treatment ($r = -0.416$, $p = 0.001$), reflecting that clients who encountered barriers did not adhere to TB treatment. We therefore reject the null hypothesis for the alternative hypothesis which states that there is a relationship between barriers and adherence to TB treatment $p \leq 0.05$. Health care providers therefore need to assess clients for potential barriers (e.g. side effects and comorbidities) to treatment adherence and attend to these instantly to reduce the risk of drug resistance.

4.2.4.1.4 Facilitators and adherence to TB treatment:

The data supported a relationship between facilitators and adherence to TB treatment ($r = 0.176$, $p = 0.050$). This indicated that facilitators of adherence enhanced TB clients' adherence to treatment. Health care providers will need to strengthen incentives, availability of treatment supporter, counselling on TB treatment and health education on the disease which were factors that facilitate client adherence to TB treatment.

4.3 SUMMARY OF RESULTS OBTAINED FROM PHASE 1 STEP 1: TB CLIENTS

Data analysis in this phase 1 step 1 described the results of data gathered from TB clients. The findings reflected that the age of the participants ranged between 18 and 64 years, with a mean of 37.2 years and a standard deviation of 10.5 years. Most participants were unemployed. A majority of the study participants were HIV positive and were on ART. Patient related factors (HIV status, smoking, alcohol, length of treatment) were to adherence. A majority of the participants were informed about TB, increasing the likelihood of adherence to treatment. However, the participants need to be empowered on the causes and modes of TB transmission to reduce the risk of TB-recurrence.

A large number of the participants did not receive any incentive while on TB treatment. The wish to live longer motivated most participants to take TB treatment as required.

Family members were found to be key treatment supporters. Health care providers played an active role in health education clients on TB. A minority of the participants did not honour treatment refill appointment dates and were at risk of developing MDR. Most health facilities met their obligation to provide medication to TB clients. A minority of the participants did not take medication as required increasing the risk of developing resistance. The reported key barrier to TB medication adherence was lack of food. Most participants reported that they experienced side effects from the medication and were taking more than three (3) tablets daily.

4.4 DATA MANAGEMENT, ANALYSIS AND PRESENTATION PHASE 1: STEP 2 TB EXPERTS

In Mbabane government hospital, 8 questionnaires were distributed to TB experts, but only 6 were returned, while 7 questionnaires were distributed to TB experts in Hlatikulu government hospital and only 6 were returned. This made a total of 12 TB experts who participated in the study.

In total 13 self-administered questionnaires (SAQ) were completed by the respondents, however, one (1) respondent did not return the questionnaire. The study remained with 12 completed SAQ which were entered into SPSS for analysis. The sample therefore comprised of $N = 12$ participants. During data entry there were no challenges (e.g. outliers, incomplete questionnaires) noted in the data. In presenting and analysing the data N depicts the whole sample and n reflects a subset of the whole sample. The study investigated determinants of adherence to TB treatment among TB clients. It also sought to come up with effective strategies that would enhance adherence to TB treatment among TB client in Eswatini.

4.4.1 Demographic variables of TB experts working in TB facilities in Eswatini

Table 4.16 Frequency distribution of the demographic variables of TB experts (N=12)

Variable	Frequency (f)	Mean (m)	Percentage (%)	Standard deviation (SD)
Age (years)		36.6		10.5
20 – 29	2		16.7	
30 – 39	4		33.3	
40 – 49	5		41.7	
50 – 59	1		8.3	
Gender				
Male	1		8.3	
Female	11		91.7	
Marital status				
Single	5		41.7	
Married	6		50.0	
Widowed	1		8.3	
Residential place				
Rural	4		33.3	
Urban	6		50.0	
Peri- urban	2		16.7	
Educational level				
Certificate	10		83.3	
Diploma	2		16.7	
Employment position				
Nurse	4		33.3	
Adherence Officer	8		66.7	
Religion				
Christians	12		100	

4.4.1.1 Associations between demographic variables of TB experts

There was an association between educational level and employment position ($r=-0.632$, $p=0.027$), indicating that respondents with lower educational level were less likely to be nurses.

4.4.2 TB expert's perspective on patient-related factors and adherence to TB treatment

With reference to Figure 4.7, Thirty-three percent (33.3%, n=4) of the respondents indicated that they had worked in the TB facility for 1-2 years, 33.3% (n=4) had worked 3-4 years and another 33.3% (n=4) reported that they had worked for 5 years and above in the TB facility. The study findings suggest that the TB experts had worked for more than a year in the TB clinics.

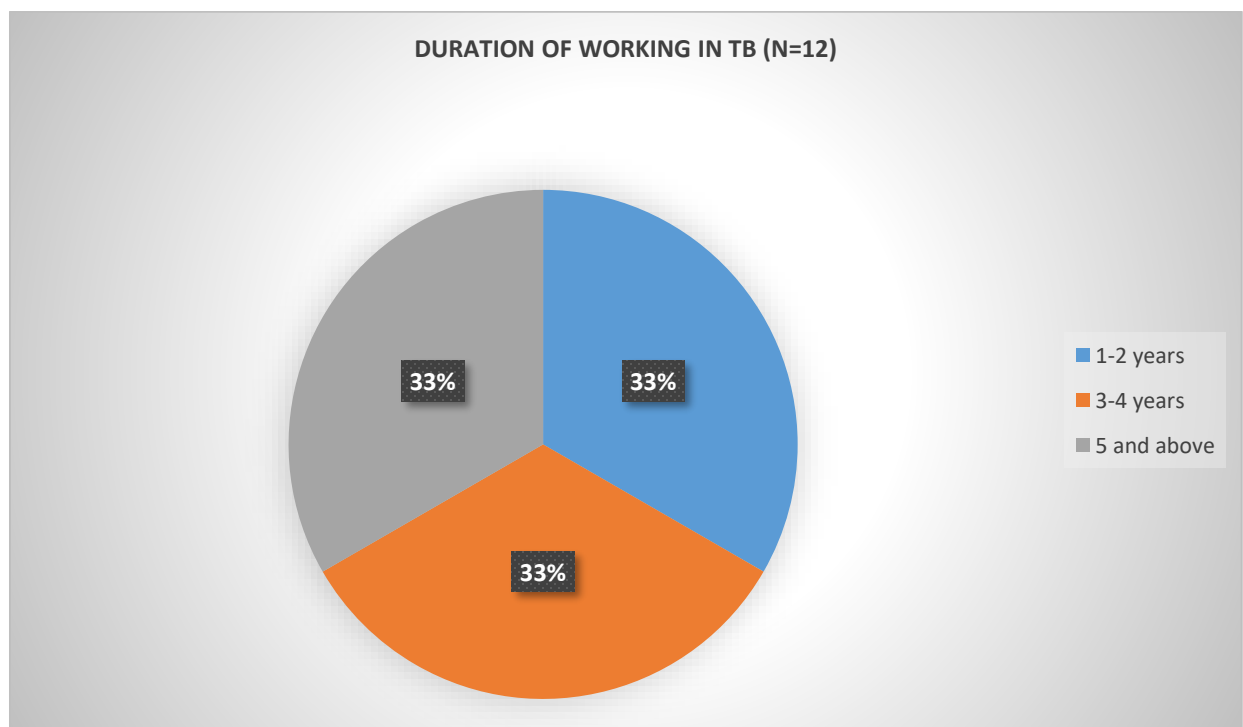


Figure 4.7 Duration of working in TB facility (N=12)

The participants were using TB standard treatment guidelines. All (100%, n=12) the respondents indicated that they were using a TB guideline in the facility. The use of TB standard treatment guidelines promotes consistency in the management of TB. Such a practice is likely to increase adherence to treatment.

The participants were using TB standard treatment guidelines from two (2) entities. Fifty-eight percent (58.3%, n=7) of respondents indicated that they used guidelines from the Eswatini Ministry of Health, while 41.7% (n=5) used guidelines from the World Health Organization (WHO). Notable, the use of guidelines from different bodies may bring inconsistencies in prescription of similar drugs.

The findings on availability of TB drugs in the facility were comparable with those of clients. Ninety four percent (94.3%, n=116) of the clients reported that TB drugs were always available at the facility. Likewise, ninety-one percent (91.7%, n=11) of TB experts indicated that TB drugs were always available, and 8.3% (n=1) reported that TB drugs were not always available at the health facility. The availability of TB drugs is a potential promoter of adherence to treatment.

Table 4.17 Procedures used when initiating clients on TB drugs (N=12)

Procedure	Frequency (f)	Percent (%)
Advise client on compliance to the therapy	1	8.3
Advise client on honouring treatment appointment dates	1	8.3
Refer client to adherence officer	2	16.7
More than one response	8	66.7
Total	12	100.0

With reference to Table 4.17, a majority (66.7%, n=8) of the participants indicated that they followed more than one procedure when initiation TB clients on TB treatment, including advising the clients to honour TB treatment refill appointment dates, referring clients to Adherence Officer and adherence to therapy. In addition, 16.7% (n=2) of the participants revealed that they referred clients to an Adherence Officer when they were initiated on TB treatment, 8.3% (n=1) advised clients on adherence to therapy only, and another 8.3% (n=1) advised clients to honouring TB treatment refill appointment dates. There seem to be a need for policy on initiation clients on TB treatment for consistency.

The different procedures reported in initiating clients may have a negative impact on adherence.

Assessment of client level of adherence to treatment is important because it may assist in early isolating treatment defaulters and need to re-assessment. All (100%, n=12) the participants indicated that they performed TB treatment adherence assessment on TB clients. The performance of client TB treatment adherence assessment may motivate clients to adhere.

Table 4.18 Types of TB treatment adherence assessment (N=12)

TB adherence assessment tools	Frequency (f)	Percent (%)
DOT	1	8.3
Pill count	3	25.0
Client self-reporting	0	0
Check daily treatment record	1	8.3
Trace clients who missed appointments	0	0
Combination of the above	7	58.3
Total	12	100

Table 4.18 indicates that 58.3% (n=7) of the participants revealed that they conducted more than one TB adherence assessment on TB clients which included pill count, self-reporting, daily treatment record and tracing clients who missed appointments. Moreover, 25% (n=3) of the participants used pill count only, 8.3 % (n=1) utilized DOT, and another (8.3%, n=1) reported that they used the daily treatment record as a tool for TB treatment assessment. The use of TB treatment adherence assessment on clients may promote client adherence to therapy.

The TB experts 'responses on client adherence were not consistent with those from the clients. Sixteen percent (16.3%, n=20) of clients reported that they were not able to adhere to TB treatment. In spite of that, all (100%, n=12) TB experts reported that TB

clients were performing well on adherence to TB treatment. There is need for physiologic measures for TB clients' adherence to treatment.

Consistent with responses from clients (97.4%, n = 120), most TB experts revealed that rapport contributed to adherence. With reference to Figure 4.8, a majority (58.3%, n=7) of participants indicated that rapport with clients contributed to adherence, 16.7% (n=2) reported incentives, and another 16.7% (n=2) reported that social support contributed to adherence. In addition, eight percent (8.3%, n=1) of the participants indicated that there were more than one factors that contributed to adherence including client-health care provider rapport and incentives.

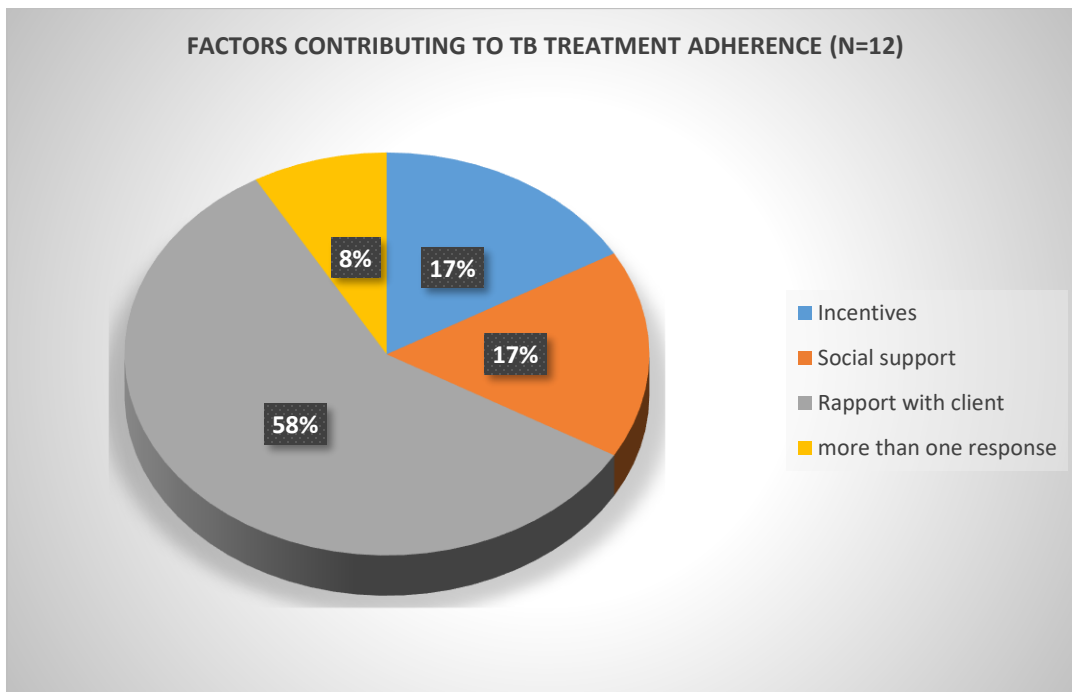


Figure 4.8 Factors contributing to TB treatment adherence (N=12)

4.4.2.1 Associations between patient-related factors and adherence to TB treatment

The data supported association between treatment adherence tool and procedure followed when initiating a client of TB treatment ($r = 0.703$, $p = 0.011$). This means that

those who used treatment adherence tools were more likely to follow a certain procedure when initiating the TB client on treatment, a practice which is likely to increase client adherence.

There was an association between adherence and duration of work ($r = -0.592$, $p = 0.043$), reflecting that clients cared for by TB experts who had worked for a longer duration in the facility were less likely to adhere to treatment. There is need for continuous workshops on adherence, even for TB experts that have worked for a longer period.

