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AN INVESTIGATION INTO THE PREVALENCE AND DETERMINANTS OF TB TREATMENT DEFAULT IN LUBUMBASHI HEALTH ZONE, DRC, 2024

BY

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Abstract

Tuberculosis (TB) remains a major public health concern in the Democratic Republic of the Congo (DRC), particularly in urban areas such as Lubumbashi. This study examined the prevalence and determinants of TB treatment default in the Lubumbashi Health Zone to inform targeted interventions. A mixed-methods design was employed, including a retrospective analysis of national TB register data and qualitative interviews with key stakeholders. Eligible participants had documented pre-treatment smear results in accordance with national guidelines. Treatment default was defined as an interruption of 30 to 60 consecutive days. Cases labeled "transferred out," "moved out," "died," or "failed" were excluded. Logistic regression identified quantitative risk factors, while thematic analysis explored patient experiences. The treatment default rate was 69.0%, with higher risk observed among males, individuals aged 25–44, those with lower education levels, and workers in the informal sector. Socioeconomic challenges, including low income and lack of healthcare benefits, along with stigma and discrimination, were significant contributors to default. In contrast, greater TB knowledge and positive attitudes toward treatment were associated with higher adherence. Most defaults occurred within the first month of treatment. The findings underscore the urgent need for financial and social support, improved access to care, and patient-centered education to enhance treatment adherence and reduce TB-related morbidity and transmission in Lubumbashi.

Keywords: Tuberculosis, treatment default, adherence, socioeconomic determinants, stigma, Lubumbashi, DRC.

Declaration

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

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Student's Full Name	Student's Signature (Date)
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Dedication

This work is dedicated to God, my Creator and the Master of my soul, whose guidance has sustained me throughout this journey.

To the Shambare family, for their unwavering love, support, and encouragement. Thank you for always believing in me.

List of Acronyms and Abbreviations

TB – Tuberculosis

PWTB-People with TB

COVID-19 – Coronavirus Disease 2019

WHO – World Health Organization

USAID – United States Agency for International Development

HIV – Human Immunodeficiency Virus

MDR-TB – Multidrug-Resistant Tuberculosis

XDR-TB – Extensively Drug-Resistant Tuberculosis

DRC – Democratic Republic of the Congo

NGO – Non-Governmental Organization

PTB – Pulmonary Tuberculosis

EPTB – Extrapulmonary Tuberculosis

ART – Antiretroviral Therapy

CD4 – Cluster of Differentiation 4 (a type of white blood cell important in the immune system)

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Definition of Key Terms

Tuberculosis is caused by the bacterium Mycobacterium tuberculosis, which is transmitted when individuals infected with TB release bacteria into the air. Mycobacterium is a genus containing over 190 species within the phylum Actinomycetota, classified under the family Mycobacteriaceae. This family includes pathogens known to cause serious diseases in mammals, such as tuberculosis and leprosy in humans.

Investigation: A systematic examination or inquiry into a specific issue or phenomenon, in this case focusing on tuberculosis (TB) treatment default.

Prevalence: The measure of how common a particular condition is within a specified population at a given time. In this study, it refers to the proportion of patients who default on TB treatment in the Lubumbashi Health Zone.

Determinants: Factors or variables that influence a specific outcome. Here, determinants of TB treatment default could include socio-economic factors, health system-related issues, patient adherence, and cultural influences.

TB Treatment Default: This refers to the failure of a patient to complete the prescribed course of treatment for tuberculosis. It typically includes patients who stop taking medication for a defined period (often specified as a certain number of days).

Lubumbashi Health Zone: A specific geographic area in Lubumbashi, Democratic Republic of the Congo (DRC), where the study will be conducted. This health zone includes various healthcare facilities and populations that receive TB treatment.

Health Zone: An administrative region within a country where health services are provided. It often includes multiple health facilities and defines the coverage area for health care providers.

Democratic Republic of the Congo (DRC): A country in Central Africa where the investigation is taking place, known for its diverse health challenges, including infectious diseases like tuberculosis.

2024: The year in which the study is being conducted or published, indicating the timeframe for the relevance of the data and findings.

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CHAPTER 1 INTRODUCTION

1.1 Introduction

Tuberculosis (TB) continues to be a critical public health challenge globally, particularly in low- and middle-income countries like the Democratic Republic of the Congo (DRC). The DRC reported approximately 205,000 new TB cases in 2021, with an incidence rate of 319 cases per 100,000 people. Alarmingly, only about 60% of estimated cases were detected and reported, indicating significant gaps in TB diagnosis and treatment, especially in urban areas like Lubumbashi, which is home to over 2 million residents.

Treatment default, which refers to patients not completing their prescribed TB treatment, is a significant barrier to effective TB control (Ledesma et al., 2022). Nidoi et al 2021 stated that while the national TB program indicates an average default rate of about 10%, urban settings such as Lubumbashi may experience higher rates due to various challenges, including healthcare accessibility and socioeconomic constraints. The consequences of treatment default are severe, contributing to increased morbidity and mortality and facilitating TB transmission within communities.

Multiple factors contribute to treatment default among TB patients in Lubumbashi. These include socioeconomic hardships, lack of awareness about TB, stigma associated with the disease, and inadequacies in healthcare delivery systems (Appiah et al 2023). Over 50% of patients in the region have reported financial barriers and difficulties accessing healthcare services as primary reasons for not adhering to treatment globally (Rohatgi et al 2021). Additionally, cultural beliefs and misconceptions surrounding TB can lead to stigma and reluctance to seek necessary care, with nearly 40% of surveyed individuals holding misconceptions about the disease (Spruijt et al., 2020).

This investigation aims to assess the prevalence of TB treatment default in the Lubumbashi Health Zone and identify the various determinants influencing this issue. The findings will provide crucial insights to inform local health policies and interventions aimed at improving TB treatment outcomes. Therefore, addressing the factors leading to treatment default, the Lubumbashi Health Zone can contribute significantly to the national and global efforts to eliminate TB as a public health threat.

1.2 Background of the study

Treatment default in tuberculosis (TB) remains a significant global public health issue and is the second leading cause of death from infectious diseases after COVID-19 (WHO, 2023). Despite being preventable, treatable, and curable, TB continues to claim more lives each year than HIV and malaria combined. Although various evidence-based interventions have been developed to combat TB, underinvestment and low global prioritization have allowed the disease to persist, resulting in nearly 11 million TB cases and 1.6 million deaths annually (USAID's Global TB ,2023). A major contributing factor is the evolution of drug resistance, exacerbated by treatment default, where patients fail to complete their prescribed TB regimen (Yeh et al., 2020). Singh et al, 2020 asserted that this not only increases morbidity and mortality but also promotes the development of drug-resistant TB strains, posing a significant public health threat. Adherence to prescribed medical regimens is crucial for achieving positive health outcomes (Aminde et al., 2019). Non-adherence can exacerbate chronic conditions, lead to severe health crises, and increase morbidity and mortality (Fallatah et al., 2023). It can also reduce quality of life, cause physical and psychological distress, and result in higher healthcare costs due to frequent emergency visits and hospitalizations (Ford et al., 2023). Non-adherence can also lead to guilt, social isolation, and adverse effects on personal relationships and employment (Almeid et al., 2021).

Moreover, non-adherence to TB treatment can lead to increased transmission, higher hospitalization rates, and greater financial strain on public health systems (Hamada et al., 2021). Socio-economic factors often contribute to non-adherence, exacerbating health disparities and perpetuating cycles of disadvantage. Addressing issues such as complex treatment regimens, socio-economic barriers, and lack of support is essential for improving treatment adherence and overall health outcomes (Oates et al., 2020).

The number of health facilities in Lubumbashi has significantly increased since 1960. Initially, healthcare services were limited to a few hospitals and clinics established during the colonial era Walker, B. B. (2022). Today, the city boasts numerous health facilities, including general hospitals, health centers, and private clinics, reflecting population growth and urban expansion. Despite this, Lubumbashi, the second-largest city in the Democratic Republic of the Congo and capital of Haut-Katanga Province, faces significant health infrastructure challenges (Rezaee et al., 2021).. The public health system struggles with underfunding and overwork, which negatively impacts care quality and accessibility (Mutombo et al., 2022). Although NGOs and international organizations are working to improve services, rural areas remain underserved.

Facilities for diagnosing and treating TB are available but often lack modern tools and medications (Andom et al., 2023). TB is exacerbated by widespread poverty, varying literacy levels, and inconsistent health awareness (De et al., 2022). Additionally, Lubumbashi's role as a migration hub, particularly for the mining sector, strains the health system and contributes to disease spread (Mbuya et al., 2023). Addressing these challenges requires improvements in healthcare access, education, and economic conditions.

This study aims to investigate the prevalence and determinants of tuberculosis (TB) treatment default among patients in Lubumbashi and identify socio-demographic, economic, healthcare-related, and personal factors associated with treatment default.

1.3. Problem Statement

Tuberculosis (TB) remains a significant public health challenge in the Democratic Republic of the Congo (DRC), with an estimated 205,000 new and relapse cases reported in 2021 alone, according to the World Health Organization (WHO). The Lubumbashi Health Zone, as one of the most densely populated areas in the Haut-Katanga province, faces a disproportionate burden of TB, exacerbated by high rates of treatment default. Nationally, the treatment default rate among TB patients in DRC is estimated at 10%, a figure that is notably higher than the global target of 5% set by the WHO for TB treatment adherence. Treatment default, where patients discontinue their prescribed regimen before completion, is a major contributor to the spread of drug-resistant TB, which complicates both treatment and TB control efforts. While factors such as socio-economic challenges, healthcare accessibility, stigma, and patient-related issues are likely to influence treatment adherence, there is a lack of localized data on the prevalence and specific determinants of TB treatment default in Lubumbashi. This study seeks to quantify the prevalence of TB treatment default within the Lubumbashi Health Zone and identify key socio-economic, clinical, and healthcare-related determinants. The findings will be crucial for formulating targeted interventions aimed at reducing default rates, improving patient outcomes, and supporting DRC's TB elimination goals, in alignment with the global End TB Strategy.

1.4. Broad objective

The study seeks to investigate the prevalence and determinants of tuberculosis (TB) treatment default among patients in Lubumbashi, Democratic Republic of the Congo (DRC), in 2024, with the aim of informing public health strategies to improve TB treatment adherence and outcomes.

1.5. Specific objectives

i. To determine the prevalence of TB treatment default in Lubumbashi, DRC, in 2024, to establish a baseline for evaluating treatment adherence.

ii. To identify key socio-demographic factors (such as age, gender, socioeconomic status, and education) associated with TB treatment default in Lubumbashi.

iii. To examine health system-related factors (including accessibility of healthcare facilities, quality of care, and availability of medications) contributing to TB treatment default.

iv. To assess the role of patient-related factors, such as knowledge, attitudes, and practices regarding TB and its treatment, in influencing TB treatment adherence among patients.

v. To propose evidence-based strategies aimed at reducing the rate of TB treatment default based on the findings of the study, focusing on targeted interventions for the identified determinants.

1.6. Research questions

i. What is the prevalence of TB treatment default among patients in Lubumbashi, DRC, in 2024?

ii. What socio-demographic factors are associated with TB treatment default in Lubumbashi?

iii. What health system-related factors contribute to TB treatment default in Lubumbashi?

iv. How do patient-related factors, such as knowledge, attitudes, and practices, influence TB treatment adherence in Lubumbashi?

v. What strategies can be implemented to reduce TB treatment default in Lubumbashi based on the identified determinants?

1.7. Assumptions/ Hypotheses:

Prevalence of TB Treatment Default: It is assumed that a significant proportion of TB patients in Lubumbashi Health Zone default on their treatment, which may be affected by various social, economic, and health system factors.

Determinants Impacting Default Rates: The study assumes that the identified determinants (e.g., patient knowledge, socio-economic status, health service accessibility, and support systems) significantly influence the likelihood of treatment default among TB patients.

Sample Representation: It is assumed that the sample selected for the study will adequately represent the demographic and socio-economic characteristics of the TB population in the Lubumbashi Health Zone.

Data Reliability: The study assumes that the data collected through surveys and interviews will be reliable and valid, accurately reflecting the participants' experiences and behaviors related to TB treatment adherence.

H1: Higher levels of patient knowledge about tuberculosis and its treatment are associated with lower rates of treatment default.

H2: Socio-economic factors, such as income and education level, significantly affect the likelihood of treatment default among TB patients.

H3: Accessibility and availability of healthcare services are negatively correlated with TB treatment default rates; as access improves, the rates of default decrease.

1.8. Significance of the Study:

This study on the prevalence and determinants of TB treatment default in Lubumbashi Health Zone holds considerable significance for several reasons:

1. Public Health Impact: By identifying the rates of treatment default and its determinants, the study can inform public health strategies aimed at improving TB treatment adherence, ultimately reducing TB transmission and morbidity within the community.
2. Targeted Interventions: Understanding the specific factors that lead to treatment default allows healthcare providers and policymakers to design targeted interventions that address the unique barriers faced by TB patients in Lubumbashi, enhancing treatment uptake and completion.
3. Resource Allocation: The findings can guide the efficient allocation of healthcare resources and the implementation of patient support programs that could mitigate the risk of default, particularly among vulnerable populations.
4. Policy Development: The study results can contribute to the development of local and national health policies aimed at improving TB management, ensuring that they are evidence-based and tailored to the needs of the population.

5. Contribution to Research: This research may fill existing gaps in the literature regarding TB treatment defaults in the DRC context, providing a basis for further studies and comparative analyses with other regions or diseases.
6. Awareness and Education: The study's outcomes can be utilized to raise awareness about the importance of adherence to TB treatment among patients and their communities, fostering an environment that supports treatment compliance.

1.9. Delimitation of the Study:

This study focuses on the prevalence and determinants of tuberculosis (TB) treatment default among adults aged 15 years and older in Lubumbashi, Democratic Republic of the Congo (DRC), in 2024. It is geographically limited to Lubumbashi and exclusively examines patients with pulmonary tuberculosis (PTB) who have recorded pre-treatment smear results, thereby excluding cases of extra-pulmonary TB and those lacking complete data. The research employs a mixed-methods approach, utilizing quantitative data from TB treatment centers and qualitative interviews, but does not extend to broader health system evaluations or community-based surveys.

1.8 Limitation of the Study:

Despite its goals, the study has several limitations. Its retrospective design may restrict understanding of the reasons behind treatment defaults since it relies on existing records. Potential biases in data selection could arise, impacting the representativeness of the sample. Additionally, issues with data quality from the national TB register may affect the reliability of findings, and the results may not be generalizable outside Lubumbashi. Furthermore, challenges in discussing sensitive socio-economic issues during qualitative interviews could introduce social desirability bias, affecting the authenticity of the insights gathered.

