HARAMAYA UNIVERSITY

DIRECTORATE FOR POSTGRADUATE PROGRAMS

Cost of Seeking TB Treatment and Its Associated Factors among Patients Attending TB Clinics in Jigjiga Town, Eastern Ethiopia

MPH Thesis Report

Abdirizak Ahmed Yusuf

December 2025

Haramaya University, Harar, Ethiopia

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Cost of Seeking TB Treatment and Its Associated Factors among Patients Attending TB Clinics in Jigjiga Town, Eastern Ethiopia

Abdirizak Ahmed Yusuf

A Thesis Report Submitted to the School of Public Health,

College of Health and Medical Sciences

HARAMAYA UNIVERSITY

In Partial Fulfillment of the Requirements for the Degree of

Master of Public Health in Health Service Management

Major advisor: Mr. Behailu Hawulte (MPH, Asst. Professor)

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December 2025

Haramaya University, Harar, Ethiopia

APPROVAL SHEET

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I hereby certify that I have read and evaluated this thesis entitled "Cost of Seeking TB Treatment and Its Associated Factors among Patients Attending TB Clinics in Jigjiga Town, Eastern Ethiopia" prepared under my guidance by Abdirizak Ahmed Yussuf. I recommend that it be submitted to fulfill the thesis requirement.

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As a member of the Board of Examiners of the MPH Thesis Open Defense Examination, I certify that I have read and evaluated the thesis prepared by Abdirizak Ahmed Yussuf and examined the candidate. I recommend that the thesis be accepted as fulfilling the thesis requirements for the Master's degree in Public Health in Health Service Management.

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BIOGRAPHIC SKETCH

My name is Abdirizak, and I am a seasoned humanitarian and development professional with over 14 years of diverse experience in challenging humanitarian situations. I earned a Bachelor of Arts (BA) in Public Administration and Development Management and a Bachelor of Science (BSc) in Nursing, both in 2015. Currently, I am pursuing a Master's in Public Health (MPH) in Health Service Management at Haramaya University.

In my present position as the Area Director for Save the Children International in Eastern Ethiopia, I oversee program operations across several regions, including Somali, Oromia, Harari, and Dire Dawa city administration. My duties involve crafting Area Strategic Plans, ensuring adherence to policies, and managing multiple field offices to supervise program implementation and resource distribution.

Previously, I held the roles of Area Manager and Field Operations Manager, focusing on enhancing staff accountability, program implementation, and partnership management. My leadership has been vital in overcoming complex operational challenges, aligning programs with local stakeholders, and ensuring the rigorous monitoring and evaluation of health and nutrition initiatives.

My dedication to community impact is evident in my successful management of multimillion-dollar emergency health and nutrition programs funded by international institutional donors. I have received accolades for my effective crisis coordination, including the Employee of the Year Award in 2017 from Save the Children.

As an Ethiopian citizen, I completed my primary and secondary education in Jigjiga and have a profound interest in leadership and enhancing public services. My current research investigates the costs associated with seeking TB treatment and various related factors among patients in Jigjiga Town, aiming to offer valuable insights into public health initiatives in the region.

ACKNOWLEDGMENTS

I would like to express my gratitude to the Haramaya University College of Health and Medical Science School of Public Health for giving me this excellent opportunity to undertake this thesis as a fulfillment of the Master of Public Health.

I would also like to express my deepest gratitude to my advisors, Mr. Behailu Hawulte and Mr. Adisu Birhanu, for their unreserved support and guidance throughout the entire process of this proposal.

My colleagues at my work site deserve acknowledgment for their cooperation in sharing the workload while preparing this proposal.

Finally, I would like to thank my family, without whom their encouragement and moral support for this proposal would not have been finalized.

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LIST OF ACRONYMS AND ABBREVIATIONS

AIDS:	Acquired Immune Deficiency Syndrome
AeC:	Adjusted Expenditure Coefficient
BMC:	Bio-Medical College
BSc:	Bachelor of Science
CBHI:	Community-Based Health Insurance
CI:	Confidence Interval
COVID:	Coronavirus Disease
CR:	Cost Ratio
CSA:	Central Statistics Agency
DOTS:	Directly Observed Therapy
DS-TB:	Drug-sensitive Tuberculosis
ETB:	Ethiopian Birr
FMOH:	Federal Ministry of Health
GC:	Gregorian Calendar
GLM:	Generalized Linear Model
HIV:	Human Immune Deficiency Virus
IHRERC:	Institutional Health Research Ethics Review Committee
IQR:	Interquartile Range
LOWESS:	Locally Weighted Scatterplot Smoothing
MDR:	Multidrug Resistant
MPH:	Master of Public Health
NGO:	Non-Governmental Organization
OLS:	Ordinary Least Squares
Rx:	Prescription / Treatment
SD:	Standard Deviation
SPSS:	Statistical Packages for Social Sciences
TB:	Tuberculosis
UNICEF:	United Nations International Children’s Emergency Fund
US:	United states
WHO:	World Health Organization

ABSTRACT

Background: Tuberculosis (TB) is a leading cause of mortality and a major public health concern in Ethiopia. It primarily affects economically active individuals, resulting in severe socioeconomic consequences. Patients with tuberculosis face healthcare expenses that can hinder their access to and adherence to treatment. However, evidence regarding the economic cost of tuberculosis among patients in Eastern Ethiopia remains limited.

Objective: To assess the cost of seeking tuberculosis (TB) treatment and its associated factors among patients attending TB clinics in Jigjiga Town, Eastern Ethiopia

Methods: A health facility-based cross-sectional study was conducted among 303 randomly selected adults with TB in Jigjiga Town from September 1 to 30, 2024. Data were collected using structured, interviewer-administered questionnaires to assess all cost parameters. The data were entered into Epi-Data version 3.1 and analyzed using SPSS version 23, employing descriptive and inferential statistics to analyze the data. We fitted a generalized linear model (gamma family, log link) to identify the predictors of TB treatment costs. All associations were evaluated at the 5% significance level.

Results: The patients' costs ranged from ETB 280 to 10,330, with a median of ETB 1600 (IQR: 2500). Direct medical costs ranged from ETB 280 to 5300, with a median of ETB 1250 (IQR: 2121). Direct non-medical costs ranged from ETB 300 to 1950, with a median of ETB 500 (IQR: 500). Indirect costs ranged from ETB 300 to 6500, with a median of ETB 500 (IQR: 1500). The generalized linear model identified several significant predictors of treatment costs. Extrapulmonary TB increased costs by 63% ($p = 0.03$). Patients aged 40–60 incurred 38% higher costs than those aged 18–39 ($p = 0.02$), while households with 6–10 members faced 28% higher costs ($p = 0.04$). Higher education levels reduced costs substantially: primary education by 65% ($p < 0.001$), secondary education by 81% ($p < 0.001$), and college or above by 70% ($p = 0.02$). Treatment at health centers was associated with 82% higher costs ($p = 0.02$). Sex, residence, and marital status were not significantly associated with treatment costs.

Conclusion: Despite Ethiopia's policy of providing free TB treatment in public facilities, TB patients in Jigjiga Town face considerable economic burden from both direct and indirect costs, and these costs vary by demographic, clinical, and access-related factors. Patients incurred

substantial direct medical expenses (consultation, investigations, drugs) and non-medical costs (transportation, food). The median direct medical cost was ETB 1,250, and the median non-medical cost was ETB 500, despite Ethiopia's policy of free TB treatment. Wage loss due to missed workdays contributed significantly to the overall burden, with a median indirect cost of ETB 500; higher costs were associated with extrapulmonary TB, age 40–60, larger households (6–10 members), and treatment at health centers, while higher education levels significantly reduced costs.

Key words: Tuberculosis, Direct cost, indirect cost, Generalized Linear model, Jigjiga Town, Eastern Ethiopia.

1 INTRODUCTION

1.1 Background

Tuberculosis (TB) is a bacterial infection caused by the Mycobacterium tuberculosis complex (MTBC) that affects any part of the human body, most commonly the lungs. It is transmitted through inhalation, is a major cause of morbidity, and is one of the leading causes of death worldwide. Until the coronavirus (COVID-19) pandemic, TB was the leading cause of mortality due to a single infectious agent, surpassing HIV/AIDS(Urago et al., 2021).

The costs associated with TB patients can be classified as direct or indirect. Direct costs are out-of-pocket expenses for medical and non-medical services, whereas indirect costs are income lost due to missed workdays (KNCV, 2008).

Despite free diagnosis and treatment of TB, patients with TB and their families incur substantial direct and indirect expenses due to TB (Tanimura et al., 2014). According to a systematic review, the mean total costs of tuberculosis in low- and middle-income countries ranged from less than I$1 to I$8198, with substantial variability (Tanimura et al., 2014). The high cost of TB diagnosis and treatment causes delays and poor outcomes (Finnie et al., 2011). Poor outcomes result in the development of drug-resistant tuberculosis, which requires more costly management (Pooran et al., 2013).

The implementation of global TB control measures in Ethiopia has improved access to TB care and reduced morbidity and mortality (WHO, 2015). Nonetheless, Ethiopia is still among the 14 high-burden countries for TB, TB/HIV co-infection, and multidrug-resistant TB. (WHO, 2016). Household out-of-pocket expenses accounted for 62% of the total US$47.8 million spent on tuberculosis control in 2008 (FDRE, 2010). Modeling also indicated that these OOP costs averaged US$49 per patient, pushing households below the poverty line. (Verguet et al., 2016).

Most countries aim to provide TB diagnosis and treatment free of charge through public health services. Access to free TB care has expanded substantially over the past two decades through national efforts and global financial support. However, many patients with TB and their families still face very high direct and indirect costs due to illness and care-seeking, which can limit access and increase the risk of financial catastrophe (Foster et al., 2021).

1.2 Statement of the Problem

According to the 2020 World Health Organization (WHO) global TB report, approximately a quarter of the global population is infected with Mycobacterium tuberculosis, with an estimated 10 million new cases and 1.2 million deaths in 2019. Africa accounts for approximately 25% of the global TB burden. Ethiopia, a country in East Africa, ranked 10th among the 30 high-TB-burden countries, with an estimated TB incidence of 140 cases per 100,000 population (WHO, 2020). TB is a significant barrier to socioeconomic development in Ethiopia; 75% of people affected by TB are within the economically productive age group of 15-54 years. Reducing the impact of the cost of illness is crucial for TB control because of the synergy between poverty and TB infection. In addition, TB worsens poverty by reducing patients' physical strength and ability to work, ultimately leading to income loss (Rocha et al., 2011, Ayeni et al., 2021).

The economic impact on households is further exacerbated by the costs incurred while seeking healthcare (Gebrezgabiher et al., 2016, WHO, 2021). The National Health Account five (NHA-5) report, showed an increase in overall TB spending from US$47.8 million in 2017/18 to US$51.2 million in 2020/21, representing 3% of total national health expenditure. In most settings, income loss is the largest contributor to TB-related costs. The cost of seeking TB treatment refers to the total economic burden borne by patients and their households while accessing tuberculosis care. This includes direct medical costs (consultation fees, diagnostic investigations, and drugs), direct non-medical costs (transportation, food, and accommodation), and indirect costs (income loss due to missed workdays). These costs are measured from the patient's perspective and cover both pre-diagnosis and post-diagnosis phases of TB care.(World Health Organization, 2018). Despite free TB diagnosis and treatment, patients with TB and their families incur high direct and indirect costs due to TB illness (WHO, 2021). According to a study conducted in Ethiopia, OOP payments for transportation, accommodation, and food exacerbate financial burdens, negatively affecting treatment adherence and compelling households to sell assets, borrow money, or reduce income (Assebe et al., 2020).