The relationship between adherence and causes of adherence was significant ($r = -0.614$, $p = 0.034$). This meant that clients who received incentives were less likely to adhere to treatment. Because of poverty, the incentives may motivate the client to be on treatment for an extended duration, making them to be entitled to incentives for a longer period.

4.4.2.2 Associations between structural variables

Data revealed that there was a relationship between factors contributing to adherence and duration of working in TB facility ($r = -0.592$, $p = 0.043$). This means that participants with less duration of working in TB facility were less likely know that incentives contributed to adherence. There could be need for on-going capacity building education particularly for new TB experts.

There was a relationship between procedure followed when initiating TB clients and type of adherence assessment ($r = 0.703$, $p = 0.011$), reflecting that participants were more likely to use DOT procedure when initiating a TB client on treatment.

4.4.3 Factors that facilitate adherence to TB treatment among TB clients in Eswatini

Incentives facilitate adherence to TB treatment. Most participants (66.7%, $n=8$) indicated that TB clients got incentives, while only 33.3% ($n=4$) reported that TB clients did not get

any incentives. There is a need for a policy for even distribution of incentives to TB clients who are on treatment.

On the other hand, out of the 66.7% (n=8) of the participants who indicated that TB clients received incentives, 33.3% (n=4) reported that the incentives received by TB clients were food rations or vouchers. Additionally, 25% (n=3) revealed a combination of money and food rations/voucher as incentives received by TB clients. Eight percent (8.3%, n=1) of the participants reported that TB clients received money only as an incentive. There are inconsistencies in the incentives received by clients, there is need for research to determine the impact on each of these incentives on adherence to TB treatment.

Most participants had reminders on treatment adherence. Eighty-three percent (83.3%, n=10) of the participants reported that they reminded TB clients to take TB medication, and 16.7% (n=2) did not remind TB client about taking medication. The minority that did not remind their clients to take TB treatment might contribute towards poor client adherence.

Table 4.19 Method used to remind TB clients to take medication (n=10)

Method	Frequency (f)	Percent (%)
Phone call	4	33.3
DOT officer visitation	1	8.3
Contact family member	2	16.7
More than one (1) response	3	25.0
Total	10	83.3

Table 4.19, reveals that a majority (33.3%, n=4) of the participants indicated that they used phone calls to remind TB client to take medications, 25% (n=3) used a combination of methods including phone call, DOT visitation and contacting a family member. Sixteen percent 16.7% (n=2) of the participants indicated that they contacted a family member to remind the TB clients to take medication, and 8.3% (n=1) used DOT visitation as a method

of reminding TB clients to take medication. The various methods used as reminders for TB clients could positively contribute towards TB client adherence.

4.4.3.1 Associations between variables that enhanced adherence

There was an association between receiving incentives and being reminded to take medication ($r = 0.632$, $p = 0.027$), indicating that TB clients who were reminded to take medications also received incentives. This practice may need to be encouraged to promote adherence.

4.4.4 Barriers to adherence to TB treatment among TB clients in Eswatini

Consistent with responses from clients, where a majority (87%, $n=107$) reported that they honoured the TB medication refill appointment dates, 66.7% ($n=8$) of TB experts revealed that TB clients honoured medication refill appointment dates. However, 33.3% ($n=4$) of TB experts reported that TB clients did not honour TB medication refill appointment dates. The client inability to honour TB medication refill appointment dates may be a precursor for poor adherence to treatment.

Monetary constraints were reported as barriers to client honouring TB medication refill dates. The thirty-three percent (33.3%, $n=4$) of the participants who reported that TB clients were not keeping the medication refill appointment dates indicated that transport costs contributed to client's failure to honouring medication refill appointment dates. The response from TB experts was contrary to that of clients. TB clients reported various reasons for not honouring refill appointment dates, including lack of transport money, unavailability of transport, usually sick and forgetfulness.

Consistent with responses from TB clients where 80.5% ($n = 99$) reported that they experienced side effects from the medication. All (100%, $n=12$) the TB experts indicated that TB clients reported side effects while on TB treatment. The experience of side effects is a possible deterrent for adherence.

Much like the TB clients, 100% (n=12) of the TB experts indicated that clients reported various side effect which included ringing ears, nausea and vomiting, poor appetite, skin disorders, fatigue and tingling, burning or numbness of hands and feet, abdominal disorders, and polyuria. The health care provider needs to be sensitive and address each of the side effects reported by clients in order to promote adherence.

Table 4.20 Steps taken for reported side effects (N=12)

Steps taken for reported side effects	Frequency (f)	Percent (%)
Advise to stop treatment	0	0.0
Report to TB clinic manager	2	16.7
Switch to another regimen	1	8.3
Give medication to treat side effects	6	50
More than one	3	25
Total	12	100

Only half of the TB experts addressed side-effects reported by TB patients. Table 4.20, reveals that 50% (n =6) of respondents indicated that they alleviated side effects reported by clients, 25% (n=3) reported a combination of steps they took which included switching TB clients to another regimen, alleviating side effects, and reporting TB client to Clinic Manager. Moreover, 16.7% (n=2) of participants indicated that they only referred TB clients with side effects to the Clinic Manager, and 8.3% (n=1) indicated that TB clients who reported side effects were only switched to another treatment regimen. The health care provider needs to consider asking the TB client for the presence of any side effect during each follow-up visit, and not wait for the client to report these side effects. Some clients may not be educated about some side effects; hence they may not report these to the health care provider. TB client failure to report side effects might lead to poor adherence.

Contrary to the responses from TB clients were only 85.4% (n=105) who reported that they received health education on TB, 100% (n=12) of the TB experts reported that TB clients were educated on the importance of adherence to TB treatment. Health education on TB empowers the client to make informed decision on adherence, which may in turn promote adherence.

Health education on TB yielded positive feedback from the clients. All 100% (n=12) the participants reported that following health education on TB, clients promised to adhere to treatment so as to reduce the risk of developing drug resistance. However, the verbal promise may require objective or physiological measure to determine that adherence is observed by the client.

Contrary to responses from TB clients where only 88.7% (n =109) reported that they experienced various social barriers to adherence, all (100%, n=12) TB experts reported that there were diverse social barriers which TB clients reported. Social barriers reported by TB experts included lack of incentives, co-morbidities, absconding without trace, and alcohol abuse. The social barriers encountered by clients could impede adherence to treatment.

4.4.4.1. Other barriers to adherence to TB treatment

In addition to social barriers, TB experts reported extra barriers which they observed. These included gender, educational level, monetary, distance to health care facility, treatment supporter, length of treatment, treatment supporter, food, knowledge and beliefs.

TB client's gender was reported as a barrier to treatment adherence. Fifty percent (50.0%, n=6) of the participants revealed that gender of TB clients did hinder TB treatment adherence, yet 50.0% (n=6) reported that gender did not hinder adherence to TB treatment. However, data from clients did not support an association between gender and adherence ($r = -0.010$, $p = 0.911$).

The client's educational level was reported to be barrier to adherence. Most (91.6%, n=11) TB experts reported that clients' educational level hindered adherence to TB treatment, whilst 8.3% (n=1) reported that educational level of TB clients did not hinder adherence to TB treatment. This finding was consistent with data from clients, which revealed an association between educational level and adherence ($r = 0.184$, $p = 0.042$). This means that males were more likely to adhere to TB treatment.

The higher the client costs associated with receiving treatment could be a barrier to adherence. All (100%, n=12) TB experts reported that transport costs hindered TB client adherence to TB treatment. However, clients were not assessed on cost implications on adherence.

The longer distance travelled by client to the health care facility to receive treatment could be a barrier to adherence. Seventy-five percent (75.0%, n=9) of the participants indicated that the distance to the healthcare facility hindered client adherence to TB treatment. However, twenty-five percent 25% (n=3) reported that the distance to the health care facility could not hinder TB client's adherence to TB treatment. Conversely, data did not support a relationship between adherence and distance ($r = -0.051$, $p = 0.576$).

All (100%, n=12) TB experts reported that lack of a treatment supporter was a barrier to client adherence to treatment. Consistent with scientific evidence, data supported an association between adherence and treatment supporter ($r = 0.275$, $p = 0.003$). This means that having a rural health motivator as a treatment supporter promoted client adherence to TB treatment.

The longer the length the client was on TB treatment the higher the risk of not adhering to treatment. This was evident when most (83.3%, n=10) of TB experts reported that client's length of time on TB treatment was a hindrance to adherence. However, 16.6% (n=2) reported that client's length of time on treatment was not be a hindrance to TB treatment adherence. This finding was consistent with data from clients which revealed that there was an association between duration of treatment and adherence. This means

that the longer the client was on TB treatment, the higher the risk of not adhering ($r=0.271$, $p = 0.002$).

Evidence (Gebreweld et al 2018:6) suggests that the experience of side effects from medication was a hindrance to adherence. Most (75.0%, $n=9$) TB experts reported that the occurrence of side effects impeded client adherence to TB treatment. Nevertheless, 25.0% ($n=3$) TB experts reported that side effects did not client hinder adherence to TB treatment. The data are consistent with findings from TB clients where data showed a relationship between side effects and poor adherence ($F = 57.625$, $p = 0.001$). This data supported that side effects were a good predictor of poor adherence to TB treatment at $p = 0.05$.

Lack food was a barrier to adherence. Moreover, some medication has to be taken with or immediately after meals. All (100%, $n=12$) TB experts reported that the unavailability of food hindered TB clients from adhering to treatment. Conversely, data from clients did not support a relationship between food and adherence ($r = -0.115$, $p = 0.323$).

Knowledge on the condition is a potential facilitator for adherence. Seventy-five percent (75.0%, $n=9$) of the TB experts revealed that knowledge deficit on TB was a barrier to client's treatment adherence. Nonetheless, 25.0% ($n=3$) of The TB experts reported that knowledge deficit on TB was not a barrier to TB treatment adherence. This finding was in harmony with findings from clients, which revealed an association between knowledge and adherence ($r = 0.650$, $p = 0.001$). This means that clients who were empowered on TB through health education were more likely to adhere to treatment.

Client's beliefs about the condition and its treatment are potential facilitators or barriers to adherence. Seventy-five percent (75.0%, $n=9$) of the TB experts reported that the client's belief system was a hindrance to TB treatment adherence. Yet, 25% ($n=3$) of TB experts revealed that the client's belief system was not an impediment to treatment adherence. However, data from clients did not support an association between beliefs and adherence ($r = -0.035$, $p = 0.698$).

There was one open-ended question in which the TB experts were asked if there was anything they wanted to add on what had already stated. Fifty percent (50%, n=6) of the TB experts revealed that food was a barrier to TB treatment adherence among the TB clients, and 50% (n=6) revealed that there was nothing to add. This finding has an implication on policy on food distribution to TB clients who are receiving treatment.

4.4.4.2 Associations between variables that are barriers to adherence

The data revealed an association between side effects and steps taken ($r = 0.777$, $p = 0.003$). This means that TB clients reported side effects were switched to another regimen by the health care provider. Switching the client to another regimen is a potential facilitator for adherence.

The data showed an association between side effects and length of treatment ($r = 0.761$, $p = 0.004$). This means that TB clients who were on treatment for a longer time developed side effects. The experience of side effects could deter clients from adhering to treatment.

4.4.4.3 Hypothesis testing:

Null hypothesis: There is no association between determinants of adherence (patient-related factors, facilitators and barriers) and TB clients' adherence to treatment.

4.4.4.3.1 Patient-related factors and adherence to TB treatment:

The data did not support a relationship between patient-related factors and adherence to TB treatment ($r=-0.319$, $p = 0.312$). The null hypothesis is thus accepted.

4.4.4.3.2 Facilitators and adherence to TB treatment:

The data did not support a relationship between facilitators and adherence to TB treatment ($r= -0.076$, $p = 0.814$). I therefore fail to reject the null hypothesis.

4.4.4.3.3 Barriers and adherence to TB treatment:

The data did not support a relationship between barriers and adherence to TB treatment ($r=-0.062$, $p = 0.848$). I therefore fail to reject the null hypothesis

4.5 SUMMARY OF THE RESULTS IN PHASE 1 STEP 2: TB EXPERTS

The findings suggested that a majority (41.7%, $n=5$) of respondents were ranging between 40-49 years old. About 66.7% ($n=8$) had indicated that the employment status they held was that of an adherence officer. All (91.7%, $n=11$) the respondents had indicated that TB drugs were always available in the health care facilities. Also, a majority (58.3%, $n=7$) indicated that they conducted more than one TB treatment adherence assessment to TB clients which included pill count, self-reporting, daily treatment record tracing missed clients.

4.6 SUMMARY

In this chapter, analysis, presentation and description of the research findings were presented. The study findings were presented and guided by the HBM conceptual framework. The chapter began with the presentation of research findings from TB clients and TB experts respectively. Data was analysed through SPSS for both TB clients and TB experts in the two government hospitals. Descriptive analysis was done for open ended questions. The next chapter will be the design of strategies.

CHAPTER 5

PRESENTATION OF THE STRATEGIES

5.1 INTRODUCTION

This chapter presents the strategies designed to enhance adherence of TB treatment among TB clients receiving treatment from two government hospitals in Eswatini. The strategies were designed based on the findings of the study.

5.2 THE PURPOSE OF THE STRATEGIES

The purpose of designing the strategies was to address some challenges that were highlighted by the participants in the study as determinants of adherence to TB treatment, as indicated in chapter 4.

5.3 THEORETICAL FRAMEWORK

In chapter 1 of the study, the Becker's Health Belief Model (HBM) 1974 by Tarkang and Zotor (2015) was introduced with the aim of having a framework to guide the study. The significance of this theory in designing of the strategies was acknowledged in this section.

Change of behaviour was the main focus of the theory. The theory described that change of behaviour was important in health studies to guide health promotion. This theory is used to explain behaviours that individuals use as disease prevention measures. This therefore, had assisted the study to effectively describe the determinants of adherence to TB treatment among TB clients. TB is a transmittable disease and is curable. Individuals need to adhere to its treatment to reduce its transmission and also to be cured. Therefore, the HBM theory was relevant for this study.

