



# A Study to Assess Anti-TB Treatment Compliance, Factors Predictive for Poor Adherence and Perpetual Defaulting among Patient Living with TB in Namuseche Chipata Eastern Province–Zambia

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### APPROVAL PAGE

This research has been examined and is approved as meeting the required standards for partial fulfilment of the requirements for the Bachelor Degree of Science in Nursing.

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## CERTIFICATE

This is to certify that the thesis entitled, **A study to assess anti-TB treatment compliance, factors predictive for poor adherence and perpetual defaulting among patient living with TB in Namuseche Chipata Eastern Province**, submitted by **Phiri Daliso** student number **19012782**, Department of Nursing, Chreso University is a record of research work carried out by him for the Bachelor Degree of Science in Nursing Studies under my guidance.

This thesis is an original work of the candidate and has not been submitted in any part or in full, for any Degree, Diploma, Associateship, Fellowship or other similar titles in this or any other university.

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## DECLARATION

I declare that the report entitled “**A STUDY TO ASSESS ANTI-TB TREATMENT COMPLIANCE, FACTORS PREDICTIVE FOR POOR ADHERENCE AND PERPETUAL DEFAULTING AMONG PATIENT LIVING WITH TB IN NAMUSECHE CHIPATA EASTERN PROVINCE**” is the result of a study originally carried out by me independently under the guidance and supervision of Mr **Spencer Benjamin Changwe**, Senior Lecturer Dean, Department of Nursing, Chreso University, Zambia. This research has not been submitted earlier, in full or in part, for any Degree, Diploma, Associateship, Fellowship or other similar title in this or any other university.

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## **DEDICATION**

This dissertation is dedicated to my Late Biological Mother **GETRUDE REGINAH NJOBVU** and my Late elder brother **KABWE NJOBVU** who died due to Tuberculosis in 1997 and 2016 respectively. May their soul continue resting in eternal peace until we meet again on the other side. I love your mom and my brother. Your memories are still fresh on my mind.

## ABBREVIATIONS AND ACRONYMS

<b>AFB</b>	Acid Fast Bacilli
<b>AIDS</b>	Acquired Immunodeficiency Virus
<b>ALT</b>	Alanine Aminotransferase
<b>AST</b>	Aspartate Aminotransferase
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CI</b>	Cumulative Incident
<b>CUREC</b>	Chreso University Research Ethics Committee
<b>DOT</b>	Direct Observed Therapy
<b>EHT</b>	Environmental Health Technologist
<b>EPTB</b>	Extra Pulmonary TB
<b>HIV</b>	Human Immune Virus
<b>Lab –Tech</b>	Laboratory Technologist
<b>LMICs</b>	Low- and middle-income countries
<b>MDR TB</b>	Multidrug resistance Tuberculosis
<b>NICD</b>	National Institute of Communicable Diseases
<b>NTPs</b>	National TB Programmes
<b>PTB</b>	Pulmonary TB
<b>RHZE</b>	Rifampicin, Isoniazid, Pyrazinamide, Ethambutol
<b>SDGs</b>	Sustainable Development Goals
<b>SPSS</b>	Statistical Package For The Social Sciences
<b>Stats SA</b>	Statistics South Africa
<b>STIs</b>	Sexually Transmitted Infections
<b>TB</b>	Tuberculosis
<b>WHO</b>	World Health Organisation
<b>XDR TB</b>	Extensively Drug Resistant Tuberculosis



## ABSTRACT

### ➤ *Background of the Study:*

Tuberculosis (TB) is the ninth leading cause of death worldwide. According to WHO at least 1.5 million people each year succumb to TB, thus making it the world's top infectious killer as well as the leading cause from a single infectious agent, ranking above HIV/AIDS. Zambia is one of the top 30 high TB burden countries. People with active TB can infect 5–15 other people through close contact over the course of a year. TB patients with compromised immune systems, such as people living with HIV, malnutrition or diabetes, or people who use tobacco, have a higher risk of falling ill. Without proper treatment, 45% of HIV-negative people with TB on average and nearly all HIV-positive people with TB will die. Defaulting on TB medication is a major barrier to both local and global TB control. Defaulting increases, the risk of drug resistance, treatment failure, relapse and death, and may prolong infectiousness. Poor adherence to treatment means that patients remain infectious for longer and are more likely to relapse or succumb to tuberculosis. The rate of anti-TB treatment compliance, adherence and perpetual defaulting TB treatment was and is still high during the intensive phase of treatment. Most people who are called “lost to follow up” don’t have adequate information as to why they should continue and finish their TB medication.

### ➤ *Methodology:*

A qualitative, phenomenological cross-sectional research design was used. Namuseche Prison Clinic and surrounding compounds of Chipata Township in Eastern Province Zambia. A total of 141 participants was recruited through purposive sampling. In-depth interviews were conducted. The SPSS package version 23 was applied to conduct quantitative analysis. The proposal was approved by the Chreso University Ethics Clearance Committee and National Health Research Authority. Researcher ensured confidentiality and voluntary participation with informed consent.

### ➤ *Results:*

The age of the respondents in this study ranged from 18 years to 50 years. Knowledge on TB related questions was very high in this study and stood at 87.3%. TB treatment default was found in 34 (32.7%) respondents and was associated with distance to the facility and transport costs, feeling unwell and the drug side effects.

### ➤ *Conclusion:*

TB treatment default was found in 34 (32.7%) respondents and was associated with distance to the facility and transport costs, feeling unwell and the drug side effects.

**Keywords:-** Adherence, Compliance, Defaulting, Predictive.

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## CHAPTER ONE

### INTRODUCTION TO RESEARCH

#### A. Introduction

Tuberculosis (TB) is the ninth leading cause of death worldwide and the leading cause from a single infectious agent, ranking above HIV/AIDS. Over 25% of TB deaths occur in the African Region. The emergence of multidrug-resistant TB (MDR-TB) poses a major health security threat and could risk gains made in the fight against TB. Every year, 10 million people fall ill with tuberculosis (TB). Despite being a preventable and curable disease, 1.5 million people die from TB each year making it the world's top infectious killer. TB is the leading cause of death of people with HIV and also a major contributor to antimicrobial resistance. Most of the people who fall ill with TB live in low- and middle-income countries, but TB is present all over the world. This chapter focuses on the background, statement of the problem, general objectives, specific objectives, research questions, delimitation of the study and definition of operation terms.

#### B. Background of the Study

Tuberculosis (TB) is an infectious disease caused by the bacterium *Mycobacterium tuberculosis*, primarily affecting the lungs. It is both preventable and curable. TB spreads through the air when an infected person with lung TB coughs, sneezes, or spits, releasing bacteria into the surrounding air. Even inhaling a small amount of these bacteria can lead to infection. Approximately a quarter of the global population is infected with TB bacteria, although they are not yet sick or capable of transmitting the disease. Individuals infected with TB bacteria have a 5–10% chance of developing the illness over their lifetime. Those with weakened immune systems, such as individuals with HIV, malnutrition, diabetes, or those who use tobacco, face a higher likelihood of becoming sick. When active TB develops, symptoms like a persistent cough, fever, night sweats, and weight loss may appear gradually and be mild for several months, leading to delays in seeking medical attention. This delay can increase the risk of spreading the infection, with individuals with active TB potentially infecting 5–15 others through close contact over a year. If left untreated, TB can be fatal, with about 45% of HIV-negative patients and nearly all HIV-positive patients succumbing to the disease (WHO, 2021).

The effective treatment of tuberculosis (TB) requires patients to take anti-TB medications for a minimum of six months. Zambia follows the globally recognized TB control strategy established by the World Health Organization (WHO) and has implemented the WHO-recommended treatment protocols. For newly diagnosed TB patients in Zambia, the treatment course lasts six months, while for those with multi-drug resistant TB (MDR-TB), the duration is extended to 18 months. The initial two months, known as the intensive phase, involve a daily combination of rifampicin (R), isoniazid (H), pyrazinamide (Z), and ethambutol (E) (2RHZE), with doses adjusted according to the patient's body weight. This is followed by a four-month continuation phase in which rifampicin and isoniazid (4RH) are administered, completing the six-month regimen. During the intensive phase, patients are required to visit health facilities weekly to collect their medication, and in the continuation phase, this is reduced to monthly visits. The treatment duration for patients undergoing retreatment is also six months. Direct Observation of Treatment (DOT) is emphasized, where a healthcare provider or a trusted individual closely supervises the patient's medication intake, particularly during the intensive phase, to ensure adherence to the prescribed regimen.

Given the structure of the treatment regimen, it is understood that some patients may struggle to adhere to the prescribed therapy and may stop taking their medication before completing the full course. According to the World Health Organization (WHO), patients who miss treatment for two consecutive months or longer are classified as 'Out of Control' or lost to follow-up by the end of their treatment period. When patients fail to follow the treatment plan, they remain infectious for a longer time and face a higher risk of relapse or death due to tuberculosis. Additionally, inconsistent adherence or premature discontinuation of therapy can lead to treatment failure, the development of drug-resistant TB strains, and increased treatment costs. To address the serious consequences of treatment default, many National TB Programs provide incentives and social support to encourage patients to complete their treatment and ensure adherence. This helps improve cure rates, prevent adverse outcomes, and reduce the likelihood of drug resistance.

Tuberculosis (TB) remains a significant global health issue and is the second leading cause of death among communicable diseases, claiming approximately 1.5 million lives annually. In response to this crisis, the World Health Organization (WHO) introduced the Directly Observed Treatment Short Course (DOTS) strategy in 1993. As of 2021, around 2 billion people, or roughly 23% of the global population, were infected with TB bacteria. In 2018 alone, out of the 10 million people who developed TB, about three million were missed by healthcare systems, failing to receive the necessary treatment, which allowed the disease to continue spreading. Irregular or inconsistent adherence to TB treatment has significantly contributed to treatment failure, relapse, and the rise of drug-resistant TB strains (CDC, 2022).

Several factors contribute to patients defaulting on TB treatment. These include the high pill burden, limited knowledge about the disease, long distances to health facilities, severe side effects experienced during the initial two months of treatment, hospitalization during treatment, pre-existing lung conditions, prior treatment default, TB/HIV co-infection, lack of family support, absence of supervised treatment, and poor quality of care at healthcare centers.

In 2020, tuberculosis (TB) claimed the lives of 1.5 million individuals, including 214,000 people living with HIV. During the same year, approximately 10 million people worldwide became ill with TB, including 5.6 million men, 3.3 million women, and 1.1 million children. TB in children and adolescents is often underdiagnosed and undertreated, posing challenges for healthcare providers. The 30 countries with the highest TB burden accounted for 86% of new TB cases in 2020, with eight nations—India, China, Indonesia, the Philippines, Pakistan, Nigeria, Bangladesh, and South Africa—contributing to two-thirds of the global total. Multidrug-resistant TB (MDR-TB) continues to be a serious public health issue, with only one in three people with MDR-TB accessing treatment in 2020. Globally, TB incidence is declining by approximately 2% each year, with an 11% reduction recorded between 2015 and 2020, moving over halfway toward the End TB Strategy target of a 20% reduction during this period. Between 2000 and 2020, an estimated 66 million lives were saved due to TB diagnosis and treatment.

Despite this progress, many TB-affected households continue to face significant financial strain, with nearly half of these households incurring costs exceeding 20% of their income, as per the latest TB patient cost surveys. The world failed to meet the target of zero TB-affected households facing catastrophic costs by 2020. Achieving global TB targets requires an estimated US\$ 13 billion annually by 2022 for prevention, diagnosis, treatment, and care. However, funding in low- and middle-income countries (which account for 98% of TB cases) falls significantly short. In 2020, only US\$ 5.3 billion was spent—41% of the global target—marking an 8.7% decrease in TB funding from 2019. Funding levels in 2020 returned to those seen in 2016. Ending the TB epidemic by 2030 is one of the health objectives outlined in the United Nations Sustainable Development Goals (SDGs).

In Sub-Saharan Africa, various social and economic factors, such as low income, insufficient social support, limited education, financial difficulties, and the inability to access healthcare services, have been linked to challenges in adhering to TB treatment. Patient-related factors, including older age, male gender, a lack of knowledge, ignorance about the necessity of treatment adherence, and the stigma associated with the disease, have also been identified as contributing to treatment default. Healthcare system-related barriers, such as negative attitudes from healthcare providers, poor perceptions of treatment facilities by patients, drug shortages, and limited access to healthcare—particularly for those residing near treatment centers—have also been significant obstacles. Furthermore, treatment-related factors like medication side effects, the belief that the drugs are too strong, or feeling prematurely cured, may lead to non-compliance. Additionally, HIV co-infection has been recognized as another condition-related factor impacting adherence to TB treatment.

Tuberculosis (TB) is a leading cause of death in South Africa, claiming thousands of lives each year, as highlighted by surveys and experts. According to Jody Boffa, an epidemiologist from the University of KwaZulu-Natal, "South Africa ranks eighth in global TB incidence, with a rate of 537 cases per 100,000 people annually." Additionally, it is one of 16 countries responsible for 93% of the global TB burden. A 2018 report by Statistics South Africa (Stats SA) identified TB as the top cause of death in the country, with TB-related deaths accounting for 6% of the 454,014 total deaths recorded that year. Diabetes, cerebrovascular diseases, heart disease, and HIV followed as other significant causes. The National Institute of Communicable Diseases (NICD) estimated that in 2018, there were 301,000 TB cases and 63,000 TB-related deaths in South Africa. In 2019, the estimated number of new TB cases rose to 360,000, with 58,000 deaths. Stats SA's June 2021 report reaffirmed that TB remained the leading cause of death in the country between 2016 and 2018.

