



**MASTER OF PUBLIC HEALTH
(IMPLEMENTATION SCIENCE)**

PRACTICUM REPORT

By

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Cohort-01

2022-24

Under the Guidance of

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CERTIFICATE BY FACULTY ADVISOR

This is to certify that the dissertation titled “*An Implementation Research to identify barriers associated to treatment Adherence for Patients with Drug-Resistant Tuberculosis at Lazaretto Hospital in Mogadishu*” is a record of Research work undertaken by Mr. Kulmie Mohamud Abdulle, Enrolment No. IIHMR-U/16/2022-24/0007 in partial fulfilment of the requirement for award of the degree **Master of Public Health (Implementation Science)** from IIHMR University, Jaipur, India under my guidance and supervision and his/ her approach to research study has been sincere, scientific and analytical.



Dr. Vinod Kumar
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Certificate By Scholar

This is to certify that the Practicum Project titled (**An Implementation Research to identify barriers associated to treatment Adherence for Patients with Drug-Resistant Tuberculosis at Lazaretto Hospital in Mogadishu**) submitted by me, **Kulmie Mohamud Abdulle**, with Enrollment No. **IIHMR-U/16/2022-24/0007**, under the supervision of **Dr. Vinod Kumar** Professor **IIHMR University, Jaipur**, and **Dr Qasim Moalin Hassan Matan** Professor **Galkayo University, Somalia**, for the award of **Master of Public Health (Implementation Science)**, carried out during the period From October 2023 to September 2024, embodies my original work and has not formed the basis for the award of any degree, diploma, associateship, fellowship, or title in this or any other university or similar institution of higher learning.

Signature: 

Student name: **Kulmie Mohamud Abdulle**

MPH (IS) Cohort 2022-24



Certificate by Organization Practicum Advisor

TO WHOM SO EVER MAY CONCERN

This is to certify that **Mr. Kulmie Mohamud Abdulle**, student of Master of Public Health (Implementation Science) Program offered by IIHMR University, Jaipur has undergone Practicum Training at Galkayo University from October 2023 to September 2024.

The Candidate has successfully carried out the study designated to his during practicum training and approach to the study has been sincere, systematic, and diligent, demonstrating a thoughtful understanding of the topic.

The Practicum Training is in fulfillment of the course requirements.

I wish him success in all his future endeavors.

Practicum Advisor Name: *Qasim Moalim Hassan Matan*

Designation: *Professor*

Organization: *Galkayo University*

Country: *Somalia*

Signature: *[Handwritten Signature]*

Date: *22/09/2024*



CHAPTER ONE: INTRODUCTION

1.1 Background

Adherence to treatment is a crucial factor that can impact the effectiveness of the treatment (Hayden et al., 2005). Patients who adhere to their prescribed treatment plan tend to achieve better outcomes compared to those who do not (Vermeire et al., 2001; WHO, 2003). The World Health Organization (2003) defines adherence as the degree to which a person's actions align with the recommendations provided by their healthcare provider (1)

Multidrug-resistant tuberculosis (MDR-TB) is a chronic infectious disease transmitted through the air, caused by *Mycobacterium tuberculosis* (MTB) and resistant to at least two key anti-TB medications: isoniazid and rifampin. The standard treatment for MDR-TB involves a combination of multiple drugs over a period of 24 months.² Achieving a successful cure for patients is critical to control the spread of MDR-TB. Failure to treat the disease effectively can lead to further transmission and the emergence of extensively drug-resistant TB.¹ Therefore, measuring the incidence of non-adherence to medication is crucial. Indicators of drug non-adherence include interruptions in treatment and improper use of medication. Treatment interruption is defined as missing any anti-TB drug for at least one day during the treatment course, while a serious treatment interruption refers to a gap lasting more than two consecutive weeks but less than two consecutive months.^{3,5,6(2)}

Globally, The World Health Organization (WHO) launched the End TB Strategy to combat tuberculosis globally.^{1,2} In 2019, there were approximately 465,000 cases of multidrug-resistant or rifampicin-resistant tuberculosis (MDR/RR-TB) and 182,000 related deaths worldwide.¹ China is among the countries with the highest rates of MDR/RR-TB, accounting for an estimated 65,000 cases in 2019, with a rate of 4.5 cases per 100,000 population, which represents 14% of the global burden.¹ In 2019, about 7.1% of new TB cases and 23% of previously treated cases developed into MDR/RR-TB in China—rates that are 2.15 and 1.27 times higher than the global average, respectively.¹ Ensuring treatment adherence is vital to controlling MDR-TB.^(1,3–6) Standard treatment for MDR-TB typically spans two years, starting with an intensive eight-month phase followed by a 12-month continuation phase, involving both inpatient and outpatient care. The regimen relies on second-line drugs,⁷ which have higher toxicity, more severe side effects, a greater treatment burden (e.g., number of pills),

and lower individual efficacy compared to first-line drugs.^{8–11} Studies in China have documented poor adherence behaviors, including interrupted treatment courses, irregular dosing, and inadequate follow-up. (12–14) Effective management of TB patients is crucial in addressing the TB crisis. MDR-TB case management (MTCM) involves assessing, planning, facilitating, and coordinating a patient's health needs, including medication and appointment reminders, as well as educating patients about the treatment process and the importance of adherence.⁽³⁾ Ensuring treatment adherence among patients with multi-drug-resistant tuberculosis is essential for controlling and preventing the spread of drug-resistant cases. However, this remains a significant challenge. Several factors influence treatment adherence, including medication side effects, the length of the treatment, psychosocial issues, stigma, and challenges related to the health system⁽⁴⁾.

In Africa, ensuring treatment adherence remains a challenge in a diverse city like Lagos, where some patients do not return to the clinic for their medication refills at the scheduled times. Most of the patients who missed their medication were those who needed to travel to the health facilities to obtain their prescriptions.⁽⁵⁾

According to the 2019 report, Ethiopia is ranked as the third highest TB-burdened country in Africa and the eighth worldwide among the 22 countries with the highest TB burden [12]. Tuberculosis causes an estimated 32,000 deaths annually in Ethiopia, which is more than 80 deaths per day, and has a long-term detrimental impact on the health of its citizens [13]. The disease primarily affects the young, productive age group in Ethiopia; for example, 58% of TB cases were reported in individuals under 35 years of age. A substantial portion of the 32,000 annual deaths occurred among young adults.⁽⁶⁾

When tuberculosis (TB) is resistant to both rifampicin and isoniazid the two primary first-line medications, it is classified as multidrug-resistant TB (MDR-TB). Drug-resistant TB can occur in an initial TB infection or develop as a complication during treatment [2]. In Uganda, the prevalence of MDR-TB in 2018 was estimated at 1% among new TB cases and 12% among previously treated patients [4]. MDR-TB is linked to worse treatment outcomes, longer treatment durations, and higher treatment costs compared to drug-sensitive TB [5]. These challenges are further intensified in resource-limited settings due to the presence of other infectious diseases and limited access to adequately equipped healthcare facilities.⁽⁷⁾

Drug-resistant tuberculosis (DR-TB) poses a significant threat to global health as it undermines progress in TB control efforts and places a heavy burden on health systems, particularly in resource-limited settings. DR-TB is defined as tuberculosis that is resistant to both isoniazid and rifampicin. In 2018, ten high-burden countries (HBCs) in sub-Saharan Africa (SSA) accounted for 12% of the estimated 484,000 new cases, with most occurring in Nigeria and South Africa. Additionally, Nigeria and Mozambique were among the ten countries contributing to 75% of the global gap in treatment enrollment(8)

Despite the implementation of the community-based DOTS approach, maintaining consistent treatment adherence continues to be a major challenge in many countries. [7]. Incomplete TB treatment can result in negative outcomes, including loss to follow-up, treatment failure, the development of drug resistance, and even death. [8]. In Ghana, despite significant progress in TB treatment, the success rate remains below the 90% target outlined in the country's 2015–2020 strategic plan. [3, 4]. The severity of adverse treatment outcomes varies across different regions of the country. Districts with a high TB prevalence typically face unacceptably high rates of loss to follow-up and mortality.(9)

In Somalia Tuberculosis (TB) poses a significant health challenge in Somalia, contributing to high morbidity and mortality rates among the population. The epidemiology of TB in Somalia reflects patterns seen in many other developing countries, where the disease is strongly tied to socio-economic factors. In Somalia, TB is the leading cause of illness and death among adults, resulting in substantial loss of work productivity and increased household expenses due to the lengthy treatment process. The Global Fund TB program has made notable strides in improving the population's health by reducing the burden of TB. This national TB management and control program is supported by a substantial Global Fund grant, administered by World Vision International (Somalia) as the Principal Recipient, and implemented through various sub-recipients across different regions [3]. Adherence to treatment is essential for effective disease control, as failure to complete therapy can lead to prolonged infectiousness, higher rates of treatment failure, increased transmission, the development of drug resistance, and, ultimately, death.[5] (10)

The 2021 Global TB Report indicated a slight rise in the estimated TB incidence in Somalia, increasing from 258 per 100,000 people in 2018 to 259 per 100,000 in 2020. Around 6.2% of the annual reported TB cases in Somalia are drug-resistant. A nationwide drug resistance

survey conducted in 2010–2011 also revealed that multidrug-resistant TB (MDR-TB) was present in 5.2% of newly diagnosed TB cases and 40.8% of patients with a prior history of TB treatment (11).