Based on the purpose of the study, and the need to develop strategies, the HBM theory was also used to assist the study in explaining why some TB clients took action to adhere to TB treatment while others did not.

The appropriateness of the theory for this study was founded on the premise that individuals' motivation to act depends on the perceived threat to their health and also to their belief that action will mitigate the threat. The theory further alludes that individuals have a course of action to avoid a condition. The idea of the theory was used to reduce disease condition to predict behaviours. The theory explains three broad propositions that are used to change behaviour, namely; modifying factors, benefits of taking preventive measures and individual perception.

Tarkang and Zotor (2015:3) explain that modifying factors are those factors that alter behaviour such as demographic, socio-psychological and structural variables, as illustrated in chapters 1, 2 and 4 of the study. The identification of barriers for taking the preventive measures was one of the strengths of this theory. The theory explains that individuals take action to protect their health only if they believe that they are susceptible to an ill health condition.

Adherence to treatment is one of the main elements of the theory. In order for individuals to adhere, the theory proposes six key concepts, namely; perceived susceptibility, severity, benefits, barriers, cue for action, and self-efficacy. These concepts provided the basis for designing strategies to enhance adherence to TB treatment among TB clients.

According to Joseph (2018:2) to reduce developing a health condition, an individual need to perceive the risk of developing a condition and engage in positive health behaviours. Contrary, individuals with low perceived risk may deny that they are at risk of contracting a particular disease (Onoruoiza et al 2015:14). By understanding the risk of the disease, the theory explains that individuals would adhere to their treatment. Tuberculosis is a life-threatening disease, and individuals suffering from it need to be enlightened about importance of changing behaviour. The theory further explains that individuals need to understand the seriousness of the disease before adhering to the treatment. This may set the stage for designing strategies about risk reduction.

The theory identifies obstacles to behaviour change. Tarkang and Zotor (2015:5) concur with the assertion of the theory by identifying cost, frequency and side effects as burdens to adherence to treatment. The suggestion of the burdens set the stage for contemplating about strategies for enhancing motivation to avert the threat. The theory assisted in clarifying certain actions that reduced barriers to TB treatment. When individuals realize that they have the capacity to deal with barriers, they take necessary action.

The theory identifies factors that act as enhancers to treatment adherence. These include remembering to take pills, incentives, having a treatment supporter, counselling and health education. Jones et al (2015:3) also concurs that remembering to take pills every day motivates individuals to complete the behaviour of interest despite considered barriers. The theory postulates that in order for the individual to adhere to treatment, motivation is a good factor in engaging in positive health activities.

5.4 METHODOLOGY FOR DESIGNING OF STRATEGIES

Strategies to enhance adherence were formulated in relation to the findings from the interviews as evidence from Chapter 4 Phase I. Findings were supported with literature and the results from TB experts. Clients revealed the following challenges of adherence to TB treatment that need to be enhanced:

5.4.1 Experiencing side effects while on TB treatment

Clients experienced side effects (80.5%, n=99) from the TB treatment. This can impede adherence. This finding is consistent with findings from TB experts (75.0%, n=9) that clients experienced side effects while taking treatment. Similar sentiment by Schnippel et al (2016:593) that clients on longer period of treatment are more likely to experience severe side effects such as nausea, vomiting and body itching which are challenges leading to non-adherence to treatment. The experience of side effects could result to clients defaulting treatment which is a deterrent to adherence. The interruption of treatment may lead to emerging of MDR or XDR condition which is difficult to treat. This

indicates that TB clients are more likely to develop drug resistance if side effects are not treated. Clients may not be educated about side effects; hence they may not report the side effects. This finding is consistent with Niilonga and Nghitanwa (2017:33) that clients who are not well informed about side effects of a treatment find it harder to tolerate side effects which leads to non-adherence. Health care providers to consider asking clients for the presence of side effects during each client's follow-up visit and not wait until the client reports.

Strategy 1: Education of clients on effects and side effects of each TB drug

Rationale: TB experts will educate clients on effects and side effects of each drug during treatment refill visits. Empowering clients with knowledge will promote adherence to TB treatment. When clients are educated about side effects, drug resistant will be minimised.

Strategy 2: Assessment of clients for side-effects during follow-up visits

Rationale: TB experts will assess clients for side effects and treat them during clients follow up visits. When side effects are treated, clients will adhere to TB treatment. TB experts will be sensitive to client's complaints which will enable the clients to trust the health care provider and thus make decisions on adherence.

5.4.2 Unemployment

A considerable proportion of TB clients were unemployed (43.1%, n=53). According to NTPM (2012:11) Eswatini has about 66% of the population living below poverty line. The increase demand brought by unemployment causes clients to spend a day without food. This has a negative impact in adherence to TB treatment. This finding is consistent with Niilonga and Nghitanwa (2017:33) that unemployment could result to treatment default.

On the other hand, clients could not afford the cost of travelling to the health care facility for refill of treatment as they did not have money. Data from all TB experts (100%, n=12) revealed that transport costs for travelling to the health care facility had implications on

TB client's adherence. However, clients were not assessed on cost implication. Furthermore, while the clients were unemployed, they also lacked food. This finding is supporting the study by Gabremariam et al (2010:4) that lack of food was a factor adversely affecting treatment adherence in patients with insufficient income. Conversely, data from TB experts did not support that having sufficient money for food can enhance adherence to treatment ($r=-0.115$, $p=0.323$). Issues on food policy and unemployment among TB clients to be strengthened to promote adherence to treatment.

Strategy 3: Review food policy and establishment of home backyard gardens for TB clients

Rationale: Government will review criterion for receiving food rations among clients with TB. This will assist clients who are unemployed and who do not get food parcels as incentives to put something on the table. Establishment of home backyard gardens will help TB clients to plough vegetables which they will eat to boost the immune system. The vegetables will also be sold in exchange for money and thus client will have sufficient income.

5.4.3 Lack of illness grants for clients on TB treatment

Clients lacked incentives (76.4%, $n=94$) while on TB treatment. A study by Zhou et al (2012:1) revealed that unavailability of incentives for treatment adherence are contributing factors for treatment default. When clients are no longer motivated to take treatment, they are more likely to default treatment. The criteria for receiving incentives in these TB clinics are clients with ordinary TB but malnourished, and those with MDR or XDR condition. Either monetary vouchers or food rations are used as incentives. Not getting incentives results to treatment default as there was no food. As clients are lacking food in their households, taking treatments on an empty stomach can result to intolerance of the treatments. Evidence from TB experts (100%, $n=12$) also supports that the unavailability of food in clients on TB treatment hindered adherence to treatment. Clients fear taking treatment on empty stomach and they opt to interrupt treatment rather than continuously

taking treatment without food. Moreover, treatments have to be taken with or immediately after foods. This has an implication on incentive policy.

Strategy 4: Strengthening of incentive policy for TB clients

Rationale: All TB clients will be entitled to incentives irrespective of body weight and other conditions. Issues of poverty and inconsistencies in the distribution of incentives received by TB clients will be addressed. Money as incentive will reimburse the expense of attending the treatment centre. It will also improve the attractiveness of visiting the health facility for check-ups. Availability of incentives to all clients on TB treatment will not only improve the client's health but will also enhance adherence to the treatment. Food rations or vouchers will act as a motivation to take treatment in order to adhere to the treatment regime as most pills are taken with or after meals.

5.4.4 Living with comorbidities besides TB

Clients had other ailments besides TB (83.7%, n=103). Being treated for comorbidities could increase pill burden. Clients can have difficulty in taking treatment as prescribed if the number of pills is many, thus may lead to poor adherence to treatment. According to ANTCP (2015:14) Eswatini has about 72% of TB patients who are co-infected with HIV/AIDS. TB patients not only suffer from TB clinical manifestation, but also the HIV/AIDS societal prejudice and embarrassing situations. Therefore, TB clients can be stigmatised by the co-infection which could affect the emotional aspect and thus fail to adhere to treatment. Suffering from comorbidities can also result to drug-drug interaction, which can make clients to be persistently sick. Health care workers need to attend to the client's ailments holistically. Counselling needs to be enhanced when initiating clients on TB treatment.

Strategy 5: A one stop centre for all TB clients who are treated for other illnesses to increase adherence to treatment.

Rationale: A one stop centre will assist in treating TB clients using a holistically approach (including HIV/AIDS and counselling) in one place and by the same health care providers. This will reduce the time spent by clients seeking health care.

5.4.5 Lack of health education about the TB disease and its transmission

Clients had inadequate information regarding TB disease and its transmission (55.3%, n=68) which risk adherence to TB treatment. This is consistent with findings from the TB experts (75.0%, n=9) that knowledge deficit on TB disease was a barrier to the client's treatment adherence. According to Tola et al (2016:3) clients require to have some minimal level of disease knowledge to influence adherence. Continuous health education promotes adherence to treatment. Study findings also revealed an association between knowledge and adherence ($r = 0.650$, $p = 0.001$) signifying that clients with knowledge about the TB are more likely to adhere to the treatment. Strengthening education among males residing in rural settings (53.7%, n=66) as revealed in chapter 4 table 4.2 need to be done. Evidence supports that the 77% of the populace in Eswatini reside in rural areas (WHO Country Cooperation Strategy Swaziland 2015:3).

On the other hand, findings from TB experts (50%, n=6) revealed that gender was a barrier to treatment adherence among TB clients. Although this finding was not specific to the type of gender referred to. In the study the mean age of clients was 37.2 years and majority (53.7%, n=66) were males. This finding is consistent with a study by Niilonga and Nghitanwa (2017:33) that non-adherence to treatment was higher among male patients ages 25-34 years. TB experts need to enhance health promotion to places frequently visited by males such as the shops, playing grounds, Tinkhundla or chiefdom centres.

Strategy 6: On-going in-service training on adherence for TB experts

Rationale: On-going in-service training on adherence will capacitate TB experts with knowledge about the causes, modes and transmission of TB disease. New TB experts will undergo in-service training regularly until they master.

Strategy 7: Enhance health promotion through on-going health education

Rationale: Clients will be targeted on places which are frequently visited to impart knowledge about TB and its transmission. This will help clients to adhere to TB treatment. Provision of information about tuberculosis will change the clients' behaviour thus adhere to the treatment. Health education delivered in different settings will enable clients and the community to understand the disease and support those infected. The main focus of the education will be males from the rural settings as the data revealed that the majority of males in rural setting had tuberculosis.

5.4.6 Mixing western and traditional medicine to cure ailments

Clients mixed western and traditional medicines when treating ailments (31.7%, n=39). This is in consistent with TB experts' (75%, n=9) findings that clients' beliefs about the condition and its treatment were potential barriers to adherence to TB treatment which could result to clients using any modality to treat the condition. According to (Sibandze 2009:1) Eswatini had more than 85% of the population using both western and traditional medicine in curing ailments before and after visiting health care facilities. This could affect the understanding of TB disease and result to non-adherence to treatment. When clients do not get well soon, they change the western treatment modality to traditional or spiritual. This could result to drug overdose, toxicity and drug-to-drug interaction which could be barriers to treatment adherence.

Strategy 8: Collaboration of traditional healers and spiritualists in the treatment of TB disease

Rationale: Involvement of traditional healers and spiritualists in treating TB will assist in the reduction of drug to drug interaction in clients on TB treatment. This will also help in empowering traditional healers and spiritualists with knowledge about TB and its treatment. Working in collaboration with traditional healers will call for a scientific research on the herbs that traditional healers use to treat tuberculosis.

5.4.7 Clients length of time on TB treatment

Clients were on treatment for a longer period with a mean of 2.4 months which could be a barrier to treatment adherence. This finding was consistent with that from TB experts (83.3%, n=10) that client's length of time on TB treatment was a hindrance to adherence. TB is a chronic disease that takes a longer period to be treated. As a result, clients stop taking their treatment along the course of treatment resulting to drug resistance. Most clients are no longer isolated in the health care facilities. Only those who are considered high risks are isolated such as critically ill, or those with a drug resistant condition.

Strategy 9: Isolation of all TB clients during the course of treatment

Rationale: Isolating all TB clients will help TB experts to closely monitor clients on TB treatment by strengthening the existing DOT strategy to enhance adherence to TB treatment.

5.4.8 Clients taking more tablets per day

Clients took more than 3 tablets per day (96.7, n=119) as treatment for TB and other ailments. This result to pill burden which could be a deterrent to adherence to treatment. According to NTCP (2012:49) a TB client is initiated to 1 tablet per day which is a standard treatment initial drug combination comprising of four drugs. However, TB clients are also having comorbidities such as diabetes, cancer, HIV, which increase the number of tablets

taken. This could cause risk for decrease adherence and pill burden. Gabremariam et al (210:651) revealed that there is an association between poor adherence and pill burden due to the extent of the treatment regimen and treatment of comorbidities.

Strategy 10: Reduce pill burden

Rationale: Clients will be initiated with lower a dosage of treatment to prevent pill burden and thus enhance adherence to TB treatment. The reduction of tablets taken per day will motivate the client to finish treatment and also assist in the reduction of adverse side effects.

5.5 SUMMARY

The chapter described the main purpose of designing strategies to enhance adherence to TB treatment amongst TB clients. The significance of the HBM theory in designing the strategies was acknowledged. Strategies were formulated in relation to findings from TB clients and supported by the literature and the results from TB experts. Challenges of adherence identified by TB clients include emerging of side effects, unemployment, lack of incentives, living with comorbidities, lack of health education about the disease and its transmission. In addition, mixing western and traditional medicine to cure ailments, length of time on treatment and taking more tablets per day were also reported as challenges.

Strategies were then designed based on the identified problems. These include education of clients on effects and side effects of drugs, assessment of clients for side effects, establishment of home backyard gardens, strengthening of food policy for TB clients, a mandatory one stop centres for TB clients, on-going in-service training on adherence for TB experts, and enhancement of health promotion. Collaboration of traditional healers and spiritualists in the treatment of TB, a mandatory isolation of all TB clients, and the reduction of pill burden were also strategies designed in this chapter.