A retrospective cohort study conducted in Nigeria revealed that several factors, including being a re-treatment case, having a positive smear at the second month of follow-up, remaining smear-negative after two months of treatment, having pulmonary TB, and being male, were linked to poor TB treatment outcomes. However, this particular study focused solely on TB in children. Similarly, research carried out in Mozambique identified male gender, a negative smear result at diagnosis, HIV-positive status, and retreatment cases as factors associated with unfavorable treatment outcomes.

Zambia is among the 30 countries with the highest tuberculosis (TB) burden. Despite efforts to control the disease, TB remains a significant public health issue, partly due to underreporting, with an estimated 40% of cases going undetected. Delayed diagnosis and low uptake of TB preventive therapies, at just 18%, have contributed to treatment outcomes that exceed the World Health Organization's (WHO) recommended threshold of less than 5% unfavorable results. The estimated TB incidence in Zambia stands at 427 per 100,000 people, and 61% of those diagnosed with TB are co-infected with HIV. Additionally, multidrug-resistant TB (MDR-TB) occurs in 0.3% of new cases and 8.1% of retreatment cases.

In response to the global TB crisis, the WHO introduced the Directly Observed Therapy (DOT) policy in 1993 to improve patient adherence to treatment. However, DOT has been criticized for its paternalistic approach, and its implementation by National TB Programs (NTPs) faces challenges due to socioeconomic factors. Modern public health strategies to control TB acknowledge the complexities of managing MDR-TB and HIV co-infections, as well as the burdens associated with long treatment durations, pill load, and the overburdened TB control programs. Cultural and socioeconomic factors, such as stigma, poverty, and inequality, also influence how patients seek care. Stigma often leads to discrimination and social exclusion, worsening healthcare access. Poverty further limits patients' ability to afford transportation or take time off work, and hunger exacerbates the side effects of TB treatment. Children, who are particularly difficult to diagnose with TB, are often underrepresented in NTPs.

In Zambia, despite longstanding DOT and awareness campaigns, optimizing the NTP remains a challenge, with issues such as pre-hospital delays and non-adherence to treatment persisting. Many studies focusing on TB care in Zambia use quantitative methods, often concentrating on HIV-TB co-infections, are conducted in rural areas, and frequently overlook children with TB.

Lusaka, the capital of Zambia, has several residential areas that have emerged due to rural-urban migration. In addition to this, Lusaka is home to numerous industries and private businesses, attracting people seeking employment and engaging in petty trade. This influx may have contributed to the rising number of TB cases reported, as many individuals in these areas live in poor conditions. In 2015, a total of 41,588 TB cases were reported nationally, with Lusaka alone accounting for 16,339 cases (39%).

Studies indicate that various factors influence TB treatment outcomes across different countries and even among communities within the same country. Identifying the specific factors affecting treatment outcomes in distinct environments is crucial for developing targeted strategies to reduce the disease burden. However, in Lusaka district, surveillance data is not regularly analyzed to pinpoint risk factors that may contribute to poor treatment outcomes.

A study in Lusaka identified several socio-demographic factors, including poverty, female gender, extra-pulmonary TB, old age, marital status, and HIV co-infection, as contributors to unfavorable treatment results. Treatment adherence remains a significant challenge in Zambia, with research showing that 29.8% of patients in Ndola stopped following their treatment regimen once they began to feel better (Kaona et al., 2004), and 19% in Lusaka defaulted on their treatment, primarily due to negative attitudes toward medication (Mweemba et al., 2008).

In Chipata Eastern Province TB notifications was 2843 and cure rates was 83% and 17% not cured due to defaulting and deaths in 2011, Namuseche Correctional Health Centre, located in Chipata, has one of the highest rates of TB infections and treatment defaulters, largely due to overpopulation.

In conclusion, the rate of compliance, adherence, and defaulting during the intensive phase of anti-TB treatment remains high. Various factors have been identified by patients as reasons for abandoning treatment. Strengthening pre-treatment counseling and educating patients about TB and the potential side effects of TB medications can significantly improve adherence and reduce the risk of defaulting. Additionally, fostering a positive relationship between patients and healthcare providers is crucial for enhancing treatment adherence. Therefore, it is essential to address these issues to improve the quality of life for TB patients and the overall effectiveness of tuberculosis care and services.

### *C. Statement of the Problem*

The research problem explored in this study focuses on assessing anti-TB treatment compliance and identifying the factors that predict poor adherence and persistent defaulting among TB patients in the Namuseche area of Chipata, Eastern Province. Defaulting on TB medication poses a significant challenge to both local and global efforts to control the disease. It elevates the risk of drug resistance, treatment failure, relapse, and death, while also extending the period of infectiousness. Despite various initiatives by health authorities, some patients continue to struggle with adherence, leading to treatment default before completing both the intensive and continuation phases of treatment, including for multidrug-resistant TB (MDR/XDR TB).

Currently tuberculosis is globally the second leading cause of death leading to about 1.5 million deaths per year. Defaulting tuberculosis treatment makes it more vulnerable for patients with tuberculosis and TB/HIV co-infection to be highly infectious and may eventually die. Most people who are called lost to follow up don't have inadequate information to why they should continue and finish their tuberculosis medication. Distance to the health facility, lack of confidentiality among health workers has also contributed to patient defaulting treatment.

Therefore there is need for rapport building between health workers and tuberculosis patients in order to make patient be free with them and be able to express their challenges regarding treatment for tuberculosis which require commitment to prevent poor adherence, poor compliance, defaulting and improve quality of life. There is also need for enhanced pretreatment counselling, education on adverse effects of tuberculosis drugs and the importance of keeping appointment dates. Patients should be encouraged to stop drinking alcohol because alcohol worsens the condition. Therefore the government in particular the ministry of health needs to partner/collaborate with other organizations, stakeholders, media, community and chiefs in order to sensitize on the importance of completing tuberculosis medications.

### ➤ *Purpose of the Study*

The purpose of this study is to assess anti-TB treatment compliance, factors predictive for poor adherence and perpetual defaulting among patient living with tuberculosis.

### ➤ *General Objectives.*

- *The main Objective of this Research is to;*



Investigate anti-TB treatment compliance, factors predictive for poor adherence and perpetual defaulting among patient living with TB in Namuseche area Chipata eastern province.

#### D. Specific Objectives

The following objectives will guide this study;

- To establish factors that contributes to poor compliance and defaulting to the required *Tuberculosis* treatment among patients in Namuseche Chipata Eastern Province.
- To analyze the effects of poor compliance and defaulting to *Tuberculosis* drugs on patients in Namuseche Chipata Eastern Province.
- To come up with reliable suggestions which could be used to reduce defaulting among *Tuberculosis* patients and improve compliance and adherence in Namuseche Chipata Eastern Province.

#### E. Research Questions

The study will incorporate the following questions;

- Which factors contribute to poor compliance and defaulting to the required *Tuberculosis* treatment among patients in Namuseche Chipata Eastern Province?
- What are the effects of poor compliance and defaulting to *Tuberculosis* drugs on patients in Namuseche Chipata Eastern Province?
- Which reliable suggestions could be used to reduce defaulting among *Tuberculosis* patients and improve compliance and adherence in Namuseche Chipata Eastern Province?

#### F. Delimitation of the Study

**This study will** explore anti-TB treatment compliance and the factors predictive for poor adherence and perpetual defaulting among patient living with tuberculosis. As such, it **will be delimited to the medical experts such as Doctors**, Clinical officers, Nurse, Lab tech, EHT, psychosocial counsellors and TB patients. **This will be done, so as to** explore predictive factors for poor adherence and perpetual defaulting among patient living with tuberculosis.

#### G. Definition of Operation Terms

- **Tuberculosis**: This is a chronic, progressive infection with a period of latency following initial infection. It's spread through the air from one person to another. It occurs most commonly in the lungs. Pulmonary symptoms include productive cough, chest pain, and dyspnea. Diagnosis is most often by sputum culture and smear. Treatment is with multiple antimicrobial drugs.
- **Latent Tuberculosis**: Infection of tuberculosis but the patient does not suffer active disease and is not contagious.
- **Active Tuberculosis**: TB that has been confirmed by clinical and positive sputum smear or chest x-ray result suggestive of TB
- **Compliance**: Compliance is defined as adherence to a prescribed therapeutic regimen because of a perceived self-benefit and a positive outcome. Patient compliance describes the degree to which a patient correctly follows medical advice or drug compliance.
- **Noncompliance**: This is also called non-adherence or concordance occurs when a patient fails to take medication as directed. Noncompliance with therapy is one of the biggest threats to successful TB treatment and one of the most common problems encountered in clinical practice.
- **Adherence**: The extent of correspondence between the patient's actual dosing history and the prescribed regimen. Defined by the world health organization as the extent to which a person's behavior in taking medication, corresponds with agreed recommendations from a health care provider.
- **Poor adherence**: Non-adherence: The number of doses not taken or taken incorrectly that jeopardizes the patient's therapeutic outcome.
- **TB defaulter**: is a patient who fails to collect their TB treatment for two consecutive months patients with pulmonary TB who default may have sputum samples that are smear positive for acid fast bacilli (AFB), indicating high risk of transmission to others. Defaulting on TB medication is a major barrier to its local and global control.
- **Treatment regimens**: Treatment of all patients with new, previously untreated TB should consist of a two month initial, intensive phase and four months continuation phase.
- **Ant-TB drugs**: These are drugs that works against tuberculosis. This includes Rifampicin, Isoniazid, Pyrazinamide and Ethambutol in pulmonary and extra pulmonary TB, and
- **Pill burden**: This refers to the number of pills (tablets or capsules, the most common dosage forms) that a patient takes on a regular basis, along with all associated efforts that increase with that number like storing, organizing, consuming, and understanding the various medications in one's regimen.
- **Pulmonary TB**: This is an infectious disease primarily affecting lung parenchyma is most often caused by mycobacterium tuberculosis.

- **Extra Pulmonary TB:** (EPTB) is TB outside the lungs. it may spread to any part of the body including meninges, kidney, bones and lymph nodes. EPTB includes lymphadenitis (often cervical), pleuritis, and meningitis, abdominal TB including peritonitis, skeletal TB such as Pott disease (spine), and genitourinary (renal) TB. Miliary TB results from hematogenous spread of *M. tuberculosis* and affects both pulmonary and extrapulmonary sites.
- **MDR-TB: Multi-drug resistance Tuberculosis.** Resistance to at least isoniazid and rifampicin.
- **XDR-TB:** Extensively drug resistant Tuberculosis. Resistance to any fluoroquinolone, and at least one of three injectable second-line drugs (capreomycin, kanamycin and amikacin), in addition to multidrug resistance.
- **DOT:** Directly Observed Therapy, Short course. This means that a trained health care worker or other designated individual (excluding a family member) provides the prescribed TB drugs and watches the patient swallow every dose.
- **Co-infection:** The existence of two or more diseases in an individual at a time.
- **TB/HIV Co-infection:** A person who has HIV infection and TB disease at the same time. People infected with HIV who also have either latent TB infection or TB disease can be effectively be treated for TB.
- **Human Immunodeficiency Virus (HIV):** Is a virus that attacks the CD4 cells or T cells that are responsible for the body's defense system.
- **Acquired Immunodeficiency Syndrome (AIDS):** Is a disease of immune system caused by infection with a retro virus HIV.
- **Risk Factor:** A feature of somebody's habits, socio-economic, environmental, genetic makeup or personal history that increases the probability of disease or harm to health.
- **Investigate:** this, in this research is defined as an act of finding out the cause of and event or an occurrence.
- **Case Study:** This is defined as an intensive study about a person, a group of people or a unit, which is aimed to generalize over several units'. A case study has also been described as an intensive, systematic investigation of a single individual, group, community or some other unit in which the researcher examine.
- **Sustainable:** this is an ability to make use of anything without forgetting the future. It means being able to make use of the opportunities in respect to the future of the society.
- **Nutrition:** is the biochemical and physiological process by which an organism uses food to support its life. It includes ingestion, absorption, assimilation, biosynthesis, catabolism and excretion.



## CHAPTER TWO

### RELATED LITERATURE REVIEWED

#### ➤ Overview

A literature review is a survey of scholarly sources on a specific topic. It provides an overview of current knowledge, allowing you to identify relevant theories, methods, and gaps in the existing research (Published on February 22, 2019, by Shona McCombes). This chapter will report a detailed synthesis of the literature review on studies done on tuberculosis, an overview of tuberculosis, assess anti TB treatment compliance, factors predictive for poor adherence and perpetual defaulting.

#### ➤ Overview of the Condition

Tuberculosis (TB) is a respiratory infection caused by the rod-shaped bacterium *Mycobacterium tuberculosis*. It is characterized by symptoms such as night sweats, fever, weight loss, and a cough lasting more than 14 days. In HIV-positive individuals, a cough of any duration may indicate TB. This airborne disease is treatable, and only pulmonary TB is considered infectious. TB is classified as a notifiable disease, transmitted through airborne droplets when an infected person coughs, talks, sings, laughs, or sneezes. Globally, the incidence of TB is on the decline; however, it remains a significant public health challenge in Zambia. With an incidence rate of 376 cases per 100,000 population, Zambia ranks among the top 30 countries with the highest burden of TB. Although the notification rates and overall number of reported cases have decreased over the past decade, this may not accurately reflect a genuine decline in incidence. The TB prevalence survey conducted between 2013 and 2014 indicated that TB burden varies significantly across different provinces, with Copperbelt Province exhibiting the highest prevalence, followed by Lusaka Province. To achieve the objectives outlined in the National TB Strategic Plan (2017–2021), which aligns with the National Health Strategic Plan, the global End TB Strategy, and the Sustainable Development Goals, focused efforts are essential to identify and address the missing TB cases in the country.