1.2. Problem Statement

Somalia, a low-income country in East Africa, faces a high burden of tuberculosis (TB). A nationwide survey conducted in 2011 found multidrug-resistant TB (MDR-TB) in 5.2% of newly diagnosed TB patients and 40.8% of those previously treated. Despite the high prevalence and concerning patterns of MDR-TB in Somalia, recent data has not been reported in the academic literature.(12)

In 2021, Somalia reported an estimated 43,000 (ranging from 27,000 to 62,000) TB cases, with an incidence rate of 250 (158 to 362) per 100,000 population. The incidence of multidrug-resistant TB (MDR-TB) was estimated at 11,000 cases (ranging from 6,500 to 17,000), with a rate of 12 (0.66 to 24) per 100,000 population. MDR-TB, which involves resistance to both rifampicin (RIF) and isoniazid (INH), is particularly concerning because it requires treatment with second-line drugs(13)

1.3. Justification

Treatment adherence is crucial for the successful management of DR-TB. By identifying barriers to adherence. According to the WHO, a total of 2,021 drug-resistant TB cases in Somalia were enrolled for treatment in 2021. Among these, approximately 1,456 cases were successfully treated, resulting in an average treatment success rate of 72%this suggests that 28% of patients did not respond to treatment. The purpose of this study To identify and understand the barriers that hinder treatment adherence among patients with Drug resistant TB in Lazaretto Hospital Mogadishu.

1.4. Research Questions.

1. What are the barriers associated with treatment Adherence in Drug-Resistant Tuberculosis Lazaretto hospital Mogadishu.?
2. What are the major enablers for continued adherence to treatment among drug resistant tuberculosis patients at Lazaretto Hospital in Mogadishu.

3. How the treatment adherence among patients with drug-resistant tuberculosis can be improved.

1.5. Objective

1.5.1. Broad Objective

To investigate and understand the barriers that hinder treatment adherence among patients with MDR and RR TB Lazaretto at Hospital Mogadishu with aim of informing strategies to improve treatment adherence rates and patient outcomes.

1.5.2. Specific Objective

1. the objective of this study is to examine the barriers associated with treatment Adherence in Drug-Resistant Tuberculosis at Lazaretto Hospital in Mogadishu
2. To identify major enablers for continued adherence to treatment among drug resistant tuberculosis patient at Lazaretto Hospital in Mogadishu
3. To propose interventions for improved treatment adherence to treatment among MDR TB cases based on findings.

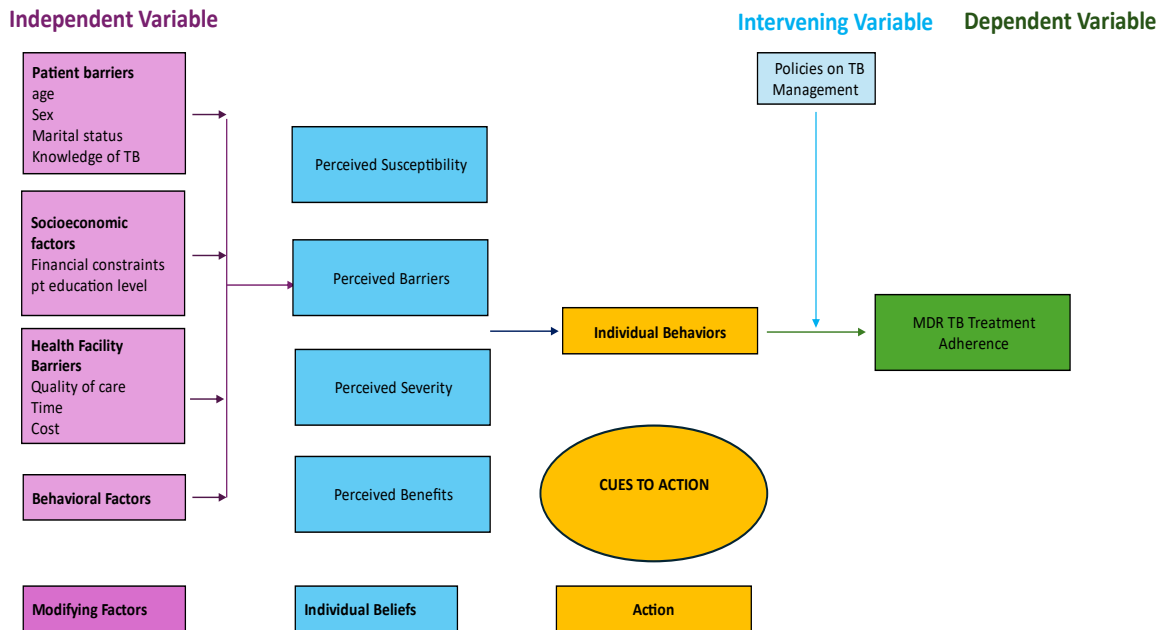
1.6. Study significance

treatment adherence is important issue in order to determine TB treatment access rate better understanding on factors affecting TB treatment adherence will help in implementing better interventions, setting policies and strategies addressing non-adherence to TB treatment this will facilitate adherence to TB treatment leading to increasing treatment outcome therefor reducing development of MDR this study will be focused on Lazaretto Hospital serves as a frontline facility managing drug resistant tuberculosis cases in Mogadishu.

1.7. Conceptual Framework

This conceptual framework adapted health belief model that involves several barriers influencing TB treatment adherence. patient barriers, socioeconomic barriers, health. facility barriers, and behavioral barriers are all independent variables influencing tuberculosis treatment adherence.

Conceptual Framework – Health Belief Model for MDR TB Treatment Adherence .



CHAPTER TWO: LITERATURE REVIEW

3.1 Introduction

TB treatment Adherence is important to the treatment success of multi-drug resistant tuberculosis (MDR-TB) and prevention of community transmission. Directly observed therapy (DOT) is the recommended approach for the management of patients with MDR-TB (14). Treatment adherence among TB patients is challenging given the complexity, modest tolerability and long duration of treatment regimen currently available for both drug- susceptible and drug-resistant TB (15)

3.2. TB treatment Adherence.

Adherence to TB treatment is essential to prevent the spread of the disease, ensure a cure, and avoid the development of drug resistance, relapse, and death. Non-adherence

to TB treatment is a critical barrier and one of the most significant challenges to TB control worldwide, becoming a major factor contributing to treatment failure. (16). Adherence to MDR-TB treatment is vital for reducing both poor and costly health outcomes for individuals and for preventing the spread of MDR-TB. Although adherence rates are similar between migrants and non-migrants, a significant number of people still fail to complete MDR-TB treatment, contributing to the continued transmission of the disease. (17) The use of various interventions, such as patient self-counseling, health education, material and psychological support, tracing and reminders, and digital health technologies, along with directly observed therapy (DOT) provided by well-trained health workers within the local community, is associated with more successful treatment outcomes for tuberculosis (TB) than DOT provided by family members or untrained providers (18) There are several methods to improve treatment adherence among tuberculosis (TB) patients. One approach is clinic-based directly observed therapy (DOT), which requires patients to visit a health facility daily to receive their medication. However, this method can be costly, time-consuming, and lacks privacy. Other approaches include home-based DOT, where a healthcare worker (HCW), community health volunteer (CHV), or family member administers the medication at the patient's home daily. Additionally, the use of electronic bottle caps is becoming increasingly popular, as well as short message services (SMS) and video-observed therapy (19).

3.3. Individual Factors and Treatment Adherence

Several factors contribute to non-adherence to multidrug-resistant tuberculosis (MDR-TB) treatment. Some barriers are related to the treatment itself, such as side effects of the drugs, the high number of medications, the long duration of treatment, and improvement in symptoms. Other barriers on the patient's side include illiteracy, lack of motivation, and migration. Social barriers like poor nutrition, lack of support, stigma, discrimination, and work-related challenges also contribute to non-adherence to TB treatment (20).