The next chapter will discuss the conclusions, recommendations and limitations.

CHAPTER 6

CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

6.1 INTRODUCTION

The purpose of this chapter was to present the conclusions, recommendations and limitations for the future.

6.2 THE PURPOSE OF THE STUDY

The purpose of the study was to investigate the determinants of adherence to TB treatment in order to design strategies to enhance adherence to TB treatment among TB clients in Eswatini.

6.3 RESEARCH DESIGN AND METHODS

The researcher used a quantitative, exploratory and descriptive non-experimental design to investigate determinants to TB treatment. The study utilised this approach as the researcher viewed a TB client as integrated with the environment, which shaped the behaviour. This approach generated an account of the client's reality in adherence to the TB treatment and descriptive determinants of adherence were measured. The Health Belief Model (HBM) assisted in guiding the study research questions and explaining and supporting the findings of the study.

The exploratory design was used to investigate the full nature of the phenomenon. The descriptive design was used in identifying variables within the phenomenon and to develop operational and conceptual variables. Ethical considerations were met through seeking permission from UNISA, National Health Research & Ethics Council of Eswatini and Managers of the two government hospitals as well as from TB clients and experts who participated in the study.

The study was conducted in Mbabane and Hlatikulu Government Hospitals, following a pre-testing in one of the government hospitals which was not part of the main study. A systematic random sampling was used to select available TB clients. One hundred and

twenty-three clients participated in the study. Data was also collected from the 12 TB experts using purposive sampling for recruitment. Data from the TB experts helped in supporting the findings from the TB clients. Data were analysed using SPSS version 20.0. Data revealed the determinants to adherence to TB treatment among TB clients.

6.4 CONCLUSIONS FROM THE STUDY

This section gives the conclusion drawn from the 2 phases of the study; phase 1 and phase 2. Phase 1 of the study involved step 1 and step 2. Step 1 was the procedure for collecting data from 123 TB clients and step 2 involved data collection from 12 TB experts. Phase 2 of the study involved the design of the strategies to enhance adherence to TB treatment.

6.4.1 Conclusions phase 1 step 1

Conclusions were drawn from the findings of the interview conducted with TB clients who were attending TB services in the two government hospitals at the time of conducting the study. Step 1 of the study revealed the following determinants:

Modifying factors such as age, gender, residential area and unemployment negatively influenced adherence to TB treatment. This suggests that the middle age group of male TB clients who were unemployed and residing in rural areas were unlikely to adhere to TB treatment. However, there was an association between educational level and adherence ($r=0.184$, $p=0.042$) indicating that with the increased educational level, there was an increased in adherence to TB treatment.

Structural factors such as length of time on treatment influenced TB client's decisions on adherence to TB treatment. TB client had been on treatment for a mean period of 2.4 months with a standard deviation of 1.5 months. This means that the longer the clients were on treatment, the increased rate of not adhering to treatment. Conversely, in the current study, the data did not support an association between HIV status and adherence

to TB treatment ($F=.649$, $p=0.201$), reflecting that HIV status was not a predictor of adherence to TB treatment.

Data revealed an association between TB clients' psychological variables and adherence ($r=1.00$, $p=0.01$). However, psychological factors such as treatment modalities, lack of knowledge about TB disease, causes and transmission were deterrent to adherence to TB treatment. This revealed that clients still had misconceptions about TB disease and its treatment. Lack of information about the TB and its treatment could be a barrier to adherence to TB treatment.

Perceived benefits such as client's support from family members, motivation to take treatment and counselling were facilitators to adherence to TB treatment. However, lack of incentives and health education both enhanced the client's decision to not adhere to TB treatment.

Data revealed an association between perceived barriers and adherence to TB treatment ($r = -0.416$, $p= 0.001$). This reflects that clients who encountered side effects from the TB treatment, having comorbidities besides TB, lack of food, and pill burden did not to adhere to TB treatment. However, honouring refill appointment dates, presence of reminders, availability of treatment in health facilities, taking pills as prescribed, and good relationship with health care providers were revealed as strong enhancers to adherence to TB treatment.

The study, concludes that those factors can be deterrent of adherence to TB treatment call for policy makers and program implementers to design new strategies and/or strengthen the existing ones that can be used to overcome these barriers.

6.4.2 Conclusions phase 1 Step 2

Conclusions in step 2 of the study were drawn from responses of TB experts who were working in the two government hospitals TB centres at the time of the data collection. Data revealed that TB experts supported the findings in step 1. The findings showed that lack of incentives, costs, travelling distance to the health care facility, side effects, lack of knowledge about the disease, beliefs, and length of treatment influenced TB client's decision not adhere to TB treatment. However, TB experts revealed that a combination of adherence assessment tools, and variety methods of reminders promoted adherence to treatment amongst clients.

6.4.3 Conclusions Phase 2

Phase 2 of the study involved the design of strategies to enhance adherence to TB. Conclusions in this phase were drawn based on the strategies that were designed in this study. These strategies included an on-going education of clients on TB disease, assessment of clients on side effects, review of food policy and strengthening incentive policy. A one stop centres for TB clients, on-going in-service for TB experts, collaboration of traditional healers and spiritualists in TB treatment, isolation of TB clients and reduction of pill burden were all strategies formulated in this phase.

6.5 RECOMMENDATIONS

The study findings unveiled a number of gaps in the adherence to TB treatment amongst TB clients. Recommendations of this study would assist in improving TB control in Eswatini. The following recommendations were drawn from the findings in phase 1 step I of the study:

- To enhance outreach programs to reach those TB clients living in the rural settings. Data revealed that male clients living in rural areas were poorly performing in terms of adherence to TB treatment.

- To reinforce holistic health assessment programs of TB clients including a one stop centres in all TB centres. Data revealed that TB clients were also co-infected with HIV and other diseases.
- To strengthen issues of food policy for TB clients such as even distribution of food to impoverished families or mandatory incentives to all clients on TB treatment. Data had revealed that most clients did not receive incentives as a motivation to adhere to treatment.
- To strengthen the health promotion programs in rural areas to increase awareness about TB treatment and problems of non-adherence. Data revealed that client's education about the TB disease was insufficient and thus risking adherence to treatment.
- To strengthen continuing in-service education programs for TB experts to ensure placement of appropriately trained TB experts in the TB centres.
- To collaborate traditional healers and spiritualists in the treatment of TB. Data has revealed that clients mix both western and traditional medicine to cure ailments.

6.6 CONTRIBUTIONS OF THE STUDY

The study generated knowledge regarding determinants of adherence to TB treatment. The study therefore, has drawn focus towards the need to improve adherence to TB treatment.

The study findings will act as a point of reference for researchers who wish to conduct future studies on the same phenomenon. In this way transferability of findings may be reached.

The investigations of determinants have resulted in the design of strategies to enhance adherence to TB treatment. This will remain a permanent record of reference should there be a need to revise the determinants of adherence in hospitals studied.

6.7 LIMITATIONS

The study applied one theoretical framework (HBM) which accommodated the important variables likely to influence adherence to TB treatment among TB clients. The use of a multi-theory approach might have added richness to the study findings.

The probability method that was used did not afford the study participants opportunities to be selected into the sample, meaning that the sample was not representative of the study population.

The generalization of the findings was limited as the high proportion of extra pulmonary TB were not included. This suggested that the study population might not be the representative of the general TB in the two hospitals.

The sample size of this study was relatively small for the two hospitals with a high burden of TB as TB services were decentralized to all the peripheral clinics and other non-governmental organizations.

Considering that the data was captured in the hospital settings where only those clients who resided nearer to the hospitals or were referrals came for the check-ups. This selection was bias as most clients were ambulatory and potentially more adherent compared to those who were admitted at the hospital wards. Therefore, inclusion criteria limited information from the clients as those who were admitted were excluded from the study.

The study targeted only two regional hospitals in Eswatini because of their accessibility to the researcher. The other regional hospitals fell off the target because they were non-government hospitals and to get permission for the study would have delayed the study.

6.8 SUMMARY

The chapter summarizes the design and methods used in the study. The Health Belief Model was acknowledged as the theoretical framework guiding the research questions and supporting the findings of the study. Conclusion of the study in two phases was done. The study has unveiled a number of gaps in terms of adherence to TB treatment hence, recommendations were made. The study identified a number of limitations that were encountered in the study for current and future use.

6.9 CONCLUSION REMARKS

Behavioural change is a foundation to TB treatment adherence. Adherence could be enhanced if effective education on change of behaviour could be emphasized when the client is initiated to TB treatment. This requires TB experts to obtain in-depth knowledge about TB disease and appropriate actions taken if side effects are reported. It also requires that TB clients should know about advantages of adhering to TB treatment. Further, it requires that clients should receive motivation such as incentives to adhere to treatment. These ideas will become achievable in Eswatini if adherence to TB treatment would be a major focus in all health care facilities as most clients have other comorbidities besides tuberculosis. This could help reduce drug resistant conditions which are difficult to treat.

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ANNEXURES

ANNEXURE A

LETTER OF APPROVAL FROM UNISA TO CONDUCT THE STUDY



**RESEARCH ETHICS COMMITTEE: DEPARTMENT OF HEALTH STUDIES
REC-012714-039 (NHERC)**

15 February 2017

Dear MS PP Khumalo

Decision: Ethics Approval

HS HDC/629/2017

MS PP Khumalo

Student: 5855-258-8

Supervisor: Prof MC Matlakala

Qualification: D Litt et Phil

Joint Supervisor: -

Name: MS PP Khumalo

Proposal: Determinants of adherence to tuberculosis treatment amongst clients with tuberculosis in Swaziland.

Qualification: DPCHS04

Thank you for the application for research ethics approval from the Research Ethics Committee: Department of Health Studies, for the above mentioned research. Final approval is granted for the duration of the research period as indicated in your application.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the Research Ethics Committee: Department of Health Studies on 15 February 2017.

The proposed research may now commence with the proviso that:

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
- 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Research Ethics Review Committee, Department of Health Studies. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*



University of South Africa
Private Bag 11, Murrumbidgee, Bloemfontein, Free State
PO Box 592 UNISA, DUC 3 South Africa
Telephone: +27 12 429 3111 Fax: +27 12 429 4150
www.unisa.ac.za

ANNEXURE B

LETTER FOR SEEKING PERMISSION TO CONDUCT THE STUDY IN THE TWO HOSPITALS

University of South Africa
P. O. Box 392
UNISA

National Research and Ethics Council
Swaziland Ministry of Health
P. O. Box 5
Mbabane

Dear Sir/Madam

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY

I am a registered student currently pursuing a doctorate programme at the University of South Africa. My research is entitled “**Determinants of adherence to tuberculosis treatment among clients with tuberculosis in Swaziland**”, under the supervision of Professor MC Matlakala of the Department of Health Studies, UNISA.

The main purpose of this study is to investigate the determinants of adherence to TB treatment among TB clients in Swaziland. The study will lead to the development of TB adherence strategies. To complete this study, I need to conduct interviews with respondents. The study settings will be the Mbabane Government Hospital and Hlatikulu Government Hospital. The duration of the study data collection will be approximately 3-6 months and the time for each session will be 30-40 minutes per respondent. Ethical considerations will be ensured in all the procedures and with the respondents. Direct benefit of this study to hospital TB centres is that the research findings will be made available to these centres. Long term benefit of the study is that the research findings will be used to develop strategies to enhance adherence to TB treatment.

I hope this request will receive your favourable consideration.

Yours sincerely




Percis P. Khumalo (+268 76758841)

**ANNEXURE C
LETTER GRANTING PERMISSION TO CONDUCT THE STUDY IN ESWATINI**

Research Protocol clearance certificate



Type of review	Expedited	<input checked="" type="checkbox"/>	Full Board	<input type="checkbox"/>	<input type="checkbox"/>
Name of Organization	Percis Khumalo				
Title of study	Determinants of adherence of Tuberculosis treatment among clients with Tuberculosis in Swaziland				
Protocol version	1.0				
Nature of protocol	New	<input checked="" type="checkbox"/>	Amendment	<input type="checkbox"/>	<input type="checkbox"/>
List of study sites	Mbabane government and Hlathikhulu Hospital				
Name of Principal Investigator	N/A				
Names of Co- Investigators	N/A				
Names of steering committee members in the case of clinical trials	N/A				
Names of Data and Safety Committee members in the case of clinical trials	N/A				
Level of risk (Tick appropriate box)	Minimal		High		
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clearance status (Tick appropriate box)	Approved	<input checked="" type="checkbox"/>	Disapproved	<input type="checkbox"/>	<input type="checkbox"/>
Clearance validity period	Start date	27/02/2018	End	27/02/2019	
Signature of Chairperson					
Date of signing	27/02/2018				
Secretariat Contact Details	Name of contact officer	Ms Simangele Masilela			
	Email address	kaluamasi@gmail.com			
	Telephone no.	(00268) 24040865/24044905			



Approval Conditions

1	Implementation of approved version of protocol	✓				
2	Reporting of adverse events within 5 days of occurrence	✓				
3	Submission of progress reporting for multi-year studies	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
		N/A	N/A	N/A	N/A	N/A
4	Submission of end of project report (Hard copy)	✓				
5	Submission of end of project report (Soft copy)	✓				
6	Submission of data sets	✓				

List of reviewed documents

Ref.	Documents	Reviewed documents (tick appropriate box)
1	Completed application form	✓
2	Cover letter	✓
3	Evidence of administrative permission to conduct the research by involved institutions/sites (where applicable)	✓
4	Detailed current resume or curriculum vitae of Principal Investigator/s including Principal investigators declaration	✓
5	Summary resume or biography for other investigator(s)	✓
6	Evidence of approval/rejection by other Ethics Committees, including comments and requested alterations to the protocol, where appropriate.	
7	Research protocol (see outline in Annex 1)	✓
8	Questionnaires and interview guides (with back-translated versions where applicable)	✓
9	Case report forms (CRFs), abstraction forms and other data collection tools	✓
10	Participant/subjects Information Statement(s) (where applicable)	✓
11	Informed consent form(s) including photographic and electronic media consent statements.	
12	Advertisements relevant to the study (where applicable)	
13	Source of funding and detailed budget breakdown including material and incentives to participants if applicable	
14	Notification form for adverse effects/events.	
15	Proof of payment	✓
16	Proof of insurance cover for research subjects in clinical trials or where applicable	
17	Any other special requirements should be stated, if applicable	None

ANNEXURE D

LETTER GRANTING PERMISSION TO CONDUCT STUDY IN MBABANE G. HOSPITAL

Telegrams:
Telex:
Telephone: (+268
2411 8000)
Fax: (+268 2404 6471)



Mbabane Government
Hospital
P.O. BOX 8
MBABANE
SWAZILAND

THE KINGDOM OF SWAZILAND

17 APRIL 2018

MS Percis P. Khumalo
Principal Investigator
UNISA
Republic of South Africa

Dear Percis,

**RE: DETERMINANTS OF ADHERENCE TO TUBERCULOSIS TREATMENT AMONGST
CLIENTS WITH TUBERCULOSIS IN SWAZILAND**

This letter serves to inform you that management has granted you permission to undertake the above mentioned main study in the facility. You are expected to adhere to all the ethical considerations in the study.