The tuberculosis (TB) epidemic in Zambia is largely driven by the high prevalence of the human immunodeficiency virus (HIV), which significantly increases the risk of developing active TB from both latent and new infections. In HIV-negative individuals, the lifetime risk of developing TB is approximately 10%, while for HIV-positive individuals, the risk rises to 10% each year. Other factors contributing to TB risk in Zambia include poverty, overcrowded living conditions, exposure to silica dust, and other immune-suppressing conditions such as diabetes, cancer treatments, and occupations that expose individuals to lung-damaging dust, like mining. The strategy for TB prevention and elimination in Zambia focuses on addressing these key risk factors. Timely detection and treatment are essential to reduce transmission, as undiagnosed cases contribute to the ongoing spread of the disease. Every healthcare service level, including community-based care, must prioritize TB screening at every opportunity, ensuring that patients and clients are properly assessed for TB symptoms.

Additionally, infection prevention measures are critical, particularly in healthcare settings, to reduce the risk of nosocomial transmission of TB. Proper infection control protocols help prevent the spread of the disease within healthcare facilities, protecting both patients and healthcare workers.

Early case finding and appropriate treatment of tuberculosis (TB) using directly observed treatment (DOT) are central to TB elimination efforts. The treatment of TB aims to cure patients, restore their quality of life and productivity, prevent further transmission within communities, reduce the risk of relapse, and prevent both death from active TB or its complications and the development of drug resistance, including multidrug-resistant (MDR-TB) and extensively drug-resistant TB (XDR-TB) (WHO, 2020).

The principles of TB treatment emphasize the use of correct doses of multiple drugs to ensure the effectiveness of therapy. Importantly, adding a single drug to a failing regimen is not recommended, as this approach does not effectively combat the infection and can promote resistance. Monotherapy, or the use of a single anti-TB drug, should never be employed for treating active TB, as this increases the likelihood of drug resistance. TB medications should be taken daily for a specified duration, depending on the severity and form of the disease (Zambia National TB Strategic Plan, 2017–2021).

Adherence refers to how closely a patient follows the health care regimen that has been agreed upon between the patient and health care provider through shared decision-making. It includes taking the prescribed doses correctly, at the right time, and for the full duration as directed. This is essential for the success of TB treatment. Adherence to care also involves attending all clinic appointments and following other instructions from health care providers. Good adherence has several positive effects, including reducing the likelihood of treatment failure, preventing the development of drug resistance, lowering morbidity and mortality rates, halting the transmission of TB, and improving the overall quality of life of patients. The goal is to achieve 100% adherence (WHO, 2020). Effective strategies to promote adherence include encouraging patients to identify treatment supporters they are comfortable with, preferably non-relatives to avoid emotional sympathy that could affect medication adherence. Structured adherence sessions should be provided to all patients and their treatment supporters both before treatment and reinforced at each clinic visit. Treatment supporters should also attend counseling sessions and clinic visits, and structured treatment preparation should be conducted before initiating TB treatment (Zambia National TB Strategic Plan, 2017–2021). Barriers to adherence on the patient side include

inadequate knowledge about the treatment duration, lack of understanding of TB/HIV services, self-stigma, medication side effects, language barriers, co-morbidities, psychiatric issues, difficult living conditions, and pill burden. Health care system barriers include insufficient DOT supporters, the time and cost associated with accessing treatment, inadequate information provided about TB/HIV co-infection, medication stock-outs, and a shortage of healthcare workers. For children, poor supervision of medication, unreliable caregivers, lack of understanding of the disease by caregivers and the child, and the absence of a caregiver (especially in the case of street children) are key barriers to adherence (WHO, 2020).

When addressing non-adherent tuberculosis (TB) patients, it is essential to be nonjudgmental and focus on building a trusting and caring relationship. Health care providers should work diligently to encourage voluntary adherence by discussing the benefits of treatment for the patient, their family, and the broader community. It is equally important to explain the risks of non-adherence, such as incomplete treatment and potential transmission to others, while showing empathy. For difficult patients, referrals for help from family members, respected community figures, social workers, or religious leaders may be helpful.

For non-adherence in children, identifying the primary caregiver is crucial. Understanding the reasons for non-adherence and conducting adherence sessions with all caregivers is necessary, as counseling only the child or adolescent is insufficient. Disclosure of the condition to the child or adolescent is important, and offering verbal praise for efforts in adherence can be encouraging. A supportive, continuous relationship with the child or adolescent should be developed to sustain adherence.

In cases where all options to gain adherence fail and the patient remains infectious, involuntary isolation may become the last resort. Under the Public Health Act, registered medical practitioners can authorize the detention of any individual who poses a public health risk. The patient would be detained until they are free from infection or can be safely discharged without endangering the public.

Patients who default from treatment are often asked open-ended questions to provide the main reason for their default. Default from TB treatment tends to occur most frequently during the early months of treatment, with many smear-positive patients defaulting before confirmation of bacteriological conversion. Early defaulting may result from inadequate pre-treatment health education and counseling, insufficient defaulter tracing due to overworked health personnel, patients feeling better after starting medication, and socioeconomic factors like lack of food or high opportunity costs. Common reasons for default include lack of knowledge about the importance of treatment compliance, travel outside the treatment area, missed clinic appointments, and running out of medication. Predictive factors for default include limited knowledge about TB, use of herbal medications, low income, alcohol abuse, prior default, HIV co-infection, and male gender. Improved education, counseling, and tracing mechanisms are needed to address these issues and reduce default rates.

#### ➤ *Health care and System Related Factors*

Among the 120 patients who failed to complete their TB treatment, 15 (12.5%) indicated that their default was due to traveling away from their treatment locations, which led to missed appointments and a shortage of medication. Additional factors related to health facilities that contributed to defaulting included a lack of medication availability on scheduled clinic days, inadequate health education on TB from healthcare providers, insufficient emphasis on the importance of treatment adherence, and poor management of drug side effects. Limited access to healthcare services and extended wait times for treatment also played a role in non-adherence. Specifically, patients who waited more than one hour for services were more likely to default, although this association was not significant after adjusting for other variables. Negative attitudes from healthcare staff, such as being unfriendly, lacking empathy, and failing to maintain confidentiality and dignity, were also reported as reasons for defaulting (Mature, B.N., Karaka, M.N., et al., September 9, 2011).

#### ➤ *Social and Economic Factors*

Among the defaulters, 8 patients (6.6%) reported that insufficient food was a factor contributing to their treatment discontinuation. Analysis of primary data revealed that being unmarried, having an education level lower than secondary, residing in the treatment area for less than two years, and experiencing stigma were linked to higher rates of default (Mature, B.N., Karaka, M.N., et al., 2011). Additionally, the use of herbal medications and low income were identified as predictive factors for non-adherence.

Non-adherence to anti-TB treatment remains a significant challenge in enhancing tuberculosis treatment outcomes in Zambia, where the rate of non-adherence among TB patients continues to be alarmingly high (Zambia National TB Strategic Plan, 2017). Factors independently associated with non-adherence include a lack of information about potential adverse effects of treatment, a history of previous anti-TB treatment, failing to disclose their TB status to family members, and smoking cigarettes (Smith et al., 2020). To address these issues, healthcare providers must educate TB patients about the potential side effects of anti-TB treatment and the appropriate actions to take if they encounter these adverse events (Jones & Lee, 2019). It is also essential for providers to encourage patients to share their TB status with their families and to discuss the negative impact of smoking on treatment effectiveness (Ngoma, 2021).

- *Health Provider Patient Relationship*

The absence of a supportive healthcare provider can hinder the establishment of a trusting relationship with patients undergoing tuberculosis treatment, which negatively impacts anti-TB treatment compliance, adherence, and increases the likelihood of defaulting (Mature et al., 2011). Consequently, fostering a positive patient-provider relationship is crucial for enhancing treatment compliance and reducing default rates. It is strongly recommended that healthcare providers utilize interpersonal rapport-building strategies in conjunction with objective methods, such as direct observation of treatment, measurement of drug levels, or ingestible sensors, to ensure accurate monitoring of adherence (Jones & Lee, 2019; Ngoma, 2021).

Research indicates that housewives have a 16.5% likelihood of defaulting on tuberculosis (TB) treatment, while employed individuals face a 21.4% chance of non-adherence to their TB medication. This is largely attributed to insufficient support from partners in reminding them to take their anti-TB medications, as well as the demands of overwork, which often lead patients to forget their treatment schedules (Smith et al., 2020; Nkosi, 2021).

- *Educational Level*

In terms of educational attainment, individuals with no formal education and those who completed secondary school exhibit the lowest rates of defaulting on tuberculosis (TB) medication, each at 12.6%. In contrast, individuals with postgraduate education have a default rate of 16.5%, while university graduates show a higher rate of 19.4%. The highest likelihood of default is seen in the primary education demographic, with a significant 38.8% default rate. Additionally, there is a slight difference in default rates between employed (30.1%) and unemployed individuals (32.0%). At treatment adherence, it is crucial to implement continuous and effective health education programs for patients and their families, alongside providing social support when initiating TB medications. Regular monitoring, counseling, and access to healthcare facilities and medications are essential for enhancing adherence and compliance with anti-tuberculosis drugs. Moreover, patient knowledge regarding the Directly Observed Treatment, Short-course (DOTS) strategy has a significant relationship with adherence levels. When patients understand the treatment schedule, the risks associated with non-compliance, and the effectiveness of their medications, they are more likely to adhere to their treatment plans. Higher levels of patient knowledge correlate with improved adherence; conversely, inadequate understanding can lead to non-compliance. Therefore, comprehensive education about the treatment process is vital for fostering awareness of the importance of adherence and the potential health implications of non-compliance (WHO, 2016).

- *Location*

Patient location significantly affects treatment compliance, adherence, and defaulting in tuberculosis (TB) management. The distance to health centers and the associated transportation costs for accessing medical services and collecting medications on a weekly basis contribute to poor adherence and eventual defaulting of TB treatment (Aderiye et al., 2017). Rural patients often face greater challenges due to the geographical barriers they encounter, which can hinder their ability to maintain regular treatment schedules (Chowdhury et al., 2020). Therefore, it is essential for health workers to implement community-based strategies, such as home visits, particularly for patients residing in rural areas, to enhance support and reduce the rates of defaulting on TB treatment (Ratanawong et al., 2019).

- *Stigma*

Reviews indicate that the stigma surrounding tuberculosis (TB) remains significantly high, manifesting in low self-esteem, humiliation, social exclusion, and isolation. These stigmatizing experiences can lead to a decline in quality of life and delays in seeking healthcare, ultimately resulting in decreased treatment adherence (Khan et al., 2018). Studies have shown that the majority of TB patients experience stigma related to various factors, which often obstruct effective TB control efforts (Madhav et al., 2019).

To address these challenges, intervention strategies should be implemented, including health education initiatives, home visits, patient support groups, social support, financial assistance, and improvements in the quality of care provided by health workers (Akinyemi et al., 2020).

- *Income Level*

Another possible explanation for early treatment default among tuberculosis (TB) patients is the lack of adequate food, particularly due to unemployment, especially in rural areas. Patients undergoing TB treatment often experience an increased appetite, which, while a positive indicator of clinical response, can pose challenges for low-income individuals who struggle with food access (Hussain et al., 2019). Inadequate food intake may negatively impact treatment adherence, as proper nutrition is vital for recovery (Singh et al., 2020). Moreover, the necessity of collecting medications weekly incurs transport costs that can further hinder adherence to treatment. In our study, a significant majority (66.1%) of the patients reported being unemployed, suggesting that limited resources for transport and other opportunity costs likely contributed to difficulties in maintaining treatment compliance (Osei et al., 2021).

- *Patient Related Factors*

Ignorance of the need for treatment compliance, coupled with inadequate knowledge about tuberculosis (TB), was cited by 20 out of 120 patients (16.7%) as the most frequent reason attributed to default. Assessment of factors related to knowledge about TB

showed that among cases, 90 (75.3%) had no history of TB in their households compared with 115 (74.7%) of the controls. Additionally, 68 (56.6%) of the cases did not suspect TB at onset, while 81 (52.6%) of the controls were in the same situation. Furthermore, 55 (45.9%) of the cases compared to 29 (19.1%) of the controls had never read any material or attended any TB health education session prior to their illness. Among the cases, 35 (31.0%) were unaware that TB is curable compared to 5 (3.2%) of the controls, while 24 (20%) of the cases compared to 5 (3.2%) of the controls did not know the duration of TB treatment. Prior attendance to a TB health education session, awareness that TB is curable, and knowledge about the duration of treatment, as well as perceiving TB as any other disease, contributed to better adherence (Moyo et al., 2020).

Univariate analysis of secondary data indicated that young adults (OR 1.43; 95% CI 1.04-1.98) and the elderly (OR 2.89; 95% CI 1.42-5.91) were at a higher risk of default compared to children. Additionally, inadequate knowledge about TB (OR 8.67; 95% CI 1.47-51.3) and the male gender (OR 1.43; 95% CI 1.15-1.78) were independently associated with default on multivariate analysis (Ibid).

TB education should begin at the patient's initial visit to the health facility and continue at each subsequent visit. All health staff and community supporters should educate TB patients and their relatives about their disease (Chanda et al., 2019). Education is essential for obtaining the patient's cooperation regarding the required treatment. It is crucial to recognize that patient education is a dialogue vital for achieving a high cure rate, ensuring good adherence, and preventing treatment default. Key educational messages should include:

- Understanding what TB is and how it is transmitted.
- Knowing the duration of treatment and expected outcomes.
- Recognizing the importance of treatment compliance and adherence.
- Managing circumstances such as travel and loss of tablets.
- Being aware of possible side effects.
- Emphasizing the importance of keeping appointments.
- Encouraging a varied diet.
- Taking medication 30 minutes before eating.
- Implementing prevention and infection control measures, including cough etiquette (coughing into a handkerchief or tissue, covering the mouth when coughing with the inner elbow, and spitting into a container).
- Discouraging the use of concomitant remedies, such as traditional medicines or herbs (Munyati et al., 2020).