Several factors contributing to non-adherence during TB treatment can be addressed through targeted interventions, as they fall within patient-related, health system-related, medication-related, and social-related categories. Non-adherence is often linked to financial challenges, lack of social support, treatment side effects, and personal circumstances. Both patients and healthcare providers recognize that adherence is influenced by sociocultural and economic contexts. Identifying these factors sheds light on key areas for potential improvement. (21). Managing and experiencing MDR-TB is highly challenging for both individual patients and their households. The disease quickly drains the economic and financial resources of affected families, adding to the burden of treatment. (22). In the current study, several factors related to patients, their perceptions of drug-resistant TB (DR-TB) treatment, socioeconomic conditions, medications, and service providers have been identified as barriers to successful completion of DR-TB treatment. To minimize the risk of loss to follow-up (LTFU), it is crucial to educate patients about the required duration of DR-TB treatment and the dangers associated with LTFU. Patients must understand that early symptom relief does not indicate a cure. Building trust in DR-TB treatment can be reinforced through interactive sessions with individuals who have successfully completed their treatment. (23).

It is important for curriculum developers and trainers to strengthen and institutionalize both pre-service and ongoing education for healthcare workers (HCWs) on patient-centered consultation. Additionally, providing targeted education and counseling to patients at the start and throughout their treatment is crucial to enhance their confidence in overcoming any challenges that may arise (24). Patients with drug-resistant tuberculosis (DR-TB) face significant challenges due to the prolonged duration of treatment and its adverse effects. There is a bi-directional relationship between DR-TB patients' psychosocial issues, treatment adherence, and outcomes (25).

3.4. Behavioral Factors

Health behaviors, also known as health-related behaviors, are actions individuals take that impact their health or mortality. These actions can be intentional or unintentional

and may either improve or harm the health of the person or others. Health behaviors include a variety of activities, such as smoking, substance use, diet, physical activity, sleep patterns, engaging in risky sexual behaviors, seeking healthcare, and following prescribed medical treatments (26). Several studies have identified alcohol consumption, cigarette smoking, and chewing khat (a natural herbal stimulant) as behavioral factors linked to non-adherence to TB medication (27). Treatment abandonment occurs when an individual fails to visit the health unit for more than 30 consecutive days after the scheduled follow-up date. Key reasons for non-adherence to anti-tuberculosis treatment include various individual, socioeconomic, and behavioral factors, as well as side effects of the medications. (28). Medication compliance was positively correlated with health behaviors. Support and involvement from families, healthcare providers, and community leaders can help address the complex challenges of medication compliance in drug-resistant TB patients (29). Individual behavioral factors, such as fear of stigma, feeling better after only a few weeks of treatment, and the use of tobacco and alcohol, as well as patient knowledge about TB, its treatment, and the consequences of non-adherence and loss to follow-up, are associated with non-adherence and loss to follow-up. Additionally, poor communication between patients and healthcare workers, distance from the treatment center, and side effects from TB and its medications are also linked to non-adherence and loss to follow-up. (30).

3.5. Social Factors and Drug-Resistant TB Treatment Adherence

Discrimination and social stigma, side effects of medication, duration of long time treatment, insufficient nutrition, and poor communication with healthcare workers are some of the barriers that have been empirically revealed to impact drug adherence (16). During interviews with patients and providers, social stigma and discrimination were identified as significant factors to complete multi-drug-resistant TB treatment. Three patients reported experiencing social isolation and discrimination due to their MDR-TB infection. This fear of discrimination directly impacted their treatment adherence and efforts to promote it. Patients were reluctant to have health providers visit their homes

for adherence counseling and avoided attending their local treatment centers to prevent Possible revelation of their disease (31).

3.6. Health Facility Factors

The capability of healthcare facilities to effectively manage MDR-TB cases was compromised and healthcare facilities experiencing stockouts of essential commodities and not enough number of well trained staff for MDR-TB. Additionally, the rise in MDR-TB cases may be attributed to changes in the surveillance system or improvements in laboratory capacity (32).

Within healthcare facilities, several key barriers affect treatment adherence. These include long distances to treatment centers, lack of funds for transportation, difficulty accessing public transport, insufficient family support, food and income insecurity, inadequate knowledge about TB, prolonged treatment duration, drug side effects, and perceived health improvement after the intensive phase of the treatment regimen (9). Factors related to healthcare workers that contribute to treatment non-adherence among patients with MDR-TB include poor communication, negative attitudes, lack of empathy, and weak healthcare provider-patient relationships (24). The successful treatment of MDR-TB relies on patient adherence and compliance, which are influenced by multiple factors. Providing thorough patient education and counseling is vital to ensure that patients fully understand the disease process and are aware of the risks and benefits of adhering to treatment. This involves empowering patients with the knowledge needed to actively engage in their treatment plan (33)

3.7. Challenges in Drug Resistant TB Treatment

MDR-TB treatment is difficult due to the limited efficacy and high toxicity of second-line TB drugs. Many of these medications, developed decades ago, were seldom used because of their severe side effects. Given their limited ability to fully eliminate the bacteria, MDR-TB treatment usually extends for 18–24 months. (34). Globally, health systems face challenges in effectively implementing multidrug-resistant tuberculosis (MDR-TB) treatment regimens, leading to suboptimal overall treatment success rates and rising levels of drug resistance. (35). Untreated MDR-TB contributes to the development and spread of extensively drug-resistant TB

(XDR-TB). Additionally, the ongoing emergence of drug-resistant TB (DR-TB) poses a major threat to global efforts to eliminate TB and risks reversing the progress achieved in TB control. (36).

CHAPER THREE: METHODOLOGY

3.1. Research Design

Hospital based Cross-sectional study mixed methods design will be conducted to identify barriers associated with treatment adherence among patients with multidrug resistance tuberculosis in Lazaretto Hospital.

3.2. Study Variables

3.2.1. Dependent Variable

The dependent variable of this study is Treatment which adherence refers to the extent to which patients follow the prescribed treatment regimen for their condition.

3.2.2. Independent Variable

Individual barriers: patients may have inadequate knowledge of the disease, its treatment and importance of adherence. TB is often associated with social stigma and discrimination and patients may fear being judged, isolated or ostracized the community.

Behavioral barriers: Some patients may lack the motivation to adhere to their treatment regimen and may not perceive the importance of completing the full treatment course or may underestimate the severity of their condition. The long duration of TB treatment can lead to treatment fatigue, where patients become tired or demotivated due to the prolonged commitment required, as perception of When patients start experiencing symptom relief early in the treatment process, they may mistakenly believe that they are cured and no longer require medication, Substance abuse, such as alcohol or illicit drug use, can significantly hinder treatment adherence. Patients who engage in substance abuse may prioritize their addictive behaviors over adhering to their TB treatment regimen.

Health facility: Patients may face challenges in accessing healthcare facilities that provide TB diagnosis and treatment. Factors such as geographical distance, lack of transportation, and limited healthcare infrastructure in rural or remote areas can hinder timely access to treatment. Lengthy waiting times at healthcare facilities can discourage patients from seeking care or adhering to their treatment schedules. Prolonged waiting times may result in missed appointments, frustration, and decreased motivation to continue treatment. Insufficient numbers of healthcare providers, Poor patient-provider communication and Inadequate patient support services.

3.3. Study Area

Somalia lies in the east of Africa or horn of Africa it is bordered by Djibouti to the northwest Ethiopia to the west Kenya to the Southeast the Indian ocean to the east and the Gulf of Aden with Yemen to the north. It has the longest coast in the continent and its terrain mainly consists of plateaus, plains, and highlands. Hot conditions prevail year-round along with periodic monsoon winds and irregular rainfall in antiquity.

The study was conducted in Mogadishu locally known as Xamar or Hamar, the capital and most populated city of Somalia from March 12 to April 30, 2021. The city has served as an important port connecting traders all-round the Indian Ocean for millennia and currently has a population of 2,425,000 residents. It has a distance of 835 miles (1344 km) over the Indian Ocean. Mogadishu located in the coastal Banadir region on the Indian Ocean, which, unlike other Somali regions, is considered a municipality rather than a federal state. Although Somalia is recovering from three decades of civil war, the health services of the country are still poor. In general, the country has 264 health posts, 197 health centers, and 47 Hospitals (37). Lazaretto Forlanini Hospital is a government hospital under the Ministry of Health and Human Services federal government of Somalia. It was built by the Italian government in 1924 and is one of the largest hospitals in Mogadishu Somalia with an area of 1.200 KM to 1.200 KM. It is located Banadir region of Abdul-Aziz district and has capacity to serve 1.5 million people. The hospital contains three partially functional parts that require renovation, as well as newly repaired emergency department.

3.4.Study Population

The population of this study included all patients with Multi Drug Resistant tuberculosis registered in and receiving treatment at Lazaretto Hospital Mogadishu.