We would very much appreciate if the findings and recommendations of the study can be communicated back to the facility (electronic and hard copy).

Wishing you all the best in your study.

Yours sincerely

Gmichanta

MATRON T. MKHONTA (Senior Matron)

FOR: HOSPITAL MANAGEMENT



ANNEXURE E

**LETTER GRANTING PERMISSION TO CONDUCT STUDY AT HLATIKULU G
HOSPITAL**

Telegrams:
Telex:
Telephone: (+268 22178000)
Fax: (+268 2276004)



HLATIKULU HOSPITAL
P.O. BOX 20
HLATIKULU
ESWATINI

THE KINGDOM OF ESWATINI

08 JUNE 2018

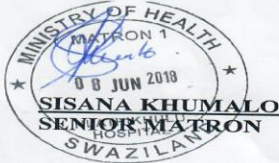
MISS PERCIS P. KHUMALO
UNISA
P.O. BOX 392
UNISA 003
SOUTH AGRICA

Dear Percis

**RE: PERMISSION TO CONDUCT A RESEARCH STUDY AT OUR
HOSPITAL**

This serves to inform you that I received your letter requesting to conduct the research at our hospital. You have been granted permission for your study.

Thanking you for choosing our facility to conduct this research and we hope that you will share the results with the Hospital Management, so as to help in the improvement of our service delivery at our institution.



ANNEXURE F
CONSENT FORM

Researcher: Ms Percis P. Khumalo

REQUEST FOR CONSENT TO PARTICIPATE IN THE STUDY

I am a student at the University of South Africa, conducting a study on, “**Determinants of adherence to tuberculosis treatment among patients with tuberculosis in Swaziland**” under the supervision of Professor MC Matlakala who is a Lecturer in the Department of Health Sciences at UNISA.

The purpose of the study is to identify and describe factors that may enhance adherence to your TB treatment, factors that may hinder your adherence to your therapy, as well as the relationship between factors that enhance and those that hinder your adherence to the TB treatment.

The study and all procedures related to the study have been reviewed and approved by the Research & Ethics Committee of the University of South Africa as well as the Research & Ethics Committee of the Ministry of Health in Swaziland. You are therefore, kindly requested to participate in the study. The study will require you to answer questions about yourself as well as the factors that influence your adherence to TB treatment. Participating in the study will take you less than an hour.

Participating in the study is voluntary. You are not coerced into participation in the study. You have a right to withdraw at any time, and your relationship with health care workers will not be compromised in any way.

A number will be given to you to use as a participation code, as opposed to your name. Your personal information will not be revealed at any point during the course of the study, even when the study has been concluded. All information pertaining to the study will be kept in a safe place known by only the researcher and her supervisor, who will have access to the information.

The direct benefit of participating in the study is the satisfaction you will get from providing responses that may be of assistance to others in future. Another benefit is that your opinions will be used to design strategies to improve adherence to TB treatment.

You are free to ask any questions pertaining to the study and participation. You can contact the researcher at this number, 76758841.

Declaration by Participant

I have read and understood the consent form, and I hereby grant my consent to participate in the study

Signature of Participant: _____ **Date:** _____

Declaration by Researcher: The participant has been given all the required information pertaining to the study and has understood the purpose of the study.

Signature of Researcher _____ **Date:** _____

ANNEXURE F SISWATI VERSION

LIFOMU LWEMVUMO

Umcwaningi: Ms Percis P. Khumalo

SICELO SEMVUMO YEKUNGENELA LUCWANINGO

Mine ngingumfundzi enyuvesi yaseSikhwahlande, ngenta lucwaningo “**ngetinkhomba tekunatsa imitsi yesifuba sengati ngekwetsembeka kubantfu labanesifo sesifuba sengati eSwatini**” ngaphansi kweliso la Professor MC Matlakala lofundzisa etikweni letemphilo enyuvesi eSikhwahlande.

Umgomo walolucwaningo kukhomba nekuchaza tintfo letingagcugcutela kunatsa kahle emaphilisi akho esifuba sengati, futsi sicwaninge tivimbeko ekunatseni imitsi yesifuba sengati, nekubuka budlelwano emkhatsini wetintfo letikhutsatako naletisivimbeko ekunatseni imitsi yesifuba sengati ngendlela.

Lolucwaningo netinchubo lwato luvunyiwe bantfu labafanele nelibandla lelicwaningako enyuvesi yaseSikhwahlande kanye nelibandla lakaNgwane lwelucwaningo etikweni Letemphilo. Ngaloko, uyacelwa kutsi ungenele lolucwaningo. Inchubo yalolucwaningo lutawufaka kutsi uphendvule imibuto lekuloluhla ngebungawe bakho kanye ngetimbangela tekunatsa imitsi yesifuba sengati ngendlela. Kungenela lolucwaningo kutawutsatsa sikhatsi lesingaba ngephansi weli awa.

Kungenela lolucwaningo kungekutinikela. Awukaphocelwa kutsi ungenele lolucwaningo. Unalo lilungelo lekuhocisa noma kunini futsi budlelwano bakho netisebenti tetemphilo angeke kukhinyabeteke.

Lolucwaningo lutawuniketwa inombolo hhayi libito lakho. Bunguwe bakho angeke buvetwe lucwaningo lusachubeka noma seluvelwa ngaphandle. Lonkhe lwati lutawugcogcwa ngumcwaningi, lugcinwe endzaweni lephephile futsi kute umuntfu luvumelekile kwati ngaphandle kwemcwaningi nemphatsi wakhe kulolucwaningo.

Inzuzo lecondzile yekungenela lolucwaningo kutsi unetiseke ngetimphenvulo letingaba lusito ngenhlomunye kulabanye. Lenye inzuzo kutsi umbono wakho utawusebentiswa ekwakheni tindlela letincono kute kutfutfukiswe kunatsa kahle imitsi yesifuba sengati.

Ukhululekile kubuta noma ngiyiphi imibuto ngalolucwaningo noma ngalokungenela futsi ungatsintsa umcwaningi kunansi inombolo yelucingo 76758841 uma unemibuto.

Kufunga kwalongenele: Ngifundzile ngalemvumo futsi ngiyatinikela kungenela kulolucwaningo

Sishicilelo Salongenele: -----**Lusuku:** -----

Sishicileleo semcwaningi -----**Lusuku:** -----

ANNEXURE G

CONFIDENTIALITY BINDING FORM

The purpose of this agreement is to help you understand your duty regarding the access, use, disclosure, storage and disposal of confidential information.

Confidentiality Agreement:

As a participant of this study, I (Name) -----
understand and agree that I may have the opportunity to participate in this study of determinants of adherence to TB treatment. In consideration of being selected to participate in this study, I understand and agree as follows:

1. That the purpose of this study was clearly explained to me “to investigate determinants of adherence to TB treatment in order to design strategies for adherence”
2. That my participation in this study is entirely voluntary and I am free to withdraw from the study anytime I wish. My discontinuation in this study will not jeopardize my health care in this facility.
3. That my right to use confidential information is allowed and the researcher will assure me that all information elicited from my participation will remain confidential. Information will not be made available to any other person outside the scope of the study. The researcher will assure me that she will be the only one collecting data and collected data will be put in a secured place.
4. That the study is non-experimental and there are no immediate benefits of taking part in this study. Potential benefits of participating in this study will be the satisfaction that the information given will help others with similar condition. Minimal risk such as fatigue from answering questions may be anticipated in my participation in this study. The whole interview process will be explained before signing a consent form.
5. That there will be no payment or incentives for my participation in this study.
6. That the researcher will show me letters of permission from UNISA and Swaziland Ministry of Health National Research and Ethics Council to conduct the study.
7. That the researcher will assure me that findings of the study may be used in nursing publications or presentation and confidentiality will still be maintained. My name will not appear in all the publications of this study.

I agree to be bound by this confidentiality agreement as a condition of participation in this research. I have read this Confidentiality Binding and agree to its terms.

-----Name
of Participant

Signature Date

ANNEXURE G: SISWATI VERSION

LIFOMU SESIVUMELWANO SEMFIHLO

Inhloso yalesivumelwano kusita kutsi ucondze tintfo lekufanele utente letihambisana nekufinyelela, kusebentisa, kuveta imfihlo, nekugcinwa kwemfihlo yalolucwaningo.

Njengalomunye loyincenye yelucwaningo, mine (libito) -----
----- ngiyacondza futsi ngiyavuma kutsi ngingaba nenhlanhla yekungenela lolucwaningo lolumayelana netinkhomba tekunatsa ngendlela imitsi yesifo sesifuba sengati, ngendlela lengifundziswe ngayo emtfolampilo, ngiyacondza futsi ngiyavuma ngalokulandzelako:

1. Kutsi inhloso yalolucwaningo ngachazeleka kahle kutsi kucubungula tinkhomba letihambelana nekunatsa ngendlela imitsi yesifo sesifuba sengati kute kwakheke indlela lencono yekutfufukiswa kunatfwa kwemaphilisi esifo sesifuba sengati.
2. Kutsi kubayincenye yalolucwaningo kube ngekutinikela, futsi ngingelilungelo lekuyekela kuchubeka nalolucwaningo uma ngifuna. Kuyekela kwami angeke kubeke engcopheni kwelashwa kwami kulomtfolampilo.
3. Kutsi lilungelo lami lekusebentisa timfihlo kulolucwaningo luvumelekile futsi nemcwaningi ungitsembisile kutsi konkhe kutoba yimfihlo. Lwati ngalolucwaningo angeke luniketwe lomunye umuntfu longekho kulolucwaningo. Umcwaningi utangitsembisa kutsi kutobe kunguye kuphela lotawugcogca lwati bese uyalugcina endzaweni lephephile.
4. Kutsi lolucwaningo lulingiselwe, futsi kute inzuzo lemasinyane ngekungenela lona. Lokungaba yinzuzo yekubandzanyeka kulolucwaningo kungaba kunetiseka kutsi lolwati lengitolunika litosita labanye labanesifuba sengati ngomhlomunye. Ingoti lencane njengekudzinwa ekuphendvuleni imibuto ingaba khona. Konkhe lokutawubutwa kutochazwa ngaphambi kwekushicilela sivumelwano.
5. Kutsi kute inzuzo noma imbadalo yekungenela kulolucwaningo. Kutsi umcwaningi utongikhombisa tincwadzi temvume yekwenta lolucwaningo letibuya esikolweni sakhe (UNISA) nakaHulumende weSwatini etiko Letemphilo.
6. Kutsi umcwaningi utangetsembisa kutsi lakutfolile kulolucwaningi kungasebentiswa ekukhipheni lwati kuletinye tingoni tetemphilo futsi nemfihlo itochubeka igcinwe. Libito lami angeke luvetwe kulolucwaningo.

Ngiyavuma kutibophelela kulesivumelwano semfihlo sekubayincenye yalolucwaningo
Ngifundzile ngekutibophelela kulemfihlo futsi ngiyavuma kulemicabo yayo.

Libito Lalongenele: -----

Sishicilelo: ----- Lusuku: -----

Fakazi: -----

ANNEXURE H

QUESTIONNAIRE FOR TB CLIENTS

Questions in this questionnaire have been structured according to the purpose, objectives as well as predetermined responses (hypothesis). The researcher will tick the answers in the relevant boxes.