To overcome this problem, the FMOH is focusing on community health workers to identify and link suspected TB patients to PHC facilities for diagnosis and treatment, aiming to reduce TB-related mortality. It also engaged in and started to put its efforts on sustainable development goal "End TB" strategies aligned with the Sustainable Development Goal "End TB," targeting a 90% reduction in morbidity, 80% reduction in mortality relative to 2015, and prevalence of 1

per 100,000 by 2030. These strategies aim to prevent catastrophic TB-related costs for families. Social protection against the cost of illness is a central policy objective of Universal Health Coverage and, correspondingly, a post-2015 global strategy for TB. Social protection strategies include access to healthcare, financial protection against the costs of seeking care, and poverty improvement strategies. The economic impact on the household is then further exacerbated by the costs incurred while seeking health care.(Assebe et al., 2020, Foster et al., 2021, Deribew et al., 2018)

Few studies have dealt with barriers to tuberculosis care, including the impact of armed conflict, limited involvement of health extension workers in identifying presumptive TB cases, and determinants of diagnostic delay. (Gele et al., 2010a, Getnet et al., 2019). In addition, none of the studies analyzed cost predictors across patients with TB and their associated factors. Therefore, this study is important for assessing the cost of seeking TB treatment and its associated factors among patients attending TB clinics in Jigjiga.

1.3 Significance of Study

This study investigated the cost of TB from a patient's perspective and the associated factors aiming to provide a comprehensive understanding of the financial burden associated with TB treatment from the patient's perspective. Identifying and evaluating factors that contribute to the cost of seeking TB treatment and its public health importance is critical for both patient welfare and public health planning.

In the situation of diminishing resources and increasing demand, up-to-date information on the costs of care and treatment is essential. Understanding these dynamics empirically is crucial for planning, budgeting, and developing strategies to reduce patient costs, optimize resource allocation, and improve healthcare financing mechanisms

The results of this study will be advantageous for both governmental and non-governmental organizations, including the Ministry of Health, regional health bureaus, and other entities involved in the health sector in designing cost-reduction strategies for TB patients, such as transportation subsidies, nutritional support, and decentralized services, ensuring efficient resource allocation to minimize catastrophic health expenditures. It also provides critical data for strengthening social protection and universal health coverage through schemes like community-based health insurance and cash transfers, aligning with Ethiopia's End TB Strategy

and global goals to eliminate catastrophic costs by 2030 (Assefa et al., 2024a, Dememew et al., 2024). Furthermore, the findings support program design and advocacy for NGOs and international agencies, allowing organizations such as WHO and UNICEF to secure donor funding and implement targeted interventions for vulnerable populations by informing them of the economic burden and supporting evidence-based decision-making, while NGOs can adopt cost-mitigation measures like mobile clinics and community health worker outreach(Abolhallaje et al., 2013). Operational improvements are also highlighted, with recommendations to streamline service delivery, reduce waiting times, and address high-cost drivers such as extrapulmonary TB through efficiency measures. Finally, the study offers academic and research benefits by providing a baseline for future investigations into TB-related economic burdens and supporting curriculum development and training for health professionals in health economics and TB care. Objectives of the study

1.4 Objectives of the study

1.4.1 General Objective

- To assess the costs associated with seeking TB treatment and identify their determinants among patients attending TB clinics in Jigjiga town, Eastern Ethiopia, September 1–30, 2024.

1.4.2 Specific Objectives

- To quantify the direct and indirect costs and total cost incurred by patients with TB attending clinics in Jigjiga Town, Eastern Ethiopia.
- To determine the factors associated with the total costs of seeking TB treatment for patients attending clinics in Jigjiga Town, Eastern Ethiopia.

2 LITERATURE REVIEW

2.1 Economic burden of TB

2.1.1 Direct costs of TB Patients

A systematic review of the financial burden of patients with TB in low- and middle-income countries showed that the mean total cost of TB ranged from $55 to $8198, with an unweighted average of $847. On average, 20% (range 0-62%) of the total cost was due to direct medical costs, 20% (0-84%) to direct non-medical costs, and 60% (16-94%) to income loss. Half of the total cost was incurred before TB treatment. On average, the total cost was equivalent to 58% (range 5-306%) of the reported annual individual income and 39% (4-148%) of the reported household income. The cost as a percentage of income was particularly high among poor people and those with multidrug-resistant TB (Assebe et al., 2020).

TB has a significant impact on patients with TB and their families. It is mainly affected by early diagnosis and treatment initiation, time spent in health facilities, distance from home to health facilities, mode of travel, frequency of follow-up visits, and waiting time. A study conducted in Ethiopia revealed that the mean and median total costs of TB to patients during DOT were $177.3 (SD = 78.7) and $177.1 (R = 461.8), respectively. Among the OOP, 37% were for food supplements for nutritional support and 33.6% were for hospital-related direct costs (Gele et al., 2009).

According to a study conducted in Southern Ethiopia, the total costs incurred by patients for care-seeking, diagnosis, and treatment amounted to a median of US$201.48 (136.70–318.94). The pre- and post-diagnosis costs constituted 53.6 and 46.4% of the total cost, respectively. The total direct costs constituted 29.4% of the total costs and amounted to a median of US$59.58 (29.43–113.81). Drugs other than anti-TB drugs and diagnostic tests (laboratory or imaging tests) accounted for 49.7% and 44.6% of the total medical costs, respectively. During the care-seeking and treatment visits, patients had totally lost a median (IQR) of 51.7 (32.0–80.8) workdays, which corresponded to a median (IQR) of US$127.68 (78.43–201.85) income loss (indirect cost). Out of the total forgone income due to the TB illness, the loss due to lost workdays following care- seeking visits amounted to a median (IQR) of US$18.02 (11.35–30.85) that constitutes 28.4% of the total indirect cost.(Assebe et al., 2020)

2.1.2 Indirect costs of TB Patients

The literature consistently demonstrates that indirect costs represent the largest component of TB-related patient expenses, often far exceeding direct medical costs across diverse global settings.

Indirect costs primarily consist of lost wages and productivity due to illness. S. Kristina et al., 2020 found through systematic review that indirect costs ranged from USD 161 to USD 3,739.21 across studies(Kristina et al., 2020). Emeli Paul Choudhury et al., 2020 reported that indirect costs contributed 96% of total median treatment costs in India(Choudhury et al., 2020). K. John et al., 2009 found mean indirect costs of $526.87 compared to direct costs of only $34.91 among rural Indian patients(John et al., 2009).

Studies consistently report substantial work time losses. S. Kik et al., 2009 found immigrant patients in the Netherlands lost an average of 81 days, primarily due to hospitalization (19 days) and additional work days (60 days), valued at €2,603(Kik et al., 2009). R. Rajeswari et al., 1999 reported mean work days lost of 83 days with an average wage loss period of 3 months in India(Rajeswari et al., 1999).

The financial burden extends beyond individual patients. V. Mauch et al., 2013 found total costs of US$908 for new patients and US$3,557 for MDR-TB patients in the Dominican Republic, with the proportion of patients without regular income increasing from 1% to 54% due to TB illness(Mauch et al., 2013b). K. Ukwaja et al., 2013 reported that median total TB care costs represented 37% of median annual household income in Nigeria, with indirect costs comprising $416 of the total $528 patient costs(Ukwaja et al., 2013).

Emeli Paul Choudhury et al., 2020 found indirect costs were significantly higher in patients who visited private facilities first and those with comorbidities like hypertension and diabetes. MDR-TB patients consistently face higher indirect costs than regular TB patients across studies(Choudhury et al., 2020).

R. Sarin et al., 2019 reported indirect costs of Rs. 7,564 compared to direct costs of Rs. 4,601 in Delhi, India. M. Muniyandi et al., 2005 found that over 50% of patients in Tamil Nadu incurred no indirect costs during treatment under DOTS, though 12% lost more than 60 workdays(Sarin et al., 2019). Filha et al., 2018 reported income loss of US$749 as the main cost component for TB/HIV co-infected patients in Brazil(de Siqueira Filha et al., 2018).

Across all studies, indirect costs consistently represent the dominant economic burden for TB patients, often comprising 70-96% of total treatment costs, demonstrating that even “free” TB treatment programs impose substantial financial hardship on patients and households through lost productivity and income.

Income loss is often the greatest financial risk for patients. Apart from ensuring that healthcare services are fairly financed and delivered in a way that minimizes direct and indirect costs, it is also necessary to ensure that TB patients and affected families receive appropriate income replacement and other social protection interventions (Getnet et al., 2017).

Households without full health insurance coverage face the risk of incurring high medical care expenditures if they fall ill. This uninsured risk reduces welfare. Furthermore, if a household member falls ill, out-of-pocket medical care purchases would disrupt the household’s material living standards. If healthcare expenses are large relative to the resources available to the household, this disruption in living standards may be considered catastrophic. One concept of fairness in health finance is that households should be protected from catastrophic medical expenses (Kirubi et al., 2021).

A study conducted in Nigeria showed that possible coping strategies devised by patients to survive during their illness included borrowing money to cover costs (26.3%). Of the 65 respondents who borrowed money, an average of US$ 206.98 was borrowed per person, and most funds were borrowed from neighbors/friends (54.0%), family (24.6%), and cooperatives (20.0%). In an attempt to cope, many patients have been known to further weaken their coping strategies by selling or leasing off their assets or resorting to borrowing, as well as the receipt of vouchers to cover certain basic costs such as food, transportation and house rental (Ukwaja et al., 2013)

A study conducted in Ethiopia revealed that for the majority (90%) of patients with TB, OOP payments were covered by their family members and for the remaining 10% by their neighbors and friends. Among patients with TB, 18% borrowed money to cope with TB costs, of whom 34% borrowed from neighbors, 26% from friends, 23% from relatives, and 17% from other organizations. None of them borrowed money with interest. Among them 11% of TB patients sold their properties to cope with TB costs, and house utensils was the major properties TB patients were selling for coping costs (Ayé et al., 2011)

2.1.3 Factors associated with the cost of seeking TB treatment.

The economic burden of tuberculosis (TB) care is influenced by a complex interplay of socio-demographic, clinical, access-related, and health system factors. Understanding these determinants is essential for designing interventions that minimize catastrophic costs and improve treatment adherence(D'Silva et al., 2025, Ngadaya et al., 2025, Organization, 2025, Nxumalo et al., 2025) .

Age and gender are important predictors of TB-related costs. Older patients often incur higher expenses due to comorbidities and prolonged treatment durations, while gender roles may influence health-seeking behavior and associated costs(Assebe et al., 2020, D'Silva et al., 2025). Education level also plays a critical role; individuals with higher education tend to have lower costs because of better health literacy and timely care-seeking(D'Silva et al., 2025). Household size and income significantly affect financial vulnerability, with larger households and those in lower socioeconomic strata facing increased catastrophic expenditures(Ngadaya et al., 2025). Employment status further compounds this burden, as unemployed patients experience higher indirect costs due to income loss during treatment. (Otoo et al., 2025).

The type of TB strongly influences treatment costs. Patients with drug-resistant TB (DR-TB) or TB/HIV co-infection incur substantially higher expenses because of prolonged treatment regimens and complex diagnostic requirements.(Akalu et al., 2023). Hospitalization during intensive phases is another major cost driver compared to outpatient care.(D'Silva et al., 2025). Additionally, comorbidities such as diabetes and HIV increase diagnostic complexity and treatment duration, further elevating costs.(Duarte et al., 2018).

Geographical barriers significantly impact TB treatment costs. Patients living far from health facilities face higher transportation expenses and opportunity costs, particularly in rural areas with poor infrastructure.(Organization, 2022) . Mode of transportation also matters; reliance on paid transport such as taxis rather than walking or public transport increases out-of-pocket spending. (Garedew and Nemera, 2017). Furthermore, lack of decentralized diagnostic services and the need for multiple visits for testing contribute to higher pre-diagnosis costs.(Teibo et al., 2024).

Health system characteristics and policy gaps exacerbate TB-related financial burdens. Patients seeking care in private facilities often face higher costs compared to those using public facilities

that provide free TB services(Assefa et al., 2024a). The absence of social protection measures—such as transport vouchers, nutritional support, and cash transfers—further increases catastrophic expenditures (Organization, 2024). Service delivery inefficiencies, including long waiting times and fragmented care, also elevate indirect costs and reduce adherence (D'Silva et al., 2025).