3.4.1Inclusion Criteria

Patients diagnosed with both Multi Drug Resistant (MDR) that resistant to rifampicin and isoniazid and Rifampicin resistant (RR) that resistant to only rifampicin detected using phenotypic or genotypic methods without resistant to other anti-Tuberculosis drugs receiving treatment at Lazaretto Hospital Mogadishu are included.

3.4.2 Exclusion Criteria

Patients with Nondrug Resistant Tuberculosis and patients who are seriously ill at the time of the study and are not able to speak or give interview are excluded from this study.

3.5. Sample size and sampling techniques

This study employed probability sampling of a finite group of registered patients the selected procedure in this study was simple random sampling technique to select the participants who were diagnosed with RR, MDR TB and admitted in Lazaretto Hospital MDR department.

3.5.1. Table of proportion of sampled per drug resistant type.

Type of DR	No of patients	No of patients selected
RR	41	24
MDR	234	139
Total	275	163

3.5.2. Sample size determination.

Mogadishu has two governmental and eight non-governmental TB treatment centers Lazaretto Hospital serves as a frontline facility managing drug resistant tuberculosis cases in Mogadishu the sample size was determined by using Slovene's formula to obtain the sample size from 275 Drug Resistant TB cases in Lazaretto Hospital Mogadishu.

$$n = \frac{N}{1 + Ne^2}$$

Where:

n=sample size

N=target population

e=level of significance/marginal error

N=275

e=0.5%=0.05

$$n = \frac{275}{1+275(0.05)^2} = 163$$

The sample size of 163 patients is included in this study survey and interview participants were MDR-TB management staff including doctors, nurses, laboratory technicians, pharmacists, medical supervisor and focal person.

3.6. Data Collection Tools

In this mixed methods implementation research the following tools were used for data collection Review of medical records, structured survey questionnaire, interview, focus group discussion.

Structured questionnaire prepared in English language was used for quantitative data collection and interview guides in Somali language were used for qualitative data collection with the help of audio records and hospital registers.

The questionnaire had Five parts, the first one was socio-demographic characteristics, and the 2nd medical history of patients, 3rd Barriers associated to drug resistant tuberculosis treatment adherence the 4th was Knowledge and awareness assessment questions related MDR TB treatment adherence, the 5th one was Substance abuse that can hinder treatment adherence.

CHAPTER FOUR: RESULTS

4.1. Introduction

This chapter presents the findings of the implementation research study conducted on treatment adherence for patients with drug resistant tuberculosis at Lazaretto Hospital Mogadishu this data collected through questionnaire interviews, survey, and review of medical records were analyzed using SPSS software to address the research objectives. The results were organized to reflect the key themes and patterns that emerged from the analysis providing insight into the barriers to treatment adherence. This chapter focuses on to present the information of socio-demographic characteristics of study participants, medical history of patients,

barriers associated to treatment adherence knowledge and awareness of respondents and behavioral factors.

4.2. Socio-demographic Characteristics of the respondents

Table 4.1 Socio-demographic Characteristics of the respondents

Variables	Frequency	Percentage
Sex		
Male	122	74.8%
Female	41	25.2%
Age		
18—25	65	39.9%
26---35	43	26.4%
36---45	28	17.2%
46---55	20	12.3%
56---65	5	3.1%
66 and above	2	1.2%
Marital Status		
Married	96	58.9%
Single	49	31.1%
Divorced		
Widowed	18	11%
Level of Education		
No formal education	81	49.7%
Primary	31	19%
Secondary	39	23..9%
College/University	12	7.4%
Occupation		
Student	14	8.6%
Employed	34	20.9%
Self Employed	43	26.4%
Unemployed	72	44.2%
Total	163	100%

Primary Data (Source:2024

The table 4.1 presents demographic characteristics of study participants, Sex: Most of the sample consists of males (74.8%), and the smaller proportion with (25.2%) were female. Age: the majority of the age group is 18–25 years (39.9%), followed by 26–35 years (26.4%). Marital Status: the largest

respondents in the sample (58.9%), followed by single individuals (31.1%). A smaller proportion were divorced (11%). Level of Education: Nearly half of the sample has no formal education 81 (49.7%), 31 and 49 with the percentage of (19% and 23.9%) were primary and secondary level respectively while the rest have varying level of education, with the smallest group having a college or university (44.2%).

4.2. Treatment Characteristics

Table 4.2.1 Distribution of patients according to their time of registration

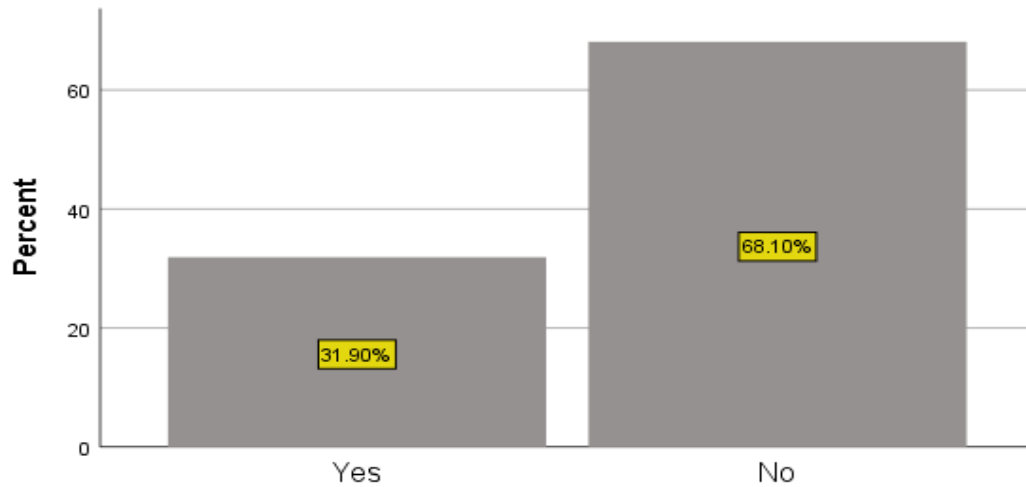
Variable	Frequence	Percentage
Less than 3 months ago	58	35.6%
3 months to 6 months ago	56	34.4%
7 months to 12 months	47	28.8%
13 months to 18 months	2	1.2%
Total	163	100%

Primary Data (Source:2024

The above Table 4.2.1 presents information about the time registered respondents at the Lazaretto Drug Resistant TB Hospital. 70% of patients were registered with in the last 6 months indicating that the hospital has been very actively in enrolling new patients. The remaining 30% of registrations occurred between 7 to 12 months ago, while only 1.2% happening more than a year ago.

4.3. History of previous treatment for TB

Figure 4.1. Previous TB treatment.



Primary Data (Source:2024

The above chart shows that the 68.1% of the respondents have not undergone previous TB treatment while 31.9% of them have undergone previous TB treatment. This indicates that a significant proportion of sample had a history of Tuberculosis treatment. This also imply that the hospital is dealing with large numbers of news case.

Table 4.2.2 The current treatment regimen

Frequency of medication	Number	Percentage
Daily medication	78	47.9%
weekly medication	83	50.9%
two weekly medications	2	1.2%
Total	163	100.0%

Primary Data (Source:2024

Table 4.2.2 provides the information related to the current MDR TB treatment regimen of respondent. Nearly half of patients (49.9%) are on daily medication schedule that suggests a significant proportion of patients may be dealing with a regimen that requires them to visit the hospital every morning which could be

challenging for adherence. the majority of patients (50.9%) are on daily medication. Coming weekly at the hospital is easier than to visit daily. A very small percentage of patients (1.2%) are on a two-weekly medication schedule.

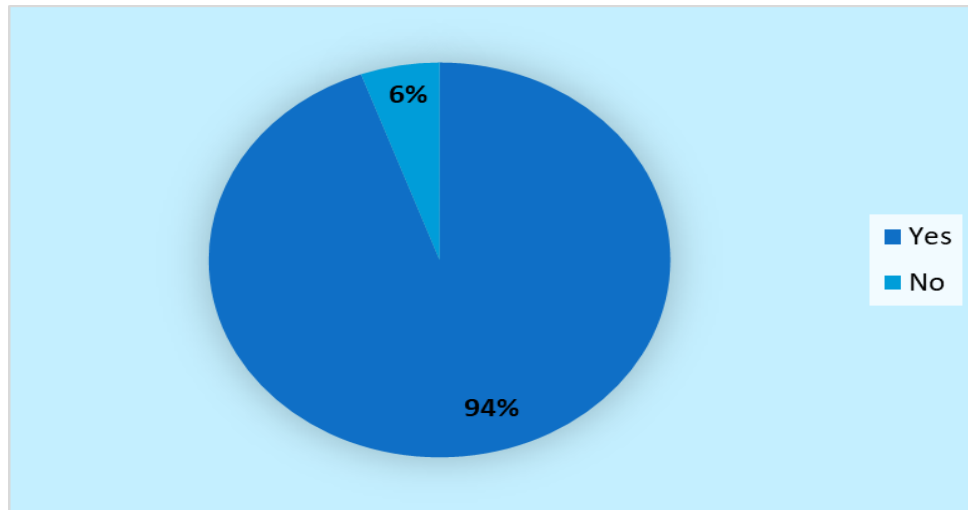
Table 4.2.3 Reported side effects due to MDR TB treatment.