Participant's code number: _____

1.0 DEMOGRAPHIC DETAILS

1.1 Age: -----years

1.2 Gender:

1. Male ()
2. Female ()

1.3 Marital Status:

1. Single ()
2. Married ()
3. Divorced ()
4. Separated ()
5. Widowed ()
6. Cohabiting ()

1.4 Residential place:

1. Rural ()
2. Urban ()
3. Peri-urban ()

1.5 Educational Level:

1. Never attended school ()
2. Primary level ()
3. Secondary level ()
4. High school level ()
5. Tertiary level ()

1.6 Employment status:

1. Unemployed ()
2. Employed ()
3. Self-employed ()

1.7 Religion:

1. None ()
2. Ancestral ()
3. Satanism ()
4. Christianity ()

5. Islam ()
6. Judaism ()

2.0 STRUCTURAL FACTORS TO ADHERENCE

2.1 How long have you been receiving TB treatment?

1. 3 - 4 months ()
2. 5 - 6 months ()
3. 7 - 8 months ()
4. Above 9 months but on treatment course ()
5. Finished treatment, but re-initiated ()
6. Defaulted treatment, and re-initiated ()

2.2 What is your current HIV status? If negative, skip to question 2.4

1. Unknown ()
2. Negative ()
3. Positive ()

2.3 If positive, are you on ART?

1. No ()
2. Yes ()

2.4 Are you smoking?

1. No ()
2. Yes ()

2.5 Are you drinking alcohol?

1. No ()
2. Yes ()

2.6 Do you have a family member with TB? If no, skip to question 3.1

1. No ()
2. Yes ()

2.7 If yes, how are you related to that family member?

1. Parent ()
2. Sibling ()
3. Aunt/uncle ()
4. Spouse ()
5. Friend ()
6. Grandparent ()
7. Adopted family member ()
8. More than 1 response ()

3.0 PSYCHOLOGICAL FACTORS

3.1 Which treatment modality do you use in the treatment of any disease(s)?

1. Spiritual ()
2. Traditional ()
3. Western ()
4. Mixing both traditional and western ()
5. More than one response ()

3.2 What do you think adherence to treatment mean to you?

1. Taking the tablets every day ()
2. Taking the tablets until death ()
3. Taking the tablets as instructed ()
4. Taking the tablets until you recover ()
5. More than one response ()

3.3 According to you, what causes TB?

1. Curse ()
2. Bewitchment ()
3. Just occurs naturally ()
4. Microorganism ()
5. More than one response ()
6. Don't know ()
7. Low immunity ()
8. Related to HIV ()
9. Smoking ()

3.4 According to you, how is TB transmitted from one person to another?

1. Sharing utensils ()
2. Sharing linen ()
3. Exposure to tobacco smoke ()
4. Coughing ()
5. More than one response ()
6. Don't know ()

4.0 FACILITATORS OF ADHERENCE TO TB TREATMENT

4.1 Do you receive any incentive for taking TB treatment?

1. No ()
2. Yes ()

4.2 If yes, what kind of incentive do you receive? If no, skip to question 4.3

1. Cell phone ()
2. Food rations/food vouchers ()
3. Money ()
4. More than one response ()

4.3 Do you get any form of support from your community as you take your TB treatment?

1. No ()
2. Yes ()

4.4 If yes, who is your treatment supporter? If no, skip to question 4.5

1. Rural health motivator ()
2. Community volunteer ()
3. Health care provider ()
4. Neighbours ()
5. Family member ()
6. Adherence officer ()
7. More than one response ()

4.5 What motivates you to take your TB treatment?

1. Wish to return to work ()
2. Wish to see my children finishing school ()
3. Wish to live longer ()
4. To have family support ()

4.6 Did you receive any adherence counselling prior to being initiated on TB treatment?

1. No ()
2. Yes ()

4.7 If yes, who offered you the counselling on adherence? If no, skip to question 4.11

1. Family member ()
2. Expert client ()
3. Health care provider ()

4.8 Do you receive health education on TB at your health facility?

1. No ()
2. Yes ()

4.9 If yes, who offers the health education to you? If no skip to question 5.1

1. Client expert ()
2. Health care provider ()

4.10 If you receive the health education or counselling, how does it assist you?

1. Makes me feel better that TB is curable ()
2. Helps me recognize the dangers of non-adhering to TB treatment ()
3. Helps me to teach others about TB ()
4. Empowers me with knowledge about TB and its treatment ()
5. More than one response ()

5.0 FACTORS YOU PERCEIVE TO BE BARRIERS TO ADHERING TO YOUR TB TREATMENT

5.1 How far are you from your health facility?

1. About 5 km ()
2. About 6 to 8 km ()
3. About 9 to 10 km ()
4. More than 10 km ()

5.2 Are you able to honour your treatment refill appointment dates? If yes, skip to question 5.4

1. No ()
2. Yes ()

5.3 If no to 5.2, what could be the cause? Responses may be more than one.

1. Lack of transport money ()
2. Unavailability of transport ()
3. I am usually sick ()
4. I usually forget ()
5. More than one responses ()

5.4 Is your TB treatment always available at your health facility? If yes, skip to question 5.6

1. Not sure ()
2. No ()
3. Yes ()

5.5 If no, which steps do you usually take?

1. Buy from pharmacy ()
2. Ask from other clients ()
3. Wait until its available ()

5.6 How do you take your pills?

1. Anyhow ()
2. As written on the pill containers ()
3. As advised in the health care facility ()
4. More than one response ()

5.7 Do you experience any side effects as you take your pills? If no, skip to question 5.10

1. No ()
2. Yes ()

5.8 If yes, what are those side effects?

1. Fever ()
2. Ringing ears ()
3. Nausea and vomiting ()
4. Poor appetite ()
5. Sleepless nights ()

- 6. Skin disorders ()
- 7. Polyuria ()
- 8. Abdominal discomfort ()
- 9. Fatigue ()
- 10. Discoloured urine ()
- 11. Tingling, burning or numbness of hands and feet ()
- 12. More than one response ()

5.9 If there are side effects, what steps do you take?

- 1. I continue taking the pills ()
- 2. I stop taking the pills for a while and then resume ()
- 3. I report the side effects to the health care facility ()
- 4. More than one response ()
- 5. Don't know ()

5.10 Is there any other barrier which disrupts your adherence to treatment? If no, skip to question 5.12

- 1. No ()
- 2. Yes ()

5.11 If yes, what could be those barriers?

- 1. Lack of food ()
- 2. Sick continuously ()
- 3. Living alone ()
- 4. Lack of social support ()
- 5. More than one response ()

5.12 Are you feeling any better since you started your TB treatment? If yes, skip to question 5.14

- 1. Not sure ()
- 2. No ()
- 3. Yes ()

5.13 If no, what do you think could be the cause?

- 1. Having other illness besides TB ()
- 2. Pills make me feel worse ()
- 3. Lack of social support ()
- 4. Fall sick again ()
- 5. Lack of food ()
- 6. More than one response ()

5.14 Do you usually forget taking your pills? If no, skip to question 5.17

- 1. No ()
- 2. Yes ()

5.15 If yes, which step do you take after realizing?

- 1. Take double dose next time ()
- 2. Take medication immediately as I remember ()
- 3. Inform the treatment support immediately ()

- 4. Wait for the next dose to take pills ()
- 5. More than one response ()
- 6. I stop treatment ()

5.16 If no to 5.14, what reminds you to take your pills?

- 1. I just feel it that I have to take the pills ()
- 2. A friend ()
- 3. A family member ()
- 4. I set the time ()
- 5. More than one response ()

5.17 If yes to 5.14, what do you think are the consequences of forgetting the treatment?

- 1. I will develop resistant to the treatment ()
- 2. I will acquire other diseases ()
- 3. I will not be cured of TB ()
- 4. More than one response ()
- 5. Don't know ()

5.18 Are you treated for any other disease, other than the TB? If no, skip to question 5.21

- 1. No ()
- 2. Yes ()

5.19 If yes, for what?

- 1. Cancer ()
- 2. Gastrointestinal problem ()
- 3. Diabetes mellitus ()
- 4. Hypertension ()
- 5. HIV/AIDS ()
- 6. More than one response ()

5.20 How many pills are you taking per day?

- 1. More than 5 pills ()
- 2. 5 pills ()
- 3. 4 pills ()
- 4. 3 pills ()
- 5. Less than 3 pills ()

5.21 Are you able to take them as prescribed? If yes, skip to question 5.23.

- 1. Yes ()
- 2. No ()

5.22 If no, what could be the reason?

- 1. Long period ()
- 2. Pill burden ()
- 3. Side effects ()
- 4. More than one response ()

5.23 How is your relationship with the health care providers?

- 1. Poor ()
- 2. Good ()
- 3. Excellent ()

5.24 If poor, what could be the reason?

- 1. Always busy ()
- 2. Short staffed ()
- 3. Poor communication ()
- 4. Attitude ()

6.0 Any additional barrier to TB treatment adherence?

.....
.....

Thank you

ANNEXURE H: SISWATI VERSION

LITFULUSI LEKUGCOGCA LWATI ETIGULANENI LETINESIFO SESIFUBA SENGATI

Imibuto kulolucwaningo yakhiwe ngendlela lehambelana nenhloso, nemigomo nangekucombelela imiphumela. Timphendvulo titomakwa kumcwangingi emabhokisini.

Inombolo yalongenele -----

1.0 LWATI NGENHLALO YAKHO

1.1. Iminyaka yakho -----

1.2. Bulili:

1. Ngimdvuna ()
2. Ngimsikati ()

1.3. Sigaba sekwendza:

1. Angikendzi ()
2. Ngendzile ()
3. Ngahlukanisa ngekwemtsetfo ()
4. Angihlali ndzawonye nalengivana naye ()
5. Ngingumfelokati ()
6. Ngingumasihlalisane ()

1.4. Kuhlala kwakho:

1. Emaphandleni ()
2. Edolobheni ()
3. Emacentselweni nelidolobha/eskomu ()

1.5. Sigaba semfundvo:

1. Angikafundzi ()
2. Nginemfundvo yasesigabeni lesincane ()
3. Nginemfundvo yasesigabeni lesisemkhatsini ()
4. Nginemfundvo yasesigabeni lesisetulu ()
5. Nginemfundvo yasesigabeni sekufundzela ()

1.6. Sigaba sekusebenta:

1. Angisebenti ()
2. Ngiyasebenta ()
3. Ngiyatisebenta ()

1.7. Inkholo:

1. Kute ()
2. Budloti ()
3. Busathane ()
4. BuKrestu ()
5. BuIslam ()
6. BuJuda ()

2.0. LWATI NGALOKUHAMBISANA NESIFUBA SENGATI

2.1 Sonesikhatsi lesinganani ulashelwa sifuba sengati?

1. Tinyanga letintsatfu kuya kuletine ()
2. Tinyanga letisihlanu kuya kuletisitfupha ()
3. Tiyanga letisikhombisa kuya kuletisiphohlongo ()
4. Kungetulu kwetinyanga letiyimfica kodvwa angikacedzi ()
5. Ngacedza kunatsa imitsi kodvwa wabuyiselwa emuva ()
6. Ngayekela emkhatsini kodvwa ngabuyiselwa emuva ()

2.2. Sitsini simo sakho sengati ngeligciwane lembulalave? Uma sihlobile, chubeka uye kumbuto 2.4

1. Angisati ()
2. Ngihlobile ()
3. Nginalo ()

2.3. Uma unalo, uyawanatsa yini emaphilisi ekulintsintsibalisa?

1. Chake ()
2. Yebo ()

2.4. Uyabhema yini?

1. Chake ()
2. Yebo ()

2.5. Uyabunatsa yini tjwala?

1. Chake ()
2. Yebo ()

2.6. Ukhona yini emndenini wakho losesifo sesifuba sengati? Uma kute, chubeka uye kumbuto 3.1

1. Kute ()
2. Ukhona ()

2.7. Uma akhona, uhlobene kanjani naye?

1. Ngumtali ()
2. Wakitsi ()
3. Malume/anti ()
4. Sitsandzani ()
5. Ngumgani ()
6. Gogo/mkhuku ()
7. Nguloniketwe ngemtsetfo ()
8. Kungetulu kwakunye ()

3.0. TINKHOMBA LETIHAMBELANA NEMCONDVO

3.1. Nguyiphi indlela loyisebentisako ekwelapheni noma ngabe ngusiphi sifo?

1. Yakamoya ()
2. Yesilungu ()
3. Yesintfu ()
4. Ngibhica sintfu nesilungu ()
5. Ngetulu kwakunye ()

3.2. Kusho kutsini kuwe kunatsa emaphilisi ngekwetsembeka?

1. Kunatsa onkhe malanga ()
2. Kunatsa ute ulanyulelwe kufa ()
3. Kunatsa ngendlela lolulekwe ngayo ()
4. Kunatsa ute ululame ()
5. Ngetulu kwakunye ()

3.3. Ngekucabanga kwakho sibangwa yini sifo sesifuba sengati?

1. Sisicalekiso ()
2. Singemaloyo ()
3. Siyindalo ()
4. Ngemagciwane ()
5. Ngetulu kwakunye ()
6. Angati ()
7. Kubate emasotja emtimbeni ()
8. Kuhambelana ngeligciwane le HIV ()
9. Kubhema ()

3.4. Ngekucabanga kwakho, sitsatselwana njani sifuba sengati?

1. Ngekusebentisa tintfo tekudla ndzawonye ()
2. Ngekusebentisa kwekulala kwalomunye ()
3. Ngehabula lugwayi ()
4. Ngekukhwehlela ()
5. Ngetulu kwakunye ()
6. Angati ()

4.0. TINTFO LETISIKHUTSATEKO EKUNATSENI KAHLE EMAPHILISI

4.1. Ikhona yini imbadalo loyitfolako ekunatseni emaphilisi esifo sesifuba sengati?

1. Chake ()
2. Yebo ()

4.2. Uma ikhona, ngulenjani? Uma kute chubeka uye kumbuto 4.3

1. Lucingo ()
2. Kudla ()
3. Yimali ()
4. Ngetulu kwakunye ()

4.3. Kukhona yini kusekeleka lokuftolako endzaweni lophila kiyo usanatsa imitsi yesifo sesifuba sengati?

1. Kute ()
2. Kukhona ()

4.4. Uma kukhona, ngubani lokusekelako? Uma kute, chubeka uye kumbuto 4.5

1. Ngumgcugcuteli wetemphilo ()
2. Livolontiya lemmango ()
3. Ngulosebenta emtfolamphilo ()
4. Ngumakhelwane ()
5. Ngulomunye wemndeni ()
6. Ngumsekeli wetemitsi ()

7. Ngetulu kwakunye ()

4.5 Yini lokukukhutsata kutsi unatse emaphilisi?

1. Kufisa kubuyela emsebenzini ()
2. Kufisa kubona bantfwabami bacedza sikolwa ()
3. Kufisa kuphela kabanti ()
4. Kusekeleka emndenini ()