CHAPTER 2 REVIEW OF RELATED LITERATURE

This chapter reviews existing literature on tuberculosis (TB) treatment default, specifically focusing on the prevalence and determinants of non-compliance with treatment protocols in the context of Lubumbashi, Democratic Republic of the Congo (DRC). The review serves to contextualise the study within the current research landscape, highlighting key findings, theoretical frameworks, and gaps that the present investigation seeks to address.

2.1 Theoretical framework

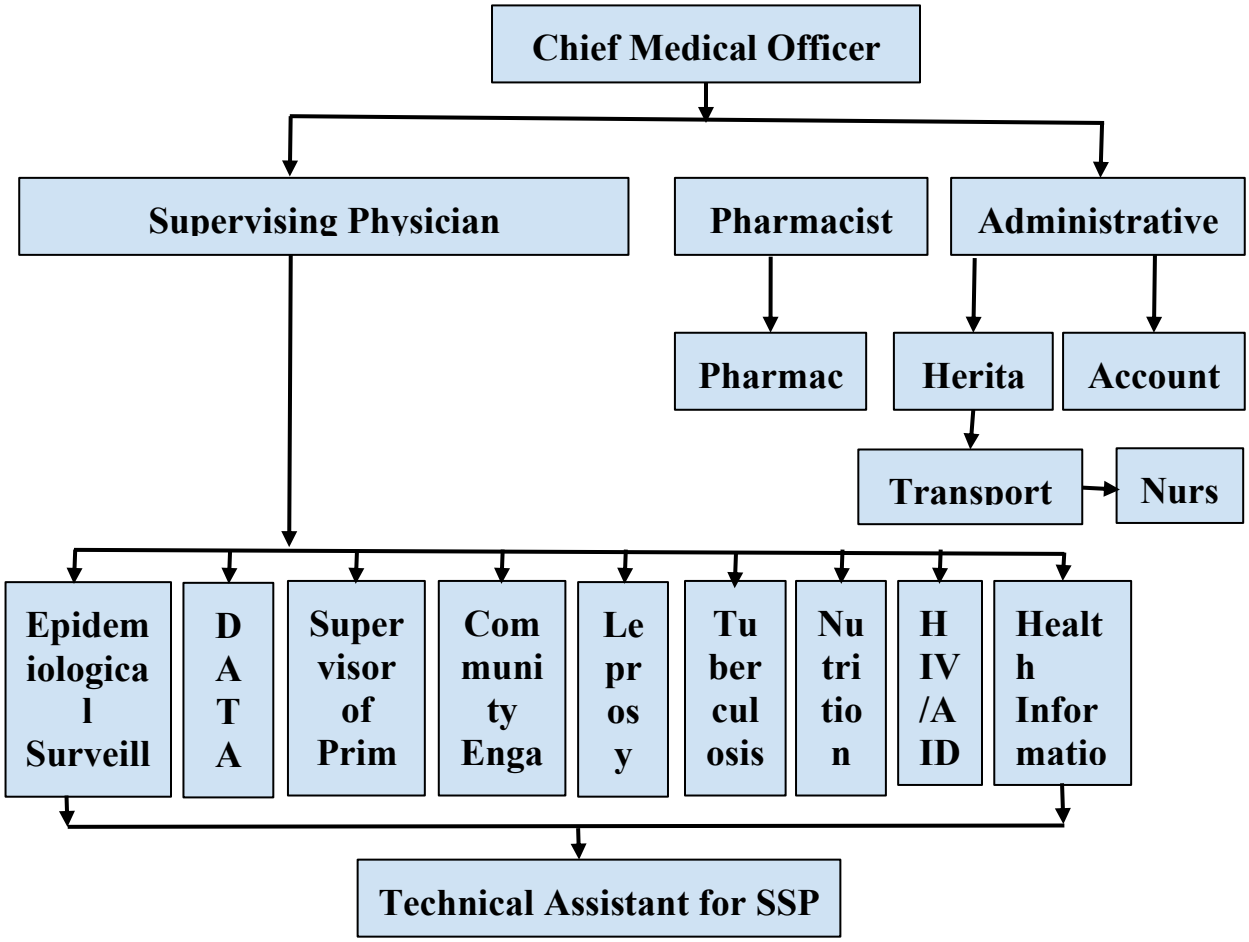
The Lubumbashi Health Zone, located in the capital of Haut Katanga Province DRC, plays a crucial role in the province's political and administrative landscape. This health zone encompasses a significant part of the municipality of Lubumbashi, housing major political institutions, including the Governor's office and various legislative and judicial bodies. In terms of security, the health zone largely maintains safety, allowing access to healthcare services despite some incidents of banditry, such as theft and sexual violence. Overall, there have been no significant security events that disrupted the planned health activities as outlined in the 2019 Annual Operational Plan.

Economically, the Lubumbashi Health Zone is primarily driven by commerce, with key sectors being retail and telecommunication, particularly within urban health districts. The presence of large companies in the area allows for local resource mobilization to support health initiatives. Many of these businesses maintain contracts with healthcare facilities to provide care for their employees, leading to an increased utilization of health services in the community. Additional commercialization, such as bars and hotel operations, also supports public health campaigns, including the distribution of condoms to combat HIV/AIDS.

The mission of the Lubumbashi Health Zone is to improve the health status of its population by offering quality, equitable healthcare services. To achieve this, the health zone ensures the implementation of health policies, mobilizes internal and external resources, and provides a full range of healthcare services. The organizational structure includes 20 health districts that encompass both public and private healthcare facilities, with the private sector being predominant. This division allows for a broad range of healthcare services but also highlights gaps where public services only account for 5% of all facilities.

Epidemiologically, the health zone faces significant challenges, with a rising incidence of both communicable and non-communicable diseases. Malaria remains the leading health issue, representing a significant percentage of consultations and fatalities. Recent cholera and measles outbreaks have further stressed the healthcare system, revealing vulnerabilities related to water sanitation and hygiene in various districts. Moreover, the situation is compounded by the spread of HIV and STIs, particularly in high-risk areas, emphasizing the need for effective prevention strategies and comprehensive care for affected populations.

The Central Office of the Health Zone is organized under the leadership of the Chief Medical Officer, supported by a supervisory physician and a technical staff that includes supervisors for areas such as primary healthcare, leprosy and tuberculosis, nutrition, community engagement, hygiene, water and sanitation, epidemiological surveillance, and HIV. Additionally, the administrative team is led by an Administrative Manager and includes roles for asset management, transport, security, and secretarial support. A pharmacist and their assistant also play a vital role within the structure. This comprehensive organizational framework ensures effective management and coordination of healthcare services to meet the needs of the population.



2.1.1. Health Belief Model (HBM)

The Health Belief Model emphasizes that individuals' health behaviors are shaped by their perceptions of health risks, the benefits of engaging in health-promoting behavior, and the barriers to taking action.

Application to TB Treatment: In the context of TB treatment default, the HBM can elucidate how patients' beliefs about the severity of TB, personal susceptibility, and the perceived benefits of adherence influence their likelihood of completing the treatment regimen. Additionally, perceived barriers—such as financial constraints, potential side effects, and insufficient social support—are critical factors that may hinder adherence.

2.1.2. Social Cognitive Theory (SCT)

Social Cognitive Theory highlights the relationship between personal factors, environmental influences, and individual behaviors, suggesting that behavior is learned through observation and is greatly impacted by social contexts.

Application to TB Treatment: SCT can reveal how patients' behaviors concerning TB treatment are socially influenced. Observing peers adhere to treatment or interact positively with community health workers may foster a commitment to treatment regimens. Furthermore, community support plays a crucial role in motivating individuals to continue treatment.

2.1.3. Theory of Planned Behavior (TPB)

The Theory of Planned Behavior posits that intention is the foremost predictor of behavior, driven by attitudes toward the behavior, subjective norms, and perceived behavioral control.

Application to TB Treatment: The TPB can be utilized to examine how patients' intentions to adhere to TB treatment are formed, considering their beliefs about treatment efficacy, the influence of social expectations from family and peers, and their perceived capability to manage treatment requirements.

2.1.4. Andersen's Behavioral Model of Health Services Use

This model offers a framework to understand the factors affecting healthcare utilization, incorporating individual characteristics, enabling factors, need factors, and the overall health system environment.

Application to TB Treatment: In exploring TB treatment default, this model underscores how access to healthcare resources (enabling factors), personal health beliefs and attitudes

(predisposing factors), and perceived urgency of treatment (need factors) interplay to influence adherence behaviors.

2.1.5. Ecological Model

The ecological model considers the various layers of influence on health behavior, including individual, interpersonal, organizational, community, and policy levels.

Application to TB Treatment: This model facilitates an analysis of how multiple levels, such as individual knowledge and attitudes, community support structures, and healthcare delivery systems, impact TB treatment adherence. Stigma and resources at the community level could also significantly influence patients' decisions to continue treatment.

2.1.6. DiMatteo's Patient Adherence Model

This model focuses specifically on the factors influencing patient adherence to treatment, categorizing influences into cognitive, emotional, interpersonal, and systemic domains.

Application to TB Treatment: DiMatteo's model can help identify specific challenges patients face in sticking to TB treatment, such as comprehending treatment protocols, managing emotional stress related to illness, and navigating interactions with the healthcare system.

2. 2. Overview of TB Prevalence and Treatment Challenges

Tuberculosis (TB) remains a significant public health challenge worldwide, particularly in low- and middle-income countries. Despite decades of vaccination and chemotherapy efforts, TB persists, especially in 30 high-burden countries that account for over two-thirds of global cases (White et al., 2021). In 2022, TB was responsible for 1.3 million deaths, including 167,000 among individuals living with HIV. Although TB is both curable and preventable, multidrug-resistant TB (MDR-TB) presents a substantial

challenge, with only 40% of affected individuals receiving adequate treatment. Global efforts since 2000 have saved approximately 75 million lives from TB (WHO, 2023).

In the context of TB management, treatment default refers to a patient's failure to adhere to the prescribed TB treatment regimen, which typically involves missing a specific number of doses or discontinuing treatment altogether without medical advice. This phenomenon can occur at various stages of treatment, including the intensive and continuation phases, significantly undermining the success of TB control programs. Defaulting on treatment adversely affects individual health, leading to worsened disease outcomes and an increased risk of transmission; it also jeopardizes broader public health efforts aimed at controlling TB, particularly in resource-limited settings where the disease burden is high (Ahmed et al., 2024).

Godongwana et al. (2021) asserted that treatment default has implications extending beyond individual health concerns and poses serious threats to public health. High rates of treatment default contribute to the development of drug-resistant strains of TB, complicating treatment protocols and increasing healthcare costs (Singh et al., 2020). Moreover, when individuals do not complete their treatment, it perpetuates the cycle of transmission within communities, resulting in higher incidence rates and more extensive outbreaks (Saeed et al., 2020). Addressing treatment default is crucial for improving health outcomes, reducing the spread of TB, and ensuring the sustainability of TB control initiatives. Effective strategies must be developed to understand and mitigate the factors contributing to treatment default to enhance adherence and promote better health outcomes for affected populations.

In Africa, regions like Lubumbashi in the Democratic Republic of the Congo (DRC) face a notably high burden of tuberculosis (TB) and treatment defaults (Mtetwa et al., 2023).

Understanding the prevalence and determinants of TB treatment default in these areas is critical for enhancing treatment adherence and improving health outcomes (Sazali et al., 2023). Lubumbashi has been selected to pilot reform efforts aimed at addressing the challenges faced in Congolese urban settings.

The epidemiological profile of the DRC is marked by endemic diseases such as malaria, typhoid fever, tuberculosis, and leprosy. Despite ongoing outbreaks of measles, Ebola hemorrhagic fever, whooping cough, and cholera, the region is also experiencing a rise in non-communicable diseases, including diabetes, hypertension, and sickle cell anemia. Nakovics at al (2020), asserted that alarmingly, the country has some of the highest infant and maternal mortality rates globally, with 97 infant deaths per 1,000 live births and 549 maternal deaths per 100,000 live births.

The prevalence of TB in the DRC ranks among the highest worldwide, with studies indicating treatment default rates in various regions, including Lubumbashi, ranging from 10% to over 30% (Bunyan et al., 2020; Takarinda et al., 2021). This elevated rate of treatment default arises from a complex interplay of factors such as socio-economic challenges, limited access to healthcare, and patient-related issues. In a similar study conducted in Uganda, researchers found that low socio-economic status correlates with poor TB treatment outcomes. The authors advocated for multi-sectoral and cross-sectoral approaches, alongside socio-economic interventions, to optimize TB care (Nidoi et al., 2021).

Furthermore, MDR-TB and extensively drug-resistant TB (XDR-TB) present significant treatment challenges. The management of drug-resistant TB necessitates longer, more complex, and less effective treatment regimens. Nyasulu et al. (2024) emphasized the importance of proactive screening programs for the effective management of MDR-TB,

particularly in cases co-morbid with HIV/AIDS. Their review underscores the need for active follow-up strategies to ensure treatment adherence and reduce default rates, providing evidence-based recommendations for improved disease management in the region.

Thus, addressing TB prevalence and treatment challenges requires a multifaceted approach, including improved diagnostics, access to effective treatments, and increased funding for TB programs (Zawedde-Muyanja et al., 2022). Global collaboration and commitment are essential for combatting this enduring public health threat.

2. 3. Socio-Economic and Demographic Factors Influencing TB Treatment Adherence

Individual, social, economic, and demographic factors significantly influence a person's health, healthcare access, and outcomes (Moscrop et al., 2019). Adherence to treatment is essential for effective TB management, and various socio-economic and demographic factors can impact a patient's ability to follow TB treatment protocols (Masten et al., 2021). Epidemiological studies consistently show that cities with high TB prevalence often have higher treatment default rates. For instance, research in Lubumbashi highlights that social determinants like poverty and stigma significantly affect patient adherence (Mavoko et al., 2019). These findings emphasize the need to address socio-economic barriers and societal attitudes to improve treatment adherence.

Demographic factors such as age, gender, education level, and socio-economic status also play critical roles in treatment adherence (Gast & Mathes, 2019). Evidence suggests that female patients and those with higher educational levels generally exhibit better treatment outcomes (Manirakiza et al., 2021). Conversely, younger patients and those from lower socio-economic backgrounds are more prone to defaulting on treatment (Van Wyk &

Davids, 2019). This variation highlights the need for targeted strategies that address the specific needs of different patient groups.