A study conducted in Tajikistan showed that receiving complementary treatment led to 2.12 times the expenditure during treatment. Patients hospitalized for one week had a 50% higher expenditure than those not hospitalized. Patients hospitalized for 2 months had 5.6% higher expenditures than those hospitalized for 1 week. The main factors leading to higher expenditures related to TB were receiving complementary treatment, longer hospital stays, and longer treatment delays. In South Africa, expanded access to care could decrease household tuberculosis-related catastrophic costs by 5–20%, but gains would be seen largely after 5–10 years (Pedroso et al., 2021)

A study conducted in Addis Ababa, Ethiopia, analyzed factors associated with high total costs due to TB, including family income, place of residence, primary income earner, cost payer, and additional food costs. Patients with TB with lower income were less likely to pay higher costs for their illness when compared to patients with TB with high income, reflecting that patients with TB with low income required more financial incentives and health insurance coverage to survive with TB illness (Assefa et al., 2024b). A study conducted in Southern Ethiopia reflected that the mean total cost incurred by patients who are rural residents is about 24% higher than that by urban residents, adjusted exp. coefficient (AeC) (95% CI) 1.24 (1.13, 1.4) (Gele et al., 2010b).

2.2 Conceptual Framework

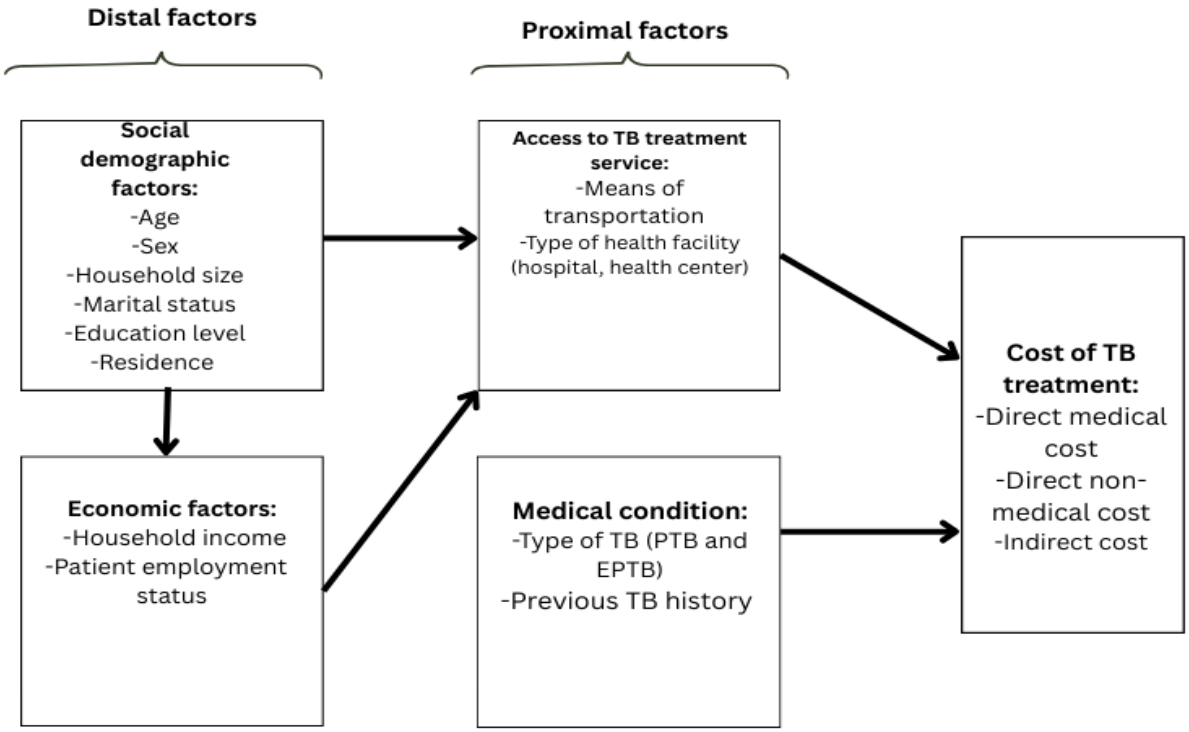

Figure 1 Conceptual Framework for Determinants of Cost of Seeking TB Treatment, 2024 (Developed by the investigator after reviewing literature.(D'Silva et al., 2025, Chen et al., 2024)

3 METHODS AND MATERIALS

3.1 Study area/setting and study period

The study was conducted in Jigjiga Town, the capital of the Somali National Regional State, located about 626 km east of Addis Ababa. Jigjiga lies in the Fafan Zone and serves as a major urban center in the Somali region, which shares borders with Somaliland, Somalia, Djibouti, and Kenya. The region is predominantly rural, with over 83% of the population engaged in pastoral or agro-pastoral livelihoods, and livestock being the primary source of income. Cross-border movements are common due to ethnic, linguistic, and cultural similarities with neighboring countries(Central Statistical Agency (CSA) [Ethiopia] and ICF, 2016).

Jigjiga is situated at an elevation of 1,634 meters above sea level and has an estimated population of 282,750. The town experiences a subtropical highland climate characterized by two rainy seasons—the main meher rains from July to September and the short belg rains in April and June—alongside a dry season known as bega. Temperatures remain mild to warm throughout the year, with seasonal variations primarily related to rainfall rather than temperature extremes(Central Statistical Agency (CSA) [Ethiopia] and ICF, 2016) .

The city hosts one referral hospital, one general hospital, one primary hospital, and one public health center, along with several private clinics providing TB treatment services. For this study, participants were recruited from four major public health facilities: Jigjiga University Sheik Hassan Yabare Referral Hospital, Karamara General Hospital, Ablele Primary Hospital, and Ayar Dega Health Center. These facilities were selected because they represent the primary TB diagnosis and treatment centers in Jigjiga.

This study was conducted from September 1 to 30, 2024.

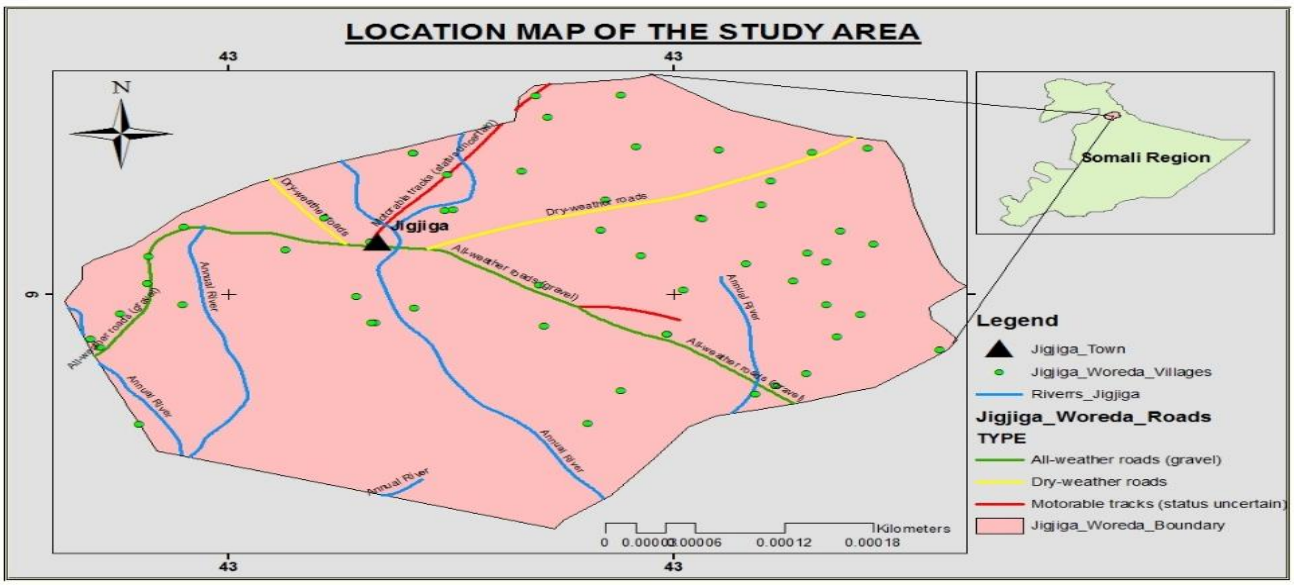

Figure 2 Map of the study area – Jigjiga town, Somali region, Ethiopia, 2024

3.2 Study design

A facility-based cross-sectional study design was employed to assess the cost of seeking TB treatment and the associated factors among patients attending TB clinics in Jigjiga Town.

3.3 Population

3.3.1 Source population

All TB patients attended public health facilities in Jigjiga Town.

3.3.2 Study population

All selected adult (≥18 years) patients with TB documented in the TB register who initiated TB treatment within the past 6 months and who were enrolled and received TB care in the four health facilities in Jigjiga town during the data collection period were included. Patients with known drug-resistant TB were analyzed as a separate subgroup due to substantially different treatment durations and cost profiles.

3.4 Inclusion and exclusion criteria

3.4.1 Inclusion criteria

Patients with confirmed active pulmonary or extrapulmonary TB who had been on TB treatment, aged ≥ 18 years, and consented to participate in the study were included.

3.4.2 Exclusion criteria

Patients under the age of 18 years and those receiving treatment in TB wards at the four health facilities were excluded. Patients receiving treatment in TB wards were excluded from this study because their cost patterns differ substantially from those of outpatients. Inpatient care typically involves prolonged hospitalization, specialized diagnostics, and bundled service charges, which would introduce extreme variability and outliers in cost estimates, making comparisons with outpatient cases less meaningful.(D'Silva et al., 2025, Organization, 2025). Furthermore, the study aimed to assess the economic burden of TB care from the perspective of patients attending clinics, where direct and indirect costs such as transportation and wage loss are most relevant.(Assebe et al., 2020) . Including ward patients would have required a separate analytical framework and posed ethical and practical challenges, as critically ill patients may not be able to provide accurate cost data(Organization, 2024).

3.5 Sample size determination

3.5.1 Sample size calculation

We calculated the sample size to compare the sample mean to a reference value and used a one-sample mean formula. This approach is often used to determine the sample size required to detect a specific difference between the sample mean and a known reference value. Here's the formula.

To calculate the estimated sample size for a one-sample mean test, the following formula was used:

$n = [(Z * \sigma) / E] ^2$

Where: n = estimated sample size

Z = Z-value corresponding to the desired level of confidence (e.g., for 95% confidence, Z = 1.96).

σ = standard deviation of the population

E = desired margin of error (maximum difference between the sample mean and the true population mean)

In this case, the mean (μ) was 3,705.198, the desired difference (E) was 185.259, and the standard deviation (σ) was 1644.665, representing all the costs. (Getahun et al., 2016).

Calculation of estimated sample size

n = [(Z] * σ) / E] ^2 = [(1.96 * 1644.665) / 185.259] ^2 ≈ [(3223.4134) / 185.259] ^2 ≈ (17.4121)^2 ≈ 302.6799

Therefore, the estimated sample size for the one-sample mean test was 303 participants with a 10% expected non-response rate.

3.6 Sampling procedure/technique

Sample was allocated using proportional to population size. Accordingly, all four health facilities currently providing tuberculosis care and treatment in Jigjiga town were selected. For this study, a list of the health facilities currently providing tuberculosis care and treatment was obtained from the Jigjiga Town Health Office, and the target health institutions for the study were selected. For each selected health facility, study participants were allocated proportionally based on patient flow six months before the study period. A proportional allocation formula was used to ensure sufficient sample size for each randomly selected health facility.

ni= n.Ni/N

where ni is the required sample size in each stratum, n is the total sample size, Ni is the number of patients in each selected health facility, and N is the total number of TB patients in their patients' flow six months before the study period in all selected health facilities.