#### ➤ *Condition Related Factors*

Recurring alcohol abuse and the subsequent forgetting to take drugs, which eventually leads to defaulting, were cited by 9 out of 120 cases (7.5%) (Ibid). Other medical reasons for default included psychiatric conditions, development of multi-drug resistance, TB misdiagnosis, heart problems, and pregnancy (Ibid). From primary data, alcohol abuse—defined as the recurring use of alcoholic drinks despite negative consequences—was found to be a predictive factor for default (OR 4.97; CI 1.56-15.9) (Ibid).

Further analysis of secondary data indicated that co-infection with HIV/AIDS (OR 1.57; 95% CI 1.28-1.93) and a history of default (OR 2.16; 95% CI 1.14-4.09) were also predictive of default (Ibid). HIV co-infected patients are reported to have twice the risk of defaulting during the intensive phase of TB treatment compared to HIV-negative patients (Ibid). HIV co-morbidity was identified as a significant predictor of default, as the side-effect profile of TB chemotherapy is often magnified in patients undergoing concurrent HIV treatment (Ibid).

Moreover, the combination of antiretroviral (ARV) drugs and TB medication increases the number of tablets patients must take daily, contributing to pill burden. This can be difficult and challenging for patients, leading to poor adherence and defaulting on TB treatment (Ibid). The higher likelihood of default among patients with HIV co-morbidity highlights the need for integrated HIV and TB care (Ibid). In response, the National Tuberculosis Control Program and the National AIDS and Sexually Transmitted Diseases (STD) Control Program in Zambia have implemented a policy of screening TB patients for HIV at treatment sites, and vice versa, as part of their integrated care efforts. This integration is crucial for addressing the unique challenges posed by co-infection and ensuring both TB and HIV patients receive comprehensive care (Ibid).

#### ➤ *Therapy Related Factors*

Anti-tuberculosis (TB) drug side effects were cited by 13 (10.8%) of defaulters as the reason for their default, though univariate analysis showed that side effects were not significantly associated with default (Ibid). Another 14 (11.7%) defaulters mentioned feeling better after a while on medication, perceiving it as a cure, which led them to stop taking their drugs. TB drug side effects are typically classified into minor and major categories. Patients with minor side effects are usually advised to continue their treatment and seek symptomatic relief at their local health facility. However, if major side effects occur, TB treatment should be stopped, and the patient referred to a higher level of care. One key concern is the concomitant use of herbs, which can lead to hepatotoxicity (liver damage) and nephrotoxicity (kidney damage), potentially causing treatment default (Ibid).



Regular alcohol use, alongside hepatotoxic drugs like fluconazole, nevirapine, and protease inhibitors, as well as conditions like viral hepatitis and chronic liver disease, also heightens the risk of defaulting on TB treatment. Similarly, a history of peripheral neuropathy from diabetes, alcoholism, malnutrition, or pregnancy, as well as the immediate postpartum period, and malnutrition itself, are all factors that can complicate TB treatment adherence (Ibid).

Hepatotoxicity, especially during the administration of first-line anti-TB medications such as isoniazid, rifampicin, and pyrazinamide, is common and can limit their use. Drug-induced hepatitis (DIH) can occur at any point during TB treatment and is typically a diagnosis of exclusion, meaning other potential causes of liver damage—such as acute viral hepatitis or disseminated TB—must first be ruled out (Ibid). One of the clearest signs of DIH is an increase in serum alanine aminotransferase (ALT), which is more specific for liver injury than an increase in aspartate aminotransferase (AST). Discontinuation of the suspected medication and a subsequent drop in ALT levels is often the strongest confirmation of a DIH diagnosis. To prevent further hepatic deterioration, temporarily stopping all anti-TB drugs (such as RHEZ or RH) is a standard measure, allowing the liver to recover before treatment is resumed (Ibid).

#### ➤ *Religion Factors*

Religious beliefs and practices can significantly influence patients' adherence to medical treatment, including anti-TB drugs. In many communities, particularly those with strong religious inclinations, there is a belief that faith and prayer alone can lead to healing. This belief may lead some patients to prioritize religious rituals over medical interventions, resulting in poor compliance with treatment regimens (Harries et al., 2016). Some churches or religious sects may discourage biomedical treatments, instead promoting faith-based healing methods, which could cause patients to default on their TB medication. In a study conducted in Zambia, it was observed that some religious groups opposed the use of modern medicine, leading to delays in treatment and, in some cases, treatment discontinuation (Chanda-Kapata et al., 2017). Additionally, certain church activities such as fasting could interfere with the prescribed medication schedule, causing patients to miss doses, further complicating treatment adherence (Kaunda et al., 2015).

#### ➤ *Cultural Factors*

Cultural beliefs also play a crucial role in TB treatment adherence. In rural settings like Namuseche, traditional healers are often the first point of contact for individuals with symptoms of illness, including TB. The reliance on traditional medicine, driven by cultural norms, can delay the initiation of anti-TB therapy, thus contributing to non-compliance (Kapata et al., 2015). Furthermore, cultural stigma associated with TB, often perceived as a "curse" or "punishment," can lead patients to hide their diagnosis or avoid treatment for fear of social ostracism (Ayles et al., 2013). In many cases, patients may stop taking their medication prematurely due to improvements in symptoms, as culturally, there may be a belief that visible signs of recovery indicate full recovery (Mbewe et al., 2014). This behavior significantly contributes to the phenomenon of perpetual defaulting.

#### ➤ *Health Infrastructure and Resources*

The availability of healthcare infrastructure and resources is a crucial determinant in TB treatment adherence. Healthcare facilities in rural areas, may lack essential resources such as diagnostic tools, laboratory equipment, and adequate medications. A shortage of healthcare personnel and outdated infrastructure can delay treatment initiation and follow-up care (Ong'ang'o et al., 2014). Inconsistent access to TB medications due to supply chain disruptions also contributes to non-adherence, as patients may become discouraged when unable to get their prescribed drugs on time (Gloyd et al., 2019). Poor infrastructure may also limit patients' ability to access directly observed treatment (DOTS), which is critical for maintaining adherence.

#### ➤ *Technological Factors*

The use of technology in healthcare, particularly in TB management, has the potential to improve treatment adherence. Mobile health (mHealth) interventions, such as SMS reminders, mobile apps, and telemedicine, have been shown to support adherence by reminding patients to take their medication and attend follow-up appointments (Mohammed et al., 2016). In rural areas where access to healthcare is limited, these tools can bridge the gap between patients and healthcare providers. However, the implementation of such technological solutions is often hindered by limited access to mobile phones, internet connectivity, and technical literacy, particularly among older populations and those with low income (Garfein et al., 2012).

#### ➤ *Legal and Policy Frameworks*

National and regional policies related to tuberculosis control and prevention can influence adherence to treatment. Strong legal frameworks, such as those supporting the DOTS strategy, can improve adherence through regular monitoring, community engagement, and access to free medication (World Health Organization, 2015). Conversely, weak enforcement of these policies, especially in rural areas, can result in poor follow-up and defaulting from treatment (Uplekar et al., 2015). In Zambia, while TB policies are generally supportive, there are gaps in the implementation, particularly in reaching underserved populations (Mwansa et al., 2014). The legal framework governing TB control should address these gaps to ensure equitable access to treatment.

#### ➤ *Gender-Based Violence and Domestic Instability*

Gender-based violence (GBV) and domestic instability can negatively impact TB treatment adherence, particularly among women. In situations of domestic violence, women may have limited autonomy in seeking healthcare or following through with

treatment (Dodor & Kelly, 2010). Fear of violence, social control by abusive partners, and economic dependency can prevent women from adhering to TB treatment, especially if it requires frequent clinic visits or involves disclosing their health status. Domestic instability, such as family conflicts or divorce, can also disrupt treatment schedules and reduce the patient's ability to attend follow-up appointments or secure support for managing side effects (Yoshikawa et al., 2020).

➤ *Environmental and Occupational Exposure*

Environmental factors, such as poor living conditions, air pollution, and occupational hazards, can influence TB treatment outcomes and adherence. Individuals living in overcrowded conditions, especially in urban slums or informal settlements, are at higher risk of TB infection and reinfection, making adherence to treatment critical (Lönnroth et al., 2010). Occupational exposure to dust, chemicals, or pollutants in industries such as mining, construction, and agriculture can exacerbate TB symptoms, making it harder for patients to complete treatment while maintaining employment.

➤ *Migration and Mobility*

Migration and high levels of mobility among populations, especially in rural and border areas like Namuseche, can severely impact TB treatment adherence. Migrant workers, seasonal laborers, or individuals who move for economic opportunities may struggle to complete long treatment regimens due to their transient lifestyles (Lönnroth et al., 2009). Additionally, patients who travel across borders may face challenges in accessing consistent healthcare, particularly when crossing from Zambia into neighboring countries with different healthcare policies and systems. This movement disrupts follow-up appointments, drug refills, and continuity of care, increasing the risk of treatment interruption (Mathema et al., 2006).

➤ *Mental Health and Psychological Well-Being*

Mental health conditions such as depression, anxiety, and post-traumatic stress disorder (PTSD) are common among patients with chronic diseases like TB, and they can negatively impact adherence (Sweetland et al., 2017). Patients may experience despair, hopelessness, and stigma, which reduces their motivation to continue with treatment. Depression is particularly common in individuals living with TB, and without adequate mental health support, these patients are more likely to default (Pachi et al., 2013). Psychological well-being is crucial for helping patients maintain adherence to long-term treatment regimens, and integrating mental health services into TB care could improve outcomes.

➤ *Family and Household Dynamics*

Family structure and household dynamics play a role in adherence to TB treatment. Supportive family environments often lead to better adherence, as family members may help the patient manage their treatment regimen, attend appointments, and cope with side effects (Jakobsen et al., 2016). Conversely, dysfunctional family settings characterized by conflict, lack of communication, or neglect can negatively affect adherence. For instance, patients living in households with limited social support or with caregivers who do not understand the importance of TB treatment may face additional barriers (Wares et al., 2013). The role of family members as caregivers is particularly significant in ensuring the patient adheres to their treatment plan.

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### ➤ Overview

This chapter will present the research methodology. It will explain how the study was conducted; the elements described in this chapter are Research Design, Study Site, Study Population, Study Sample, pilot study, Data Collection Procedure, Data Collection Instruments and ethical consideration. The chapter will further considers describing Data Analysis Procedure and Ethical Consideration.

#### ➤ Research Design

A research design is a step-by-step approach used by a researcher to conduct a scientific study. It includes various methods and techniques to conduct research so that a research problem can be handled efficiently (Hitesh Bhasin March 17, 2019). A researcher had series of questions that needed to find answers by conducting research. Research method provides a logical sequence to conduct experiments so that all questions can be assessed in proper order. An impactful research design makes sure the least bias in the data collected and increases trust in analyzed research information. A research design which leaves the least margin of errors can be considered the best research design. This study adopted a case study cross-sectional research design. This design was adopted because it allowed data to be collected from the target population horizontally and hence, it provides us with data from population that has different historical backgrounds.

A case study is a systematic investigation into a specific event or set of related events, intended to describe and explain the phenomenon of interest (Yin, 2018). It involves collecting and presenting detailed information about an individual or a small group, often incorporating the perspectives of the subjects themselves (Stake, 1995). Unlike broad statistical surveys, case studies focus on an in-depth examination of a particular situation (Creswell, 2013). As a qualitative research method, case studies explore individuals, small groups, or entire communities, emphasizing detailed contextual analysis of a limited number of events, conditions, and their interrelationships (Merriam, 1998). This method has been employed by researchers across various disciplines for many years. According to Yin (2003), a case study is appropriate when the focus is on answering "how" and "why" questions, especially when the behavior of those involved cannot be manipulated, and when contextual conditions are believed to be integral to the phenomenon under study. Case studies are valuable when the boundaries between the phenomenon and its context are unclear. Through this method, researchers can closely examine data within a specific context, analyze contemporary real-life situations, and test theoretical models in practical settings (Yin, 2003). Although a case study might not fully answer a question, it provides valuable indications and fosters further hypothesis development.

Furthermore, case studies are essential in bridging the gap between knowing what to do and understanding how, when, and why it should be done (Stake, 1995). Case study designs can vary, with common approaches including single-case and multiple-case designs. In a single-case design, events are confined to a single occurrence, which can be limiting due to its inability to generalize, particularly in rare cases. However, multiple-case designs offer a broader scope by replicating real-life events and incorporating various sources of evidence (Yin, 2003).

In light of these considerations, the researcher opted for a case study design to conduct an in-depth investigation into anti-TB treatment compliance and the factors predictive of poor adherence.

#### ➤ Target Population

Kumar (2011) defines the target population as the complete set of individuals or objects being examined in a study, which allows the researcher to apply the conclusions to the broader group. In this case the target population for this research was Namuseche Prison, community members, health workers and health system dealing with TB matters at Namuseche clinic. The selection of participants was gender sensitive. Participants were selected based on having credible information required by researcher.

#### • Inclusion Criteria

Inclusion Criteria can be defined as attribute of subjects that are essential for their selection to participation, (Burns and Grove, 2016). In clinical research, it is essential to select a specific group of relatively uniform, persistent populations. Inclusion criteria specify which individuals can be part of the study sample, ensuring that the study population is identified consistently, reliably, uniformly, and objectively. Therefore, inclusion criterion for this research was only to target those who reside in Namuseche and were capable of providing the needed information for this study.