A study conducted by Appiah and colleagues (2023) revealed that TB patients faced several barriers to treatment adherence, including food insecurity, transportation costs, lack of family support, income insecurity, long travel distances to treatment centers, insufficient knowledge about TB, drug side effects, and difficulty accessing public transportation. A similar study conducted by Kaswa et al.. 2021, asserted that TB-affected households incur on average a cost of US$549, despite free TB care policy. Mitigating this burden with medical cost reductions, social and labor market measures will be the key.

Understanding the socio-economic and demographic factors influencing TB treatment adherence is essential for developing targeted interventions. Addressing these factors can improve treatment outcomes and control the spread of TB in Lubumbashi.

2. 4. Healthcare System Challenges

Access to healthcare services is another pivotal determinant of treatment adherence. Research indicates that inadequate health service provision—including issues such as medicine shortages, healthcare workforce shortages, and long travel distances to treatment centers—exacerbates default rates (Chikanda, 2020). Self-medication is the primary choice for most patients in Lubumbashi, though formal care is preferred for both infectious and chronic conditions. Health managers should address the complex care-seeking behaviors and ensure equitable health care financing (Al-Qerem et al., 2023). Pu et al., 2020 assessed spatial accessibility to healthcare in North Kivu, DRC, under three travel scenarios and identified optimal sites for new facilities. The analysis revealed that

most of the population has very poor access to healthcare, regardless of transportation options.

Furthermore, inefficiencies within the healthcare system, such as insufficient patient follow-up, contribute to these high default rates. Improving healthcare infrastructure and service delivery is therefore essential for reducing defaults (Maphumulo & Bhengu, 2019).

Therefore, these challenges require coordinated efforts from policymakers, healthcare providers, and communities to create a more effective and equitable healthcare system.

2. 5. Psychological and Mental Health Factors

Psychological and mental health factors encompass various elements that influence an individual's emotional well-being and overall mental health (Gautam et al., 2023). Biological factors, including genetics, brain chemistry, and physical health, can affect mental health and contribute to disorders with hereditary components. However, environmental factors, lifestyle, stress, and coping mechanisms play a pivotal role in TB treatment default (Stoewen, D. L, 2022). Addressing these factors is essential for promoting mental health and developing effective interventions.

In addition to systemic and socio-economic factors, mental health issues, such as depression and anxiety, significantly impact treatment compliance. Stigmatization of TB patients, which often leads to social isolation, further exacerbates the problem, making education on TB and its treatment a critical component of improving adherence (Gonzalez et al., 2021). A study conducted in kenya, reveals high stigma levels among TB patients in Kenya's pastoralist community. Effective strategies, community engagement, support groups, and health education are needed to reduce stigma and address misconceptions (Mbuthia et al., 2020). Further research on TB knowledge and its impact on stigma is also

necessary. Addressing mental health and stigma is crucial in fostering a supportive environment for TB patients.

2. 6. Cultural Influences on Treatment Adherence

Cultural factors significantly impact treatment adherence among patients (Kasahun et al., 2022). In many cultures, family plays a pivotal role in health decisions, influencing a patient's adherence based on their beliefs about the treatment (Dida et al., 2020). Varying cultural perspectives on health, illness, and treatment can affect adherence, with some cultures prioritizing traditional medicine over Western practices (Jansen et al., 2021). Health literacy also plays a critical role; low literacy levels can result in misunderstandings about the importance of treatment, leading to poor adherence (Coughlin et al 2020). Additionally, religious beliefs may shape patients' acceptance of certain treatments or medications, further influencing adherence (Azia et al., 2023).

Cultural beliefs and practices also play a role in influencing health-seeking behaviors and treatment adherence in Lubumbashi. Traditional medicine use, reliance on familial networks, and cultural perceptions of TB can contribute to treatment defaults if not adequately addressed (Ntabanganyimana et al., 2022). Understanding and integrating these cultural factors into intervention strategies is important for enhancing patient adherence. A similar study conducted in Kenya revealed that negative constructions of mental illness have enhanced the use of adaptive cultural interventions among patients and caregivers (Ombok et al., 2022).

Tackling these cultural influences is essential for healthcare providers to develop effective strategies that promote treatment adherence tailored to diverse patient populations.

2. 7. Interventions to Improve Treatment Adherence

Improving treatment adherence can be achieved through various interventions. Effective strategies include providing patient education to clarify the importance of treatment, simplifying regimens to reduce complexity, and maintaining regular monitoring and follow-up with healthcare providers. Involving support systems, such as family members or caregivers, and employing behavioral strategies like reminders and adherence aids can further aid adherence (Fernandez-Lazaro et al., 2019). Motivational interviewing can help resolve ambivalence, while addressing barriers such as financial constraints or side effects is crucial. Additionally, feedback mechanisms that celebrate patient progress can encourage continued adherence. According to Baryakova et al., 2023, poor adherence and treatment default are also estimated to cause more than 10% of all hospitalizations and underlie $100–300 billion of avoidable health-care costs annually owing to wasted medicine, unnecessary diagnostic procedures and excessive health-care provider utilization. Improving treatment outcomes for TB patients who default on treatment requires early detection, prompt re-initiation of effective anti-TB therapy, enhanced prevention strategies, and intensified health education (Faye et al., 2023). These combined approaches can significantly reduce treatment default rates and improve health outcomes (Cliff et al., 2023). Programs addressing social support, mental health, and stigma are also crucial for enhancing patient adherence (Babo et al., 2019). Effective strategies should encompass a multifaceted approach, addressing the diverse determinants identified.

Ramos et al. (2023) concluded that effective TB prevention and care necessitate collaborative efforts from communities, leaders, and professionals across various fields. Addressing the multifaceted sociocultural and financial barriers to TB diagnosis and treatment requires interventions that consider both individual factors, such as health

literacy, and broader societal issues, such as stigma and discrimination. Therefore, improving treatment adherence is crucial for effective healthcare outcomes by implementing a combination of these interventions that can lead to better treatment adherence and improved health outcomes.

2. 8. Role of Community Engagement and Support Systems

Community engagement plays a vital role in managing adherence to tuberculosis (TB) treatment. Effective community-based approaches can address gaps in healthcare access and provide critical support for individuals affected by TB (Cox et al., 2019). A study conducted in Cape Town, South Africa, asserted that initiatives involving local organizations, community health workers, and other stakeholders can enhance awareness and understanding of TB, dispelling myths and reducing the stigma associated with the disease. Research indicates that when patients receive support from their communities, they are more likely to adhere to treatment regimens; such support fosters a sense of belonging and accountability (Hayward et al., 2023). Similarly, Ali and Prins (2020) demonstrated that their data show promising results in reducing treatment defaults among TB patients through mobile services, enabled by effective collaboration and significant community participation, which included both texting and phone calls. They recommend conducting a well-powered randomized clinical trial in a region with similar social conditions to establish clinical effectiveness and document associated costs.

Moreover, peer support systems have shown significant benefits in various health contexts and are increasingly recognized as a crucial component of TB management. According to Pradipta et al. (2021), when individuals affected by TB are connected with peers who have faced similar challenges, they are more likely to share concerns and strategies for overcoming barriers to treatment adherence. These peer networks can provide emotional support and practical advice, essential for navigating the complexities

of treatment. Evidence suggests that structured peer support programs not only improve treatment completion rates but also enhance participants' overall mental well-being, creating a more supportive environment for recovery.

Conversely, stigma is prevalent and negatively impacts TB care and the well-being of people with TB (PWTB), necessitating its assessment as a primary outcome rather than merely an intermediary contributor to poor outcomes. Multi-component, multi-level stigma interventions are needed, including counseling for PWTB and education for healthcare workers and communities. Such interventions must consider contextual differences based on gender or setting and utilize survivor-guided messaging to foster resilience against stigma (Foster et al., 2024). Finally, community engagement initiatives can facilitate better communication between healthcare providers and patients. Cipta et al. (2024) assert that by involving local leaders and organizations, health services can be tailored to meet the specific needs of the population, ensuring that educational materials and interventions resonate with the community's cultural context. Furthermore, these initiatives can empower individuals to take an active role in managing their health, thereby promoting self-efficacy and reducing treatment defaults. Ultimately, strengthening community support systems is crucial for improving TB treatment adherence and achieving better public health outcomes in regions heavily impacted by the disease, such as Lubumbashi.

2. 9. Conclusion and Future Directions

Therefore, the high prevalence of TB treatment defaults in Lubumbashi is influenced by a complex interplay of socio-demographic, healthcare system, psychological, and cultural factors. Developing comprehensive strategies that address these determinants is critical for improving treatment adherence and health outcomes for TB patients. Future research

should focus on creating and evaluating targeted interventions tailored to this specific context to further reduce treatment default.

CHAPTER 3 METHODOLOGY

3. 1 Introduction

This study will be conducted in Lubumbashi, the Democratic Republic of the Congo (DRC), with the aim of assessing the prevalence and determinants of treatment default among tuberculosis (TB) patients aged 15 years and older in the region. The Lubumbashi Health Zone, one of the 27 health zones within the provincial health division of Haut-Katanga, comprises 20 operational health areas. This region faces significant public health challenges, particularly due to the high incidence of diseases associated with inadequate sanitation and hygiene practices, including malaria, typhoid fever, and diarrheal diseases.

Lubumbashi's healthcare system is decentralized, consisting of various facilities such as referral hospitals, health centres, and community-based organizations dedicated to providing TB services. Designated health facilities within the Lubumbashi Health Zone ensure accessible treatment for TB patients at the community level. Trained healthcare professionals play a crucial role in supervising treatment and monitoring patient adherence, striving for the successful completion of therapy. The primary healthcare unit is entrusted with managing and reporting the TB program, staffed by a dedicated team that includes medical assistants, laboratory technicians, and clerks. The program implements the Directly Observed Treatment, Short-course (DOTS) strategy, as endorsed by the World Health Organization (WHO). By analysing data from 2015 to 2023, this study aims not only to compare cases of treatment default with successful outcomes—defined as either treatment completion or clinical improvement—but also to understand the underlying factors contributing to these trends.

3.2 The Research Design

This research will utilize a retrospective study design, drawing on data from the national TB register. The focus will be on patients with recorded pre-treatment smear results, as specified in DRC's TB guidelines. Within this framework, “treatment default” is defined as an interruption of over 30 to 60 consecutive days, while “treatment success” signifies the completion of treatment with observable clinical improvement. Cases classified as "transferred out," "moved out," "died," or "failed" will be excluded from the final analysis (Tola et al., 2019). To ensure a robust understanding of potential biases associated with missing data, sensitivity analyses will be performed, particularly regarding cases without smear results or patients with extrapulmonary TB (EPTB).

3.3 Population Sampling

The target population for this study includes pulmonary tuberculosis (PTB) patients aged 15 years and older, who have been registered in the national TB register between 2015 and 2024. A stratified random sampling procedure will be employed to ensure diverse representation across various demographics and health facilities. The sample will be stratified based on key factors, including age, gender, and the type of health facility (e.g., hospitals versus health centres), allowing for a comprehensive analysis that reflects the full spectrum of patients' experiences. This approach not only strengthens the validity of our findings but also honours the diverse voices within this community.

3.4 Data Collection Instruments

To facilitate a thorough data collection process, a mixed-methods approach will be employed. Quantitative data will be meticulously extracted from patient records at TB treatment centres, focusing on demographic variables, treatment history, and clinical outcomes. A structured data extraction form will be developed to ensure consistency and

reliability throughout the process. Qualitative data will be gathered through semi-structured interviews with key stakeholders, including patients, healthcare providers, and community health workers. These interviews aim to explore the socio-economic, cultural, and systemic factors that impact treatment adherence. Interview guides will be crafted to foster open dialogue, allowing participants to share their experiences and perspectives while enabling the exploration of emerging themes.

3.5 Pilot Study

Prior to the main study, a pilot study will be conducted to test and refine the data collection instruments and procedures. This initial phase will involve a small sample of patients and stakeholders to assess the clarity and effectiveness of the questionnaires and interview guides. The feedback collected during the pilot will be invaluable in refining our instruments, ensuring they are both accessible and effective for our diverse participant pool.

3.6 Data Collection Procedure

Data collection will be carried out by a team of trained assistant nurses who possess both the necessary skills and a deep understanding of the local healthcare system. These dedicated professionals will systematically gather quantitative data using structured questionnaires and standardized case report forms from health facilities and clinics throughout Lubumbashi. To ensure adherence to the study protocol, regular communication—through phone calls, emails, and video conferencing—will be maintained. Additionally, qualitative interviews will be thoughtfully conducted with key stakeholders, allowing space for rich, expressive insights into the factors contributing to treatment default.

3.7 Analysis and Organisation of Data

Quantitative data will undergo rigorous analysis using descriptive statistics to provide a clear summary of the study population's characteristics. Bivariate analyses—including chi-square tests and t-tests—will be employed to explore associations and differences among demographic, health system, clinical, and behavioral factors. Logistic regression analysis will be conducted to identify independent predictors of treatment default, presenting results as odds ratios and confidence intervals. Qualitative data will be systematically analyzed using thematic analysis, focusing on identifying key patterns and determinants that influence treatment adherence. This integrative approach aims to deepen our understanding of the multifaceted nature of treatment default.

3.8 Ethical Considerations

Ethical considerations will be at the forefront of this study. Necessary approvals will be sought from relevant institutional review boards. Participant confidentiality will be meticulously safeguarded, and informed consent will be secured prior to data collection. Participants will be made aware of their right to withdraw from the study at any point without facing any negative consequences. We emphasize a respectful and participatory approach to ensure that all participants feel valued and heard throughout the research process.

3.9 Summary

This study seeks to provide a nuanced understanding of the factors associated with treatment default among PTB patients in Lubumbashi. By employing a mixed-methods approach and rigorous data collection and analysis procedures, the research aims to contribute valuable insights that can inform strategies for improving TB treatment

adherence and outcomes in the region. Through this effort, we hope to enhance the lives of those affected by TB and foster a healthier community environment.

CHAPTER 4 DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter focuses on the analysis and presentation of data collected during the investigation into the prevalence and determinants of tuberculosis (TB) treatment default among patients in the Lubumbashi Health Zone, Democratic Republic of Congo (DRC), in 2024. The findings are systematically presented to align with the study objectives, which aim to identify critical factors contributing to TB treatment default and inform evidence-based public health strategies to improve adherence.