Regarding health facilities, one health center, one Primary Hospital, one general hospital, and one referral hospital providing tuberculosis care and treatment services were included. Therefore, systematic random sampling techniques were employed to select the respondents for this study. The study participants were patients with TB on follow-up who visited each health facility every kth (for this study, we selected the first four and jumped every fifth patient with TB) during data collection.

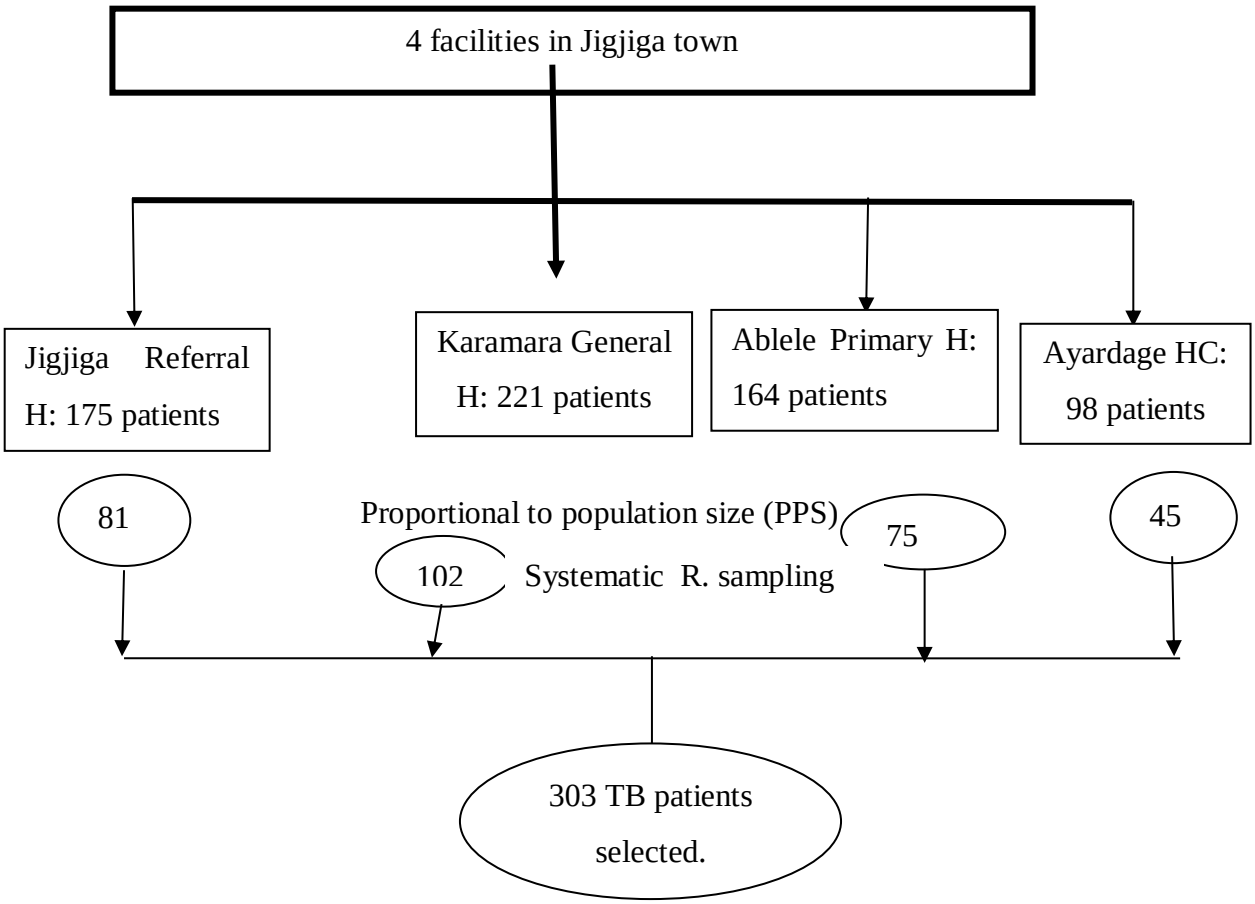

Figure 3 Schematic representation of the sampling procedure of cases (number of TB patients) on treatment in the selected facilities and selected proportion in Jigjiga Town, 2024.

3.7 Data collection tools and methods

3.7.1 Data collection instruments

A structured questionnaire was used to collect data on demographics, clinical information, and tuberculosis-related costs. Demographic and clinical data were obtained directly from TB registration books by trained data collectors. However, cost-related information is not routinely recorded in registration books. To capture these expenses, the questionnaire was adapted from the World Health Organization's standardized tool for estimating the costs of TB patients.(Organization, 2017). This tool was modified to fit the local context and was used to estimate direct patient costs, guardian costs, productivity losses, and coping costs. In this way, the study ensured that while registration books provided clinical and demographic details, the economic burden of TB care was systematically estimated using a validated framework.

3.7.2 Data Collectors and Supervisors

Ten data collectors, eight clinical nurses with diplomas, and two supervisors with Masters's degrees were recruited and assigned for data collection. Two days of training on the study's objectives, questionnaire contents, questionnaire clarity, and ethical issues during the interview were provided to both supervisors and data collectors.

3.7.3 Data collection procedures

A data abstraction checklist was developed to extract demographic and clinical information from the standard unit's TB register. The questionnaire was translated into Somali to facilitate comprehension and accurate data collection. Eight diploma-level nurses and two supervisors with master's degrees were recruited and trained for three days. Training covered the fundamentals of tuberculosis (TB) control, questionnaire administration, data abstraction procedures, interview techniques, and the different types of costs incurred by TB patients. A pretest and pilot test of the instrument were conducted in health facilities not included in the study. Eligible cases were identified using the TB registry, and face-to-face interviews were conducted during the intensive phase and at the conclusion of treatment. The first interview collected sociodemographic characteristics, healthcare-seeking behavior, and costs incurred prior to TB diagnosis (pre-diagnosis costs). Follow-up interviews captured costs incurred after TB diagnosis through treatment completion (post-diagnosis costs).

Cost measurement in this study was guided by the World Health Organization's standardized tool, adapted to the local Somali context. Data were collected through face-to-face interviews at two points: during the intensive phase of treatment to capture sociodemographic characteristics, healthcare-seeking behavior, and costs incurred prior to tuberculosis diagnosis, and at the conclusion of treatment to document costs incurred throughout the treatment period. Costs were categorized into direct medical expenses (consultation fees, diagnostic tests, medications), direct non-medical expenses (transportation, food, lodging), guardian costs (caregiver expenses and productivity losses), coping costs (borrowing, asset sales, or other financial strategies), and productivity losses (work or school days missed, valued against reported income or local wage estimates). Total household expenditure was then compared with household.

3.8 Study Variables

3.8.1 Dependent Variable

Cost of TB treatment: The cost data collected in the study were organized into three main categories: direct medical costs, direct non-medical costs, and indirect costs. Each category includes several variables that reflect the financial burden experienced by individuals during illness.

Direct medical costs refer to expenditures directly related to the treatment and management of a health condition. These include the total cost of consultation fees, covering payments made for medical visits; the total cost of investigations, involving costs for diagnostic procedures, such as laboratory tests or imaging; and the total cost of drugs purchased, reflecting money spent on prescribed medications. Additionally, this category includes the total amount spent on other medical-related items such as registration cards and minor clinic-related expenses.

Direct non-medical costs encompass expenses that are not directly part of medical treatment but are incurred as a result of seeking health care. This includes the amount spent on non-prescribed remedies, such as traditional or alternative medicines; the amount spent by patients or their visitors on food during the treatment period; the total cost of transportation to and from the healthcare facility; and the amount spent on other expenditures, which may include accommodation or personal necessities related to hospital visits.

Indirect costs account for income loss due to illness. The main variable in this category is the amount of wages lost due to days off work, representing productivity losses experienced by the patient or caregiver because of time spent seeking or receiving care. Productivity loss was calculated by recording the number of workdays missed due to tuberculosis and multiplying these by the patient's reported daily income or, when unavailable, the local minimum wage. The overall cost combines direct medical, direct non-medical, and indirect costs to estimate the full economic burden of the illness episode on the patient or household. The exchange rate during the study period was 1 USD = 56.5 Ethiopian Birr (ETB), which may be used to contextualize the financial data in international terms.

3.8.2 Independent Variables

- **Socio-demographic factors:** age, sex, marital status, educational level, residence, and household size
- **Economic factors:** patient employment status and family income
- **Access:** type of treatment center, , means of transportation
- **Medical condition:** type of TB, previous history of TB

3.9 Operational definitions

Direct costs include the costs of medical treatment, transport, and food expenses required to reach healthcare facilities to receive treatment, which were measured from the perspective of the household. That means what individual or household's pays that was measured by combining all the average out-of-pocket medical and non-medical costs for TB patients, as well as costs for accompanying person/s(Assebe et al., 2020). Respondents provided the amount spent and these values were then averaged across patients to estimate the typical out-of-pocket burden. By combining medical and non-medical expenses, the study captured the total direct cost of TB care borne by households.

Indirect costs: productivity losses due to TB-related morbidity, mortality, and disability borne by individuals. OR inability to carry out normal daily activities (paid or unpaid work) and their valuations (Getnet et al., 2017). Productivity loss was calculated by recording the number of work or school days missed due to tuberculosis and multiplying these by the patient's reported daily income or, when unavailable, the local minimum wage.

Normal daily activities: Formal and informal work performed by individuals. To calculate productivity losses, the inability of patients with TB was divided into absenteeism and presenteeism. To calculate the number of days lost due to illness, respondents were asked whether they were completely unable to work in the last two months (60 days).

Out-of-pocket Expenditures*:* The portion of medical expenses for which a patient is responsible for paying.

Total cost refers to the sum of the patient-side direct and indirect costs (the value of foregone earnings from domestic and economic activities during illness).

***TB patient*:** A patient who has been diagnosed with pulmonary and extra-pulmonary TB by a clinician and has been prescribed and followed TB treatment.

3.10 Data quality control

The questionnaire, adapted from WHO tools to estimate the cost of TB, was translated into the local language Af-Somali, which is the working language of the region, and translated back to English by an independent translator to check consistency. Prior to data collection, a pre-test was performed to ensure clarity of questions among 5% (15) of the TB patients in **Karamara Hospital**. The results of the pretests were discussed, and corrections were made as much as possible before the actual data collection. The data collectors and supervisors were trained and oriented about the tools before the pre-test and actual data collection. Furthermore, completeness, clarity, and any misunderstandings on the questionnaires were checked daily for quality after each data collection process by supervisors and the researcher. The data was cleaned to check for completeness and missing values, coded, entered intoEpiData version 3.1, and exported to SPSS version 23 for analysis.

3.11 Data processing and analysis

Before analysis, the data were examined to fulfill the statistical assumptions. Data were exported to SPSS 23 version software for analysis. Continuous variables are presented and median (interquartile range, IQR) was calculated, while categorical variables are described as absolute numbers and frequencies. The median was used because it is not sensitive to extreme values, making it more appropriate for skewed data such as treatment costs. Generalized linear models (GLM) were used to identify the predictors of pre- and post-TB treatment costs.

To determine whether the standard linear model was appropriate for our data, we examined five key assumptions: linearity, independence of errors, homoscedasticity, normality of residuals, and absence of multicollinearity.

Linearity was evaluated using residual-vs -fitted plots and LOWESS smoothing (lowess). Visual inspection revealed systematic curvature in the residuals, indicating that the relationship between one or more predictors and the outcome was not strictly linear.

The independence of errors was tested using the Durbin–Watson statistic. The resulting Durbin–Watson value fell well outside the range 1.5–2.5, indicating significant autocorrelation in the residuals.

Homoscedasticity was assessed using the Breusch–Pagan/Cook–Weisberg test, which yielded a chi-square of 60.25 ($p < 0.001$). This confirmed the non-constant variance of the residuals across the fitted values (heteroskedasticity).