#### • Exclusion Criteria

Exclusion criteria refer to specific characteristics of potential study participants who, despite meeting the inclusion criteria, possess additional traits that may compromise the study's success or elevate their risk of negative outcomes. Common exclusion factors include attributes that increase the likelihood of participants being lost to follow-up, missing scheduled data collection appointments, providing unreliable data, or having comorbid conditions that could skew the study results or raise the risk of adverse

effects, particularly in intervention-based studies. Therefore, individuals were excluded from this study based on these outlined factors.

#### ➤ *Study Site*

The study site or research setting refers to the physical, social, or experimental environment where the research takes place. Accurately describing this setting in a research paper is important because the results and their interpretation can be significantly influenced by it. This research was carried out at Namuseche Prison Clinic and the surrounding compound in Chipata Township, located in the Eastern Province of Zambia. The area was chosen due to its high incidence of TB defaulters, its accessibility, and the convenience it offered to the researcher.

#### ➤ *Sample Size*

A sample refers to a subset of the population that is representative, allowing researchers to make generalizations about the entire population. Sampling is the process of selecting a portion of the population that reflects the whole, as described by Michael (2012). In this study, participants were selected randomly. Sample size refers to choosing a portion of the population or universe that accurately represents it. Purposive sampling, also known as judgmental or selective sampling, was used, which is a type of non-probability sampling where researchers use their judgment to select participants. Simple random sampling was also employed to obtain a representative sample from a group of subjects with similar characteristics. This method relies on chance, giving every member of the population a non-zero probability of being chosen, which enhances the representativeness of the sample in relation to the target population (Basavanthappa, 2014).

#### ➤ *Sample Size Calculation*

The sample size represents a sub-population that is studied to infer conclusions about a larger reference population, which is the group to which the study findings will be generalized. While a census involves studying the entire population, meaning the sample size equals the population size, research often employs a representative sample due to constraints in time and budget. Thus, a smaller, carefully chosen subset is used to reflect the population (Swati Singh, 2015).

#### ➤ *Study Response*

Table 1 Study Response

Category of Sample	Target number	Number selected	Percentage of number selected	Sampling technique used for section
Medical officers	3	2	66.7%	Random sampling
Clinical officers	7	4	57.1%	Random sampling
EHT	3	1	33.3%	Random sampling
Lab –Tech	3	2	66.7%	Random sampling
Counselors	7	4	57.1%	Random sampling
Nurses	18	12	66.7%	Random sampling
Client	100	60	60%	Random sampling
Total	141	84		

A sample of one hundred forty-one (141) participants was used for the study comprising of one hundred clients, three (03) medical officers, seven (07) clinical officers, three (03) EHT, three (03) Lab-Tech, seven (07) counsellors, and eighteen (18) nurses in TB departments, counselling and ART department. The study recruited more clients because they are the ones who fail to comply, adhere and who defaults TB treatment. Suffice, to say that participant selection were done randomly while paying attention to the ability of people to be able to articulate issues amicably so as to acquire information which is credible, reliable and efficacy.

#### • *Validity of the Instruments*

Validity refers to the ability of an instrument to measure the variable it is intended to measure within the context of its application (Brink, 2013). In this study, validity was ensured by asking each respondent the same questions in the same sequence. The researcher assessed both the validity and reliability of the data collection tools, which included structured interviews and questionnaires, to guarantee accurate results. To avoid ambiguity, questions were clearly formulated, and where necessary, simple terms were used, translating them into local languages (Chewa, Ngoni, Nyanja, and Bemba) instead of medical jargon to ensure respondents understood the questions.

Internal validity, which measures the extent to which the observed effects truly reflect reality rather than extraneous variables (Burns and Grove, 2009), was ensured by consistently asking the same questions to all participants. Content validity was maintained by ensuring that all variables relevant to the study were covered in the interview schedule and questionnaires. Additionally, a pilot study was conducted to test the validity of the data collection tools used.



- *Reliability of the Instruments*

Reliability refers to the consistency of a measuring instrument over time, indicating that the instrument should provide accurate information even when used at different points in time (Basavanthappa, 2010). Ensuring reliability helps standardize the instruments for data collection. In this study, reliability was achieved by testing the research tools through a pilot study conducted in an environment with characteristics similar to those of the main study. This approach ensured that the instruments would yield stable and dependable results during the actual research.

- *Data Collection Procedure*

Data refers to observable and measurable facts that provide information about the phenomenon being studied. Data collection is a systematic process of gathering information relevant to the study's purpose or questions (Kothari, 2021). This study employed three methods of data collection: structured questionnaires, interviews, and documentary reviews. The researcher chose these methods due to their cost-effectiveness. Interviews are particularly suitable for exploring complex and sensitive topics, as they allow the interviewer to prepare respondents before posing sensitive questions and to clarify complex issues in person. On the other hand, the use of questionnaires minimizes face-to-face interaction between respondents and the interviewer (Kothari, 2021), promoting greater anonymity and helping respondents feel more comfortable. This anonymity can enhance the likelihood of obtaining accurate information, especially when sensitive questions are asked. Further details about these tools are provided below.

- *Primary Data*

- *Structured Questionnaires*

Questionnaires consist of a set of questions sent to selected respondents, allowing them to answer at their convenience and return the completed forms to the researcher (Kothari, 2021). This method is effective in ensuring privacy and confidentiality while saving time and costs associated with research. In this study, questionnaires were distributed to respondents who were able to read, understand, and write. The questionnaires were written in English and translated into local languages as needed. For those unable to comprehend the structured questionnaire, semi-structured interviews served as the primary method of collecting data. Respondents were provided with a different set of guiding questions, which were administered by the researcher in both one-on-one and group interview formats. This approach facilitated a deeper understanding of the respondents' perspectives and experiences.

- *Interview*

Interviewing is a widely used method for collecting information from individuals. It encompasses various forms of interaction where individuals gather data through direct engagement with others. An interview is defined as any person-to-person interaction between two or more individuals with a specific purpose in mind (Kumar, 2021). The interview method involves presenting oral-verbal stimuli and receiving oral-verbal responses. This approach can be conducted through personal interviews, and when feasible, through telephone interviews as well (Kothari, 2021). Interviews provide valuable insights and allow for in-depth exploration of participants' thoughts and experiences.

- *Secondary Data*

- *Documentary Review*

The study also utilized secondary data through documentary review. The researcher gathered information from various documents, including journals, theses, newspapers, articles, dissertations, and reports. Unlike oral communication, a document can exist independently of its creator and the context in which it was produced. This method includes data that have already been collected by different researchers and subjected to statistical analysis.

According to Kombo and Tromp (2006), documentation involves gathering information by examining written documents, which serve as a vital source of data in many research areas. The use of documentary methods refers to analyzing documents that contain information relevant to the phenomenon being studied. Payne and Payne (2004) describe the documentary method as a technique for categorizing, investigating, interpreting, and identifying the limitations of physical sources, primarily written documents in both private and public domains. Kothari (2021) defines documentary analysis as the process of reviewing various extracts found in offices or locations associated with the research topic. In this study, different journals, theses, newspapers, and articles were reviewed to gain a deeper understanding of previous work and identify knowledge gaps that the current research aims to address.

➤ *Data Analysis Procedure*

Various methods exist for analyzing both qualitative and quantitative data (Kothari, 2021). In this study, the researcher employed both qualitative and quantitative analysis using Microsoft Excel and SPSS (version 23). Quantitative analysis involved calculating frequencies and percentages to determine overall opinions. The main steps taken to manage the data included organizing and preparing the data for analysis, reading the data, coding, generating categories, and ultimately interpreting the data. This systematic approach ensured a comprehensive understanding of the findings and facilitated effective data interpretation.

➤ *Ethical Consideration*

Observing privacy during the research process is crucial to minimizing potential negative ethical implications. In this study, the privacy of the information collected was prioritized. Respondents were given the opportunity to make self-determined decisions regarding their voluntary participation, ensuring that they felt no intimidation. They were encouraged to skip any questions they were uncomfortable answering, although the importance of providing responses to all questions was emphasized.

Confidentiality was strongly upheld, with all collected data used solely for academic purposes. To maintain confidentiality, codes were assigned instead of names for coding the questionnaires. This approach allowed respondents to provide honest answers in their truest sense, fostering an environment of trust and openness in the data collection process.

- *Beneficence*

Beneficence refers to the ethical obligation to do no harm while maximizing potential benefits, respecting individuals' decisions and ensuring their well-being (Wood and Haber, 2006). In this study, respondents were not subjected to any harm, as the research did not involve invasive procedures. Additionally, to protect participants from psychological harm, they were allowed to complete the questionnaires in a supportive environment that was conducive for both the interviewer and the respondents, reducing the risk of victimization.

The analysis, interpretation, and findings of this study are expected to provide valuable insights into assessing anti-TB treatment compliance, identifying factors predictive of poor adherence, and understanding the reasons for persistent defaulting among patients living with TB in Namuseche, Chipata, in the Eastern Province.

- *Respect for Persons*

Respect for persons emphasizes individuals' rights to self-determination and treatment as autonomous agents (Wood and Haber, 2006). To uphold this principle, the researcher informed each respondent that they had the freedom to decide whether or not to participate in the study. Additionally, the researcher assured respondents of the confidentiality of their personal information, ensuring that their names would not be included on the questionnaires. This approach fostered an environment of trust and respect, allowing participants to make informed choices about their involvement in the research.

- *Justice*

Justice is a fundamental principle that emphasizes the fair treatment of human subjects (Wood and Haber, 2006). In this study, justice was upheld by ensuring that no favoritism was shown to any respondents; all participants were treated equally. Appropriate sampling methods were employed to select respondents, ensuring adherence to the established inclusion criteria. This commitment to fairness helped guarantee that all individuals had an equal opportunity to participate in the research, promoting ethical standards throughout the study.

## CHAPTER FOUR

### DATA PRESENTATION AND ANALYSIS

#### A. Introduction

This chapter highlights the procedures that were used in data analysis and presentation. Data from the questionnaires was entered and cleaned in Microsoft excel and exported to SPSS version 23 for analysis. The total sample size for the study was 141 comprising of 104 patients and 33 health workers.

#### B. Demographic Data

The demographic characteristics of the respondents considered in this study included; gender, age, marital status, employment status and family size.

Table 2 Demographic Characteristic of the Patients

Variable	Category	Frequency	Percent
Gender	Female	60	57.7
	Male	44	42.3
	Total	104	100.0
Age	18-30	69	66.3
	31-40	22	21.2
	41-50	13	12.5
	Total	104	100.0
Marital Status	Divorced	1	1.0
	Married	31	29.8
	Single	72	69.2
	Total	104	100.0
Employment Status	Formal Employment	37	35.6
	Self Employed	16	15.4
	Unemployed	51	49.0
	Total	104	100.0
Family Size	1-3	48	46.2
	4-6	43	41.3
	7 and above	13	12.5
	Total	104	100.0
Education Level	Secondary	10	9.6
	Tertiary	94	90.4
	Total	104	100.0

According to table 1 above, there were slightly more females,60 (57.7%) compared to the males,44 (42.3%). Majority were in the 18-30 age group,69 (66.3%), were single,72(69.2%), were unemployed,51 (49%) and had family size of 1-3,48 (46.2%) and 4-6,43 (41.1%).

#### C. TB Transmission and Prevention

The patients were asked TB transmission and prevention related questions which included; causes and transmission of TB, TB symptoms and whether TB can be prevented and if there is preventive chemotherapy against TB. Other questions included TB drugs and diagnosis and whether there are health promotion campaigns against TB. The responses are shown on the next page.

#### D. TB Infectious Agent

Patients were asked knowledge question regarding TB infectious agent as shown in the figure below.

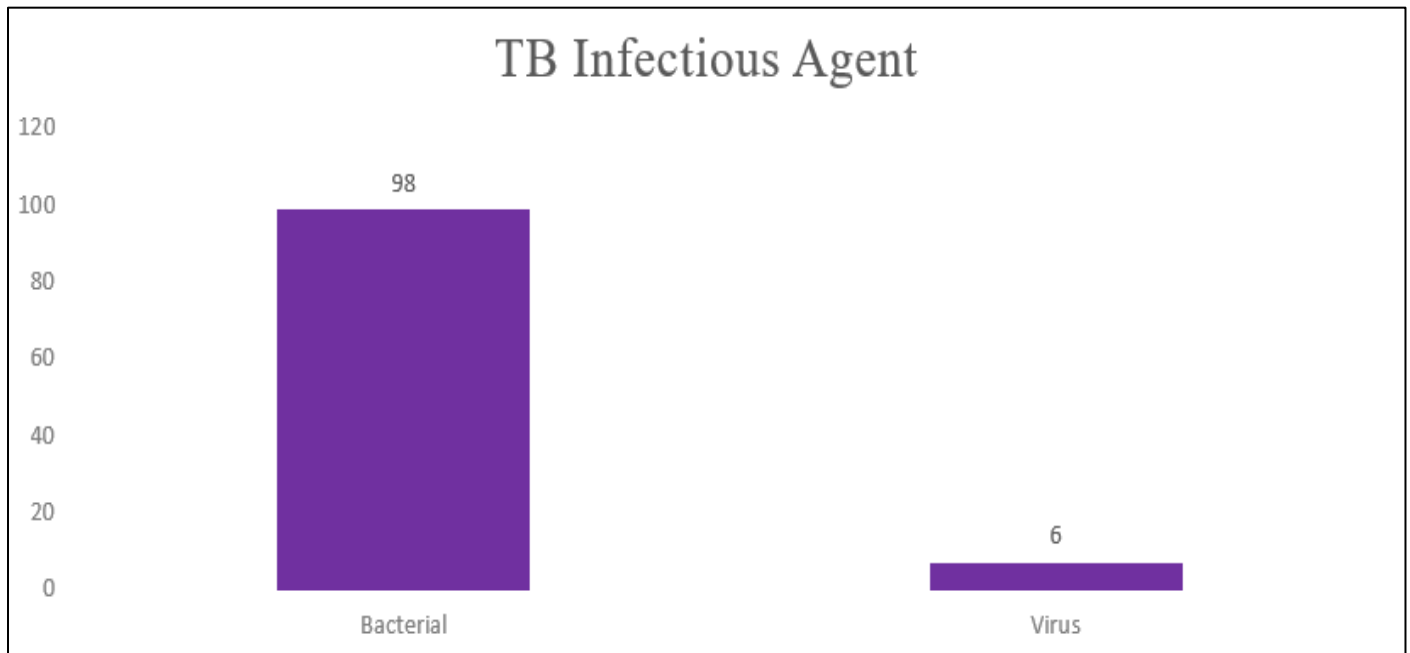


Fig 1 TB Infectious Agent

According to figure 1, 98 (94.2%) of the Respondents were Knowledgeable about the Infectious Agent of TB.