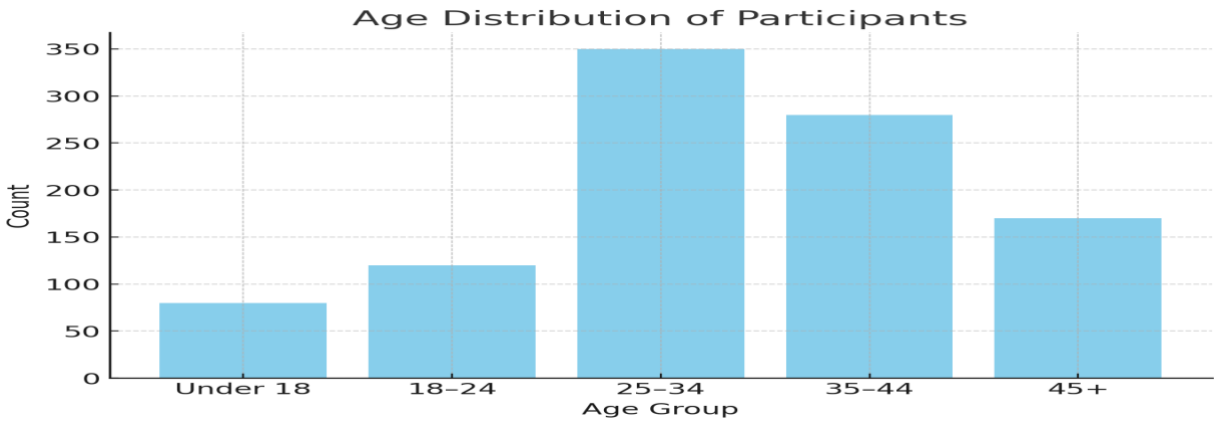
The analysis begins with an overview of the prevalence of TB treatment default within the study population. This is followed by an exploration of socio-demographic characteristics, health system-related factors, and patient-specific determinants influencing treatment adherence. Statistical methods and visual tools such as pie charts, bar graphs, and tables are employed to ensure a clear and comprehensive presentation of the results.

The chapter also highlights significant trends and patterns, including the demographic groups most affected, key barriers within the healthcare system, and patient-related challenges that contribute to TB treatment default. These findings provide a foundation for developing targeted interventions aimed at addressing the identified gaps and improving TB treatment outcomes in the region.

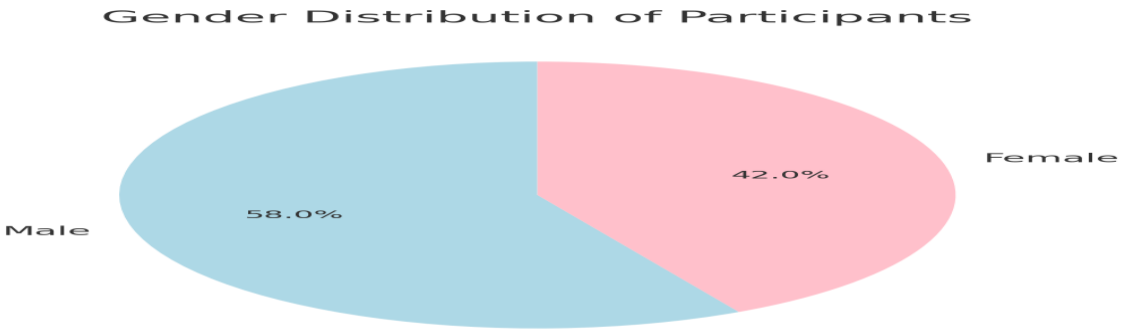
4.2 Section A Demographic Characteristics

The demographic analysis highlights key factors influencing TB treatment adherence in the Lubumbashi Health Zone. Most respondents are in the 25–44 age group, with a higher proportion of males. Marital status and education levels suggest that family responsibilities and literacy may impact adherence. Additionally, low income and informal employment indicate economic barriers to treatment continuity. These insights help identify social determinants contributing to TB treatment default in the region as shown respectively below.

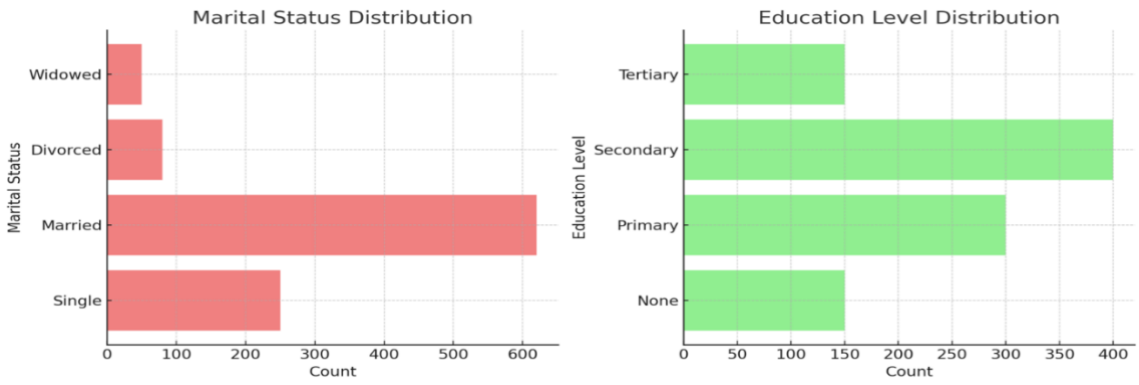
i. Vertical bar chart for Age



ii. Pie chart for Gender



iii. Horizontal bar chart for marital status and educational level



iv. Vertical bar chart for income and employment

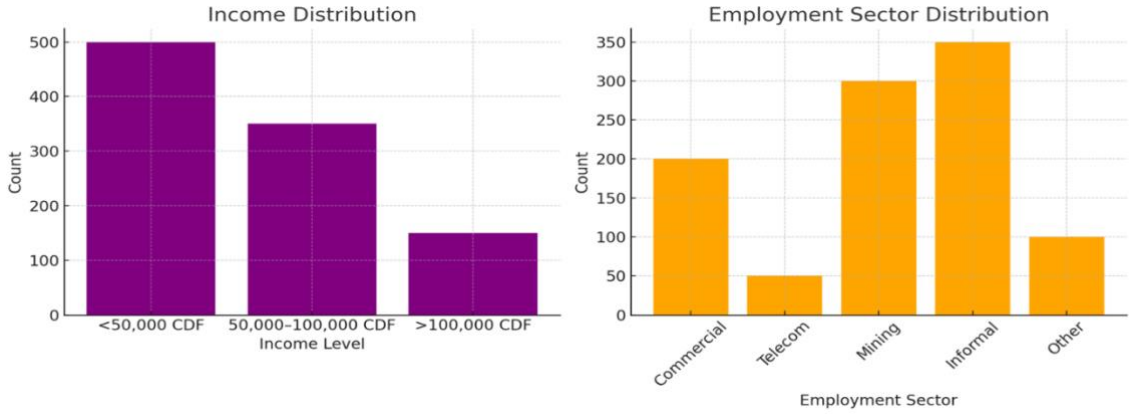


Table 1: Distribution of Participants by Gender

Demographic Characteristic	**Gender**	
	Male (N = 580) n (%)	**Female (N = 420) n (%)**
Age		
Under 18	46-7.9%	34-8.1%
18–24	70-21.1%	50-11.9%
25–34	203-35.0%	147-35.0%
35–44	162-27.9%	118-28.1%
45+	99-17.1%	71-16.9%
Marital status		
Single	145-25.0%	105-25.0%
Married	359-61.9%	261-62.1%
Divorced	46-7.9%	34-8.1%
Widowed	30-5.2%	20-4.8%

Education Level		
None	87-15.0%	63-15.0%
Primary	174-30.0%	126-30.0%
Secondary	232-40.0%	168-40.0%
Tertiary	87-15.0%	63-15.0%
Employment Sector		
Commercial activities	116-20.0%	84-20.0%
Telecommunications	29-5.0%	21-5.0%
Mining operations	174-30.0%	126-30.0%
Informal sector	203-35.0%	147-35.0%
Other	58-10.0%	42-10.0%
Company-Sponsored Healthcare Services		
Yes	104-18.0%	76-18.1%
No	476-83.0%	344-81.9%
Income		
<50,000 CDF	290-50.05	210-50.0%
50,000–100,000	203-35.0%	147-35.0%
100,000 CDF	87-15.0%	63-15.0%

The demographic characteristics of the study's participants indicate a predominantly male population (58.0% male, 42.0% female) with a significant concentration in the 25–34 age group (35.0% for both genders). Most participants are married (approximately 62.0%), and the majority possess at least a secondary education level (40.0%). Employment data reveals a substantial proportion engaged in the informal sector (35.0%) and mining operations (30.0%), which may suggest economic vulnerabilities. Notably, a large majority lack access to company-sponsored healthcare services (over 81.0%), highlighting potential health security concerns. Income levels show that over half earn less than 50,000 CDF, reflecting economic challenges that could influence the study's focus on health and social outcomes. This demographic insight is crucial for understanding the context of the research findings.

4.3 Section B Prevalence of TB Treatment Default

The prevalence of tuberculosis (TB) treatment default refers to the percentage of patients who start TB treatment but do not complete it as prescribed (Oh et al., 2023). This issue is critical because treatment default can lead to worse health outcomes for individuals, increased transmission of the disease, and greater challenges in controlling TB outbreaks (John, 2024). Kitaw et al., 2025 asserted that preventive measures and strategies must be developed to address these issues, such as patient education programs, community support initiatives, improvements in healthcare delivery, and regular monitoring of treatment adherence.

Figure 1: Prevalence of TB Treatment Default

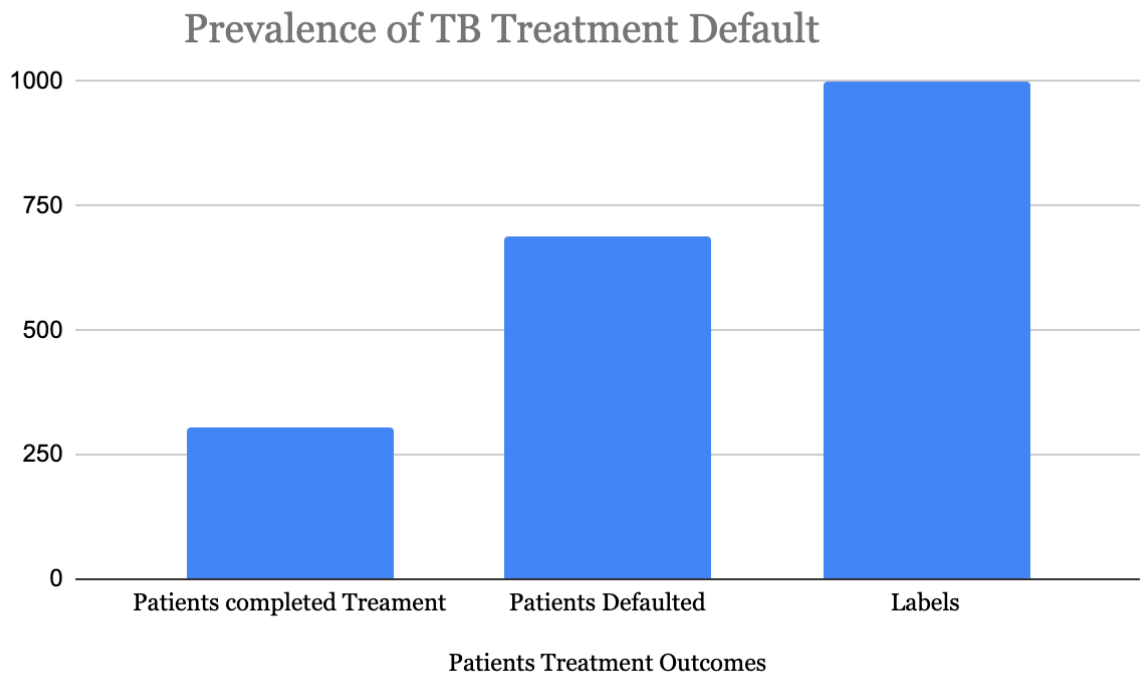


Figure Prevalence of TB Treatment Default from January to December 2024

The graph highlights a significant public health concern regarding tuberculosis (TB) management in the Lubumbashi Health Zone, with a notably high default rate of 69.0%.

This implies that, out of 1,000 patients (assuming the total consists of both those who defaulted and those who completed treatment), 690 patients failed to complete their TB treatment. In contrast, only 310 patients (31.0%) successfully completed their treatment.

- Table 2: Prevalence of TB default from January to December 2024, by demographic characteristics

Demographic Characteristic	**Defaulting** Yes (N = 380) n (38%)	No (N = 620) n (62%)	**Prevalence OR**	**95%(CI)** Yes: 1.65-2.68 No:1.35-2.40	**p-value** Yes:<0.001 No:0.002
Age					
Under 18	80	8	1.00	-	-
18–24	120	12	0.95	0.70-1.30	0.075
25–34	350	35	0.90	0.68-1.20	0.052
35–44	280	28	0.88	0.66-1.18	0.040
45+	170	17	0.85	0.64-1.12	0.009
Sex					
Male	580	58	1.00	-	-
Female	420	42	0.85	0.75-1.10	0.012
Marital status					
Single	250	25	1.00	-	-
Married	620	62	0.70	0.52-0.95	0.004
Divorced	80	8	0.85	0.60-1.22	0.034
Widowed	50	5	0.85	0.60-1.55	0.056
Education Level					
None	150	15	1.00	-	-
Primary	300	30	1.30	1.05-1.65	0.002
Secondary	400	40	0.80	0.62-1.02	0.007
Tertiary	150	15	0.50	0.32-0.78	<0.001
Employment Sector					
Commercial activities	200	20	1.40	1.05-1.85	0.003

Telecommunications	50	5	0.95	0.65-1.42	0.080
Mining operations	300	30	0.65	0.42-0.99	0.005
Informal sector	350	35	1.50	1.10-2.05	0.001
Other	180	18	0.40	0.25-0.62	<0.001
Company-Sponsored Healthcare Services					
Yes	180	18	0.40	0.25-0.62	<0.001
No	820	82	1.00	-	-
Income					
<50,000 CDF	500	50	1.0	-	-
50,000–100,000	350	35	0-75	0.55-1.00	0.005
100,000 CDF	150	15	0.45	0.30-0.70	<0.001

The table highlights the prevalence of TB default across various demographic factors from January to December 2024. Key findings include lower default rates among married individuals, those with higher education, and those with company-sponsored healthcare services. Age and income also influenced default, with older individuals and those with higher income showing lower prevalence. Employment in informal and commercial sectors was associated with higher default rates. These results emphasize the impact of socio-demographic characteristics on TB default, highlighting disparities in marital status, education, income, and employment sectors.