The normality of the residuals was checked using a histogram overlaid with a normal curve, Q-Q plot, and the Shapiro–Wilk test. The Shapiro–Wilk $W = 0.989$ ($p = 0.052$) indicated no significant departure from normality, and the Q-Q plot showed only minor deviations at the tails

Multicollinearity was examined using variance inflation factors (VIFs), all of which were below the commonly used threshold of 10, indicating acceptable levels of intercorrelation among the predictors.

Since the assumptions of linearity, independence, and homoskedasticity were violated (while normality and multicollinearity assumptions held), standard OLS estimates may produce biased standard errors and inefficient coefficients. To address these issues, we employed a generalized linear model (GLM) with a gamma distribution and log link function. Coefficients (β), 95% confidence intervals, and p-values were estimated using a gamma log GLM with robust standard errors to predict TB treatment costs Because we used a log link, each β coefficient represents the difference in the log of the expected cost. For ease of interpretation, we exponentiated the βs to obtain cost ratios, which quantify the multiplicative change in the mean cost.

3.12 Ethical considerations

An ethical clearance letter was obtained from the Haramaya University College of Health and Medical Sciences Institutional Health Research Ethics Review Committee (IHRERC). Permission was obtained from the respective administrations. Informed, voluntary, written, and signed consent was obtained from the heads of each hospital and health center and from each participant. No harmful actions were imposed on the patient files, and documents were photocopied or removed from the records. The anonymity of patient records was maintained. This study was conducted in accordance with the principles of human rights confidentiality.

3.13 Information dissemination

The findings of this study will be disseminated through presentations at Haramaya University. The discussion will be held with the concerned bodies (departments, Zonal, and Woreda health offices). Written documents will be submitted to Haramaya University, a health institution, and efforts will be made for publication.

4 RESULTS

4.1 Socio-demographic characteristics

A total of 303 individuals participated in this study, which resulted in a 100% response rate. Approximately half of the participants (52.14%) were men, and 70% were married. More than half (55%) of the participants were within the age range of 18-39 years, and the mean age of the participants was 38.60 (± 13.1). The majority (91.10%) of the participants were currently unemployed, and the mean (±SD) income was 25,163.2 (± 16809.60). The average number of family members in the sample had an average (mean) of 6.23 (±3.51). Most of the study participants were from the Somali ethnic group (83.17%), and the majority of them (92.08%) followed Islam. Nearly two-thirds (64.67%) were from urban areas, and 65.05 % had never attended formal education (Table 1).

Table 1: Socio-demographic characteristics of patients attending TB clinics in Jigjiga Town, Eastern Ethiopia, September 2024

Variables	**Category**	**Frequency**	**Percentage**
Sex	Male	158	52.14
	Female	145	47.86
Age in years*	18-39	166	55
	40-60	126	41.58
	60+	10	3.30
Family size	<6	155	51.16
	6-10	105	34.65
	> 10	43	14.19
Occupational status	Employed	27	8.91
	Unemployed	276	91.09
Ethnicity	Somali	252	83.17
	Others*	51	16.83
Religion	Muslim	279	92.08
	Others[£]	24	4.0
Residence	Rural	107	35.3

	Urban	196	64.67
Marital status	Currently married	212	70.0
	Currently not married¥	91	30.0
Education level	No formal education and unable read and write	114	37.62
	No formal education but able to read and write	83	27.40
	Primary (Grade 1-8)	24	7.90
	Secondary (Grade-9-12)	16	5.30
	College +	66	21.80
*= Amhara (24), Oromo (23), Gurage (3), Tigray (1), £= Orthodox (12), Protestant (9), Catholic (2), Traditional (1), ¥= Never married, divorced/separated, widowed *Reference: World Health Organization. (2015). World report on ageing and health. WHO Press.			

4.2 Healthcare-related factors

Table 2 summarizes the health-related characteristics of patients attending TB clinics in Jigjiga Town, Eastern Ethiopia, in September 2024. Most patients (76.9%) received their TB medication from hospitals, while 23.1% were treated at health centers. The vast majority (91.4%) were diagnosed with pulmonary TB, with only 8.6% having extra-pulmonary TB.

Nearly all participants (98.7%) had no previous history of TB treatment, and only 1.3% reported having been treated for TB before. Additionally, 14.5% of patients reported visiting another health facility prior to their TB diagnosis at the current clinic, whereas 85.5% did not seek care elsewhere.

In terms of transportation to the health facility, the majority of patients (82.8%) used public transport, followed by 8.3% who used taxis and another 8.3% who walked. A small proportion (0.7%) reported using a private vehicle or a relative's car.

Table 2: Health-related factors among Patients Attending TB Clinics in Jigjiga Town, Eastern Ethiopia, September 2024

Variables	Category	Frequency	Percentage
Place received medication	Hospital	233	76.9
	Health center	70	23.1
Type of TB	Pulmonary TB	277	91.4
	Extra-pulmonary TB	26	8.6
Previous TB Treatment History	Yes	4	1.3
	No	299	98.7
Visiting Other place TB diagnosis	Yes	44	14.5
	No	259	85.5
Mean of Transportation	Public transport	251	82.8
	Taxi	25	8.3
	Foot	25	8.3
	Private vehicle/relative car	2	0.7

4.3 Cost of seeking TB treatment

Table 3 presents the distribution of cost-related variables among patients attending TB clinics in Jigjiga Town, Eastern Ethiopia.

Direct Medical Costs

The consultation fee ranged from ETB 300 to 650, with a median of ETB 400 (IQR: 250), indicating moderate variability in the charges. The cost of investigations varied widely from ETB 280 to 1750, with a median of ETB 500 (IQR: 500). The cost of purchased drugs showed the greatest variation in this category, ranging from ETB 350 to 3500, with a median of ETB 1250 (IQR: 1050), suggesting that medication expenses were a major contributor to total medical costs. Minor medical expenses, such as registration cards, were more consistent, with both the minimum and median values at ETB 300 (IQR: 0).

Direct Non-Medical Cost

The amount spent on non-prescribed remedies ranged from ETB 400 to 550, with a median of ETB 475 (IQR: 125), whereas food expenses incurred by patients or their visitors ranged between ETB 300 and 1000, with a median of ETB 450 (IQR: 385), indicating considerable variability. Transportation costs ranged from ETB 350 to 800 (median: 500; IQR: 172), and other expenditures ranged from ETB 300 to 500 (median: 390; IQR: 150).

Indirect Costs

In the current study, the indirect cost was wage loss due to work absence, which ranged from 300 to 6500 ETB. The median wage loss was 500 ETB (IQR: 1500).

Total Cost

The total cost analysis showed that direct medical costs ranged from ETB 280 to 5300, with a median of ETB 1250 (IQR: 2121). Direct non-medical costs ranged from ETB 300 to 1950, with a median of ETB 500 (IQR: 500). Indirect costs had a wide range (ETB 300–6500), with a median of ETB 500 (IQR: 1500). The overall cost incurred by patients ranged from ETB 280 to 10,330, with a median of ETB 1600 (IQR: 2500).

Table 3: Cost-related Variables among Patients Attending TB Clinics in Jigjiga Town, Eastern Ethiopia September 2024

Direct medical cost				
Variables	Minimum	Maximum	Median (IQR)	
Total cost of consultation fee	300	650	400 (250)	
Total cost of investigations	280	1750	500(500)	
Total cost of drugs purchased	350	3500	1250(1050)	

Total amount spent on other items (registration cards, etc.)	300	500	300(0)	
Direct non-medical cost				
Variables	Minimum	Maximum	Median (IQR)	
Amount spent on any other non-prescribed remedies	400	550	475(125)	
Amount spent/visitors spent on your food	300	1000	450(385)	
Total cost of Transportation	350	800	500(172)	
Amount of cost for other expenditures	300	500	390(150)	
Indirect costs				
Variables	Minimum	Maximum	Median (IQR)	
Amount of wages lost for days lost from work	300	6500	500(1500)	

Total Cost

Variables	**Minimum**	**Maximum**	**Median (IQR)**	**Median**	**SE**
Direct medical cost (ETB)	280	5300	1250(2121)	1250	95.1
Direct non-medical cost	300	1950	500(500)	500	86.3
Indirect cost (ETB)	300	6500	500(1500)	500	155
Overall Cost	280	10330	1600(2500)	1600	123.3
$1 = 56.5 ETB, USD/ETB rate, During the study period					

Factors Predicting the Cost of Seeking TB Treatment

We fitted a generalized linear model with a gamma distribution and log link to identify factors associated with tuberculosis (TB) treatment costs. The analysis revealed several significant predictors of the total cost incurred by TB patients.

Patients with extra-pulmonary TB incurred significantly higher costs than those with pulmonary TB ($\beta = 0.49$; 95% CI: 0.04–0.93; $p = 0.03$), corresponding to an average increase of about 69% in total costs.

Compared to patients aged 18–39 years, those aged 40–60 years faced significantly higher costs ($\beta = 0.32$; 95% CI: 0.05–0.58; $p = 0.02$), which translated to an average 38% increase in treatment costs.

Family size was also associated with cost burden. Patients from households with 6–10 members incurred significantly higher costs compared to those with fewer than six members ($\beta = 0.25$; 95% CI: 0.10–0.48; $p = 0.04$), corresponding to an average 28% increase in costs, while no significant difference was observed among families with more than 10 members.

Educational attainment showed a protective effect against high costs. Relative to patients with no formal education, those with primary education ($\beta = -1.06$; 95% CI: –1.49 to –0.64; $p < 0.001$), secondary education ($\beta = -1.64$; 95% CI: –2.27 to –1.01; $p < 0.001$), and college-level or higher education ($\beta = -1.12$; 95% CI: –2.06 to –0.18; $p = 0.02$) all incurred significantly lower costs, with reductions of approximately 65%, 81%, and 67% in total treatment costs, respectively.

Treatment location was another important determinant: patients treated at health centers faced significantly higher costs than those treated at hospitals ($\beta = 0.60$; 95% CI: 0.09–1.11; $p = 0.021$), corresponding to an average 82% increase in costs.

No statistically significant differences in costs were observed for other sociodemographic factors, including sex, marital status, and urban residence (Table 4).

Table 4: Factors Predicting the Cost of Seeking TB Treatment among Patients Attending TB Clinics in Jigjiga Town, Eastern Ethiopia September2024

Variables and categories	**β**	**Cost ratio [e^(β)]**	**95% Confidence Interval**		
			Lower	**Upper**	**P -value**
Type of TB					
Pulmonary	Ref	-	-	-	-
Extra-Pulmonary	0.49	1.63	0.04	0.93	0.03*
Sex					
Male	Ref	-	-	-	-
Female	-0.05	0.95	-0.25	0.14	0.59
Age					
18-39	Ref	-	-	-	-
40-60	0.32	1.37	0.05	0.58	0.02*
61-80	0.10	1.11	-0.42	0.62	0.71
Marital status					
Married	Ref	-	-	-	-
Currently not married	-0.12	0.89	-0.71	0.48	0.70
Number of people living in family					
<6	Ref	-	-	-	-
6-10	0.25	1.28	0.10	0.48	0.04*
> 10	-0.07	0.93	-0.35	0.21	0.61
Residence					
Rural	Ref	-	-	-	-
Urban	-0.16	0.85	-0.39	0.07	0.18
Education level					
No formal education	Ref	-	-	-	-
Primary	-1.06	0.34	-1.49	-0.64	<0.001*
Secondary	-1.64	0.19	-2.27	-1.01	<0.001*
College+	-1.12	0.32	-2.06	-0.18	0.020*
Place of treatment					
Hospital	Ref	-	-	-	-
Health center	0.60	1.82	0.09	1.11	0.021*

5 DISCUSION

The Ethiopian government has implemented a free TB treatment policy in public health facilities as part of the End TB Strategy, which aims to eliminate catastrophic costs related to TB by 2035 and lower TB incidence and mortality by 90% and 95%, respectively, from 2015 (Health, 2021). Despite this policy, TB patients in Jigjiga Town, Eastern Ethiopia, still face significant financial burdens due to direct and indirect costs associated with treatment. This study aimed to assess these costs and identify the factors influencing them, providing valuable insights for policymakers and healthcare providers.