#### ➤ TB Transmission

All the respondents were aware that TB was transmittable, however, there were differences in the knowledge regarding transmission as shown below.

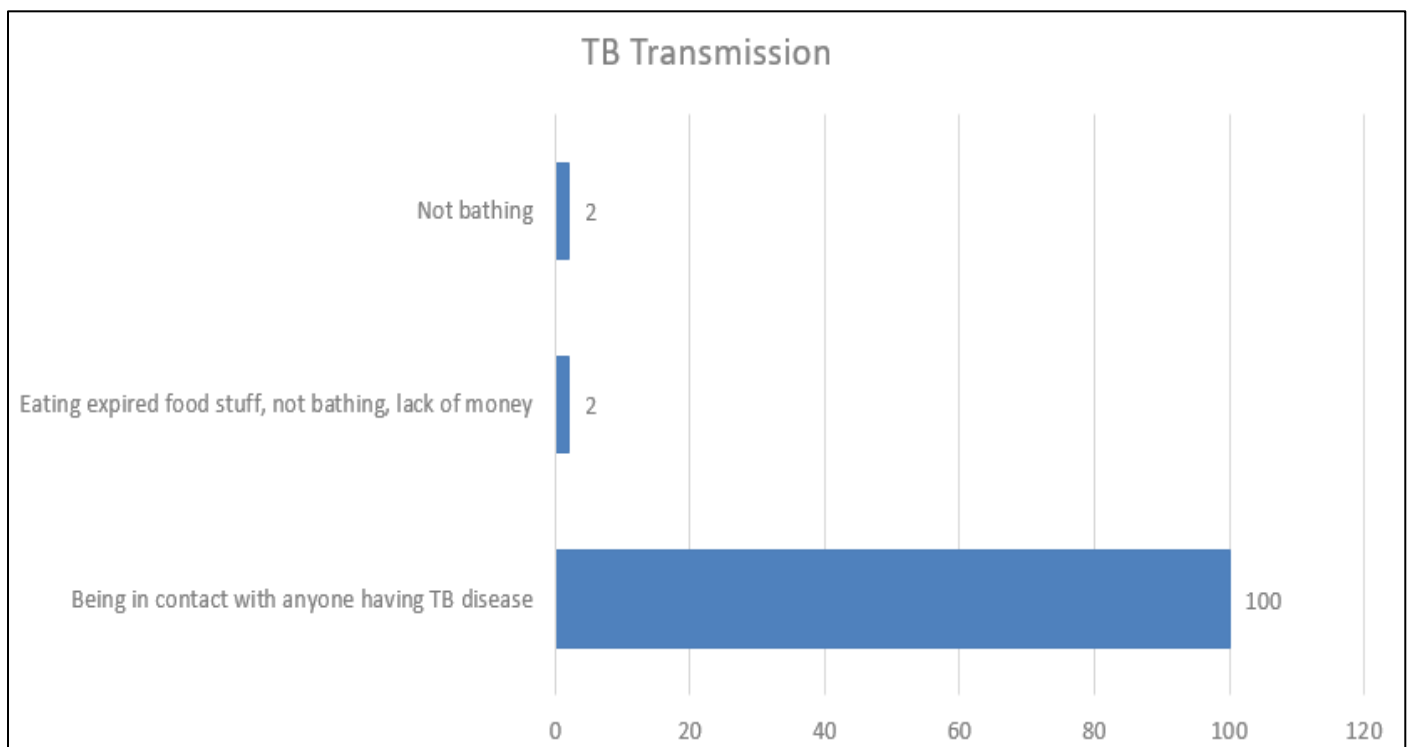


Fig 2 TB Transmission

According to figure 2, 100 (96.2%) of the respondents were knowledgeable about TB disease transmission.

#### ➤ Symptoms of TB

All the respondents were at least aware of the TB symptoms as shown in the table below.

Table 3 Symptoms of TB

TB Symptoms	Frequency	Percent
Coughing out blood, sweating at night, loss of weight	75	72.1
Cough out blood	7	6.7
Cough out blood, sweating at night	1	1.0
Cough out blood, weight loss, sweating at night	7	6.7
Sweating at night	11	10.6
Weight loss	1	1.0
Weight loss, sweating at night	2	1.9
Total	104	100.0

According to the table above 75, 72.1% respondent were knowledgeable on the symptoms of TB.

➤ *TB Prevention*

Knowledge on whether could be prevented was very high as shown in the figure below.

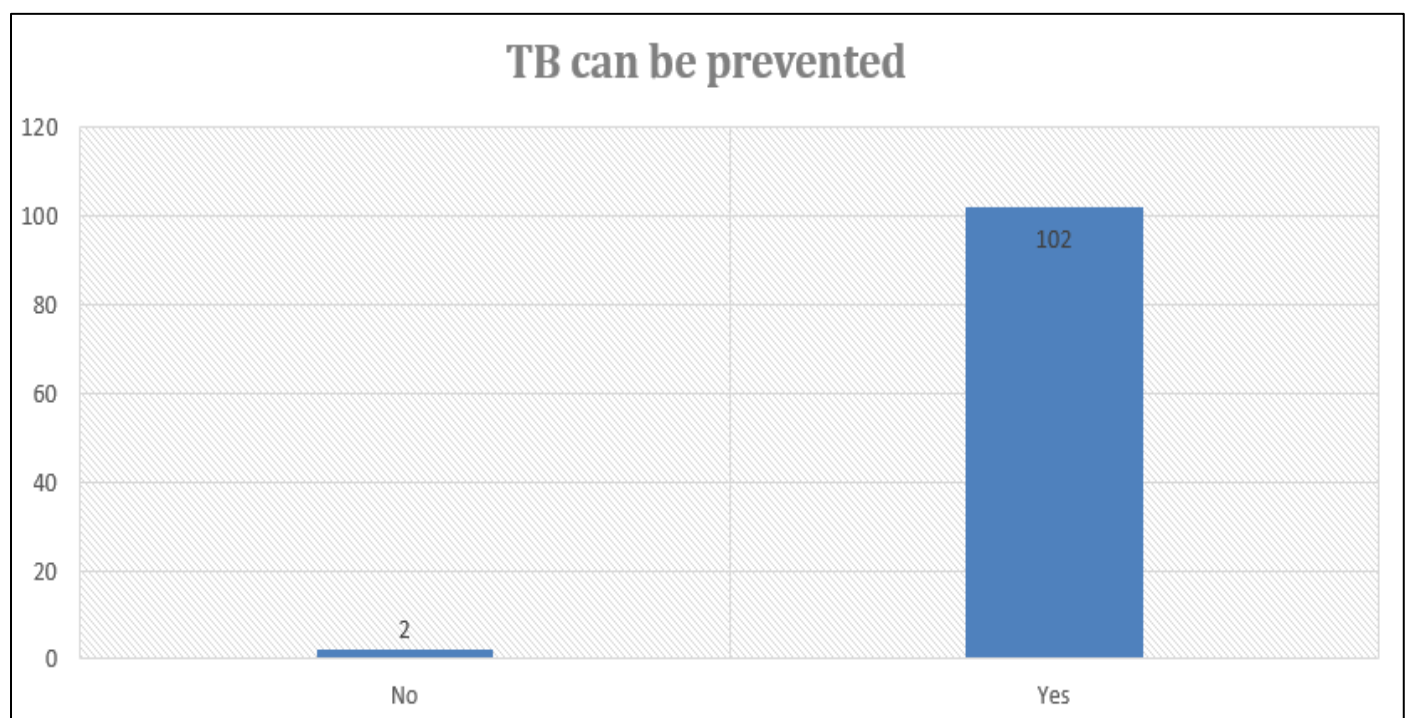


Fig 3 TB Prevention

According to figure 3 above 102, 98.1% respondent knew that TB can be prevented.

➤ *TB Preventive Chemotherapy and Campaigns against TB*

Table 4 TB Preventive Chemotherapy and Campaigns against TB

Statement	Response						Total
	Yes		No		No Response		
	n	%	n	%	n	%	
TB Preventive Therapy	76	73.1	28	26.9	0.0	0.0	104
Campaigns against TB	53	51.0	51	49.0	0.0	0.0	104

The table above represents 76, 73.1% respondent knew someone who received TB preventive therapy and 53, 51% respondent knew about TB campaigns in their area and 51, 49% didn't know of any campaigns.

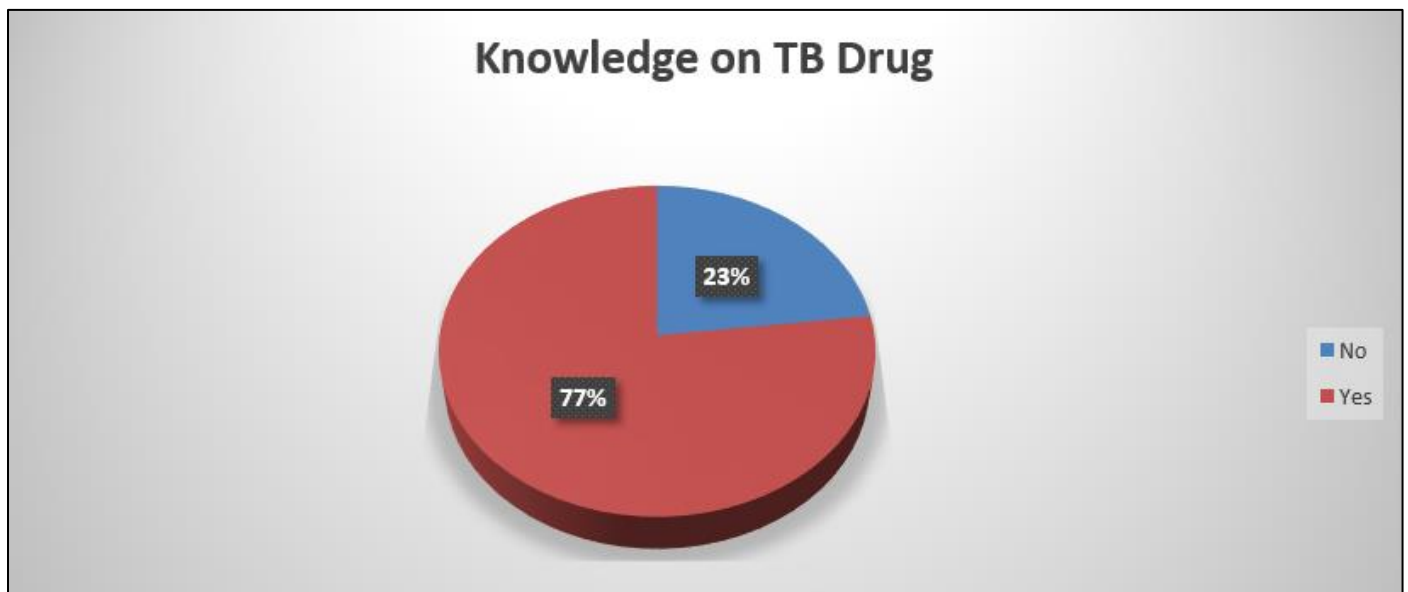
*E. Knowledge of the TB Drugs*

Fig 4 Knowledge on TB Drugs

The above figure represents 77% of the population knew the drugs they were taking and 23% didn't know the drugs.

➤ *TB Drugs Being Taken*

On drugs against TB, the following were the responses.

Table 5 TB Drugs being taken

TB Drug	Frequency	Percent
Rifampicin, Isoniazid, Pyrazinamide, Ethambutol, Streptomycin, Levofloxacin	52	50.0
Rifampicin, Ethambutol	2	1.9
Vitamin B6, Bedaquiline	2	1.9
Rifampicin, Isoniazid, Ethambutol	2	1.9
Isoniazid	9	8.7
Isoniazid, Ethambutol	3	2.9
Isoniazid, Pyrazinamide, Ethambutol, Streptomycin	2	1.9
Rifampicin	8	7.7
<b>Total</b>	<b>104</b>	<b>100.0</b>

According to table 4, 52 (50.0%) of the respondents knew their TB drugs being taken.