Reported side effects	Number	Percentage
Yes	154	94.5%
No	9	5.5%
Total	163	100.0

Primary Data (Source:2024

The above table indicates 154 of the of the hospital patients with the percentage of (94.5%) reported experiencing side effects from their MDR TB treatment. This shows that side effects are frequent issue for those undergoing this treatment regimen. Only 9 respondents with the percentage of (5.5) answered they did not experience any side effects. It is uncommon to undergo MDR TB treatment without encountering some form of adverse effect. health care providers are offering support including counseling, monitoring for side effects and providing sympathetic relief to help patients cope with challenges of treatment.

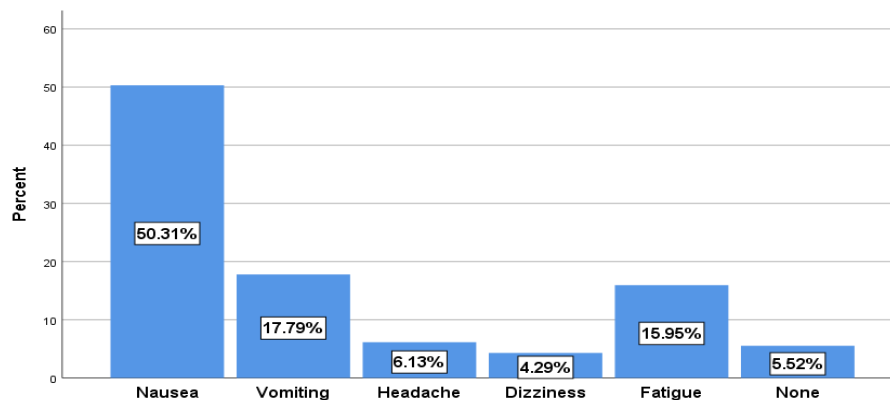
Figure 4.2. Reported side effects due to MDR TB treatment.



The above figure presents that 94.48% of respondents reported experiencing side effects due to MDR TB treatment, while only 5.52% did not report any side effects. This indicates that majority of patients undergoing MDR-TB treatment are affected by side effects.

4.2.3. Profile of side effects reported by respondents on MDR-TB Treatment

Figure 4.3. Profile of side effects reported by respondents on MDR-TB Treatment



The above chart shows over half of the patients (51.53%) reported experiencing nausea, making it the most common side effect. Vomiting and fatigue are also significant side effects reported by 17.79% and 15.95% of patients respectively.

While only small percentage of patients (5.52%) answered they did not experience any side effects.

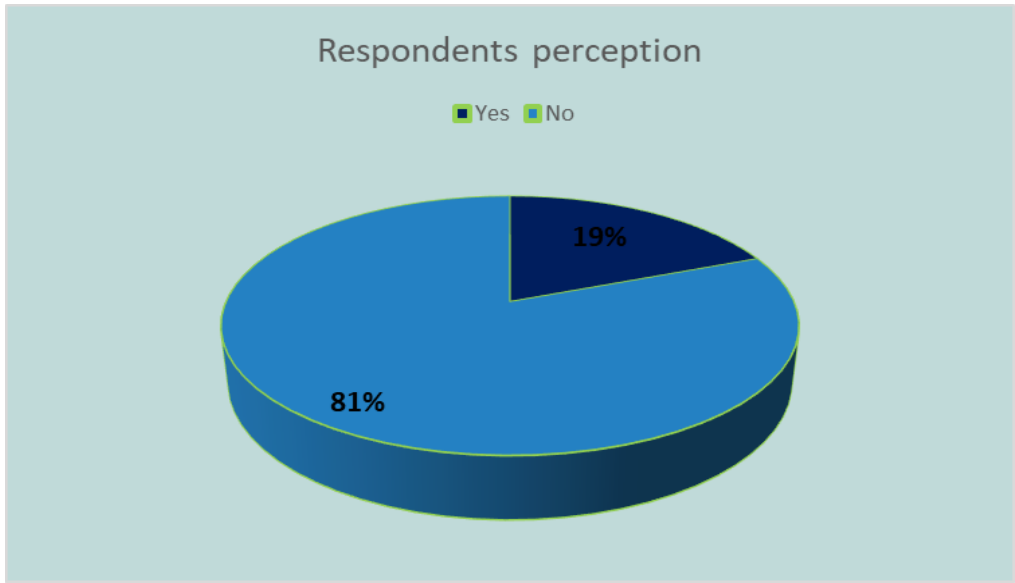
Table 4.2.4. Respondents’ perception on side effects affecting adherence to MDR-TB treatment

Variable	Frequency	Percentage
Yes	31	19.0%
No	132	81.0%
Total	163	100.0%

Primary Data (Source:2024

This table shows 31 out of 163 patients with the percentage of (19%) reported that side effects from their treatment affect their medication adherence. majority of patients 132(81%) reported that side effects do not affect their adherence to medication.

Figure 4.4. Respondents’ perception on side effects affecting adherence



The above pie chart shows that 80.98% percent of participants do not perceive side effects as affecting their adherence to treatment while 19.02% believe that side effects impact their adherence.

Table 4.2.5. Presence of other chronic disease. or diseases

Variable	Frequencies	Percentage
Yes	12	7.4%
No	151	92.6%
Total	163	100.0%

Primary Data (Source:2024

The above table provides the results on the other chronic diseases among patients undergoing MDR TB treatment at Lazaretto hospital. Only 12 out of 163 patients with the percentage of 7.4% reported having chronic disease in addition to MDR TB. While 151 respondents with the percentage of (92.6%) reported having no additional chronic conditions

Table 4.2.6. Chronic diseases among patients with MDR-TB

Variable	Frequency	Percentage
Diabetes	4	2.5%
Hypertension	2	1.2%
Asthma	5	3.1%
Chronic Kidney disease	1	.6%
None	151	92.6%
Total	163	100.0%

Primary Data (Source:2024

The table provides the chronic conditions among respondents undergoing MDR TB treatment at Lazaretto hospital 4 patients (2.5%) reported having diabetes, 2(1.2%)

reported having hypertension, 5(3.3%) reported having asthma, only 1(0.6%) reported having chronic kidney disease. While 151 (92.6%) reported they do not have any other chronic conditions.

4.3. Barriers associated to drug resistant tuberculosis treatment adherence

Table 4.3.1. Barriers associated to drug resistant tuberculosis treatment adherence

Variable	Frequencies	Percentage
Sociocultural barriers faced during treatment		
Social stigma associated with tuberculosis	11	6.7%
Lack of social support from family and friends	15	9.2%
Cultural beliefs and misconceptions about Mycobacterium and its treatment	8	4.9%
No sociocultural barriers	129	79.1%
Total	163	100.0%
personal barriers to adherence		
	Frequency	Percentage
Forgetfulness or difficulty in adherence to the treatment schedule	7	4.3%
Fear of side effects.	19	11.7%
Lack motivation or willpower to continue treatment	2	1.2%
No personal barriers	135	82.8%
Total	163	100.0%
Financial barriers		
Variables	Frequency	Percentage
Transportation expenses	100	61.3%
Treatment expenses	2	1.2%
living expenses	2	1.2%
No financial barriers	59	36.2%
Total	163	100.0%

Primary Data (Source:2024

11 respondents (6.7%) reported social stigma associated with tuberculosis 15(9.2%) answered they lack social support from family and friends, only 8(4.9%) respondents suggested they

have cultural beliefs and misconceptions about Mycobacterium and its treatment while the majority of respondents 129(79.1%) suggested that they did not experience sociocultural barriers. In personal barriers 135(82.8%) reported no personal barriers to adherence their medication, 19(11.7%) reported that they fear side effects while only 7(4.3%) and 2(1.2%) respondents suggested forgetfulness or difficulty in adhering to treatment schedule and lack of motivation or willpower to continue treatment. In financial barriers 100(61.3%) respondents complained about transportation expenses, 4(2.4%) reported treatment expenses and living expenses while 59(36.2%) reported no financial barriers at all. Transportation expenses and fear of side effects are the most significant barriers indicating the for intervention to address these concerns.