4.6 Wakutfola yini kwelulekwa ngaphambi kwekucala kunatsa imitsi yesifuba sengati?

1. Chake ()
2. Yebo ()

4.7 Uma welulekwa, ngubani?

1. Ngulomunye emndenini ()
2. Sigulane lesinelwati ()
3. Nguloniketa temphilo ()

4.8 Uyakutfola yini kufundziseka ngesifo sesifuba sengati emfolampilo wakho?

1. Angikutfoli ()
2. Ngiyakutfola ()

4.9 Uma ufundziseka, ngubani lokufundziseka? Uma ungakutfoli, chubeka uye kumbuto 5.1

1. Ngulomunye emndenini ()
2. Sigulane lesinelwati ()
3. Nguloniketa temphilo ()

4.10 Uma ufundziseka, kukusita njani?

1. Ngungeta ngitive ngincono ()
2. Kungenta ngibone tingoti tekunganatsi kahle emaphilisi ()
3. Kungenta ngikhona kufundzisa labanye ()
4. Kunginika lwati ngalesifo nekwelashwa kwaso ()
5. Ngetulu kwakunye ()

5.0. TINTFO LOTIVA TITIVIMBO EKUNATSENI IMITSI

5.1 Ukhashane kanganani umfolampilo wakho?

1. Kungaba ngemabamnga lasihlanu emakhilomitha ()
2. Kungaba ngemabanga langu sitfupha kuya kulasiphohlongo emakhilomitha ()
3. Kungaba ngemabanga layimfica kuya kulalishumi emakhilomitha ()
4. Kungaba ngemabanga langetulu kwelishumi emakhilomitha ()

5.2 Uyakhona yini kuhlonipha lilanga lakho lekuyolandza imitsi yakho yesifo sesifuba sengati? Uma ukhona, chubeka uye kumbuto 5.4

1. Angikhoni ()
2. Ngiyakhona ()

5.3 Uma ungakhoni, ngabe yini imbangela yaloko. Timphendvulo tingaba ngetulu kwayinye.

1. Kubate imali yekugibela ()

- 2. Kubate kwekuhamba ()
- 3. Ngisuke ngigula ()
- 4. Ngiyakhohlwa ()
- 5. Ngetulu kwakunye ()

5.4 Ngabe imitsi yakho yesifo sesifuba sengati ivamisile yini kuba khona emtfolamphilo wakho? Uma ikhona, chubeka uye kumbuto 5.6

- 1. Anginasiciniseko ()
- 2. Ayibi khona ()
- 3. Ibakhona ()

5.5 Uma kute, uvamise kwenta njani?

- 1. Ngitsenga ekhemisi ()
- 2. Ngicela kuletinye tigulane ()
- 3. Ngiyema ate abekhona ()

5.6 Uwatsatsa njani emaphilisi akho?

- 1. Nome kanjani ()
- 2. Njengoba kubhaliwe ebhokisini lemaphilisi ()
- 3. Njengoba ngitjeliwe emtfolamphilo ()
- 4. Ngetulu kwakunye ()

5.7 Ikhona yini imivuka levelako usanatsa imitsi yakho? Uma kute, chubeka uye kumbuto 5.10

- 1. Kute ()
- 2. Ikhona ()

5.8 Uma ikhona, nguyiphi?

- 1. Kushisa ()
- 2. Umsindvo emadlebeni ()
- 3. Kufuna kuhlanta nekuhlanta ()
- 4. Kubate inkhaphunkhaphu yekudla ()
- 5. Kungalali kahle ebusuku ()
- 6. Tifo tesikhumba ()
- 7. Kuchamela futsi ()
- 8. Kubulawa sisu ()
- 9. Kudzinwa ()
- 10. Umbala lohlukele wemcamo ()
- 11. Kuba buhlungu kwetinyawo netandla ()
- 12. Ngetulu kwakunye ()

5.9 Uma ikhona, wenta njani?

- 1. Ngichubeka nginatse emaphilisi ()
- 2. Ngiyayekela kunatsa emaphilisi ()
- 3. Ngiya emtfolampilo ngibike ()
- 4. Ngetulu kwakunye ()
- 5. Angati ()

5.10 Kukhona yini lokunye lokungenta unganatsi imitsi yakho kahle? Uma kute, chubeka uye kumbuto 5.12

1. Kute ()
2. Kukhona ()

5.11 Uma kukhona, kungaba yini?

1. Kubate kudla ()
2. Kugulela futsi ()
3. Kuhlala ngedvwa ()
4. Kubate umsekeli ()
5. Ngetulu kwakunye ()

5.12. Kukhona yini buncono solo wacala kulashelwa sifo sesifuba sengati? Uma Bukhona, chubeka uye kumbuto 5.14

1. Kute ()
2. Kukhona ()

5.13 Uma kute, ucabanga kutsi kungabangwa yini?

1. Kuba naletinye tifo ngaphandle kwalesi ()
2. Lamaphilisi enta simo siyembili ()
3. Kubate umsekeli ()
4. Kugulela futsi ()
5. Kubate kudla ()
6. Ngetulu kwakunye ()

5.14 Uke uwakhohlwe yini kuwanatsa emaphilisi? Uma ungawakhohlwa, chubeka uye kumbuto 5.17

1. Chake ()
2. Yebo ()

5.15 Uma ukhohlwa, yini lobese uyakwenta?

1. Ngiwanatsa ngalokuphindziwe ()
2. Ngiwanatsa uma sengikhumbula ()
3. Ngibikela bemfolampilo ()
4. Ngimela sikhatsi lesinye sekuwanatsa ()
5. Ngetulu kwakunye ()
6. Ngiyawayekela kuwanatsa ()

5.16 Uma ungakhohlwa kumbuto 5.14, yini lekukhumbutako?

1. Ngiyeva nje emtimbeni ()
2. Ngumngani ()
3. Ngulomunye wemndeni ()
4. Ngicipha sikhatsi ()
5. Ngetulu kwakunye ()

5.17 Uma ukhohlwa kumbuto 5.14, yini umphumela wekukhohlwa kunatsa emaphilisi?

1. Kutfola ligciwane leligwamile lesifo sesifuba sengati ()
2. Ngitotfola letinye tifo ()

- 3. Angeke ngilapheke kahle ()
- 4. Ngetulu kwakunye ()
- 5. Angati ()

5.18. Kukhona yini lesinye tifo lolashelwasona ngaphandle kwesifuba sengati?

- 1. Chake ()
- 2. Yebo ()

5.19. Uma sikhona, ngusiphi?

- 1. Ngumdlavuzwa ()
- 2. Sifo sesisu ()
- 3. Sifo sashukela ()
- 4. Sifo sehayihayi ()
- 5. Ligciwane lembulalave ()
- 6. Ngetulu kwakunye ()

5.20. Utsatsa mangakhi emaphilisi ngelilanga?

- 1. Ngetulu kwalasihlanu ()
- 2. Lasihlanu ()
- 3. Lamane ()
- 4. Lamatsatfu ()
- 5. Ngephansi kwalamatsatfu ()

5.21. Uyakhona kuwanatsa Njengoba utjeliwe? Uma ukhona, chubeka uye kumbuto 5.23

- 1. Yebo ()
- 2. Chake ()

5.22 Uma ungakhoni, ngutiphi tizatfu?

- 1. Sikhatsi lesidze sekunatsa emaphilisi ()
- 2. Kudzinwa kunatsa emaphilisi ()
- 3. Imivuka ()
- 4. Ngetulu kwakunye ()

5.23. Budlelwano bakho netisebenti temtfolamphilo bunjani?

- 1. Bubi ()
- 2. Buhle ()
- 3. Buhle kakhulu ()

5.24. Uma bungasiko lobuhle, ngabe bubangwa yini?

- 1. Baba matasatasa ()
- 2. Kushoda kwetisebenti ()
- 3. Kubate kukhulumiseka kahle ()
- 4. Kungaphatseki kahle ngetento ()

6.0 Yini lokunye longakungeta lokungaba sivimbeko sekunatsa kwemaphilisi ngendlela?

Ngiyabonga

ANNEXURE I

DATA COLLECTION INSTRUMENT FOR TB EXPERTS

This structure questionnaire is in accordance to the study's purpose, objectives and hypothesis and HBM tenets.

Instructions: Please respond to all questions. Put a tick in the box against the response you feel is appropriate for the question.

Code no. -----

1.0 DEMOGRAPHIC DATA

1.1 Age:

1. 20-29 ()
2. 30-39 ()
3. 40-49 ()
4. 50-59 ()

1.2 Gender:

1. Male ()
2. Female ()
3. Bisexual ()

1.3 Marital Status:

1. Single ()
2. Married ()
3. Divorced ()
4. Separated ()
4. Widowed ()
5. Cohabiting ()

1.4 Residential Level:

1. Rural ()
2. Urban ()
3. Peri-urban ()

1.5 Educational Level:

1. Certificate ()
2. Diploma ()
3. Bachelor's Degree ()
4. Master's degree ()
5. Doctorate degree ()

1.6 Employment Status:

1. Nurse ()
2. Doctor ()

- 3. Expert ()
- 4. Program Officer ()

1.7 Religion:

- 1. None ()
- 2. Traditional ()
- 3. Christianity ()
- 4. Satanism ()

2.0 EXPERT STRUCTURAL FACTORS

2.1 How long have you been working in this TB facility?.....years/months

2.2 Are you using any TB guidelines in this facility?

- 1. No ()
- 2. Yes ()

2.3 If yes, specify the type of guideline

- 1. WHO ()
- 2. Health facility made ()
- 3. Swaziland Ministry of Health ()
- 4. More than one ()

2.4 Are the medications listed in the guidelines available in your facility?

- 1. No, they are not available ()
- 2. Some drugs are not available ()
- 3. Yes, they are available ()

2.5 If they are not available, what could be the reason?

- 1. I am not sure ()
- 2. Lack of transport money ()
- 3. Unsafe drug storage area ()
- 4. Inadequate drug quantities ()
- 5. Delayed ordering process ()

2.6 Which action do you take when there are no TB drugs in the facility?

- 1. I give them another appointment date ()
- 2. I give them the available alternative drugs ()
- 3. I send them back home ()
- 4. I report the issue to the TB clinic manager ()

2.7 Which procedure(s) do you follow when a TB client is initiated on treatment for the first time? You may tick more than one response.

- 1. Admit client for closer monitoring and tests procedures ()
- 2. Advise client on compliance o the therapy ()
- 3. Advise client on honouring treatment appointment dates ()
- 4. Refer client to an adherence officer ()
- 5. More than one response ()

2.8 Is there any TB treatment adherence assessment you conduct on the clients who are on treatment?

1. No ()
2. Yes ()

2.9 If yes, which one(s). If no, skip to question 2.10.

1. DOT ()
2. Pill count ()
3. Client self-reporting ()
4. Check monthly treatment record when re-supplying drugs ()
5. Trace clients who miss appointments ()
6. More than one response ()

2.10 According to you, how are your clients doing in terms of adherence to their treatment?

1. Poor ()
2. Moderate ()
3. Good ()
4. Very good ()

2.11 If adherence is good or very good, what do you think is the cause?

1. Incentives ()
2. Social support ()
3. Rapport with clients ()

2.12 If adherence is poor, what do you think is the cause?

1. Lack of incentives ()
2. Lack of social support ()
3. Poor with clients ()
4. More than one response ()

3.0 DETERMINANTS WHICH ENHANCE ADHERENCE TO TB TREATMENT

3.1 Do your clients receive incentives as they take the TB treatment?

1. No ()
2. Yes ()

3.2 If yes, what type of incentive do they receive? If no, skip to Question 3.3.

1. Phone ()
2. Money ()
3. Food ration ()
4. More than one response ()

3.3 Do you remind your clients about taking their medication?

1. No ()
2. Yes ()

3.4 If yes, which method(s) do you use to remind them? If no, skip to question 4.1

1. Send short message services (SMS) ()
2. Phone call ()

- 3. DOT officer visitation ()
- 4. Contact family member ()
- 5. More than one method ()

4.0 BARRIERS TO ADHERENCE TO TB TREATMENT

4.1 Do your clients keep their treatment refill appointment dates?

- 1. No ()
- 2. Yes ()

4.2 If no, what do you think is the cause? If yes, skip to Question 4.3.

- 1. Forgetfulness ()
- 2. Transport cost ()
- 3. Busy ()
- 4. Client's decision ()
- 5. Illness ()
- 6. More than one response ()

4.3 Do you clients report any side effects?

- 1. No ()
- 2. Yes ()

4.4 If yes, which side effect (s) is commonly reported? If no, skip to question 4.6.

- 1. Fever ()
- 2. Ringing ears ()
- 3. Nausea and vomiting ()
- 4. Poor appetite ()
- 5. Sleepless nights ()
- 6. Skin disorders ()
- 7. Polyuria ()
- 8. Abdominal discomfort ()
- 9. Fatigue ()
- 10. Discoloured urine ()
- 11. Tingling, burning or numbness of hands and feet ()
- 12. More than one response ()

4.5 If yes to 4.3, which steps do you take after the clients have reported the side effect?

- 1. Switch to another regimen if side effects are severe ()
- 2. Give medication to treat side effects ()
- 3. Report to the TB clinic manager ()
- 4. Advise to stop taking the tablets ()
- 5. More than one ()

4.6 Do you teach your clients about the importance of adhering to TB treatment?

- 1. No ()
- 2. Yes ()

4.7 If yes, how are the responses from the clients on adherence? If no, skip to question 4.8.?

- 1. Not promising ()

- 2. Promising ()
- 3. Very promising ()

4.8 Which problems are barriers to the clients adherence do you come across with?

- 1. They just disappear ()
- 2. They take too much alcohol ()
- 3. They have other illnesses ()
- 4. Lack of incentives ()
- 5. More than one response ()

4.9 State your opinion which you thin may hinder clients from adhering to their TB treatment, as shown in the able below. Please tick in the appropriate box:

Key: 1. SA: Strongly agree; 2. A: Agree; 3. DU: Don't understand; 4. D: Disagree; 5. SD: Strongly Disagree

Content	SA	A	DU	D	SD
	1.	2.	3.	4.	5.
1. Client's Gender					
2. Client's educational level					
3. Transport Costs					
4. Distance to the health facility					
5. Treatment supporter					
6. Length of treatment					
7. Side effects					
8. Food availability at home					
9. Knowledge about TB					
10. Belief system					

5.0 Is there any additional hindrance to clients' adherence to TB treatment?

Thank You

ANNEXURE I: SISWATI VERSION

LITFULUSI LEKUGCOGCA LWATI KULABASEBENTA NGESIFO SESIFUBA SENGATI

Imibuto kulolucwaningo yakhiwe ngendlela lehambelana nenhloso, nemigomo nangekucombelela imiphumela. Timphendvulo titomakwa ngulongenele lolucwaningo emabhokisini laniketiwe.