➤ *TB Diagnosis*

Table 6 TB Diagnosis Methods

TB Diagnosis	Frequency	Percent
No response	3	2.9
Chest X-ray	2	1.9
Gene Xpert	3	2.9
Mantox test	3	2.9
Mantox test, blood	1	1.0
Sputum examination	28	26.9
Sputum, chest X-ray	15	14.4
Sputum Exam, chest X-ray, blood	1	1.0
Sputum exam, chest X-ray, Gene Xpert	9	8.7
Sputum exam, chest x-ray, Gene Xpert, Mantox test, Urine LAM	25	24.0
Sputum exam, chest x-ray, Gene Xpert, stool	2	1.9
Sputum exam, chest x-ray, Gene Xpert, urine	5	4.8
Sputum exam, chest x-ray, skin test	2	1.9

Sputum exam, chest x-ray, skin test, stool	1	1.0
Sputum exam, chest x-ray, skin test, stool, urine LAM	1	1.0
Sputum exam, Gene Xpert	1	1.0
Sputum exam, Gene Xpert, blood	2	1.9
<b>Total</b>	<b>104</b>	<b>100.0</b>

The above table 5 represent 28, 26.9% were diagnosed by sputum alone, 25, 24.0% were diagnosed using Sputum exam, chest x-ray, gene xpert, mantox test, and urine lipoarabinomannan (LAM).

#### F. TB Treatment Default

TB treatment default was accessed by asking on whether the respondents took the drugs regularly or not and also whether they missed any drugs.

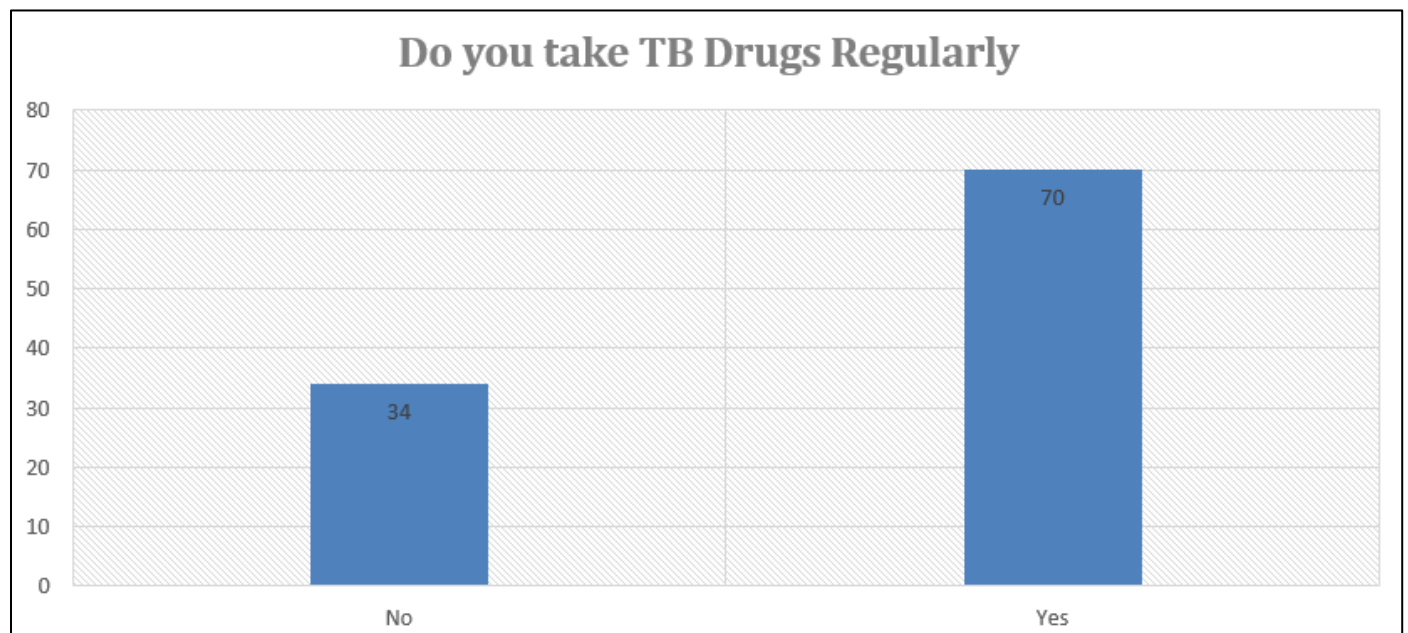


Fig 5 TB Treatment Default

According to figure 5 above treatment default was found in 34 (32.7%) of the respondents.

#### G. Factors Affecting TB Treatment Adherence

The following were factors that affected TB treatment adherence as shown in the table.

Table 7 Factors affecting TB Drug Adherence

<b>Factors TB Drug Treatment Adherence</b>	<b>Frequency</b>	<b>Percent</b>
Distance to the facility	8	23.5
Feeling unwell	4	11.8
Drug side effects	11	32.4
Travelling Cost	11	32.4
<b>Total</b>	<b>34</b>	<b>100.0</b>

From the table above, major factors affecting adherence were drug side effects and travelling costs (32.4%) and distance to the facility (23.5).



## CHAPTER FIVE

### DISCUSSION, CONCLUSION AND RECOMMENDATION

#### ➤ Introduction

This chapter discussed the study under different sub-headings. These are for both the TB patients and the health workers. At the end of the chapter, a conclusion is given followed by the recommendations.

#### ➤ Demographic Characteristics of the Respondents

The age of respondents in this study ranged from 18 years to 50, which is comparable to the age range covered in Mweemba et al., (2008) study except that in the Mweemba study, the age group was from 18 years to 60 years. The sample size in the current study was 104 just like in the Mweemba study. Similarly, there were more females in this study just like in the Mweemba study though this study had more single people (69.2%) compared to the Mweemba study (48.1%). In terms of levels of education, this study had low in the secondary level education (9.2%) compared to those in the Mweemba study (57.7%).

#### ➤ Knowledge on TB

The knowledge levels on TB differed depending on the questions asked. The patients were asked TB transmission and prevention related questions which included; causes and transmission of TB, TB symptoms and whether TB can be prevented and if there is preventive chemotherapy against TB. Other questions included TB drugs and diagnosis and whether there are health promotion campaigns against TB. Knowledge on TB related questions was very high in this study 87.3% compared to the Mweemba study (49%).

The study revealed that knowledge alone is not a direct determinant of compliance with TB treatment; rather, attitude significantly influences compliance. Therefore, it is crucial to explore strategies for improving attitudes among patients, as enhancing these attitudes may lead to better adherence to treatment protocols.

#### ➤ TB Treatment Default

TB treatment default was based on whether they took the drugs regularly. TB treatment default was found in 34 (32.7%) respondents and was associated with distance to the facility and transport costs, feeling unwell and the drug side effects. Drug adherence default in this study was comparable but slightly higher than what has been reported elsewhere 29.4% (Kaona et al., 2004).

Studies done elsewhere have demonstrated that adherence to TB treatment is associated with demographic factors. Similarly, in this study compliance to TB drugs taking was associated with gender, size and education level.

Orem (1990) posits that if an individual lacks knowledge about self-care, they are likely to lack self-care practices. In the context of tuberculosis (TB), a lack of knowledge about TB treatment can result in non-compliance with the treatment regimen.

#### ➤ Conclusion

In conclusion, the study identified suboptimal anti-TB treatment compliance, factors predictive of poor adherence, and perpetual defaulting among patients in Namuseche, Chipata, Eastern Province. Addressing these challenges requires a multifaceted approach involving the healthcare system, community engagement, and patient support. By Addressing/targeting awareness, knowledge gaps, substance abuse, stigma reduction, reducing healthcare attitudes towards TB patients, improving access, strengthening social support networks and financial constraints can potentially improve treatment compliance. Efforts to raise awareness about the importance of completing the treatment course and measures to overcome barriers to access and affordability are crucial in reducing perpetual defaulting among TB patients. It is evident that efforts need to be made to improve both individual and system-level factors to enhance adherence and treatment outcomes. TB treatment default was found in 34 (32.7%) respondents and was associated with distance to the facility and transport costs, feeling unwell and the drug side effects.

#### ➤ Recommendations

Based on the findings of this research the following, recommendations are suggested to enhance adherence, compliance, and reduce defaulting in TB treatment:

- **Strengthen health education:** Implement comprehensive health education programs to increase TB awareness, knowledge, and understanding of treatment protocols among patients and their families. This can be achieved through community outreach, health campaigns, and the use of print and electronic media.
- **Target high-risk groups:** Identify and prioritize high-risk populations, such as those with comorbidities, substance abusers, and individuals living in crowded conditions such as the prisons, for intensified education on adherence and treatment benefits.
- **Sensitize healthcare providers:** Conduct regular training sessions for healthcare providers to enhance their knowledge and skills on TB management and effective patient counseling techniques. This would enable them to address patients' concerns and fears, thereby fostering treatment compliance.



- **Expand DOT (Directly Observed Treatment):** Increase the availability and accessibility of DOT services to ensure proper supervision of medication intake. This may involve deploying community health workers or utilizing digital health platforms for remote monitoring.
- **Strengthen patient-provider communication:** Encourage open and supportive communication between healthcare providers and patients to address their fears, reduce stigma, and build trust. This can be achieved through counseling sessions, support groups, and the use of language interpreters, if necessary.
- **Integrate mental health support:** Identify patients with underlying mental health issues and provide integrated mental health services alongside TB treatment, including counseling, psychiatric evaluation, and appropriate management.
- **Address socioeconomic challenges:** Develop interventions to alleviate socioeconomic barriers that hinder treatment adherence, such as providing financial support for transportation, food, and livelihood support for patients and their families.
- **Enhance treatment accessibility:** Ensure close proximity of treatment facilities to patients' homes, especially in rural areas, to minimize travel costs and time constraints.
- **Utilize mobile health technology:** Explore the use of mobile health technologies, such as SMS reminders and mobile applications, to deliver medication reminders, appointment notifications, and educational materials.
- **Strengthen community engagement:** Involve community leaders, local organizations, and community health workers in TB awareness campaigns, treatment support, and behavior change communication activities.
- **Implement peer support programs:** Establish peer support networks, where recovered TB patients can mentor and support those currently undergoing treatment, ultimately enhancing treatment adherence and reducing defaulting rates.
- **Conduct regular follow-up:** Implement a robust system for follow-up of patients throughout their treatment journey to detect early signs of non-adherence, provide timely counseling intervention, and address any concerns or barriers that may arise.
- **Monitor treatment side effects:** Strengthen monitoring and management of treatment side effects, providing prompt medical attention and adjustments to minimize the impact on patients' adherence.
- **Provide nutritional support:** Offer nutritional counseling and support to patients, particularly those with malnutrition, to enhance drug absorption, reduce side effects, and improve treatment outcomes.
- **Improve data management:** Strengthen the collection, analysis, and utilization of data on treatment adherence, defaulting rates, and treatment outcomes to inform evidence-based interventions and program improvements.
- **Strengthen infection control measures:** Ensure strict adherence to infection control measures within healthcare facilities and communities to minimize the risk of transmission and reverse stigma associated with TB.
- **Collaborate with employers:** Forge partnerships with employers to provide workplace support and flexible treatment options, ensuring continuity of treatment for employed individuals.
- **Involve the education sector:** Collaborate with the education sector to promote TB awareness and integrate TB education into school curricula, reaching both students and their families.
- **Strengthen laboratory services:** Invest in strengthening laboratory facilities and services to ensure prompt diagnosis, accurate monitoring, and timely adjustments of treatment regimens.
- **Address language and cultural barriers:** Ensure that healthcare providers are equipped with cultural competency and language skills to effectively communicate with patients from diverse ethnic backgrounds.
- **Leverage social support networks:** Mobilize social support networks, including religious organizations and local community groups, to provide emotional and practical assistance to patients during their treatment journey.
- **Involve patients in treatment planning:** Involve patients in shared decision-making processes, ensuring their inclusion in discussions regarding treatment plans, goals, and potential challenges.
- **Implement continuous quality improvement:** Establish quality improvement mechanisms within treatment centers to regularly assess and improve service delivery, patient satisfaction, and treatment outcomes.
- **Strengthen medication supply chain:** Ensure consistent availability of quality-assured TB medications and prevent stockouts that may disrupt patients' treatment regimens.
- **Address treatment costs:** Advocate for policies to reduce the cost burden on patients, such as subsidizing or waiving fees for treatment, diagnostic tests, and follow-up visits.
- **Promote self-care practices:** Educate patients on self-care practices, emphasizing the importance of hygiene, nutrition, and general health maintenance to support treatment outcomes.
- **Conduct regular community dialogues:** Organize community dialogues to address misconceptions, tackle stigma, and promote community support for TB patients.
- **Establish patient feedback mechanisms:** Create platforms for patients to provide feedback on their treatment experiences, enabling continuous improvement of services based on their needs and suggestions.
- **Strengthen research and evaluation:** Encourage further research and evaluation to identify emerging adherence challenges and develop innovative interventions to address them.
- **Foster collaboration between healthcare facilities:** Facilitate collaboration and exchange of best practices between treatment facilities within the district and the broader region to improve overall treatment delivery and patients' experiences.
- **Advocate for policy change:** Advocate for policy changes that support TB prevention, detection, and treatment, such as the development and implementation of comprehensive TB control strategies.