4.3.2 Waiting times at hospitals or health facilities clinics

Table 4.3.2 Waiting times at hospitals or health facilities clinics

waiting time at the health facility for medical consultation (n=163)		
Variable	Frequency	Percentage
Less than 1 hour	67	41.1%
1 hour to 2 hours	87	53.4%
2 hours to 3 hours	7	4.3%
More than 3 hours	2	1.2%
Waiting time at the health facility for laboratory investigations (n=163)		
Variable	Frequency	Percentage
1 hour to 2 hours	5	3.15
2 hours to 3 hours	83	50.9%
More than 3 hours	75	46.0%
Waiting time at the health facility for receiving MDR TB treatment (n=163)		
Variable	Frequency	Percentage
Less than 1 hour	94	57.7%
1 hour to 2 hours	69	42.3%

The table provides data on waiting times at hospital that shows the duration patients spend before receiving medical consultation, laboratory investigations and MDR TB treatment. Most patients (53.4%) wait between 1 to 2 hours before receiving medical consultation, waiting time for medical laboratory investigation (41.1%) wait less than 1 hour and only a

small percentage (5.5%) wait for 2 hours or more, waiting time for MDR TB treatment most patients (57.7%) receive treatment less an hour this is relatively shorter compared to medical consultations and laboratory investigations. MDR TB patient waiting time to receive their prescribed medication is relatively efficient and the waiting time for consultation is moderate while waiting time for laboratory investigations waiting time is significantly longer with the most patients experiencing delays 2 hours or more

4.4. Knowledge about Drug Resistant TB treatment and the importance of adherence.

Table 4.4.1. Knowledge about Drug Resistant TB treatment and the importance of adherence.

Level of knowledge	Number	Percentage
Very knowledgeable	9	5.5%
Moderately knowledgeable	35	21.5%
Slightly knowledgeable	42	25.8%
No knowledge	77	47.2%
Total	163	100.0%

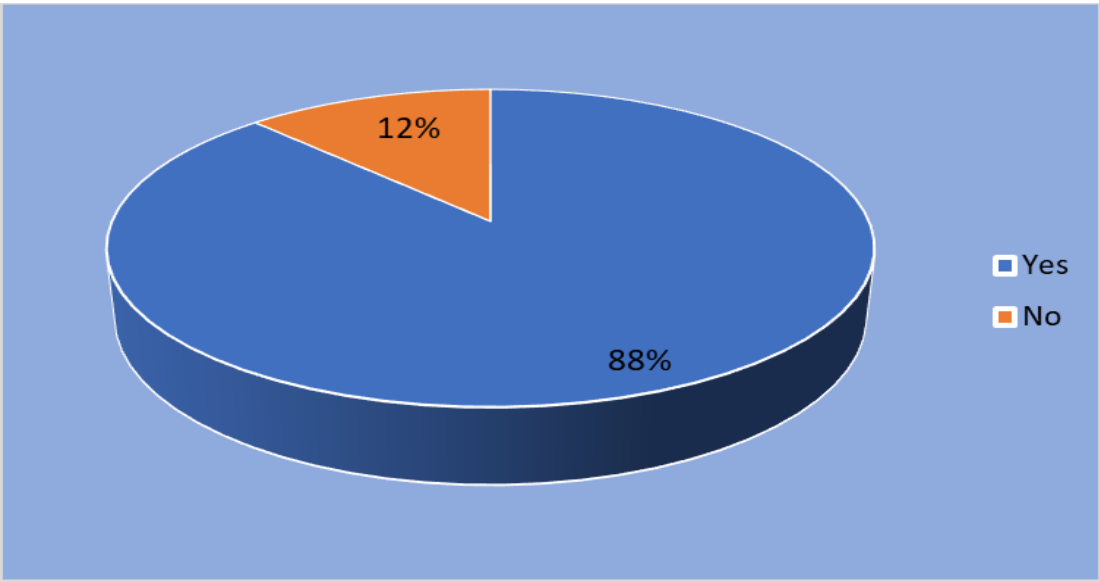
The table provides information related to the level of knowledge for MDR TB most of the participants (47.2%) reported they do not have knowledge about MDR TB at all, (21.5%) of participants think themselves moderately knowledgeable and (25.8%) are slightly knowledgeable while only very small proportion of participants (5.5%) consider they very knowledgeable indicating that knowledge rate suggests a low level of awareness and understanding of MDR-TB among participants

Table 4.4.2 Information or awareness about Drug Resistant TB treatment and adherence

Variable	Number	Percentage
Yes	143	87.7%
No	20	12.3%
Total	163	100.0%

The above table provides the significant majority of the participants (87.7%) answered they received health education and information about MDR TB and its treatment adherence. indicating the most individuals received medical consultations. Small percentage of respondents 912.3%) reported not received information and education related to this disease and important of treatment adherence.

Figure 4.5. Information or awareness about Drug Resistant TB treatment and adherence



This pie chart summarizes that 87.73% of respondents indicated they have information and awareness drug-resistant TB treatment and adherence while only 12.27% of respondents reported they do not, suggesting that most of the patients are informed about drug resistant and the importance of treatment adherence.

Table 4.4.2 Source of information on Drug Resistant TB and adherence

Source of information	Number	Percentage
From healthcare providers	118	72.4%
From community awareness campaign	14	8.6%
From educational materials (brochures and posters	11	6.7%
None	20	12.3%
Total	163	100.0%

The table summarizes data on individuals who received information and education about drug resistant tuberculosis (DR-TB) and treatment adherence. 72.4% of the respondents receive health education and information about multidrug resistant Tuberculosis and adherence to treatment from the health providers indicating the critical position that medical professionals doctors, lab technicians and nurses play in educating patients, 8.6% of patients received information from community awareness campaigns suggesting limited engagement or effectiveness compared to direct healthcare providers communication, a very small percentage of individuals (6.7%) obtain information from education materials such as posters and brochures that indicates the requirement of distribution and availability of brochures and posters in educating patients about DR-TB and adherence to medication, (12.3%) patients reported not receiving information about multidrug resistant tuberculosis and treatment adherence.

4.4.3. Respondents' ability to adhere to the prescribed Drug-Resistant TB treatment regimen

Variable	Number	Percentage
Very confident	139	85.3%
Somewhat confident	19	11.7%
Not very confident	3	1.8%
Not confident at all	2	1.2%
Total	163	100.0%

The above table shows participants self-reported confidence in their ability to adhere to the prescribed MDR-TB treatment regimen. 85% of participants are high confidence in their adherence and reported being very confident in their ability to adhere to their MDR-TB treatment regimen according to this high level of confidence it is a positive indicator implying that most patients feel capable of following their prescribed treatment, which is crucial for succeeding positive treatment outcomes and to prevent further resistant, a smaller group of participants (11.7%) are moderately confidence and feel somewhat confident about their ability to adhere to the treatment, while a very small number of

respondents 1.8% and 1.2% report they are not very confident and not confident at all respectively,

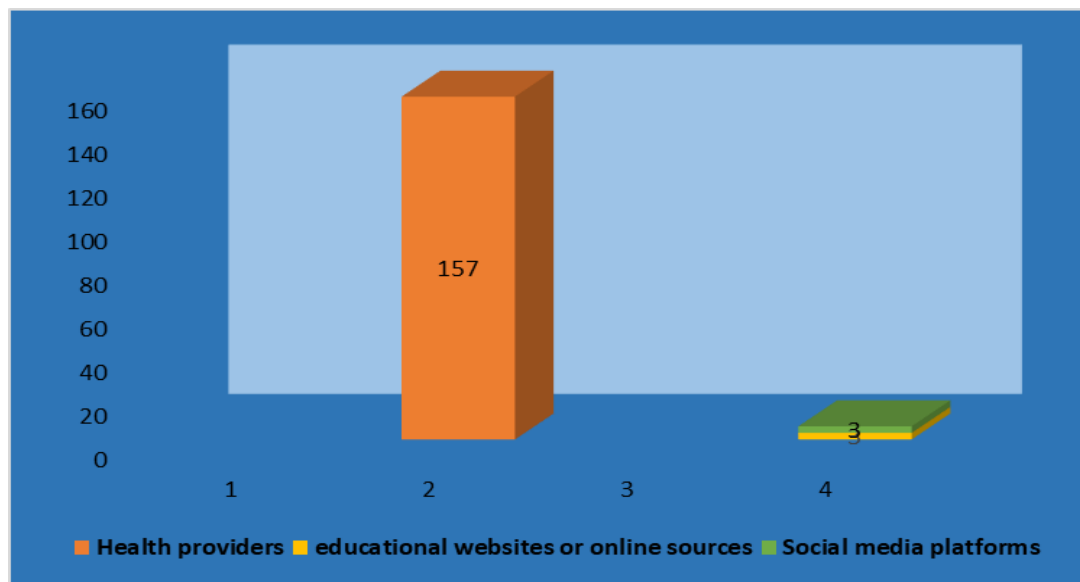
4.4.4. Respondents' perception on the most reliable source information of Drug-Resistant TB

Table 4.4.4. Respondents' perception on the most reliable source information of Drug-Resistant TB

Variable	Frequency	Percentage
Health providers	157	96.3%
Educational websites or online resources	3	1.8%
Social media platforms	3	1.8%
Total	163	100.0%

The above table provides summary on data where the people believe they can obtain reliable knowledge about MDR-TB and treatment adherence majority of respondents (96.3%) consider they can obtain health education from healthcare providers as the most reliable source of information about DR-TB treatment and adherence indicating the strong trust in the knowledge of health providers in educating patients about the importance of treatment regimen and its adherence, a very small number of respondents considered educational websites or online resources (1.8%) and social media platforms (1.8%) this shows compared to direct consultations with health providers social media and online resources are less accessible by the patients.