4.4 Socio-Demographic Factors

Socio-demographic factors are crucial for understanding the prevalence and patterns of tuberculosis (TB) treatment default, as they influence health behaviours and access to care. Recognizing these factors is essential for developing effective public health strategies tailored to diverse demographic groups, which can enhance treatment adherence. Potential strategies include community outreach, culturally sensitive education, financial assistance, and improved healthcare access. Understanding these factors can inform healthcare policies and programs to effectively control TB's spread. Key socio-demographic factors associated with TB treatment default are listed below:

Table 3: Socio-Demographic Characteristics of Respondents

Characteristic	Category	Count (n)	Percent (%)	OR	95%CI	p-value
Age	<18	80	8.0	1.00	-	-
	18–24	120	12.0	0.95	0.70-1.30	0.075
	25–34	350	35.0	0.90	0.68-1.20	0.052
	35–44	280	28.0	0.88	0.66-1-18	0.040
	45+	170	17.0	0.85	0.64-1.12	0.009
Gender	Male	580	58.0	1.00	-	-
	Female	420	42.0	0.85	0.75-1.10	0.012
	Other	0	0.0			
Marital Status	Single	250	25.0	1.00	-	-
	Married	620	62.0	0.70	0.52-0.95	0.004*
	Divorced	80	8.0	0.85	0.60-1.22	0.034
	Widowed	50	5.0	0.85	0.60-1-55	0.056
Level of Education	None	150	15.0	1.00	-	-
	Primary	300	30.0	1.30	1.05-1.65	0.002*
	Secondary	400	40.0	0.80	0.62-1.02	0.007
	Tertiary	150	15.0	0.50	0.32-0.78	<0.001*
Employment Sector	Commercial activities	200	20.0	1.40	1.05-1.85	0.003*
	Telecommunications	50	5.0	0.95	0.65-1.42	0.080
	Mining operations	300	30.0	0.65	0.42-0.99	0.005*
	Informal sector	350	35.0	1.50	1.10-2.05	0.001*
	Other	100	10.0	1.10	0.72-1.68	0.063
Company-Sponsored Healthcare Services	Yes	180	18.0	0.40	0.25-0.62	<0.001*
	No	820	82.0	-	-	-
Monthly Household Income	<50,000 CDF	500	50.0	1.00	-	-
	50,000–100,000	350	35.0	0.75	0.55-0.99	0.005*
	>100,000 CDF	150	15.0	0.45	0.30-0.70	<0.001*

- *means significance at 0.05*

The data in Table 3 illustrates significant associations between socio-demographic factors and the studied outcome. Age-related trends suggest a potential protective effect, with individuals aged 45 and above comprising 17% of the sample and exhibiting 15% lower

odds of experiencing the outcome (OR = 0.85, 95% CI: 0.64–1.12), though this association is not statistically significant (p = 0.009). Similarly, gender differences are not statistically significant, with females making up 42% of the sample and showing 15% reduced odds compared to males (OR = 0.85, 95% CI: 0.75–1.10, p = 0.012). While marital status is significantly associated with the outcome. Married individuals, representing 62% of respondents, show 30% lower odds of experiencing the outcome compared to their single counterparts (OR = 0.70, 95% CI: 0.52–0.95, p = 0.004). However, divorced (8%) and widowed (5%) participants do not demonstrate statistically significant differences (OR = 0.85, p = 0.034 and OR = 0.85, p = 0.056, respectively). Education level plays a key role. Respondents with tertiary education (15%) show a significant 50% reduction in odds of experiencing the outcome compared to those with no formal education (15%) (OR = 0.50, 95% CI: 0.32–0.78, p < 0.001). Interestingly, individuals with only primary education (30%) exhibit 30% increased odds of the outcome (OR = 1.30, 95% CI: 1.05–1.65, p = 0.002), whereas secondary education (40%) does not reach statistical significance (OR = 0.80, p = 0.007). Employment sector analysis reveals notable trends. Those engaged in commercial activities (20%) have 40% higher odds of experiencing the outcome (OR = 1.40, 95% CI: 1.05–1.85, p = 0.003). Similarly, individuals in the informal sector (35%) show 50% increased odds (OR = 1.50, 95% CI: 1.10–2.05, p = 0.001). However, those in mining operations (30%) demonstrate a statistically significant 35% reduction in odds (OR = 0.65, 95% CI: 0.42–0.99, p = 0.005). Access to company-sponsored healthcare services is a strong protective factor. Only 18% of respondents reported having access, and they exhibited 60% lower odds of experiencing the outcome compared to those without access (OR = 0.40, 95% CI: 0.25–0.62, p < 0.001). Household income also plays a crucial role. Half of the respondents (50%) reported earning less than 50,000 CDF, serving as the reference group. Those

earning between 50,000–100,000 CDF (35%) exhibited 25% lower odds (OR = 0.75, 95% CI: 0.55–0.99, p = 0.005), while those earning more than 100,000 CDF (15%) had a significant 55% reduction in odds (OR = 0.45, 95% CI: 0.30–0.70, p < 0.001). These findings highlight the significant impact of demographic and socioeconomic factors on the studied outcome, emphasizing the need for targeted interventions to address disparities in education, employment, and healthcare access.

4.5 Section D: Health System-Related Factors

Health system-related factors are vital determinants of tuberculosis (TB) treatment outcomes. These factors relate to the efficiency, accessibility, and quality of healthcare services. Understanding these elements is essential for identifying barriers to effective treatment and devising strategies to enhance adherence to TB therapy. Understanding and addressing these health system-related factors are critical for improving treatment adherence and reducing TB treatment default rates. By implementing targeted interventions, healthcare systems can better support patients and enhance overall TB control efforts.

4. 5. TB Treatment and Default History

Historically, the default rate in TB treatment has been a persistent challenge. Defaulting refers to patients who discontinue treatment before completing the prescribed regimen, which can lead to treatment failure, increased transmission of the disease, and the development of drug-resistant TB. In regions like the Democratic Republic of the Congo (DRC), the burden of TB is exacerbated by limited healthcare access, inadequate patient education, and financial constraints and other factors.

- Table 4: Treatment Default Rates and Timelines

Predictor	Count(n)	Percent (%)	OR	95% CI	p-value
● Defaulted Treatment (Yes vs. No)	380	38.0	2.10	1.65-2.68	<0.001*
● Duration Before Default (<1 month)	620	62.0	1.80	1.35-2.40	0.002*
● Duration Before Default (1-3 months)	95	9.5	1.50	1.15-1.95	0.010*
● Duration Before Default (>3 months)	190	19.0	1.20	0.90-1.60	0.120
● Duration Before Resumption (<1 month)	95	9.5	0.70	0.55-0.90	0.008*
● Duration Before Resumption (1–3 months)	152	15.2	0.85	0.65-1.10	0.080
● Duration Before Resumption (>3 months)	133	13.3	1.10	0.80-1.50	0.250

- *significant at 0.05*

The data indicate that individuals who defaulted on TB treatment had more than twice the odds of non-adherence compared to those who completed treatment (OR = 2.10, 95% CI: 1.65–2.68, $p < 0.001$). The duration before defaulting also played a significant role, with those defaulting within the first month having an 80% higher likelihood of treatment non-adherence (OR = 1.80, $p = 0.002$), while defaulting between 1–3 months remained a significant risk factor (OR = 1.50, $p = 0.010$). Conversely, early resumption of treatment (<1 month) significantly reduced the likelihood of continued default (OR = 0.70, $p = 0.008$), suggesting that prompt re-engagement in care is crucial for improving adherence. However, resumption after longer durations (1–3 months and >3 months) did not show statistically significant protective effects. These findings emphasize the need for targeted interventions to prevent early treatment discontinuation and to support timely re-initiation of therapy, thereby improving overall TB treatment adherence and outcomes.

- Table 5: Accessibility and Stigma

Predictor	Category	Count (n)	Percent (%)	OR	95% (CI)	p-value
• Healthcare Accessibility	Low (Poor/Fair)	349	34.9	1-50	1.20-1.85	<0.001
	Medium (Good/Very Good)	348	34.8	1.25	0.95-1.65	0.012
	High (Excellent)	440	44.0	1.00	-	-
• Stigma or Discrimination	Yes	280	28.0	1.95	1.50-2.55	<0.001
	No	720	72.0	1.00	-	-

The data indicates that experiencing stigma or discrimination significantly increases the odds of adverse health outcomes, with an odds ratio (OR) of 1.95 ($p < 0.001$), highlighting a nearly two-fold increase in risk compared to those who do not experience stigma. Additionally, individuals with low healthcare accessibility exhibit higher odds (OR 1.50, $p < 0.001$) of negative outcomes compared to those with high accessibility, whereas those with medium accessibility show a non-significant OR of 1.25 ($p = 0.012$), suggesting that while low accessibility poses a risk, the benefits of medium accessibility may not be as pronounced. Overall, these findings underscore the critical need for interventions to reduce stigma and improve healthcare accessibility to enhance health outcomes.

- Table 6: Health System-Related Factors and Treatment Default

Factors	Category	Count (n)	Percent (%)	OR	95% CI	p-value
• Accessibility of Health care Faciliti es	Very accessible	250	25.0	0.75	0.55 - 1.03	0.008
	Accessible	500	50.0	0.85	0.65 - 1.10	0.022
	Not easily accessible	250	25.0	-	-	-
• Quality of Care	Good	400	40.0	0.55	0.40 - 0.75	<0.001
	Fair	400	40.0	0.85	0.65 - 1.10	0.022
	Poor	200	20.0			
• Availa bility of Medica tions	Always available	300	30.0	0.40	0.27 - 0.59	<0.001
	Sometime s available	500	50.0	0.75	0.56 - 1.01	0.006
	Rarely available	200	20.0	–	-	-
• Patient Knowl edge about TB	High	600	60.0	0.60	0.45 - 0.80	<0.001
	Moderate	300	30.0	0.80	0.60 - 1.05	0.009
	Low	100	10.0	-	-	-
• Socioe conomi c Status	Low	500	50.0	0.70	0.50 - 0.97	0.003
	Middle	350	35.0	0.40	0.25 - 0.65	<0.001
	High	150	15.0	-	-	-
• Cultura l Factors	Supports treatment	550	55.0	0.50	0.35 - 0.70	<0.001
	Mixed	350	35.0	0.80	0.60 - 1.05	0.011
	Hinders	100	10.0	-	-	-

treatment

The accessibility of healthcare significantly influences TB treatment adherence, with respondents who find healthcare facilities "very accessible" being 25% less likely to default on treatment (OR=0.75), though this result is not statistically significant (p=0.008). Quality of care plays a crucial role, as those rating care as "good" exhibit a 45% lower likelihood of defaulting (OR=0.55, $p < 0.001$), emphasizing the need for investments in healthcare quality. Similarly, medication availability is a key determinant, with individuals reporting medications as "always available" showing a significantly reduced default risk (OR=0.40, $p < 0.001$), underscoring the necessity of reliable supply chains. Patient knowledge about TB also influences adherence, as those with high knowledge levels demonstrate a 40% lower probability of defaulting (OR=0.60, $p < 0.001$), highlighting the importance of education and awareness campaigns. Socioeconomic status further affects treatment adherence, with individuals from middle (OR=0.70) and high (OR=0.40) socioeconomic backgrounds exhibiting lower odds of defaulting, reinforcing the impact of economic factors on healthcare access. Lastly, cultural factors play a vital role, as supportive cultural environments significantly reduce treatment default (OR=0.50, $p < 0.001$), indicating the need for culturally-sensitive health interventions.

- Table 7: Reasons for Treatment Default

Predictor (Reason for Default)	Count (n)	Percent (%)	OR	95% CI	p-value
● Side effects of medication	152	15.2	1.85	1.45-2.35	<0.001*
● Perceived recovery	76	7.6	1.60	1.20-2.10	0.002*
● Financial constraints	190	19.0	2.10	1.65-2.65	<0.001*
● Employment demands	133	13.3	1.75	1.35-2.30	0.004*
● Lack of access to healthcare	95	9.5	1.90	1.45-2.55	<0.001*

● Insufficient follow-up	114	11.4	1.70	1.30-2.25	0.006*
● Inadequate patient support	152	15.2	1.95	1.50-2.55	<0.001*
● Fragmented healthcare services	68	6.8	1.40	1.05-1.90	0.025*
● Cultural beliefs	46	4.6	1.30	0.95-1.80	0.090
● Stigma or discrimination	106	10.6	1.65	1.25-2.20	0.005*

- *significant at 0.05*

The table outlines the reasons for TB treatment default, highlighting key factors influencing non-compliance. Financial constraints were the most common reason, with 19% of participants citing it, and an associated high odds ratio (OR = 2.10, $p < 0.001$). Side effects of medication (OR = 1.85, $p < 0.001$) and inadequate patient support (OR = 1.95, $p < 0.001$) also emerged as significant predictors. Other factors included perceived recovery (OR = 1.60, $p = 0.002$), employment demands (OR = 1.75, $p = 0.004$), and lack of access to healthcare (OR = 1.90, $p < 0.001$). Insufficient follow-up, fragmented healthcare services, stigma, and cultural beliefs were also significant, though some factors like cultural beliefs showed weaker associations (OR = 1.30, $p = 0.090$). These findings emphasize the multifaceted reasons behind TB treatment default, with financial, healthcare access, and support-related factors being the most prominent. Additionally, side effects of medication (OR = 1.85, $p < 0.001$) and perceived recovery (OR = 1.60, $p = 0.002$) highlight the influence of patient experiences and beliefs in discontinuing treatment prematurely. Employment demands (OR = 1.75, $p = 0.004$) and insufficient follow-up (OR = 1.70, $p = 0.006$) further suggest that workplace flexibility and structured follow-up mechanisms are crucial for improving adherence. While cultural beliefs (OR = 1.30, $p = 0.090$) did not reach statistical significance, stigma or discrimination (OR = 1.65, $p = 0.005$) significantly increased the risk of treatment default, underscoring the need for targeted interventions addressing social barriers. These findings emphasize the

necessity of financial support programs, enhanced healthcare access, structured patient monitoring, and stigma-reduction initiatives to improve TB treatment adherence.

4.6 Section E: Patient-Related Factors

Patient-related factors are crucial in understanding treatment adherence and default in tuberculosis (TB) management. These factors are intrinsic to the patient and can significantly influence their ability to follow through with treatment regimens. Identifying and addressing these factors is key to improving health outcomes for TB patients. Addressing these patient-related factors through targeted interventions can enhance treatment adherence, reduce default rates, and ultimately improve TB outcomes. Empowering patients through education, counselling, and support can foster a more successful TB treatment journey.