The median total cost of seeking TB treatment in this study was 1600 ETB (28.32. USD), which is higher than that reported in other regions. For instance, a study in Southwestern Ethiopia reported a median total cost of 3159.23 ETB(Asres et al., 2018). Furthermore, in Pakistan, the median total household cost for TB care was USD 129.2 (IQR: 99–172.2) (Razzaq et al., 2022), in Myanmar, USD 53.4 (Khaing et al., 2024), and in China, USD 171 (75.6—387) (Pan et al., 2013). These variations highlight the influence of regional healthcare systems, socioeconomic conditions, and access to services on the financial burden of TB treatment.TB treatment in Ethiopia imposes substantial financial burdens on patients despite officially free services being available. Studies show that patients incur catastrophic costs, with 51% facing expenses exceeding 20% of their annual income for drug-sensitive pulmonary TB (Assefa et al., 2024a).

Despite policies guaranteeing free TB services, the study showed patients still face substantial out-of-pocket expenses, driven largely by non-medical costs such as transportation and food. These findings are consistent with evidence from low-income settings(Iqbal et al., 2014, Mauch et al., 2013a)where fragmented healthcare systems often shift ancillary expenses onto patients. However, this contrasts with studies in sub-Saharan Africa and South Asia(Fuady et al., 2020b, Organization, 2017), where indirect costs (e.g., income loss due to care-seeking or disability) frequently surpassed direct medical expenditures. This divergence likely reflects contextual differences, such as urban-rural disparities in healthcare access, variability in social protection programs, and the socioeconomic status of affected populations.

This study revealed that extrapulmonary TB carries a substantially greater economic burden than pulmonary TB. Extra-pulmonary TB often requires more advanced diagnostics such as

biopsies, ultrasound, CT scans, or MRI to confirm TB at non-pulmonary sites, each adding to investigation costs. These results corroborate studies from similar settings, which demonstrate that direct medical expenses, especially diagnostic procedures and hospital stays, account for the largest share of TB treatment costs(Sajith et al., 2015, Kalotra et al., 2023).

Patients aged 40–60 years experienced significantly higher TB treatment costs than those of the youngest adults. This trend aligns with findings from studies in Indonesia and Ethiopia, which suggest that older individuals often face greater healthcare costs owing to comorbidities and longer treatment durations(Fuady et al., 2020a, Assefa et al., 2024a).Physiological and immunological changes associated with aging significantly complicate TB diagnosis, management, and clinical outcomes of TB in older adults. Elderly patients are more prone to developing non-classical TB presentations, such as renal tuberculosis, skeletal involvement, tuberculous meningitis, and sputum smear-negative pulmonary TB. These forms frequently evade timely detection due to overlapping symptoms with age-related comorbidities, and their treatment is complicated by higher risks of drug toxicity, comorbidities, and drug interactions. Diagnostic delays and prolonged, complex therapies not only escalate healthcare costs but also contribute to poorer prognoses than typical pulmonary TB(Yoshikawa, 1992).

Household size emerged as a significant predictor of tuberculosis (TB)-related financial burden, with patients from larger households incurring 28% higher costs than those from smaller households. This aligns with broader evidence on the drivers of catastrophic health expenditures across diverse settings, where larger family sizes have consistently been linked to increased financial vulnerability. Studies in Ghana(Kusi et al., 2015), Kenya(Barasa et al., 2017), and Iran(Abolhallaje et al., 2013) demonstrate that larger households face elevated odds of catastrophic health spending due to factors such as greater dependency ratios, reduced per capita income, and competing financial priorities.

The study also found that patients with no formal education incurred higher treatment costs than those who attended college or university. This finding is consistent with previous studies that identified education level as a significant factor influencing the cost of TB treatment(Assefa et al., 2024a, Ghazy et al.). Individuals with higher education levels generally have better health literacy, making them more likely to understand health information, navigate the healthcare system, and adhere to treatment protocols(Lahdji et al., 2022). This can lead to earlier diagnosis

and more effective treatment, ultimately reducing the overall costs. Additionally, access to treatment may also play a role, as higher education is often associated with better job opportunities and higher income, enabling individuals to afford healthcare expenses such as treatment costs, transportation, and other related expenditures.

Patients receiving TB treatment at health centers faced 82% higher costs than those treated in hospitals. This disparity aligns with the findings of a study conducted in Southwestern Ethiopia, which reported significantly lower post-diagnosis expenses for hospital-treated patients(Asres et al., 2018). The structural and operational differences between the two settings likely explain this gap. Hospitals typically employ dedicated, full-time TB care teams to enable streamlined services and reduce delays. In contrast, health center staff often juggle TB care with competing responsibilities, leading to prolonged patient waiting times and fragmented care. Additionally, geographic accessibility plays a critical role, as hospitals are usually located in urban hubs with robust transportation networks, minimizing travel burdens for patients. However, health centers are predominantly situated in rural areas, where poor road infrastructure and limited public transit options force patients to incur substantial travel costs. Together, these factors, such as staffing limitations, operational inefficiencies, and rural-urban disparities in accessibility, underscore the systemic challenges driving elevated costs in decentralized health center settings.

5.1 Limitations

This study had several limitations that warrant consideration. First, its cross-sectional design precludes causal inferences between variables because temporal relationships cannot be established. Second, the exclusion of private and informal healthcare sectors limits the generalizability of the findings to patients reliant on public facilities, potentially underestimating the broader economic burden of tuberculosis (TB). Methodologically, cost data relied on patient self-reports, which are susceptible to recall bias, particularly for expenses incurred over extended periods of time. Furthermore, the analysis adopted a narrow patient-centered perspective, omitting costs borne by health systems, households, and communities, which is a critical gap in understanding the societal impact of TB. Finally, the prevalent cost approach, which estimates expenses for a single illness episode, fails to capture the lifetime costs associated with TB, including long-term complications or post-treatment disability.

6. Conclusion and Recommendations

6.1 Conclusions

Despite Ethiopia's policy of free TB treatment in public facilities, patients in Jigjiga Town continue to incur substantial out-of-pocket expenses driven by both medical and nonmedical costs. Our findings demonstrate that extrapulmonary TB, older patients, and larger household sizes are associated with significantly higher treatment costs, whereas higher educational attainment substantially lowers the financial burden. Moreover, decentralized care at health centers paradoxically imposes greater expenses than hospital-based treatment, likely reflecting diagnostic delays, fragmented service delivery, and rural accessibility challenges.

6.2 Recommendations

The findings underscore the need for targeted interventions to reduce the financial burden of TB treatment, particularly among vulnerable groups, such as older adults and those with lower education levels. The recommendations are as follows:

- Income Support Programs: Providing financial assistance or vouchers for transportation and food to reduce out-of-pocket expenses for patients with TB.
- Decentralized Care Models: Expanding access to TB diagnosis and treatment through mobile clinics and community health workers, especially in rural areas.
- Social Protection Schemes: Implementing social safety nets, such as cash transfers or community-based health insurance (CBHI), to protect households from catastrophic health expenditures.

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7 ANNEXES:

7.1 Information sheet and informed voluntary consent form(s) for Heads or Directors of Health Facilities.

My name is Abdirizak Ahmed Yussuf, and I am the principal investigator of this research on the financial implications of seeking treatment for tuberculosis (TB) in Jigjiga town, Eastern Ethiopia. Currently pursuing a master's in public health (MPH) with a specialization in Health Service Management at Haramaya University.

Title of the study: Cost of Seeking TB Treatment and its Associated Factors among Patients Attending TB Clinics in Jigjiga Town, Eastern Ethiopia

Purpose/aim of the study: This study seeks to determine the direct and indirect costs borne by TB patients, recognize the factors that impact the cost of TB treatment, and offer essential insights for healthcare planners, administrators, and the community. Additionally, the objective of this study is to compose a thesis as a partial component of meeting the requirements for a master's Program in Public Health in Health Service Management for the principal investigator.

Procedure and duration: I will be conducting interviews with patients at this health facility who come for TB treatment using a questionnaire to gather relevant data for the study. Additionally, I will review secondary records related to TB services at the facility to enhance the research. I kindly ask for your collaboration, support and patience during the data collection period. During the study, I may also ask you some questions that is important for the research. The interview will take about 30-35 minutes with a minimum of 15 questions to be asked. I kindly request you to spare me this time for the interview.

Risk and benefits: The risk of participating in this study is very minimal, only taking 30-35 minutes from the participant's time. There would not be any direct payment for participating in this study, but the findings from this research may reveal important information for concerned bodies.

Confidentiality: The information that will be provided to us will be confidential. There will be no information that will identify the participants (TB patients) in particular. The findings of the study will be general for the study population and will not reflect anything particular of individual person or organization. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

Rights: Participation in this study is fully voluntary. You have the right to declare to participate or not in this study. If you decide to participate, you have the right to withdraw from the study at any time, this will not able you or your organization for any loss of benefit which you otherwise are entitled. You do not have to answer any question that you do not want to answer.
Contact address: If there are any questions or inquiries at any time about the study or the procedure, please contact: Mr. Abdirizak Ahmed (PI), +251915730406; as well as Institutional Health Research Ethics Review Committee (IHRERC) of Haramaya University, College of health sciences at office phone (+251)- 025-466-20-11 or P.O.Box 235, Harar.
Declaration of informed voluntary consent: I have read the participant information sheet and informed voluntary consent. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participating, and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that participants have the right to withdraw from the study at any time or not to answer any question that they do not want. Therefore, I declare my consent to allow this study to be conducted in this _____ on behalf of the management with my signature as indicated below:

Name and signature of the head of the facility _____ _____ Date: _____

Name and signature of principal investigator: _____ _____ Date: _____

7.2 Participant information sheet and Informed voluntary consent form(s) (English Version) only for participants ≥18 years (adults).

My name is _____ and I am a data collector for a study being conducted at this facility by Abdirizak Ahmed, who is pursuing his Master's degree at Haramaya University, College of Health and Medical Sciences. I kindly ask for your attention as I explain the study and your selection as a participant.

Title of the study: Cost of Seeking TB Treatment and its Associated Factors among Patients Attending TB Clinics in Jigjiga Town, Eastern Ethiopia

Purpose/aim of the study: This study seeks to determine the direct and indirect costs borne by TB patients, recognize the factors that impact the cost of TB treatment, and offer essential insights for healthcare planners, administrators, and the community. Additionally, the objective of this study is to compose a thesis as a partial component of meeting the requirements for a master's Program in Public Health in Health Service Management for the principal investigator.

Procedure and duration: I will be interviewing you using a questionnaire to provide me with pertinent data that is helpful for the study. There are few questions to answer where I will take note of your responses. The interview will take about 30-35 minutes with a minimum of 40 questions to be asked. I kindly request you to spare me this time for the interview.

Risks and benefits: The risk of participating in this study is very minimal, only taking 30-35 minutes of your time. There would not be any direct payment for participating in this study, but the findings from this research may reveal important information for concerned bodies.

Confidentiality: The information you will provide will be confidential. There will be no information that will identify you in particular. The findings of the study will be general for the study population and will not reflect anything particular of individual person or organization. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link you to the research.

Rights: Participation in this study is fully voluntary. You have the right to declare to participate or not in this study. If you decide to participate, you have the right to withdraw from the study at any time, this will not able you or your organization for any loss of benefit which you otherwise are entitled. You do not have to answer any question that you do not want to answer.

Contact address: If there are any questions or inquiries at any time about the study or the procedure, please contact: Mr. Abdirizak Ahmed (PI), +251915730406; as well as Institutional

Health Research Ethics Review Committee (IHRERC) of Haramaya University, College of health sciences at office phone (+251)- 025-466-20-11 or P.O.Box 235, Harar.