Figure 4.6. Respondents' perception on the most reliable source information of Drug-Resistant TB



The above bar chart summarizes Respondents' perception on the most reliable source information of Drug-Resistant TB most respondents 157 rely on healthcare for information.

4.4. Seeking information or support to improve adherence to MDR-TB Treatment

Table 4.4.5 Seeking information or support to improve adherence to MDR-TB Treatment.

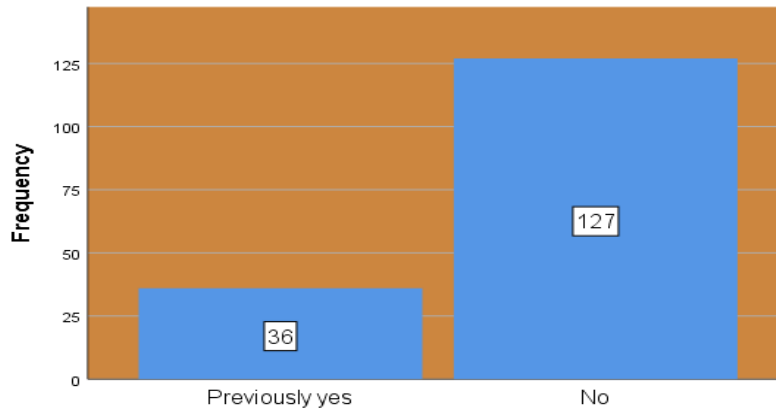
Variable	Frequency	Percentage
Very likely	98	60.1%
Somewhat likely	55	33.7%
Not very likely	7	4.3%
Not likely at all	3	1.8%
Total	163	100.0%

The table above presents the likelihood of participants seeking information or support to improve their adherence to multidrug resistant tuberculosis treatment, (60.1%) of respondents answered very likely and (33.7%) of respondents answered somewhat likely this suggests that the patients seek support and consultation to improve

adherence to treatment, a small proportion of patients 4.3% not very likely and 1.8% not likely at all these individuals may face barriers that that them to seek help.

4.5. Respondents use of substances abuse

Figure 4.7. Respondents use of substances abuse



The above bar chart shows the responses about substance abuse 36 (21.1%) respondents reported they have previously used substance while 127 of them (77.9%) reported have never use these substances.

4.5.2. Type of substances used

Table 4.5.1. Type of substances used

Variable	Frequency	Percentage
Chewing khat	15	9.2%
Tobacco	7	4.3%
Smoking cigarette	14	8.6%
None	127	77.9%
Total	163	100.0%

The table provides the distribution of respondent's substance use behaviors showing the 77.9% of respondents reported never use substance abuse, 9.2% reported chewing khat, 8.6% reported smoking cigarette, while only 4.3% of respondents answered tobacco suggesting number of patients had tobacco use are less compared to Khat and Cigarette.

Table 4.6. Table results about Qualitative MDR-TB treatment adherence barriers

CFIR Domains	Themes	Quotations
Intervention characteristics	Adaptability of the drug	"The pills are too many, and patients have to take them for such a long time; they feel like it will never end." (Medical Doctor, #10)
	Complexity of TB service delivery	"Due to country's unstable health infrastructure limited treatment facilities and access to diagnostics" (focal person #11)
	Cost of the treatment	"The medicines are free, but there are still many costs for the patients to pay for extra things like vitamins and antihistamine drugs. They cannot afford all these expenses." (Medical Doctor, #9)
Outer setting		
	Socioeconomic	"Sometimes we see patients who come to hospital who are only the breadwinners for their families. They cannot afford to stay for too long because they need to meet their basic needs" (Nurse, #7)
	Sociocultural	"People in the community avoid it when they know their close relative have been diagnosed with TB. patients feel ashamed to come to the hospital because everyone will know." (Nurse, #6)
	Environmental	"The hospital is far from where most patients live, and the roads are bad, especially during the rainy season. Sometimes they must walk for hours or pay a lot for transport, and it's not always safe. It makes it very difficult

		for them to come regularly for treatment." (Pharmacist, #4).
	Emergencies and outbreaks	"Sometimes there are outbreaks like cholera, or emergencies like floods, which make it impossible to come to the hospital. When these things happen, patients miss their appointments, and it makes them hard to keep up with the treatment." (Nurse, #5)
Inner setting		
	Infrastructure	"Lack of environmental rehabilitation and inadequate inpatient equipment hinder quality of care" (medical supervisor #8)
	Patient communication	"We ensure patients, and their families complete the treatment successfully, maintaining good communication throughout" (pharmacist #3)
	Patient centeredness	"We provide care and respect, respect their values and preferences." (Lab technician #1)
	Access to patient education, consultation and information sharing	"We conduct regular group awareness sessions where patients participate, and we discuss existing conditions and challenges that need solutions" (Nurse #2)
characteristics of Individual		
	Role of hospital decision makers	"Resource allocation, ensure quality care as we can and engage with stakeholders" (focal person #11)
	Role of service providers	The MoH and SNTP set policies coordinate healthcare services and oversee control efforts Somalia, WHO provides technical assistant, World Vision PR and Muslim Aid SR
	Patient needs	"I saw some patients who traveled from other regions and previous have undergone TB treatment, and now they are experiencing more side effects from the medication, they need close monitoring." (Nurse # 2)

Implementation process		
	Engaging stakeholders	“Engaging health workers, patients and their families, and community leaders to raise awareness and improve adherence to MDR-TB treatment” (focal person #11)
	Feedback from patients	Patients offer insights into their experiences during treatment, including barriers like stigma, side effects, and difficulties in accessing care (Medical Doctor, #10)

This table presents the qualitative results of MDR-TB treatment adherence barriers, categorized using the CFIR (Consolidated Framework for Implementation Research) domains. Here’s an interpretation of the findings from each domain:

1. Intervention Characteristics

Adaptability of the Drug: Patients find it difficult to adhere to the treatment because of the long duration and large number of pills. This suggests that the drug regimen could benefit from improvements in ease of use or dosage adjustments.

Complexity of TB Service Delivery: The unstable health infrastructure and limited access to diagnostics make the delivery of TB services complicated, leading to potential delays or interruptions in patient care.

Cost of the Treatment: Although TB medications are free, other related costs like vitamins and antihistamines burden patients financially, which might affect their ability to adhere to treatment.

2. Outer Setting

Socioeconomic Factors: Some patients are the primary earners in their families and cannot afford extended hospital stays, which directly impacts their treatment adherence.

Sociocultural Factors: The social stigma around TB in the community leads patients to avoid the hospital, affecting their willingness to seek treatment.

Environmental Factors: Geographic barriers, such as the distance from the hospital and poor infrastructure, particularly during the rainy season, make it difficult for patients to attend appointments regularly.

Emergencies and Outbreaks: Natural disasters and disease outbreaks (e.g., floods, cholera) disrupt patient appointments, worsening adherence.

3. Inner Setting

Infrastructure: Inadequate inpatient equipment and lack of infrastructure maintenance diminish the quality-of-care patients receive, affecting treatment adherence.

Patient Communication: Ensuring strong communication between patients, families, and healthcare providers is vital to keeping patients on track with their treatment.

Patient-Centered Care: Respecting patients' values and preferences fosters an environment that supports adherence.

Access to Patient Education and Consultation: Regular group awareness sessions help patients understand their treatment and challenges, which may improve adherence.

4. Individual Characteristics

Role of Hospital Decision Makers: Decision-makers focus on resource allocation and maintaining quality care, which influences how well treatment is implemented.

Role of Service Providers: Multiple agencies coordinate healthcare services and policy implementation, ensuring patients receive comprehensive care.

Patient Needs: Patients who travel long distances and experience severe side effects require close monitoring, which may impact their adherence.

5. Implementation Process

Engaging Stakeholders: Involving health workers, patients, families, and community leaders raises awareness and enhances treatment adherence efforts.