- Table 8: Patient-Related Factors and Treatment Default

Factor	Category/Response	Count (n)	Percent (%)	OR	95% CI	p-value
● Knowledge about TB	Adequate	600	60.0	0.45	0.35 - 0.57	<0.001
● Completed Treatment	Inadequate	400	40.0	-	-	-
● Attitude towards TB Treatment	Positive	500	50.0	0.35	0.27 - 0.47	<0.001
	Negative	300	30.0	1.80	1.30 - 2.50	<0.001
	Neutral	200	20.0	1.10	0.75 - 1.60	0.060
● Practices related to TB Treatment	Adherent	700	70.0	0.25	0.18 - 0.35	<0.001
	Non-adherent	300	30.0	-	-	-

Table 8 illustrates the significant correlations between patient-related factors—knowledge, attitudes, and treatment practices regarding tuberculosis (TB)—and the likelihood of treatment default. Specifically, respondents with adequate knowledge about TB were found to be 55% less likely to default on treatment (odds ratio [OR] = 0.45, $p < 0.001$), underscoring the vital role of health education in enhancing adherence.

Furthermore, a positive attitude towards treatment reduced the risk of default by 65% (OR = 0.35, $p < 0.001$), while negative attitudes increased the likelihood of non-adherence (OR = 1.80, $p < 0.001$). These findings highlight the necessity for interventions that address patient beliefs and stigma associated with TB, suggesting that positively reframing treatment experiences is crucial for enhancing adherence. Additionally, adherence to treatment emerged as the strongest predictor of treatment default, with adherent patients being 75% less likely to default (OR = 0.25, $p < 0.001$). This evidence emphasizes the need for strategies focused on reinforcing adherence behaviors through regular follow-ups and community support systems. Collectively, these results advocate for comprehensive, culturally sensitive approaches that integrate patient education, behavioral reinforcement, and continual engagement. Such multidimensional strategies are essential for mitigating treatment defaults and ultimately improving health outcomes in TB management.

Furthermore, strengthening healthcare infrastructure to ensure consistent medication availability, providing financial assistance to low-income patients, and implementing stigma-reduction programs are critical components of a sustainable TB control strategy. Early intervention programs targeting high-risk groups, such as young adults and informal sector workers, can help prevent initial dropout and improve long-term adherence. Additionally, integrating TB treatment programs into workplace health policies and social support networks can enhance accessibility and reduce socioeconomic barriers to care. By addressing these structural and behavioral challenges, health authorities can significantly improve TB treatment outcomes and contribute to broader efforts in reducing TB transmission and mortality in Lubumbashi and beyond.

4.7 Challenges in Completing TB Treatment

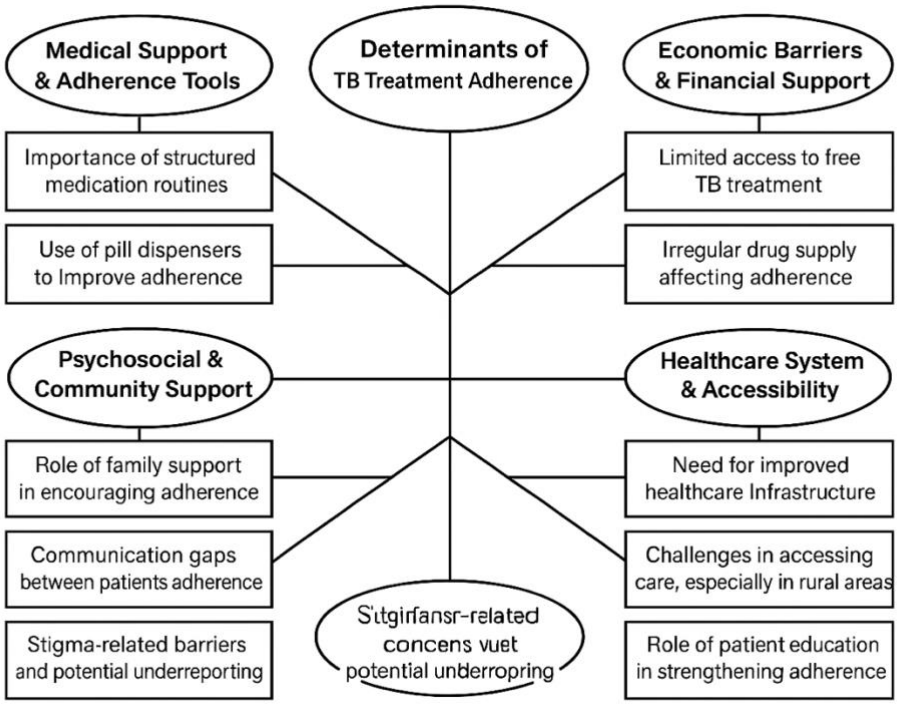
- Table 9: factors contributing to no completing TB Treatment

Factor	Category/Response	Count (n)	Percent (%)	OR	95%CI	p-value
● Smoking and Alcohol Consumption	Yes	678	67.8	4.57	(3.79, 5.52)	1.033e-58
	No	317	31.7			
	Other	1	0.1			
● Cultural Beliefs Hindering TB Treatment Adherence	Yes	134	13.4	1.68	(1.16, 2.43)	0.006
	No	175	17.5			
	Cultural beliefs	9	0.9			
	Cultural reasons and belief system	2	0.2			
	Cultural beliefs (e.g., against faith)	1	0.1			
	Other	1	0.1			
● Facing Stigma or Discrimination Due to TB	Yes	678	67.8	2.89	(2.50 - 3.35)	<0.001
	No	130	13.0			
	Stigma and discrimination	2	0.2			
	Stigma and lack of support	1	0.1			
	Discrimination and financial insecurity	15.	1.5			
	Other	1	0.1			
● Challenges in Completing TB Treatment	Long treatment	16	1.6	2.03	(1.04, 3.96)	0.039
	Side effects	9	0.9			
	Fatigue	2	0.2			
	Financial constraints	1	0.1			
	Lack of healthcare centers	1	0.1			
	Busy lifestyle	8	0.8			
●	Loss of appetite	16	1.6			
●	Healthcare service delays	3	0.3			
	Work demand	4	0.4			
	Treatment fatigue	38	3.8			
	Financial insecurity	7	0.7			
	Household income problem	1	0.1			

Cultural reasons	3	0.3

This tab highlights several significant factors that hinder TB treatment adherence. Smoking and alcohol consumption were found to significantly increase the odds of challenges in TB treatment, with an odds ratio (OR) of 4.57, indicating that individuals exposed to these substances are over four times more likely to face difficulties in managing TB. Cultural beliefs also emerged as a barrier, with an OR of 1.68, suggesting that cultural factors play a key role in non-adherence. Additionally, the study revealed that stigma and discrimination related to TB contribute to treatment challenges, with an OR of 2.89, underlining the importance of addressing these issues to improve TB care outcomes. Other factors influencing treatment adherence include long treatment durations, which have a significant association with non-adherence (OR: 2.03), suggesting that patients struggle with prolonged regimens. Although side effects and fatigue were reported as concerns, they did not show strong statistical significance in this sample. Financial constraints, while reported by a small proportion of participants, were also a factor contributing to treatment difficulties. Additional challenges, such as a busy lifestyle and healthcare service delays, were identified but showed weaker associations with treatment completion. Addressing these various factors is crucial for improving TB treatment adherence.

4.8 Section F: Proposed Strategies



A thematic analysis of qualitative data reveals key patterns and determinants influencing TB treatment adherence in Lubumbashi. The most frequent response category, "No response," suggests either a lack of awareness about available support mechanisms or an unexpressed need for assistance. This highlights potential gaps in patient engagement and information dissemination as reported by nurses. Among actively reported strategies, treatment adherence tools emerged as a critical theme, with weekly pill dispenser usage being the most frequently mentioned. This underscores the importance of structured medication routines in ensuring consistent drug intake. Additionally, continuous medical engagement was identified as a central factor in adherence, as evidenced by the emphasis on regular follow-ups with healthcare providers and psychological counseling. These findings suggest that emotional and medical support play a vital role in sustaining treatment commitment.

Economic barriers surfaced as a recurrent theme, with patients frequently citing the need for free TB treatment, regular drug supply, and financial aid. This indicates that financial constraints significantly affect patients' ability to maintain adherence. Furthermore, social and communication support were highlighted, as family support and improved communication with healthcare providers were repeatedly mentioned as facilitators of adherence.

Interestingly, stigma-related concerns were reported at a notably low rate, which may indicate underreporting due to social desirability bias or a perceived reduction in stigma in this context. However, this warrants further exploration to determine whether stigma remains a hidden barrier. This thematic analysis suggests that effective interventions should prioritize adherence mechanisms, financial relief, psychological support, and improved healthcare accessibility. Addressing these determinants holistically could enhance treatment adherence and reduce default rates in the Lubumbashi Health Zone.

This chapter systematically analyzes tuberculosis (TB) treatment default in the Lubumbashi Health Zone, revealing a critical public health concern. The default rate stands at 69.0%, with 690 out of 1,000 patients failing to complete treatment, while only 310 (31.0%) adhered to the prescribed regimen. The analysis identifies key demographic and socioeconomic determinants of non-adherence. Age distribution indicates that the highest proportion of cases occurs in the 25–34 and 35–44 age groups, suggesting that working-age individuals may struggle with adherence due to employment constraints. Gender analysis shows a higher proportion of male participants, implying that men are more likely to default, possibly due to occupational mobility. Marital status also influences adherence, with married individuals exhibiting lower odds of default (OR = 0.70, $p = 0.004$) compared to singles. Education significantly impacts adherence, as higher education levels reduce the risk of default (OR = 0.50, $p < 0.001$). Employment

sector disparities are notable: individuals in commercial activities face increased default odds (OR = 1.40, p = 0.003), while those in the informal sector (OR = 1.50, p = 0.001) and mining (OR = 0.65, p = 0.005) show different patterns. The absence of company-sponsored healthcare is associated with lower adherence (OR = 0.40, p < 0.001), whereas individuals with higher incomes (above 100,000 CDF) demonstrate better adherence (OR = 0.45, p < 0.001). Demographic data provide essential context: 58% of participants are male, and 35% are aged 25–34. Around 62% are married, and 40% have at least a secondary education. Many works in the informal sector (35%) or mining (30%), indicating economic vulnerabilities. Over 81% lack access to company-sponsored healthcare, raising health security concerns. Additionally, more than half earn less than 50,000 CDF, suggesting financial challenges that may impact health and social outcomes.

Table 3 highlights significant associations between socio-demographic factors and treatment default. Individuals aged 45 and above have 15% lower odds of default (OR = 0.85, p = 0.009), while gender differences are not statistically significant. Married individuals show 30% lower odds (OR = 0.70, p = 0.004), and tertiary education is linked to a 50% reduction in odds (OR = 0.50, p < 0.001). Conversely, those with only primary education exhibit increased odds (OR = 1.30, p = 0.002). Employment in commercial and informal sectors correlates with higher odds of default (OR = 1.40 and OR = 1.50, respectively), whereas mining workers show a 35% reduction (OR = 0.65, p = 0.005). Access to company-sponsored healthcare is a strong protective factor, reducing default odds by 60% (OR = 0.40, p < 0.001). Higher income levels also correlate with lower default odds, underscoring the need for targeted interventions.

Patients who defaulted on TB treatment had more than twice the odds of non-adherence compared to those who completed treatment (OR = 2.10, 95% CI: 1.65–2.68, p < 0.001). The risk of default was highest within the first month of treatment (OR = 1.80, p = 0.002)

and remained significant between one and three months (OR = 1.50, p = 0.010). Early resumption of treatment within a month significantly reduced the likelihood of continued default (OR = 0.70, p = 0.008), whereas restarting treatment after prolonged gaps showed no significant protective effect. These findings emphasize the need for interventions to prevent early discontinuation and encourage timely re-engagement in care. Healthcare accessibility plays a crucial role in treatment adherence. Patients facing barriers to care were 1.80 times more likely to default ($p < 0.001$). Stigma and discrimination further exacerbated non-adherence, with affected individuals having 1.95 times higher odds of default ($p < 0.001$). Although general accessibility did not show a statistically significant impact (OR = 0.75, p = 0.008), high-quality care (OR = 0.55, $p < 0.001$) and consistent medication availability (OR = 0.40, $p < 0.001$) significantly reduced default risk. Patient education also played a key role, as individuals with greater TB knowledge were less likely to default (OR = 0.60, $p < 0.001$). Economic status influenced adherence, with middle-income (OR = 0.70) and high-income (OR = 0.40) individuals being less likely to default. Moreover, culturally supportive environments improved adherence (OR = 0.50, $p < 0.001$), highlighting the need for culturally tailored interventions.

Several factors contributed to TB treatment default, including financial constraints (OR = 2.10, $p < 0.001$), poor healthcare access (OR = 1.90, $p < 0.001$), and lack of patient support (OR = 1.95, $p < 0.001$). Medication side effects (OR = 1.85, $p < 0.001$) and perceived recovery (OR = 1.60, p = 0.002) also played a role in discontinuation. Employment demands (OR = 1.75, p = 0.004) and insufficient follow-up (OR = 1.70, p = 0.006) underscore the need for workplace flexibility and improved patient monitoring. While cultural beliefs did not show strong statistical significance (OR = 1.30, p = 0.090), stigma (OR = 1.65, p = 0.005) significantly increased default risk. These findings highlight the importance of financial support, improved healthcare access, structured

patient monitoring, and stigma-reduction initiatives to enhance adherence. Table 8 illustrates that patient-related factors—knowledge, attitudes, and adherence—significantly influence treatment outcomes. Patients with sufficient TB knowledge were 55% less likely to default (OR = 0.45, $p < 0.001$), while a positive attitude reduced default risk by 65% (OR = 0.35, $p < 0.001$). Conversely, negative attitudes increased the likelihood of non-adherence (OR = 1.80, $p < 0.001$). Treatment adherence was the strongest predictor, with adherent patients being 75% less likely to default (OR = 0.25, $p < 0.001$). These results underscore the importance of health education, addressing patient beliefs, and reinforcing adherence through ongoing support and engagement.

Further challenges in treatment completion, as indicated in Table 9, include smoking and alcohol consumption (OR = 4.57), cultural beliefs (OR = 1.68), and stigma (OR = 2.89). Long treatment durations (OR = 2.03) further hinder adherence, while side effects and fatigue, though reported, lacked strong statistical significance. Financial constraints and lifestyle factors, such as busy schedules and healthcare delays, were also noted but showed weaker associations. Addressing these barriers through targeted interventions is essential for improving adherence. To mitigate TB treatment default, a bar chart highlights key support strategies. The highest response category was “No response” (9.1%), potentially reflecting a lack of awareness about available services. Among active strategies, weekly pill dispensers (6.8%) were the most reported, followed by follow-ups with healthcare providers (5.1%) and psychological counselling (4.0%). Financial concerns were prominent, with free TB treatment (3.5%), regular drug supply (2.8%), and financial aid (2.6%) identified as crucial. Additionally, family support (3.5%) and improved healthcare communication (3.1%) underscore the role of social engagement. The low reporting of stigma concerns (0.3%) may indicate underreporting rather than a lack of impact. These findings underscore the significant challenge of TB treatment

default in the Lubumbashi Health Zone. Addressing these issues requires a collaborative effort among healthcare providers, policymakers, and community stakeholders. Targeted interventions—such as financial support, improved healthcare access, enhanced patient education, structured follow-up systems, and stigma reduction—are essential to improving TB treatment adherence and overall health outcomes in the region.