Declaration of informed voluntary consent: I have read/was read to me the participant information sheet and voluntary informed consent. I have clearly understood the purpose of the research, the procedures, the risk and benefits, issues of confidentiality, the rights of participating and contact address for any enquiry. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that I have the right to withdraw from the study at any time or not to answer any question that I do not want. Therefore, I declared my voluntary consent to participate in this study with my initials (signature) as indicated below:

Name and signature of participant: _____ _____ Date: _____

Name and signature of data collector: _____ _____ Date: _____

7.3 Participant information sheet and Informed voluntary consent form(s) (Somali Version) only for participants ≥18 years (adults).

Magacayguwaa Abdirizak Ahmed Yussuf, waxaanahaybaaritaankaugumuhiimsan ee cilmi-baaristankusaabsansaameyntamaaliyadeed ee raadsashadadaaweyntabukaankatuberkulosis (TB) magaaladaJigjiga, Bariga Itoobiya.

Haddawaxaankugudajiraabarashadamasterkacaafimaadkadadweynaha (MPH) ookutakhasusayMaareyntaAdeegyadaCaafimaadka ee JaamacaddaHaramaya.

Cinwaankadaraasadka: KharashkaRaadsashadaDaaweynta TB iyoQodobbada La Xidhiidha ee Bukaannada Ka QaybgalayaRugaha TB ee MagaaladaJigjiga, Bariga Itoobiya.

Ujeedadadaraasadda: Daraasaddanwaxaydooneysaainaygo'aamisokharashyadatooska ah iyokuwaaantooskaahayn ee ay bixiyaanbukaannada TB, aqoonsatoqodobbadasaameeyakharashkadaaweynta TB, iyoinaybixisoaragtiyomuhiim ah ooloogutalagalayqorsheeyayaashacaafimaadka, maamulayaasha, iyobulshada. Intaaswaxaadheer, ujeedadadaraasaddanwaa in la qoroqormosidiiqayb ka mid ah buuxintashuruudahabarnaamijkamasterka ee CaafimaadkaDadweynaha ee MaareyntaAdeegyadaCaafimaadka ee baaritaankaugumuhiimsan.

Habkaiyomuddada: Waxaansameyndoonaawareysiyo la xiriirabukaannadaku sugan xaruntancaafimaadka ee u yimaadadaaweynta TB anigooisticmaalayasu'aalosiaan u uruuriyoxogtakhuseysa ee daraasadda. Intaaswaxaadheer, waxaan dib u eegidoonaadiiwaannolabaadoo la xiriiraadeegyada TB ee xaruntasiaan u xoojiyocilmi-baarista. Waxaansinaxariislehkaagacodsanayaainaaditaageerto, icaawiso, ooaadsamir u yeelatointiilagugudajiraywaqtigaururintaxogta. Intalagujirodaraasadda, waxaansidoo kale kuweydiinkaraasu'aalomuhiim ah ookusaabsancilmi-baarista.

Wareysiguwuxuuqaadandoonaaqiyaastii 30-35 daqiiqoiyadoo la weydiindoonouguyaraan 15 su'aalood. Fadlan igaraalinoqowaqtigaassiaan u sameeyowareysiga.

Khatartaiyofaa'iidooyinka: Khatarta ka qaybgalkadaraasaddanwaa mid aad u yar, kaliyawaxayqaadaneysaa 30-35 daqiiqowaqtiga ka qaybgalaha. Ma jiridoonto wax lacag ah oositoos ah loogubixinayo ka qaybgalkadaraasaddan, laakiinnatiijooyinkacilmi-baaristanwaxaymuujinkaraanmacluumaadmuhiim ah ooloogutalagalaydhinacyadadaneynaya.

Sirt Haynta: Macluumaadka la siindoonowaa mid qarsoodi ah. Ma jiridoonto wax macluumaad ah ooaqoonsanaya ka qaybgalayaasha (bukaannada TB) gaarahaan.

Natiijooyinkadaraasaddawaxaynoqondoonaanguudahaanbulshadadaraasadda mana muujindoonaan wax gaar ah ooqof ama hay'ad ah.
Su'aalahawaxaalagukoodindoonaasiaanmagacyada loo muujin. Wax tixraac ah lagumasamayndoonowarbixinnoafka ama qoraal ah ooxiriir la leh ka qaybgalayaashacilmi-baarista.
Xuquuqda: Ka qaybgalkadaraasaddanwaasibuuxdaiskaa wax u qabso. Waxaadxaq u leedahayinaadgo'aansatoinaad ka qaybqaadato ama aanad ka qaybqaadan. Haddiiaadgo'aansatoinaad ka qaybqaadato, waxaadxaq u leedahayinaad ka baxdodaraasaddawakhtikasta, tani ma keeneyso wax khasaaro ah ooaad ama ururkaagaxaq u leedihiin. Ma jirto wax su'aal ah ooaad u baahantahayinaad ka jawaabtohaddiiaadanrabin.
Macluumaadka xiriirka: Haddii ay jiraan wax su'aalo ah ama codsiyowakhtikastaookusaabsandaraasadda ama habka, fadlan la xiriir: Mr. Abdirizak Ahmed (PI), +251915730406; iyosidoo kale Guddiga Dib-u-eegistaAnshaxa Cilmi-baaristaCaafimaadka ee JaamacaddaHaramaya, KulliyaddaSayniska Caafimaadka, telefoonkaxafiiska (+251)- 025-466-20-11 ama P.O.Box 235, Harar.
Bayaankaogolaanshaha Ka qeybgalka: Waxaanakhriyeywarqaddamacluumaadka ka qaybgalayaashaiyoogolaanshahaiskaa wax u qabso. Waxaansi cad u fahmayujeedadacilmi-baarista, habraacyada, khatarahaiyofaa'iidooyinka, arrimahasirta, xuquuqda ka qaybgalka, iyocinwaankaxiriirka ee su'aalaha.
Waxaanhelayfursadaankuweydiiyosu'aalokusaabsanwaxyaabahalagayaaboinaycaddaynla’aan yihiin. Waxaa la ii sheegay in ka qaybgalayaasha ay xaq u leeyihiininay ka baxaandaraasaddawakhtikasta ama aanay ka jawaabin wax su'aal ah ooaysanrabin.
Sidaasdarteed, waxaankudhawaaqayaaogolaanshahayga in daraasaddan la sameeyo _____ magacamaamulkaanigoosaxiixayasidahooskuqoran:

MagacaiyosaxiixamadaxaXarunta _____ _____ Taariikh: _____

MagacaiyosaxiixaXogUruuriyaha: _____ _____ Taariikh: _____

7.4 Participant information sheet and Informed voluntary consent form(s) (English Version) only for participants <18 years (Children).

My name is _____ and I am a data collector for a study being conducted at this facility by Abdirizak Ahmed, who is pursuing his Master's degree at Haramaya University, College of Health and Medical Sciences. I kindly ask for your attention as I explain the study and your selection as a participant.

Title of the study: Cost of Seeking TB Treatment and its Associated Factors among Patients Attending TB Clinics in Jigjiga Town, Eastern Ethiopia

Purpose/aim of the study: This study seeks to determine the direct and indirect costs borne by TB patients, recognize the factors that impact the cost of TB treatment, and offer essential insights for healthcare planners, administrators, and the community. Additionally, the objective of this study is to compose a thesis as a partial component of meeting the requirements for a master's Program in Public Health in Health Service Management for the principal investigator.

Procedure and duration: I will be interviewing your child using a questionnaire to provide me with pertinent data that will be helpful for the study. If you allow your child to participate, they will be asked to answer questions regarding the costs they have incurred while seeking TB treatment and other related factors. This will take approximately 35-35 minutes with a minimum of 40 questions to be asked.

Risk and benefits: The risk of participating in this study is minimal, but it only takes a few minutes of your child's time. There would not be any direct payment for participating in this study but your child's participation will help us understand the financial burden of seeking TB treatment, which can inform future policies and support mechanisms.

Confidentiality: The information your child will provide us will be confidential. There will be no information that will identify her/him in particular. The findings of the study will be general for the study population and will not reflect anything particular to your daughter/son. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

Rights: Participation in this study is fully voluntary. You have the right, on behalf of your Child, to declare to participate or not in this study. If you decide your child to participate, you

have the right to withdraw her/him from the study at any time; this will not able you and your child to any loss of benefit to which you or your Child are otherwise entitled. Your Child has the right not to answer any question that she/he does not want to answer.

Contact address: If there are any questions or inquiries at any time about the study or the procedure, please contact: Mr. Abdirizak Ahmed (PI), +251915730406; as well as Institutional Health Research Ethics Review Committee (IHRERC) of Haramaya University, College of health sciences at office phone (+251)- 025-466-20-11 or P.O.Box 235, Harar.

Declaration of Informed Voluntary Consent: I have read/was read to me the participant information sheet and informed voluntary consent. I have clearly understood the purpose of the research, the procedures, the risk and benefits, issues of confidentiality, the rights of participating and contact address for any enquiry. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that I have the right to withdraw my child from the study at any time, and my child has the right not to answer any question that she/he does not want. Therefore, I declare my voluntary consent to allow my child to participate in this study with my initials (signature) as indicated below:

Name and signature of parent/guardian: _____ _____ Date: _____

Name and signature of data collector: _____ _____ Date: _____

7.5 Participant information sheet and Informed voluntary consent form(s) (Somali Version) only for participants <18 years (Children).

Magacayguwaa _____ waxaanahayururiyahaxogta ee daraasadda ka socotaxaruntanoouusameynayo Abdirizak Ahmed, kaasookugudajirabarashadamasterka ee JaamacaddaHaramaya, KulliyaddaSayniska Caafimaadka iyo Caafimaadka. Waxaansinaxariislehkaagacodsanayaainaadidhageysatoanigoosharraxayadaraasaddaiyodooras hadaada ka qaybgalaha.

Cinwaankadaraasadka: KharashkaRaadsashadaDaaweynta TB iyoQodobbada La Xidhiidha ee Bukaannada Ka QaybgalayaRugaha TB ee MagaaladaJigjiga, Bariga Itoobiya.

Ujeedadadaraasadka: Daraasaddanwaxaydooneysaainaygo'aamisokharashyadatooska ah iyokuwaaantooskaahayn ee ay bixiyaanbukaannada TB, aqoonsatoqodobbadasaameeyakharashkadaaweynta TB, iyoinaybixisoaragtiyomuhiim ah ooloogutalagalayqorsheeyayaashacaafimaadka, maamulayaasha, iyobulshada. Intaaswaxaadheer, ujeedadadaraasaddanwaa in la qoroqormosidiiqayb ka mid ah buuxintashuruudahabarnaamijkamasterka ee CaafimaadkaDadweynaha ee MaareyntaAdeegyadaCaafimaadka ee baaritaankaugumuhiimsan.

Habkaiyomuddada: Waxaanwareysiyo la yeelandoonaailmahaagaanigooisticmaalayasu'aalosiaan u uruuriyoxogmuhiim ah oo ka caawindoontadaraasadda. Haddiiaadogolaato in ilmahaaga ka qaybqaato, waxaa la weydiindoonaasu'aalokusaabsankharashyada ay kubixiyeenraadsashadadaaweynta TB iyoqodobbada kale ee la xiriira. Tani waxayqaadandoontaaqiyaastii 30-35 daqiiqoiyadoo la weydiindoonouguyaraan 40 su'aalood.

Khatartaiyofaa'iidooyinka: Khatarta ka qaybgalkadaraasaddanwaa mid aad u yar, laakiinkaliyawaxayqaadaneysaadaqiiqado yar oowaqtigailmahaaga ah. Ma jiridoonto wax lacag ah oositoos ah loogubixinayo ka qaybgalkadaraasaddan, laakiin ka qaybgalkailmahaagawuxuu naga caawindoonaainaanfahannoculayskamaaliyadeed ee raadsashadadaaweynta TB, taasoo ka caawinkarta in la sameeyosiyaasadomustaqbalka ah iyohababkataageerada.