- **Develop monitoring and evaluation tools:** Develop standardized tools for monitoring and evaluating adherence, defaulting rates, and treatment outcomes, which can be utilized across healthcare facilities.
- **Enhance community mobilization:** Strengthen community mobilization efforts to engage key stakeholders, including traditional healers, local leaders, and NGOs, in TB control activities.
- **Conduct regular health worker trainings:** Organize regular trainings for healthcare workers on the latest TB treatment guidelines, diagnostic techniques, and best practices in patient management.
- **Establish patient support call centers:** Set up dedicated call centers to provide information, answer patients' queries, and address any concerns or challenges they may face during treatment.
- **Promote research on TB and HIV co-infection:** Encourage research specifically focused on the challenges and strategies related to TB-HIV co-infection, as this population faces unique adherence challenges.
- **Conduct health system assessments:** Periodically assess the health system's capacity to deliver comprehensive and patient-centered TB care, identifying gaps and prioritizing improvements.
- **Strengthen referral systems:** Develop and strengthen referral systems between healthcare facilities and other support services, ensuring continuity of care for TB patients beyond the treatment phase.
- **Promote interdisciplinary collaboration:** Facilitate collaboration between different healthcare professionals, including doctors, nurses, pharmacists, social workers, and Community Health Assistants HIV Medics (CHA HIV Medics), to provide comprehensive care for TB patients.
- **Conduct awareness campaigns on TB and HIV testing:** Promote routine testing for both TB and HIV among high-risk populations, ensuring early detection and timely initiation of treatment.
- **Develop community-based medication distribution points:** Explore the establishment of decentralized medication distribution points in communities, reducing the need for patients to travel long distances and ensuring a continuous supply of medication.
- **Engage private healthcare providers:** Collaborate with private healthcare providers to ensure standardized TB care delivery, adherence support, and reporting to the national TB control program.
- **Strengthen treatment monitoring systems:** Establish robust mechanisms for tracking medication pickup and adherence, such as electronic medication monitors or digitally integrated treatment cards.
- **Promote partnership with pharmaceutical companies:** Foster partnerships between the national TB control program and pharmaceutical companies to negotiate affordable pricing of TB medications, ensuring availability and accessibility.
- **Integrate TB services into primary healthcare:** Strengthen integration of TB services into primary healthcare settings, enabling early detection, prompt treatment initiation, and continuous tracking of patients.
- **Establish financial incentives for healthcare workers:** Introduce incentive structures for healthcare workers based on treatment success rates, encouraging their active involvement in enhancing treatment adherence and outcomes.
- **Strengthen infection control in households:** Provide training and support to patients' families regarding infection control measures within households, minimizing transmission risks and supporting patients' adherence.
- **Share success stories:** Share success stories of TB survivors and their journey towards successful treatment completion to inspire and motivate patients currently undergoing treatment.
- **Address healthcare worker shortage:** Advocate for increased healthcare worker recruitment and deployment at TB treatment facilities, ensuring adequate staffing levels for patient care.
- **Foster Multisectoral collaboration:** Promote collaboration between various sectors, such as health, education, social welfare, and finance, to address the multidimensional challenges associated with TB treatment adherence and defaulting.

These recommendations encompass a wide range of interventions targeting both individual and system-level factors that contribute to poor adherence and defaulting in TB treatment. Implementing these recommendations will require concerted efforts from all stakeholders involved in TB control and will ultimately contribute to improved treatment outcomes and the reduction of TB burden in Namuseche, Chipata, and the Eastern Province as a whole.

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## APPENDICES

### APPENDIX 1: INFORMATION CONSENT

Dear participants,

My name is **Phiri Daliso**; a fourth-year student at Chreso University. I am pursuing a Bachelor's of Science Degree in Nursing.

In partial fulfilment of the degree program, I am required to undertake a research project. My study topic is **“To assess anti-TB treatment compliance, factors predictive for poor adherence and perpetual defaulting among patient living with TB in Namuseche prison Chipata eastern province.**

You have been randomly selected to participate in this study and I wish to inform you that participation in this study is voluntary and you are free to withdraw at any stage of the study if you wish to do so. You will be asked some questions on anti-TB treatment compliance, factors predictive for poor adherence and perpetual defaulting. The information you will give me will be kept confidential and no name will be written on the interview schedule.

You will not receive direct benefits from the study or monetary gain but the information that you will provide will help Chreso University for educational purposes and other relevant authorities to assess anti-TB treatment compliance, factors predictive for poor adherence and perpetual defaulting among patient living with TB in Namuseche prison Chipata eastern province.

By signing below, I confirm that I understand the nature and purpose of this research and that my participation is voluntary. I understand that I can withdraw my participation at any time during the session.

.....  
Signature

.....  
Date

## APPENDIX 2: QUESTIONNAIRE

➤ *Chreso University*

➤ *Department of Nursing*

**A Study to Assess Anti-TB Treatment Compliance, Factors Predictive for Poor Adherence and Perpetual Defaulting among Patient Living with Tb in Namuseche Chipata Eastern Province.**

➤ *Intructions*

- You are required to tick in the box provided on the correct answer to the question asked.
- You are free to ask the researcher were you do not understand the question clearly.
- You are not allowed to indicate your name on this questionnaire.
- Any response provided shall only be used for academic purpose.

➤ *Part One: Participant's Information*

• *What's your Gender?*

- ✓ Male ☐
- ✓ Female ☐

• *How old are you?*

- ✓ 18- 30 years ☐
- ✓ 31 – 40 years ☐
- ✓ 41-50 years ☐

• *What is your Marital Status?*

- ✓ Married ☐
- ✓ Single ☐
- ✓ Widower ☐
- ✓ Divorced ☐

• *What is your Current Employment Status?*

- ✓ Unemployment ☐
- ✓ Self-employment ☐
- ✓ Formal employment ☐

• *How many People live in your House? .....*

- ✓ 1-3 ☐
- ✓ 4-6 ☐
- ✓ 7 and above ☐

• *What is your Religion?*

- ✓ Christian ☐
- ✓ Protestant ☐
- ✓ Muslim ☐
- ✓ Other ☐

• *What is your Highest level of Education?*

- ✓ Primary ☐
- ✓ Secondary ☐
- ✓ Tertiary ☐

✓ Non-formal ☐

➤ *Section B: Knowledge on Tuberculosis*

• *What causes Tuberculosis?*

- ✓ Bacteria ☐
- ✓ Virus ☐
- ✓ Fungi ☐
- ✓ I don't know ☐

• *How do you Know that a Person has Tuberculosis?*

- ✓ Coughs out blood ☐
- ✓ Loses weight ☐
- ✓ Having night sweats ☐
- ✓ All of the above ☐

• *Is Tuberculosis Transmittable or Not?*

- ✓ Yes, it is transmittable ☐
- ✓ No, it is not transmittable ☐
- ✓ I don't know ☐

• *How can someone get Tuberculosis?*

- ✓ Being in contact with anyone having TB disease ☐
- ✓ Eating expired stuff ☐
- ✓ Not bathing ☐
- ✓ Lack of money ☐
- ✓ Other specify..... ☐

• *Can Tuberculosis be Prevented?*

- ✓ Yes ☐
- ✓ No ☐
- ✓ Not too sure ☐

• *How can Tuberculosis be Prevented?*

- ✓ Giving tuberculosis vaccine to children at birth to 13 days ☐
- ✓ Giving isoniazid for 6 months to all new HIV positive clients ☐
- ✓ Good ventilation ☐
- ✓ All the above ☐
- ✓ I don't know ☐
- ✓ Any other specify..... ☐

• *Do you Know someone who has Received the Tuberculosis Preventive Therapy?*

- ✓ Yes ☐
- ✓ No ☐

• *Are there any Campaigns against Tuberculosis in your Area?*

- ✓ Yes ☐
- ✓ No ☐

➤ *Section C: Health Practitioner Questions*

The anti-TB treatment compliance, factors predictive for poor adherence, defaulting and Tuberculosis preventive Measures in Namuseche Prison compound.



• *What measures did the residents of Namuseche put in place to promote TB treatment compliance?*

- ✓ Developing houses with good ventilations ☐
- ✓ Developing good buddy system towards TB treatment ☐
- ✓ Enhanced tuberculosis prevention campaigns ☐
- ✓ Any other specify..... ☐

• *What did the government do to help control and prevent the disease?*

- ✓ Improve standard of living ☐
- ✓ Provision of tuberculosis prevention campaigns ☐
- ✓ Provision of tuberculosis vaccines ☐
- ✓ Direct observed therapy (DOT) implementation ☐
- ✓ Provision of isoniazid preventive therapy to all new HIV positive clients ☐
- ✓ Other specify..... ☐

• *Were the measures from the government effective in helping control the disease?*

- ✓ Yes ☐
- ✓ No ☐

• *Did these measures helped in controlling the disease?*

- ✓ Very helpful ☐
- ✓ Average ☐
- ✓ Not helpful ☐

• *What permanent systems or structures were put in place that helped control the disease?*

- ✓ Continued disease surveillance ☐
- ✓ Community involvement ☐
- ✓ Continued tuberculosis sensitization campaigns ☐
- ✓ Direct observed therapy (DOT) implementation ☐
- ✓ Provision of isoniazid preventive therapy to all new HIV positive clients ☐
- ✓ Other specify.....☐

➤ *Section D: Impact of the Preventive Measures Introduced.*

• *Which measures do you know was introduced in Namuseche prison on tuberculosis prevention?*

- ✓ Improved ventilation ☐
- ✓ Provision of tuberculosis vaccines ☐
- ✓ Direct observed therapy (DOT) implementation ☐
- ✓ Campaigns against tuberculosis ☐
- ✓ Provision of isoniazid preventive therapy to all new HIV positive clients ☐
- ✓ Other specify..... ☐

• *To what extent are these measures effective in preventing the outbreak of tuberculosis?*

- ✓ Very effective ☐
- ✓ Effective ☐
- ✓ Not effective ☐
- ✓ I don't know ☐

• *What are the factors that contribute to poor compliance and adherence of tuberculosis treatment among patients?*

.....

.....

.....

.....

.....

- .....
- *What factors contributes to patients defaulting tuberculosis treatment?*
- .....

- *What are the effects of poor compliance and defaulting tuberculosis treatment/drugs?*
- .....

- *What solutions can be implemented in order to improve **compliance, adherence** and **reduce defaulting** tuberculosis treatment?*
- .....

➤ *Work Plan for 2022-2023*

The researcher aims to conduct this study within 3 months from now after approval from the CUREC

Task to be performed	Responsible person	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
1. Proposal writing	Researchers									
2. Finalise research proposal	Researchers									
3. Clearance from school authority	Researchers									
4. Permission to conduct research from Namuseche prison clinic	Researchers									
5. Collection of data	Researchers									
6. Preliminary data analysis	Researchers									
7. Data analysis and report writing	Researchers									
8. Finalise report	Researchers									
9. Discuss recommendations/plans Of action with hospital management	Researchers									
10. Monitor research Progress	Researchers									

**APPENDIX 3 – STUDY BUDGET**

<b>S/NO</b>	<b>DESCRIPTION</b>	<b>AMOUNT IN ZMK</b>
1	Pilot study Logistics	1000
2	Internet	300
3	Questionnaires printing	500
4	Proposal Printing	120
5	Final Report Printing	800
6	Report Binding	600
7	Other Logistics	500
8	Transport	1800
<b>Total Expenditure</b>		<b>K5620</b>

## APPROVAL LETTER FROM CUREC



# CHRESO UNIVERSITY

*measured with Highest Education Authority - HEA Zambia*

All correspondence should be addressed to the Vice Chancellor

GO Centre City Campus  
17715 Nangwenya Road  
P.O.Box 37178  
Lusaka 10101 / Zambia

[vicechancellor@chresouniversity.edu.zm](mailto:vicechancellor@chresouniversity.edu.zm)  
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### CHRESO UNIVERSITY RESEARCH ETHICS COMMITTEE

06<sup>th</sup> February, 2023

Your Ref: 1640-01-2023

Mr. Daliso Phiri  
Chreso University  
Faculty of Health Science  
P.O.Box 37178  
LUSAKA.

CHRESO UNIVERSITY RESEARCH  
ETHICS COMMITTEE (CUREC)

06 FEB 2023

**APPROVED**

P. O. BOX 37178, LUSAKA, 10101, ZAMBIA.

Dear, Daliso Phiri,

**RE: SUBMISSION RESEARCH "A STUDY TO ASSESS ANTI-TB TREATMENT COMPLIANCE, FACTORS PREDICTIVE FOR POOR ADHERENCE AND PERPETUAL DEFAULTING AMONG PATIENT LIVING WITH TB IN NAMUSECHE CHIPATA EASTERN PROVINCE." (REF. NO. 1640-01-2023)**

The above-mentioned research proposal was presented to the Chreso University Ethics Committee meeting held on 27<sup>th</sup> January, 2023 as a re-submission.

Most of the concerns earlier raised were addressed and the Committee therefore **approves** the proposal. Kindly apply for further study clearance from National Health Research Authority.

This approval is valid until 27<sup>th</sup> January, 2024. You are required to submit at least two (2) progress reports to the Committee and submit the final report to the Committee upon completion of the study. The Committee wish you luck in the execution of the study.

Yours sincerely,



Prof. Christopher Simoonga (PhD)  
**CHAIRPERSON**

Meeting the Educational Needs of Today



## NATIONAL HEALTH RESEARCH AUTHORITY

Lot No. 18961/M, off Kasama Road, Chalala, P.O. Box 34075, LUSAKA  
Tell: +260211 250309 | Email: [znhrasec@nhra.org.zm](mailto:znhrasec@nhra.org.zm) | [www.nhra.org.zm](http://www.nhra.org.zm)

Ref No: NHRA0001/11/05/2023

Date: 11<sup>th</sup> May 2023

The Principal Investigator,  
Daliso Phiri,  
Chreso University,  
Lusaka, Zambia.

Dear Mr Phiri,

### Re: Request for Authority to Conduct Research

The National Health Research Authority Is in Receipt of Your Request for Ethical Clearance and Authority to Conduct Research Titled "A Study to Assess Anti-Tb Treatment Compliance, Factors Predictive for Poor Adherence and Perpetual Defaulting Among Patient Living with Tb in Namuseche Chipata Eastern Province."

I wish to inform you that following the submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been approved on the condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA bi-annually from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours faithfully,

NATIONAL HEALTH RESEARCH AUTHORITY

Ms. Sandra Chilengi-Sakala,  
ACTING DIRECTOR/CHIEF EXECUTIVE OFFICER