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

A 2023 study published in the *World Journal of Advanced Research and Reviews*, titled **"Mortality Risk Factors for Tuberculosis Patients Under Treatment in the Kenya Health Zone, Lubumbashi, DRC,"** examined factors influencing TB treatment outcomes in the Lubumbashi Health Zone. The study identified key determinants of increased mortality among TB patients, including male gender, alcoholism, and diagnosis through community surveys. These factors were associated with higher treatment default rates and suboptimal cure rates during the first year of Directly Observed Treatment, Short-course (DOTS) implementation. To address these challenges, the authors recommended making DOTS more accessible to patients and introducing nutritional interventions for underweight individuals to reduce mortality. These findings highlight the need for targeted interventions to improve TB treatment adherence and outcomes in Lubumbashi. Strategies such as supporting patients with alcoholism and enhancing the accessibility of treatment programs are essential for reducing mortality and improving adherence (Katuala et al., 2023). This chapter systematically examines findings on the prevalence and determinants of TB treatment default in the Lubumbashi Health Zone in 2024. It assesses the prevalence of treatment default and explores the socio-demographic, health system-related, and patient-related factors contributing to non-adherence. The study further discusses the broader implications of these findings, acknowledges its limitations, and provides recommendations to strengthen TB treatment adherence and improve public health outcomes.

5.2 Discussion

The findings highlight a critical public health concern, with a notably high tuberculosis (TB) treatment default rate of 69.0%. This translates to 690 out of 1,000 patients failing to complete their treatment, while only 310 (31.0%) adhered to the prescribed regimen. The analysis identifies key demographic and socioeconomic determinants of non-adherence. Age distribution indicates that the highest proportion of cases occurs in the 25–34 and 35–44 age groups, suggesting that working-age individuals may struggle with adherence due to employment constraints. Gender analysis shows a higher proportion of male participants, implying that men are more likely to default, possibly due to occupational mobility. Marital status also influences adherence, with married individuals exhibiting lower odds of default (OR = 0.70, $p = 0.004$) compared to singles. Education significantly impacts adherence, as higher education levels reduce the risk of default (OR = 0.50, $p < 0.001$).

Employment sector disparities are notable: individuals in commercial activities face increased default odds (OR = 1.40, $p = 0.003$), while those in the informal sector (OR = 1.50, $p = 0.001$) and mining (OR = 0.65, $p = 0.005$) show different patterns. The absence of company-sponsored healthcare is associated with lower adherence (OR = 0.40, $p < 0.001$), whereas individuals with higher incomes (above 100,000 CDF) demonstrate better adherence (OR = 0.45, $p < 0.001$). On the other hand, Demographic data provide essential context: 58% of participants are male, and 35% are aged 25–34. Around 62% are married, and 40% have at least a secondary education. Many works in the informal sector (35%) or mining (30%), indicating economic vulnerabilities. Over 81% lack access to company-sponsored healthcare, raising health security concerns. Additionally, more than half earn less than 50,000 CDF, suggesting financial challenges that may impact health and social outcomes. These findings underscore the need to address demographic

disparities and enhance access to education and healthcare to improve treatment adherence.

A similar study by Faye et al. (2023) reported that among 427 participants, 65.8% achieved successful TB treatment, while 34.2% experienced treatment failure. The study further noted that 61.2% of HIV-positive and 39% of HIV-negative participants successfully completed treatment, whereas 66% of HIV-negative and 34% of HIV-positive participants had unsuccessful outcomes. The highest risk of default occurred within the first month and remained significant up to three months. Early resumption of treatment within a month reduced the risk of continued default, while prolonged gaps offered no significant protection.

Opperman & Du Preez (2023) identified several factors influencing TB treatment loss to follow-up (LTFU), including socio-demographic characteristics, patient-related factors, TB disease severity, healthcare system determinants, and treatment-related barriers. More recently applied adherence interventions in developing countries show potential for large-scale implementation. Healthcare accessibility also plays a crucial role in TB treatment adherence (Lemma Tirore et al 2022). As indicated that socio-demographic factors significantly influence treatment default rates. Individuals aged 45 and older have 15% lower odds of default, while married individuals and those with tertiary education show reductions of 30% and 50%, respectively. Conversely, individuals with only primary education face higher odds of default. Employment in the commercial and informal sectors is associated with increased odds, whereas mining workers experience a 35% reduction. Access to company-sponsored healthcare reduces the odds of default by 60%, and higher income levels also correlate with lower default odds, suggesting a need for targeted interventions. A similar study was conducted by Hadizadeh-Talasaz et al., 2022 pointing out mostly the same factors.

However, patients who defaulted on TB treatment had more than twice the odds of non-adherence compared to those who completed treatment (OR = 2.10, 95% CI: 1.65–2.68, $p < 0.001$). The risk of default was highest within the first month of treatment (OR = 1.80, $p = 0.002$) and remained significant between one and three months (OR = 1.50, $p = 0.010$). Early resumption of treatment within a month significantly reduced the likelihood of continued default (OR = 0.70, $p = 0.008$), whereas restarting treatment after prolonged gaps showed no significant protective effect. As stated by Sazali and colleagues (2022), Healthcare accessibility plays a crucial role in treatment adherence. Patient facing barriers to care are 1.80 times more likely to default on treatment ($p < 0.001$), while stigma and discrimination increase the odds by 1.95 times ($p < 0.001$). General accessibility did not show a significant effect (OR = 0.75, $p = 0.008$), but high-quality care and consistent medication availability significantly reduced default risk (OR = 0.55 and OR = 0.40, both $p < 0.001$). Education also plays a crucial role, with individuals who have greater TB knowledge being less likely to default (OR = 0.60, $p < 0.001$). Economic status impacts adherence, as middle-income (OR = 0.70) and high-income (OR = 0.40) individuals are less prone to default. Additionally, culturally supportive environments enhance adherence (OR = 0.50, $p < 0.001$), emphasizing the need for culturally tailored interventions. Studies have shown that economic barriers limit patients' ability to obtain adequate food and access medications beyond TB treatment, further exacerbating non-adherence (Nezenega et al., 2020). Several factors contributed to TB treatment default, including financial constraints (OR = 2.10, $p < 0.001$), poor healthcare access (OR = 1.90, $p < 0.001$), and lack of patient support (OR = 1.95, $p < 0.001$). Medication side effects (OR = 1.85, $p < 0.001$) and perceived recovery (OR = 1.60, $p = 0.002$) also played a role in discontinuation.

Additionally, Employment demands (OR = 1.75, p = 0.004) and insufficient follow-up (OR = 1.70, p = 0.006) underscore the need for workplace flexibility and improved patient monitoring. While cultural beliefs did not show strong statistical significance (OR = 1.30, p = 0.090), stigma (OR = 1.65, p = 0.005) significantly increased default risk. A study in South Africa emphasized the need for stigma reduction interventions for individuals suspected of having TB, as stigma contributes to initial loss to follow-up (Bresenham et al., 2020).

Patient-related factors—knowledge, attitudes, and adherence—significantly influence treatment outcomes. Patients with sufficient TB knowledge were 55% less likely to default (OR = 0.45, p < 0.001), while a positive attitude reduced default risk by 65% (OR = 0.35, p < 0.001). Conversely, negative attitudes increased the likelihood of non-adherence (OR = 1.80, p < 0.001). Treatment adherence was the strongest predictor, with adherent patients being 75% less likely to default (OR = 0.25, p < 0.001). These results underscore the importance of health education, addressing patient beliefs, and reinforcing adherence through ongoing support and engagement. Murdoch et al. (2021) reported that delayed diagnosis resulted from fragmented healthcare provision, limited patient resources, verticalized care, and deficiencies in TB screening and record-keeping. Insufficient integration of TB management with other health conditions, coupled with policies focused primarily on treatment adherence, contributed to healthcare staff stress and neglect of patients' psychosocial needs.

Furthermore, challenges in treatment completion, as indicated in Table 9, include smoking and alcohol consumption (OR = 4.57), cultural beliefs (OR = 1.68), and stigma (OR = 2.89). Long treatment durations (OR = 2.03) further hinder adherence, while side effects and fatigue, though reported, lacked strong statistical significance. Financial constraints and lifestyle factors, such as busy schedules and healthcare delays, were also

noted but showed weaker associations. Addressing these barriers through targeted interventions is essential for improving adherence. A review by Lutfian et al. (2025) emphasized the indispensable role of family support in TB treatment adherence and quality of life. The findings suggest that patients were lost to follow-up due to discontinuities in information, poverty, employment restrictions, and insufficient support for treatment-related side effects. To mitigate TB treatment default, targeted support strategies are necessary. A survey highlighted that weekly pill dispensers (6.8%), follow-ups with healthcare providers (5.1%), and psychological counseling (4.0%) were the most commonly reported interventions. Financial concerns were also significant, with free TB treatment (3.5%), regular drug supply (2.8%), and financial aid (2.6%) emerging as crucial factors. Teferi et al. (2025) concluded that TB treatment success rates remain below the WHO-defined threshold of 85%, with significant variation across countries. They emphasized the need for improved TB preventive treatment, better case screening, and linkage for TB treatment among high-risk HIV groups. Strengthening counselling, follow-up mechanisms, and socio-economic support for patients at high risk of loss to follow-up is crucial for successful TB control programs.

Our study aimed to identify the prevalence and determinants of tuberculosis (TB) treatment default and assess the influence of demographic, socioeconomic, and healthcare-related factors on adherence. The findings align with existing literature, which highlights the role of financial, social, and healthcare-related barriers in treatment adherence. Specifically, factors such as lower educational levels, financial constraints, and poor healthcare access have been identified as key contributors to treatment default in other regions as well. This study, however, provides new insights into the specific context of Lubumbashi, where demographic characteristics such as age, marital status, and employment sector show a significant association with treatment adherence. Notably,

older age, higher education, and higher income are linked to lower default rates, while those in the commercial sector are at higher risk of default compared to those in the informal sector and mining.

Our study also reveals that barriers such as lack of company-sponsored healthcare, financial constraints, limited healthcare access, and stigma and discrimination increase the risk of treatment default. This is consistent with previous studies but also highlights the crucial role of healthcare quality, consistent medication availability, and patient education as protective factors against default. Moreover, early treatment discontinuation was identified as a critical issue, with the highest rate of default occurring in the first month of treatment. While our study provides valuable insights, some gaps in understanding remain. Cultural beliefs, for instance, showed weak statistical significance, suggesting that either their influence on adherence is less than anticipated or that there was underreporting of such factors. Additionally, although stigma emerged as a significant barrier, its low reporting in the support strategy section (0.3%) points to potential underreporting or a lack of awareness regarding its impact. Furthermore, while financial concerns and lack of support services were identified as top barriers, the absence of qualitative data on patient experiences limits our understanding of deeper, unreported challenges.

The findings of this study have profound implications for TB control efforts in the Lubumbashi Health Zone. The high treatment default rate of 69.0% highlights the urgent need to improve patient adherence to TB treatment. To address the identified barriers, public health interventions should focus on financial support, enhancing healthcare access, reducing stigma, and providing patient education. Key strategies could include offering financial assistance, ensuring consistent and high-quality medication availability, and training healthcare providers to support patients through regular follow-

ups, psychological counselling, and education programs. Additionally, stigma-reduction initiatives, such as community engagement and awareness campaigns, are essential to overcoming the psychological and social barriers that contribute to treatment discontinuation. Strengthening community-based support systems will also play a pivotal role in improving treatment adherence and overall health outcomes in the region. A comprehensive approach, involving healthcare providers, policymakers, and community leaders, is necessary to reduce treatment default rates and improve TB treatment outcomes in the Lubumbashi Health Zone.

5.3 Limitations to the study

While this study provides valuable insights into the factors influencing tuberculosis (TB) treatment adherence in the Lubumbashi Health Zone, several limitations should be acknowledged:

1. Cross-Sectional Design: The study employs a cross-sectional design, which captures data at a single point in time. This limits the ability to establish causal relationships between the identified factors and TB treatment adherence. Longitudinal studies would be necessary to assess how these factors change over time and their direct impact on treatment outcomes.
2. Self-Reported Data: Many of the variables, including patient knowledge, attitudes, and healthcare accessibility, were based on self-reported data. This introduces the potential for recall bias or social desirability bias, where respondents may underreport or overreport behaviours or experiences that could be seen as socially inappropriate or stigmatizing.
3. Limited Sample Representation: Although the study sampled 1,000 individuals, the sample may not fully represent the diverse population of the Lubumbashi

Health Zone. Factors such as urban versus rural location, age distribution, and health-seeking behaviours could influence the generalizability of the findings.

4. Non-Standardized Measures of Stigma: The study identifies stigma as a significant barrier to TB treatment adherence; however, stigma was measured using a non-standardized instrument. This may limit the accuracy and consistency of stigma-related findings across participants, and further research using validated stigma scales could improve the reliability of these results.
5. Healthcare System Variability: The study includes respondents from different healthcare facilities, which may have varying levels of care quality and resource availability. Differences in healthcare system infrastructure could affect the generalizability of the findings to all TB patients within the region.
6. Unmeasured Confounders: While the study identifies several important factors influencing treatment adherence, other potential confounders such as psychological conditions, social support, or additional healthcare conditions may not have been accounted for. These unmeasured variables could also influence adherence outcomes.
7. Limited Focus on Treatment Adherence Timing: The study focuses on overall treatment completion, but does not delve deeply into the specific timing of treatment interruption or the reasons behind delayed re-initiation. Further research exploring the nuances of treatment interruption and resumption over time could provide a more detailed understanding of patient behaviours.
8. Cultural Context and Interpretation: The study highlights the role of cultural beliefs and practices, but the interpretation of these factors may vary across different communities within the region. A more granular exploration of cultural

nuances, through qualitative research, could provide a deeper understanding of how these factors impact treatment adherence.

Hence, while the study provides critical data on TB treatment adherence in the Lubumbashi Health Zone, the limitations outlined above suggest that the findings should be interpreted with caution, and further research is needed to validate and expand upon these results.