Uyacelwa uphendvule yonkhe imibuto. Faka luphawu ngekumaka eceleni kwemphendvulo lova ungatsi ingiyo.

Inombolo yalongenele

1.0 LWATI NGENHLALO YAKHO

1.1 Iminyaka yakho:

1. 20-29 ()
2. 30-39 ()
3. 40-49 ()
4. 50-59 ()

1.2 Bulili:

1. Ngimdvuna ()
2. Ngimsikati ()
3. Ngiyimphacambili ()

1.3 Sigaba sekwendza:

1. Angikendzi ()
2. Ngendzile ()
3. Ngahlukanisa ngekwemtsetfo ()
4. Angihlali ndzawonye nalengivana naye ()
5. Ningumfelokati ()
6. Ngingumasihlalisane ()

1.4 Kuhlala kwakho:

1. Emaphandleni ()
2. Edolobheni ()
3. Emacentselweni nelidolobha/eskomu ()

1.5 Sigaba semfundvo:

1. Sitifiketi ()
2. Ngine Diploma ()
3. Ngine Degree ()
4. Ngine Master's Degree ()
5. Ngine Doctorate Degree ()

1.6 Sigaba sekusebenta:

1. Ngingunesi ()
2. Ngingu dokotela ()

3. Ngingu lobukela kunatsa kahle emaphilisi ()

1.7 Inkholo:

1. Kute ()
2. Sintfu ()
3. BuKrestu ()
4. Busatane ()
5. Bulslam ()
6. BuJuda ()

2.0 LWATI NGALOKUHAMBELANA NESIFUBA SENGATI

2.1 Sonesikhatsi lesinganani usebenta kulotfolamphilo wesifo sesifuba sengati? -----

2.2 Ukhona yini umkhombandlela lowusebentisako wesifo sesifuba sengati kulomtfolamphilo?

1. Kute ()
2. Ukhona ()

2.3 Uma ukhona, ngabe ngumuphi?

1. Wakamhlabuhlangene wetemphilo ()
2. Wemtfolamphilo letakhele wona ()
3. Ngulewakhiwe litiko letemphilo eSwatini ()
4. Ngetulu kwakunye ()

2.4 Ingabe lemitsi lekumkhombandlela iyatfolakala yini la emtfolamphilo?

1. Ayitfolakali ()
2. Ayitfolakali yonke ()
3. Iyatfolakala ()

2.5 Uma ingatfolakali, ingabe kubangwa yini?

1. Anginasiciniseko ()
2. Kubate kwekutwala imitsi ()
3. Kungavikeleki kwenzawo lagugcinwa khona imitsi ()
4. Kute kahle linani ()
3. Imitsi ayifiki ngesikhatsi ()

2.6 Wentanjani uma kute imitsi yetigulane?

1. Ngibanika lilanga lelanye lokubuya ()
2. Ngibanika umutsi lokhona kuphela ()
3. Ngivele ngibancandze baye ekhaya ()
4. Ngibikela baphatsi ()

2.7 Nchubo yini loyilandzelako uma sigulane siniketwa emaphilisi esifo sesifuba sengati kwekucala?

Timphendvulo tingaba ngetulu kwayinye.

1. Siyamlalisa atocwaningwa kabanti ()
2. Siyameluleka ngekunatsa ngekwetsembeka imitsi yakhe ()
2. Simtjela kutsi abuye ngesikhatsi latjelwe ngaso kutogcwalisa emaphilisi ()
4. Simmikisa kulokhokhela ngekunatsa kahle emaphilisi ()
5. Lokungetulu kwakunye ()

2.8 Ikhona yini indlela leniyisebentisako yekubuka kutsi sigulane ngabe sinatsa ngekwetsembeka emaphilisi aso?

1. Kute ()
2. Ikhona ()

2.9 Uma ikhona, ndlela yini? Uma kute, phendvula umbuto 2.10

1. Kunatsa emaphilisi embikwe sisebenti semphilo ()
2. Kubala emaphilisi ()
3. Kuva ngesigulane ()
4. Kuhlola kunatsa kwemaphilisi kwenyanga ()
5. Kulandzelela labo labapholotile ()
6. Ngetulu kwakunye ()

2.10 Ngekucabanga kwakho ngabe tigulane takho tichuba njani ngekwetsembeka kunatsa imitsi?

1. Kubi ()
2. Kusemkhatsini ()
2. Kuhle ()
3. Kuhle kakhulu ()

2.11 Uma kukahle noma kukahle kakhulu, ngabe kubangwa yini kutsi betsembeke?

1. Imbadalo ()
2. Kusekeleka ()
3. Budlelwano lobuhle ()

2.12 Uma kukubi, yini imbangela yaloko?

1. Kubate imbadalo ()
2. Kungasekeleki ()
3. Budlelwane lobubi ()
4. Ngetulu kwakunye ()

3.0 TINKHOMBA LETIKHUTSATA KUNATSA IMITSI NGEKWETSEMBEKA

3.1 Ngabe tigulane takho tiyayitfolo yini imbadalo (incentives) tisanatsa emaphilisi esifo sesifuba sengati?

1. Kute ()
2. Ikhona ()

3.2 Uma ikhona, ngulenjani? Uma kute, chubeka uye kumbuto 3.3

1. Lucingo ()
2. Yimali ()
2. Kudla lokukaliwe ()
3. Ngetulu kwakunye ()

3.3 Niyatikhumbuta yini tigulane takho ngekunatsa emaphilisi?

1. Chake ()
2. Yebo ()

3.4 Uma nitikhumbuta, tindlela tini lenitisebentisako kukhutsata tigulane kunatsa ngekwetsembeka emaphilisi? Uma kute, chubeka uye kumbuto 4.1

1. Sitfumela umlayeto kubomahlalekhukhwini ()

2. Sishaya lucingo ()
3. Tisebenti temitsi tiyabavakashela emakhaya ()
4. Sitsintsa lomunye wemndeni ()
5. Ngetulu kwakunye ()

4.0 TINTFO LETITIVIMBEKO EKUNATSENI EMAPHILISI NGEKWETSEMBEKA

4.1 Ingabe tigulane takho tiyatigcina yini tinsuku tekulandza imitsi yato?

1. Chake ()
2. Yebo ()

4.2 Uma bangatigcini, ucabanga kutsi ngabe kubangwa yini? Uma batigcina, chubeka uye kumbuto 4.3.

1. Kukhohlwa ()
2. Tindleko tekuhamba ()
3. Kuba matasatasa ()
4. Kutincomela ()
5. Kugula ()
6. Ngetulu kwakunye ()

4.3 Ikhona yini imivuka labayibikako basanatsa emaphilisi?

1. Kute ()
2. Ikhona ()

4.4 Uma ikhona, kuvamise kuba yini? Uma kute, chubeka uye kumbuto 4.6

1. Kushisa ()
2. Umsindvo emadlebeni ()
3. Kufuna kuhlanta nekuhlanta ()
4. Kubate inkhaphunkhaphu yekudla ()
5. Kungalali kahle ebusuku ()
6. Tifo tesikhumba ()
7. Kuchamela futsi ()
8. Kubulawa sisu ()
9. Kudzinwa ()
10. Umbala lohlukile wemcamo ()
11. Kuba buhlungu kwetinyawo netandla ()
12. Ngetulu kwakunye

4.5 Ubese sewenta njani uma babika lemivuka?

1. Ngiyabashintja kuleminye imitsi ()
2. Ngibanika umutsi wekwelapha imivuka ()
3. Ngibapota kumphatsi wemtfolamphilo ()
4. Ngibayala kutsi bawayekele emaphilisi ()
5. Ngetulu kwakunye ()

4.6 Uyatifundzisa yini tigulane ngebumcoka bekunatsa emaphilisi ngekwetsembeka?

1. Chake ()
2. Yebo ()

4.7 Uma utifundzisa, ingabe timphendvulo tiba njani?

1. Atitsembisi ()
2. Tiyetsembisa ()
3. Tiyetsembisa kakhulu ()

4.8 Tingcinamba tini lobhekene nato etigulaneni takho mayelana nekunatsa kahle emaphilisi esifo sesifuba sengati?

1. Bayanyamalala ()
2. Banatsa tjwala kakhulu ()
3. Banaletinye tifo ()
4. Kute imbadalo ()
5. Ngetulu kwakunye ()

4.9 Chatsanisa imibono yakho kulokulandzelako ngetinkhomba letihlupha tigulane kutsi tinganatsi imitsi yato ngekwetsembeka: Ngicela ukhombise imphendvulo yakho ngekufaka luphawu (kumaka) kulamabhokisi laniketive:

Lokufinyetiwe nenchazelo: 1. NK: Ngivuma kakhulu; 2. N: Ngiyavuma; 3. AK: Angicondzi kahle; 4. A: Angivumelani; 5. AK: Angivumelani kakhulu

Luhlu	NK	N	AK	A	AK
	1.	2.	3.	4.	5.
1. Bulili besigulane					
2. Sigaba sekufundza kwesigulane					
3. Tindleko tekuhamba					
4. Libanga lokuya lemfolamphilo					
5. Kuba nalokusekelako ekunatseni imitsi					
6. Bundze sekwelashwa					
7. Imivuka					
8. Kuba khona kudla ekhaya					
9. Lwati ngesifo sesifuba sengati					
10. Inkholelo					

5.0 Yini lokunye longakungeta lokungaba yingcinamba ekunatseni emaphilisi esifuba sengati ngekwetsembeka etigulaneni?

ANNEXURE J

STATISTICIAN CURRICULUM VITAE

NAME: Tengetile R. Mathunjwa-Dlamini
ADDRESS: P. O. Box 3866 Manzini, Swaziland
PHONE: +268-7626-9455 (mobile), +268-2517-0739
EMAIL: tmathunj@uniswa.sz

INSTITUTION OF HIGHER LEARNING ATTENDED AND QUALIFICATIONS

AQUIRED:

1. January 1981 – July 1981 Science Pre-entry Course at the University of Swaziland (UNISWA).
2. August 1981 – August 1984 Studied and Passed Diploma in General Nursing (RN) at the Swaziland Institute of Health Sciences (SIHS).
3. November 1984 – November 1985 Studied and acquired a Diploma in Midwifery (CM) SIHS.
4. August 1987 – May 1990 Studied and passed the Bachelor of Education (BEd) in Nursing at the University of Botswana.
5. January 1996 – July 1997 Studied and passed Master of Science in Nursing (MSN: Medical-Surgical Nursing) at the University of Zimbabwe.
6. August 2002 - August 2006 Studied and passed Doctor of Philosophy (PhD) in Nursing at Francis Payne Bolton School of Nursing, Case Western Reserve University, Ohio, USA.
7. August 2014 - August 2015 Studied and passed Post-Doctoral, Master of Science in Epidemiology (MS Epi.) at Columbia University, New York, USA.

PROFESSIONAL EXPERIENCE:

1. December 1985 – July 1987 worked at Mbabane Government Hospital, Swaziland, as a qualified professional nurse (RN & CM)
2. August 1990 – July 1997a lecturer at the then Swaziland Institute of Health Sciences (SIHS) now University of Swaziland, Faculty of Health Sciences.
3. August 1997 – March 2008 Lecturer at the University of Swaziland, Faculty of Health Sciences (formerly SIHS).

4. April 2008 – March 2012 Beyond Bar Lecturer at the University of Swaziland, Faculty of Health Sciences.
5. April 2012 – October 2016 Senior Lecturer at the University of Swaziland, Faculty of Health Sciences.
6. November 2016 – date Associate Professor at the University of Swaziland, Faculty of Health Sciences.

AWARDS RECEIVED

1984 – Dr Samuel Hynd Award (SIHS)

1985 – Leadership Award (SIHS)

1997 – University of Zimbabwe Book Prize

2006 - \$ 100.00 from Euclid Avenues Christian Church (USA) to assist the vulnerable populations in Swaziland

2013 – Columbia University-Southern African Fogarty AIDS International Training and Research Program (CU-SA Fogarty AITRP) Traineeship Award

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- 2011 University of Swaziland IDE Module: HSC 113 HIV Prevention, Infection and Management of AIDS.
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- 2011 Ministry of Health Non-Communicable Diseases (NCDs) Strategic Plan
- 2011 - Ongoing Ministry of Health Distance Education Policy
- 2015 - University of Swaziland IDE Module: HSC 404 Health Statistics.
- 2015 - Eswatini National Standard: Natural rubber latex male condoms —Requirements and test methods
- 2017 - Eswatini National Standard: HIV AND AIDS care & services and HIV AND AIDS prevention & education- requirements
- 2018 - Eswatini National Standard: HIV and AIDS Prevention, Treatment, Care and Support services-requirements

PREFERRED COURSES

Research; Statistics; Epidemiology; Medical-Surgical

EXTERNAL MODERATION

Southern Africa Nazarene University (SANU) – Faculty of Health Sciences (SANU): 2011/2012; 2012 / 2013; 2019/2019;

Swaziland Christian Medical University (SCMU) – 2015/2016

Sefako Makgatho Health Sciences University 2018.

REFERENCES

Professor Faye A Gary, EdD, RN, FAAN

Case Western Reserve University
Bolton School of Nursing
10900 Euclid Avenue
Cleveland, OHIO, USA

Professor Sharon Schwartz, PhD

Epidemiology at Columbia Frances Payne
University Medical Centre
722 West 168th Street
Room 720B, New York,

fgary@case.edu

(216) 368-5240

10032sbs5@columbia.edu

(212) 3035-7789

Professor Nonhlanhla A. Sukati, PhD, MSN, CM, RN

University of Swaziland

Faculty of Health Sciences

P. O. Box 369

Mbabane, Swaziland

nasukati@healthsci.uniswa.sz

+268-404-171/2