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter presents a comprehensive discussion of the key findings from the study on barriers to treatment adherence among patients with multidrug-resistant tuberculosis (MDR-TB) at Lazaretto Hospital in Mogadishu. It explores how the results align with existing literature, highlighting similarities and discrepancies, and evaluates their implications for public health, particularly in resource-limited settings. The chapter also draws conclusions based on the evidence gathered and offers actionable recommendations aimed at improving adherence to MDR-TB treatment. These insights are critical for guiding future interventions and policies to enhance patient outcomes and reduce the burden of MDR-TB in Somalia.

5.2 Socio-demographic Factors

The study found that the majority of patients undergoing MDR TB treatment were male (74.8%) and young adults aged 18–25 (39.9%). This aligns with global trends indicating that TB predominantly affects younger populations in developing countries due to higher exposure rates and lower socioeconomic status. The high proportion of young male patients suggests that targeted interventions, such as community-based awareness campaigns and tailored educational programs, should focus on this demographic to improve adherence rates.

Moreover, nearly half of the participants (49.7%) had no formal education, a factor commonly associated with poor health literacy and understanding of the disease. Limited education may affect patients' ability to comprehend the importance of strict adherence to MDR TB treatment, highlighting the need for accessible, simplified, and culturally relevant health education materials. The study suggests that the level of education is crucial in shaping patient behaviors toward treatment adherence, consistent with findings in other studies that emphasize education's role in public health interventions.

5.3 Medical History and Barriers to Adherence

Patients who have been previously treated for TB are more likely to develop drug resistance compared to those who have never undergone treatment. The use of second-line drugs to treat drug-resistant TB is expected to rise in cases of XDR-TB. Therefore, accurate assessments of the incidence, prevalence, and factors contributing to XDR-TB are essential for guiding treatment strategies. The presence of resistance to both first- and second-line drugs highlights the need for timely, feasible, and rapid drug susceptibility testing (DST) to inform patient management and prevent further resistance progression (38).

The study indicates that 70% of the patients had been registered within the past six months, reflecting an influx of new patients and the hospital's active role in managing MDR TB. However, a significant challenge is the high rate of reported side effects (94.5%), with the most common being nausea (51.53%), vomiting (17.79%), and fatigue (15.95%). This high prevalence of side effects can negatively impact treatment adherence, as 19% of patients reported that side effects affected their medication adherence.

These findings align with other studies that have highlighted side effects as a critical barrier to adherence in MDR TB treatment. Effective management of these side effects through supportive care, counseling, and potentially adjusted medication regimens is essential. Providing psychosocial support and building patient trust in the healthcare system are crucial strategies to mitigate this barrier.

5.4 Socioeconomic and Cultural Barriers

The study identified significant socioeconomic barriers, such as transportation expenses (61.3%) and lack of social support (9.2%). These barriers are consistent with the broader literature on TB in resource-limited settings, where access to treatment is often hindered by financial constraints and inadequate healthcare infrastructure. The study's findings suggest that improving access to financial support and transportation services could enhance adherence rates.

Cultural beliefs and misconceptions about tuberculosis and its treatment were also reported as barriers by 4.9% of respondents. This aligns with previous research showing that cultural perceptions and stigma around TB can prevent patients from seeking or adhering to treatment. Addressing these barriers requires community engagement and culturally sensitive health education programs to dispel myths and promote a better understanding of MDR TB.

5.5 Health System-Related Challenges

The findings reveal that waiting times at health facilities are significant barriers, particularly for laboratory investigations, with 50.9% of patients waiting between 2 to 3 hours. These delays can discourage patients from continuing their treatment and attending follow-up appointments. This is consistent with studies in similar contexts where long waiting times and poor service delivery were significant barriers to treatment adherence.

To address this, healthcare facilities should implement more efficient patient management systems, increase staffing levels, and ensure timely availability of medical supplies and diagnostic services. Strengthening the health system's capacity to handle MDR TB cases is crucial for reducing waiting times and improving patient outcomes.

5.6 Knowledge and Awareness

The study revealed that almost half of the participants (47.2%) lacked knowledge about MDR TB and its treatment. This lack of awareness poses a significant challenge to adherence, as patients may not fully understand the disease's severity or the importance of completing their treatment regimen. Most patients reported receiving information from healthcare providers (72.4%), indicating that while health workers play a critical role in patient education, more comprehensive strategies are needed.

Increasing the availability of educational materials, using diverse media channels, and enhancing community outreach efforts can help bridge this knowledge gap.

Digital tools, such as mobile health applications, can also be used to deliver tailored information and reminders to patients.

Knowledge about TB treatment and the importance of completing it after infection are viewed differently among the people in Somalia. Many individuals are unaware of the consequences of interrupting treatment, leading to early discontinuation. This lack of awareness often results in patients stopping treatment before the prescribed duration, which can lead to treatment failure and the need to restart the regimen (10).

5.7 Behavioral and Personal Barriers

Behavioral factors, such as substance use (21.1%), particularly chewing khat and smoking cigarettes, were identified as significant barriers to adherence. These findings corroborate previous studies that show how substance abuse negatively impacts adherence by affecting cognitive function and increasing forgetfulness or lack of motivation.

Interventions to address these barriers should include counseling services to address substance use and tailored behavioral change communication strategies to support patients in maintaining adherence to their treatment regimens.

5.8 Implications for Public Health

The findings of this study have several implications for public health strategies aimed at improving MDR TB treatment adherence:

1. **Strengthening Health Education and Communication:** Developing targeted education and communication strategies that are culturally relevant and accessible to all demographic groups, especially young adults and those with limited education.
2. **Improving Health System Infrastructure:** Addressing health system-related barriers such as long waiting times by increasing healthcare workforce capacity, optimizing patient flow, and ensuring consistent availability of medical supplies.

3. **Providing Comprehensive Support Services:** Enhancing psychosocial and nutritional support, to reduce the socioeconomic burden on patients.
4. **Integrating Community Engagement:** Engaging local communities through culturally appropriate awareness campaigns to reduce stigma, dispel myths, and promote a better understanding of MDR TB and the importance of treatment adherence.

5.9 Recommendations

Based on the findings, the following recommendations are proposed:

- **Enhance Patient Education:** Employ multimedia strategies to spread information about MDR-TB, using platforms such as social media, radio, and community outreach programs to reach a broader audience. Utilize voice messages through ring back tones with concise messages about MDR-TB symptoms and prevention to raise awareness and promote public health education
- **Address Health System Barriers:** Enhance service delivery efficiency by providing additional training for healthcare providers and ensuring timely payment of staff salaries to boost morale and reduce patient waiting times. Construct and improve adequate waiting areas that are clean, safe, and ensure separate spaces for healthcare workers and patients.
- **Strengthen Financial Support Mechanisms:** Provide sufficient and well-equipped inpatient care for patients from other regions and distant districts to reduce the need for transportation and minimize indirect costs associated with treatment. This not only prevents patients from discontinuing treatment due to financial challenges but also helps limit the spread of MDR-TB, as patients will avoid using public transportation, where they could otherwise risk transmitting the disease to the broader population. This approach is particularly important in regions like Mogadishu, where public transport is commonly shared, and overcrowding can increase the risk of infection spread.
- **Implement Supportive Behavioral Interventions:** Integrate counseling and support groups to address substance use and promote positive behavioral changes among patients.

5.10 Conclusion

This study identified various barriers to treatment adherence for MDR TB patients at Lazaretto Hospital, including socio-demographic, medical, socioeconomic, cultural, and health system-related challenges. Addressing these barriers requires a multifaceted approach that combines patient education, health system strengthening, and community engagement. By implementing these strategies, healthcare providers and policymakers can improve adherence rates, ultimately reducing the burden of MDR TB in Mogadishu and beyond.

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RESEARCH



MINISTRY OF HEALTH
FEDERAL GOVERNMENT OF
SOMALIA
MOGADISHU

FEB, 06 2024

Mr. Kulmie Mohamud Abdulle
Graduate student
Faculty of Health Science
Department of Puplic Health
Galkayo University

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN HOSPITAL

I am pleased to inform you that the above referenced for Ethical Approval of research has been approved on behalf of University Research Ethics Review Committee. This approved is in effect for twenty-four months from the above date. Any changes in the procedures affecting interaction with human subjects should be reported to the the University research Ethics Review Committee. Significant changes will require the submission of a revised request for Ethical Approval of Research. This approval is in effect only while you are a registered Galkayo University student.

Best wishes for success in this research

Sincerely,

Mr. Abdirizak Khalif Adan, member
University Research Ethics Review Committee

CC: Dr. Qasim Moallim H.
Dhiblawe, Chairman

Signature:

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