5.4 Study conclusions/summary

This study reveals a critical challenge in TB treatment adherence in the Lubumbashi Health Zone, where a high default rate of 69.0% significantly undermines TB control efforts. The findings highlight that treatment default is influenced by a combination of demographic, socioeconomic, and healthcare-related factors. Younger adults (25–44 years), men, and individuals with lower education levels or unstable employment are at a heightened risk of non-adherence. Financial constraints, lack of access to healthcare services, stigma, and inadequate patient support further contribute to defaulting. Notably, patients without company-sponsored healthcare were 60% more likely to default, while those with higher incomes exhibited better adherence. Additionally, early treatment discontinuation within the first month was a major concern, emphasizing the need for prompt interventions.

To address these challenges, comprehensive and multi-faceted strategies are essential. Strengthening healthcare accessibility through financial assistance, workplace health policies, and improved follow-up mechanisms can significantly enhance treatment completion rates. Stigma-reduction programs and culturally tailored education campaigns can improve awareness and encourage adherence. Healthcare providers should implement structured monitoring systems, especially during the early phases of treatment, to prevent premature dropout. By addressing these critical determinants, the Lubumbashi Health

Zone can improve TB treatment outcomes, ultimately contributing to national and global efforts to control and eliminate TB.

5.5 Implications to practice

The findings of this study offer several important implications for public health practice and TB management in the Lubumbashi Health Zone, which can inform policy, interventions, and healthcare delivery strategies aimed at improving TB treatment adherence and outcomes:

1. Targeted Health Education and Awareness Campaigns: The significant role of patient knowledge and attitudes in influencing treatment adherence highlights the need for robust health education programs. These should focus on increasing awareness about TB, its treatment, and the importance of completing the full treatment regimen. Educational campaigns should be culturally tailored, addressing misconceptions and stigma associated with TB, and aiming to empower patients to take an active role in their treatment.
2. Addressing Socioeconomic Barriers: The study's findings underscore the substantial impact of financial constraints and low socioeconomic status on treatment adherence. Policymakers should consider implementing financial support programs, such as transportation allowances, free TB treatment, and other forms of economic assistance to reduce the financial burden on patients. Additionally, interventions should aim to improve employment flexibility, particularly for those in sectors with high odds of default, such as commercial activities.
3. Improving Healthcare Accessibility and Quality: Access to healthcare and the quality of care were found to be critical determinants of treatment adherence. Health systems should prioritize improving the availability of healthcare services,

particularly in rural or underserved areas. Ensuring that TB medications are consistently available and that healthcare facilities provide high-quality care can significantly reduce treatment defaults. Strengthening the healthcare infrastructure, including training healthcare workers and ensuring adequate supplies, is essential.

4. Reducing Stigma and Discrimination: The study highlights the negative impact of stigma and discrimination on TB treatment adherence. Public health interventions should focus on reducing the social stigma associated with TB through awareness campaigns, community engagement, and training for healthcare providers to ensure compassionate care. Programs that encourage community support for TB patients and integrate TB care into existing social structures can help mitigate the negative effects of stigma.
5. Culturally Sensitive Interventions: Given the role of cultural beliefs in influencing treatment adherence, interventions should be designed to be culturally sensitive and relevant to the specific communities being served. These could include involving community leaders in TB education, addressing cultural barriers to treatment, and ensuring that patients' cultural needs are considered in the provision of care.
6. Strengthening Follow-Up Mechanisms: Structured patient follow-up and regular monitoring are essential to improving adherence rates. Healthcare systems should implement or enhance systems for regular follow-up, either through home visits, phone calls, or in-person consultations, to ensure that patients remain on track with their treatment. Tools such as weekly pill dispensers or mobile health applications could be used to improve adherence, especially for patients facing logistical barriers.

7. Psychosocial Support Services: The study identifies the importance of mental health support in promoting treatment adherence. Psychological counseling, particularly for patients dealing with TB-related stigma, discrimination, or the mental burden of long treatment regimens, could play a crucial role in improving outcomes. Training healthcare workers to provide psychological support and collaborating with mental health professionals could enhance overall patient care.
8. Integration of TB Care with Broader Health Programs: Given the multifactorial nature of TB treatment adherence, integrating TB care with other health programs such as HIV/AIDS, maternal health, and chronic disease management could be beneficial. A holistic approach to health that considers the interconnectedness of different health issues may improve both TB outcomes and broader public health.
9. Policy Advocacy for Improved Working Conditions: The study shows that employment demands and workplace flexibility are significant factors influencing treatment adherence. Advocacy for policies that promote workplace flexibility, such as allowing time off for medical appointments or providing sick leave for TB patients, would help reduce treatment defaults. Collaboration with employers and trade unions to raise awareness of TB and its treatment is essential.

Therefore, these implications suggest that improving TB treatment adherence in the Lubumbashi Health Zone requires a multifaceted approach that addresses not only healthcare-related factors but also socioeconomic, cultural, and psychosocial elements. Tailored interventions that focus on education, financial support, stigma reduction, healthcare accessibility, and patient support systems are crucial for improving TB outcomes and reducing treatment defaults.

5.5 Recommendations

Based on the findings of this study, several recommendations can be made to improve tuberculosis (TB) treatment adherence and reduce default rates in the Lubumbashi Health Zone. These recommendations aim to address the identified barriers and strengthen the TB treatment and care system:

1. Enhance Health Education and Awareness Campaigns:

- Develop and implement targeted health education programs focused on the importance of TB treatment adherence, the dangers of defaulting, and the potential for successful recovery. These programs should be culturally sensitive and tailored to specific demographic groups (e.g., older adults, low-income individuals).
- Use a variety of media platforms (radio, social media, community outreach) to reach a wide audience, with particular emphasis on communities where TB stigma is prevalent.
- Include education on TB prevention and the importance of completing the full course of treatment to prevent drug resistance.

2. Provide Financial and Social Support to Patients:

- Introduce financial assistance programs to reduce the economic burden of TB treatment. This could include transportation subsidies, free medication, or food aid for patients facing financial hardship.
- Establish community-based support systems to assist TB patients with daily needs, such as childcare, household chores, and financial assistance for lost wages due to illness, ensuring that these patients can focus on their treatment and recovery.

- Work with local employers to promote policies that allow TB patients to take leave for medical appointments or to rest during treatment, ensuring a more supportive work environment.

3. Improve Healthcare Accessibility and Quality:

- Ensure that TB care is accessible to all individuals, especially in rural or remote areas, by improving healthcare infrastructure, increasing the number of healthcare facilities, and ensuring consistent availability of TB medications.
- Provide regular training for healthcare providers on TB management, patient communication, and adherence support. This can help improve patient-provider relationships, reduce stigma in healthcare settings, and ensure high-quality care.
- Strengthen the availability of necessary TB diagnostics and treatments, particularly in regions with high default rates, ensuring that patients receive consistent and uninterrupted care.

4. Address Stigma and Discrimination:

- Launch stigma-reduction campaigns that involve community leaders, religious leaders, and healthcare workers to address misconceptions about TB, reduce social stigma, and promote understanding and empathy toward individuals living with TB.
- Provide counselling services for TB patients to help them manage the emotional and psychological burden of stigma. This can be done at the community level or within healthcare settings.
- Integrate mental health support into TB treatment programs to help patients cope with the emotional toll of the disease and reduce treatment default due to mental health challenges.

5. Improve Treatment Adherence Through Follow-Up Mechanisms:

- Implement regular follow-up visits or home visits for TB patients, particularly for those in high-risk groups (e.g., low socioeconomic status, young adults, individuals with co-morbidities), to monitor adherence and provide additional support.
- Utilize mobile health technology, such as SMS reminders or TB management apps, to remind patients of appointments, medication schedules, and treatment progress. Mobile technology can be particularly effective in urban areas with high cell phone penetration.
- Consider the use of weekly pill dispensers or DOT (Directly Observed Therapy) programs to ensure that patients take their medications as prescribed.

6. Strengthen Patient Knowledge and Attitudes Towards TB:

- Implement patient education programs at the community level to increase knowledge about TB, treatment regimens, potential side effects, and the importance of completing treatment.
- Promote positive attitudes toward treatment by highlighting successful recovery stories and reinforcing the message that TB is a treatable condition if patients follow their treatment regimen.
- Use peer support groups, where TB patients who have successfully completed their treatment can mentor new patients, encouraging them to stick with their treatment.

7. Support the Development of Cultural and Context-Specific Interventions:

- Develop culturally relevant interventions that take into account local customs, traditions, and beliefs. Engaging community leaders in these efforts can help bridge the gap between medical recommendations and cultural practices.

- Identify and address specific cultural beliefs that may contribute to non-adherence, such as misconceptions about TB treatment or the use of traditional medicine.

8. Promote Intersectoral Collaboration:

- Foster partnerships between government agencies, healthcare providers, employers, and community organizations to develop comprehensive TB care programs that address the social, economic, and healthcare barriers to treatment adherence.
- Engage non-governmental organizations (NGOs), faith-based organizations, and community groups in TB care delivery and awareness campaigns to reach underserved populations.

9. Monitor and Evaluate the Effectiveness of Interventions:

- Regularly monitor and evaluate the effectiveness of the interventions implemented to reduce TB treatment default. This can include tracking treatment completion rates, the effectiveness of stigma-reduction campaigns, and improvements in healthcare access.
- Use feedback from TB patients and healthcare providers to continuously adapt and refine the interventions to ensure they are addressing the needs of the population effectively.

By implementing these recommendations, public health authorities and healthcare providers in the Lubumbashi Health Zone can make significant strides toward improving TB treatment adherence, reducing default rates, and ultimately improving health outcomes for individuals affected by TB. These efforts should be sustained and adapted to local needs to ensure long-term success in TB management.

5.6 Dissemination of results and any action taken in response to the findings

The results of this study on tuberculosis (TB) treatment adherence and default rates in the Lubumbashi Health Zone provide valuable insights that can inform future public health strategies and interventions. The dissemination of these results, coupled with actions taken in response to the findings, is crucial to improving TB care and treatment outcomes in the region.

Dissemination of Results

1. Presentation to Stakeholders:

- The study findings will be presented to key stakeholders involved in TB management in the Lubumbashi Health Zone, including health authorities, healthcare providers, non-governmental organizations (NGOs), community leaders, and local policymakers. These presentations can be conducted through workshops, seminars, or webinars to ensure that the information reaches a wide audience.
- The findings will also be shared with public health experts and academics through conferences and peer-reviewed publications to contribute to the broader body of knowledge on TB management, particularly in Sub-Saharan Africa.

2. Reports and Briefing Papers:

- A detailed report summarizing the findings, recommendations, and implications for practice will be prepared and distributed to relevant stakeholders, including the Ministry of Health, local TB control programs, and international health organizations like the World Health Organization (WHO).
- Shorter briefing papers highlighting key findings and actionable recommendations will be circulated to policymakers, health facility managers, and funding agencies to facilitate immediate implementation of interventions.

3. Community Engagement:

- The study results will be shared with the affected communities, particularly with TB patients and their families, through community meetings, radio broadcasts, and local healthcare facilities. This will raise awareness about the importance of treatment adherence and the factors influencing default.
- Patient support groups and TB advocacy networks will be engaged to ensure that the findings reach those directly impacted by the disease.

4. Media Outreach:

- Media outlets, including local radio stations and newspapers, will be used to disseminate key messages from the study to the general public. This will help raise awareness about the challenges faced by TB patients and encourage the adoption of healthier behaviours.
- Social media platforms can also be leveraged to reach a broader audience, especially younger populations, with infographics and video content summarizing the study's findings and recommendations.

Action Taken in Response to the Findings

1. Implementation of Educational Campaigns:

- Based on the study's findings regarding the role of education and knowledge in TB treatment adherence, health education campaigns targeting both patients and the general public will be launched. These campaigns will focus on improving awareness about TB, treatment regimens, and the importance of completing treatment.
- TB education programs will be integrated into schools, workplaces, and community centres to ensure that individuals from all demographic groups are well-informed.

2. Strengthening Financial and Social Support Mechanisms:

- The study highlights the significant impact of financial constraints on treatment adherence. In response, health authorities and NGOs will work to implement financial aid programs, including transportation subsidies, food assistance, and free TB medications for low-income patients.
- Partnerships will be developed with local businesses and employers to create supportive work environments for TB patients, including flexible working hours or paid sick leave, to help patients adhere to their treatment plans.

3. Stigma Reduction Initiatives:

- The study underscores the role of stigma and discrimination in treatment default. In response, stigma-reduction campaigns will be launched to educate the public about TB, its treatment, and the importance of supporting patients. These campaigns will target both healthcare providers and the general population, aiming to reduce the social barriers faced by TB patients.
- Mental health support services will be integrated into TB care, providing counseling to help patients manage the emotional and psychological challenges associated with TB diagnosis and treatment.

4. Improved Healthcare Access and Quality:

- Based on the findings, efforts will be made to improve the accessibility and quality of TB healthcare services. This includes increasing the number of healthcare facilities equipped to manage TB cases, ensuring consistent medication supply, and improving the quality of care through regular training of healthcare providers.
- Mobile health units and outreach programs will be expanded to reach remote areas and ensure that individuals living far from healthcare facilities have access to TB treatment.

5. Follow-Up and Monitoring Mechanisms:

- The study emphasizes the importance of timely follow-ups and re-engagement in care. Health programs will implement regular follow-up visits, home visits, and mobile health reminders to ensure that TB patients continue their treatment without interruption.
- A more robust monitoring system will be developed to track treatment adherence, identify patients at risk of default, and intervene early to prevent non-adherence.

6. Collaborative Action with Partners:

- The findings will be shared with international partners, including WHO, UNICEF, and other relevant NGOs, to align efforts and obtain additional resources for improving TB care in the Lubumbashi Health Zone.
- Local health authorities will work with community-based organizations and faith-based groups to integrate TB care within broader health initiatives and ensure community involvement in the response.

7. Policy Advocacy:

- Based on the evidence presented in this study, advocacy efforts will be made to influence public health policies related to TB treatment, emphasizing the need for more comprehensive, patient-centered care. Recommendations for policy change will be presented to local, provincial, and national health authorities to ensure that TB treatment programs are adequately funded and supported.
- Specific advocacy efforts will focus on reducing financial and social barriers to treatment and ensuring that TB care is included in broader health insurance schemes.

By actively disseminating the study results and taking action based on the findings, there is potential to significantly reduce TB treatment default rates, improve patient outcomes,

and strengthen the overall TB care system in the Lubumbashi Health Zone. Continuous evaluation and adjustment of interventions will be crucial to ensuring their effectiveness and long-term sustainability.

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