Sirta Haynta: Macluumaadka ilmahaaga ee nasiindoonowaa mid qarsoodi ah. Ma jiridoonto wax macluumaad ah ooaqoonsanayaisaga/iyadagaarahaan. Natiijooyinkadaraasaddawaxaynoqondoonaanguudahaanbulshadadaraasadda mana

muujindoonaan wax gaar ah ookusaabsangabadha/wiilkaaga.
Su'aalahawaxaalagukoodindoonaasiaanmagacyada loo muujin. Wax tixraac ah lagumasamayndoonowarbixinnoafka ama qoraal ah ooxiriir la leh ka qaybgalayaashacilmi-baarista.

Xuquuqda: Ka qaybgalkadaraasaddanwaasibuuxdaiskaa wax u qabso. Waxaadxaq u leedahay, adigoomatalayailmahaaga, inaadgo'aansatoinaad ka qaybqaadato ama aanad ka qaybqaadandaraasaddan. Haddiiaadgo'aansato in ilmahaaga ka qaybqaato, waxaadxaq u leedahayinaad ka baxdodaraasaddawakhtikasta; tani ma keeneyso wax khasaaro ah ooaad ama ilmahaagaxaq u leedihiin. Ilmahaagawuxuuxaq u leeyahayinuu ka jawaabin wax su'aal ah oouusanrabininuu ka jawaabo.

Macluumaadka xiriirka: Haddii ay jiraan wax su'aalo ah ama codsiyowakhtikastaookusaabsandaraasadda ama habka, fadlan la xiriir: Mr. Abdirizak Ahmed (PI), +251915730406; iyosidoo kale Guddiga Dib-u-eegistaAnshaxa Cilmi-baaristaCaafimaadka ee JaamacaddaHaramaya, KulliyaddaSayniska Caafimaadka, telefoonkaxafiiska (+251)- 025-466-20-11 ama P.O.Box 235, Harar.

Bayaankaogolaanshaha Ka qeybgalka: Waxaanakhriyey/laguakhriyeywarqaddamacluumaadka ka qaybgalayaashaiyoogolaanshahaiskaa wax u qabso. Waxaansi cad u fahmayujeedadacilmi-baarista, habraacyada, khatarahaiyofaa'iidooyinka, arrimahasirta, xuquuqda ka qaybgalka, iyocinwaankaxiriirka ee su'aalaha.

Waxaanhelayfursadaankuweydiiyosu'aalokusaabsanwaxyaabahalagayaaboinaycaddaynla’aan yihiin. Waxaa la ii sheegay in aanxaq u leeyahayinaan ka baxoilmahaygadaraasaddawakhtikasta, iyoilmahaygauuxaq u leeyahayinuusan ka jawaabin wax su'aal ah oouusanrabin. Sidaasdarteed, waxaankudhawaaqayaaogolaanshahaygaiskaa wax u qabsosiaan u oggolaadoilmahaygainuu ka qaybqaatodaraasaddananigoosaxiixayasidahooskuqoran:

Magacaiyosaxiixawaalidka/ilaaliyaha: _____ _____ Taariikh: _____

Magacaiyosaxiixaururiyahaxogta: _____ _____ Taariikh: _____

7.6 Data Collection Questionnaire

Section 1: Socio-demographic characteristics

S. N	Questions	Possible answers and coding	Skip
101	Sex	1. Male 2. Female	
102	Age	1. _____years	
103	Ethnicity	1. Somali 2. Amhara 3. Oromo 4. Gurage 5. Other_____	
104	Residence	1. Urban 2. Rural	
105	Religion	1. Muslim 2. Protestant 3. Orthodox 4. Catholic 5. other _____	
106	Marital status	1. Single (never been married) 2. Married 3. Separated 4. Widowed 5. Divorced 6. Other (specify)_____	
107	Educational status	1. Cannot read and write 2. Able to read and write only 3.Elementary school 4. Secondary school 5.College, university and above 6. Other (specify)_____	
108	Your main occupation (Past twelve months)?	1. Farmer 2. Employed 3. Retired 4. student 5. House wife 6. Trade/ Private business 7. Unemployed 8. Others	
109	Number of people living in your family	1._____	
110	History/ Type of tuberculosis	1. Smear positive PTB 2. Smear negative PTB 3. Extrapulmonary TB 4. MDR/RR-TB	
111	Where was the patient taking TB treatment?	1. Public health facility 2 NGO health facility 3. Private health facility	
112	How many are employed/ working at the moment?	1._____	

113	What is their regular total monthly income?	1._____	
114	What are sources of your income?	1. My employment 2. My spouse's employment 3. My son/Daughter's employment 5. My Business 6. My Farming 7. Others (specify)_____	
115	How much income do you get from your Q114 Choices? (Convert yearly income to monthly later on)	Year Income (Birr)_____ When converted to Month_____	
116	What is your monthly income?	1._____Birr or _____in Kind	

Section 2: Costs of Tuberculosis before diagnosis

S. N	Questions	Possible answers and coding	Skip
201	How long did you have your complaints before becoming a patient at this health facility?	1._____ days	
202	How many days had you remained from work?	1._____ days	
203	Amount of wages lost for days lost from work	1._____	
204	Did you visit any other providers before diagnosis of TB?	1. yes 2. No	
205	If yes to Q 204, number of health services/providers visited before diagnosis?	1._____	
206	Which health services did you visit?	1. Government 2.NGO 3. Private 4. Traditional Healer 5. other (specify)	
207	Total cost of consultation fees	1._____Birr	
208	Total cost of Investigations (Laboratory,X-ray, etc.)	1._____Birr	
209	Total cost of drugs purchased	1._____Birr	
210	What is the means of transportation to get to the health facilities?	1. On foot 2. On animal Back 3.Taxi/bus 4.Other(specify)_____	
211	How long does it take you to get the health services site?	1._____hours _____minutes _____KM	
212	Have you ever lost your wage as a result of missed days from work?	1. Yes 2. No	

213	If yes to Q 212, amount of wages lost per days lost from work?	1._____ Birr	
214	What is the means of transportation for caregivers to get to the health facility?	1. On foot 2. On animal Back3.Taxi/bus4.Other(specify)_____	
215	How long does it take them to get to the health services site?	1._____hours /____minutes_____KM	
216	How much do you pay for transportation to and from the health facility?	1._____ Birr	

Section 3: Costs of Tuberculosis after Diagnosis as an Outpatient

S. N	Questions	Possible answers and coding	Skip
301	How long have you been an outpatient for TB treatment?	1._____ days	
302	How many outpatient visits have you had in that time?	1._____	
303	How many days have you remained from work being an outpatient?	1._____ days	
304	Amount of wages lost for days lost from work	1._____Birr	
305	Did you have to pay anything for your treatment, prescribed drugs or tests since you have been an outpatient?	1.Yes 2. No	If no, skip to Q 315
306	If yes to Q305, how much have you spent on prescribed drugs while you were an outpatient?	1._____Birr	
307	If yes to Q305, how much have you spent on investigations while you were an outpatient?	1._____Birr	
308	If yes to Q305, how much have you spent on other items, (Doctors payments, registration cards, clothing etc.)?	1._____Birr	
309	If yes to Q305, how much have you spent on traditional medicines?	1._____Birr	
310	If yes to Q305, how much have you spent on any other no prescribed remedies?	1._____Birr	
311	If yes to Q305, how much have you or any visitors spent on your food?	1._____Birr	
312	What is the means of transportation to get to the health facility?	1. On foot 2. On animal Back 3. Taxi/bus 4 other(specify)_____	

313	How long does it take you to get the health services site?	1.___hrs/__ min ___KM	
314	Total cost of Transportations	1._____Birr	
315	Has anyone from your family or friends looked after you during your treatment?	1. Yes 2. No	If no, skip to Q401
316	If yes to Q 315, number of days lost from work to accompany You?	1._____ days	
317	If yes to Q 315, what is their monthly income?	1._____ Birr	
318	If yes to Q 315, Do any of the care-givers lose any income because they cared for you?	1. Yes 2. No	If no, skip to Q 401
319	If yes to Q318, amount of wages lost per days absent from work?	1._____ Birr	
320	What is the means of transportation for caregivers to get to the health facility?	1.On foot 2. On animal Back 3.Taxi/bus 4. Other(specify)_____	
321	How long does it take them to get the health services site?	1.__hrs or __minutes –KM	
322	If yes to Q 318, amount of cost for transportation?	1._____ Birr	
323	If yes to Q 318, amount of cost for other expenditures?	1._____ Birr	

Section 4. Household Economic Status and Spending

SN	Questions	Possible answers and coding
401	Does your family/household own? Check all that applies.	1. Piped water 2. Electricity 3.Radio 4.TV 5. Own car 6. Own Bicycle 7. Own home 8. Other(specify) _____

402	What is the main source of energy in the house?	1. Fire wood 2. Charcoal 3. Animal dung 4.Kezrosene 5.Electricity 6. Other(specify)_____
403	What is your household budget for?	1. Food items_____2. Electricity_____3. water_____ 4. Education_____ 5. Clothing_____ 6. Transport_____7. Telephone_____ 8. House Rent_____ 9.Kerosene_____10.Milling_____11.``Eder``_____12.``Equb``_____13. Savings_____ 14.Utensils_____15.Health_____16.Tax_____ 17.Others_____

Section 5: Cost to be Filled from Secondary Record Review

SN	Direct Cost	# Visit		Unit cost	Total cost	
		TB	MDR TB		TB	MDR TB
501	Direct medical cost					
502	HIV test					
503	CBC					
504	Sputum-test					
505	X-ray					
506	Ultrasound					
507	ESR					
508	Blood chemistry					
509	A) TB drugs (strength, dosage, form)					

7.7 Data Collection Questionnaire (Somali Version)

Qaybta 1: Xogtaguud eewarbixiyaha (sifooyinkanololeed, dhaqan-bulsheed, IWM)

S. N	Su'aalo	Jawaabahalaga bixin karo iyokoodhka	Kaboood
101	Jinsiga	1. Lab 2. Dhadig	
102	Da'ada	1. _____sano	
103	Qoomiyada	1.Somali 2. Amhara 3. Oromo 4. Gurage 5. Cid kale_____	
104	Degan	1. Magaalo 2. Miyi	
105	Diin	1. Muslim 2. Protestant 3. Orthodox 4. Catholic 5. Wax kale _____	
106	Xaaladaguur	1. aanguursan (waligiiaanguursan) 2. Xaas ah 3. Kala maqan 4. Garoobah 5. Is furay 6. Wax kale (sheeg)_____	
107	Xaalada wax barasho	1. wax Ma qoro mana akhriyo2.Kaliya wax akhriyawaxnaqorana 3.Dugsi hoose 4. Dugsisare	

		5.Kuliyad, Jaamacadiyo wax ka sareeya 6. Wax kale (sheeg)_____	
108	Shaqadaadii u muhiimsanayd (12kii bilood ee u danbeeyay)?	1. Beeralay 2. Shaqaale 3. Howl-gab 4. arday 5. Hooyo 6. Ganasi/ ganacsishaqsi ah 7 bilaacamal 8. Wax kale	
109	Tiradadadkakunoolqoyskaaga	1._____	
110	Raad raaca/noocaqaaxada	1. Smear positive PTB 2. Smear negative PTB 3. Extrapulmonary TB 4. MDR/RR-TB	
111	Goobtauubukaanku ka heliadeega/dawadaQaaxada?	1. Goobcaafimaadoodawli ah 2 Goobcaafimaadoohayada ah 3. Goobcaafimaadooshaqsileeya hay.	
112	Imisaayaa la shaqaaleeyay/hadashaqaynaysa?	1._____	
113	Waa imisaguudahaandakhligoodu/mushaarkoodubi shii?	1._____	
114	Waa halkeeilahadakhligaagu?	1. mushaarkayga 2. Mushaarkaxaaskayga 3. mushaarka 5. Ganacsigayga6.beertayda 7. Wax kale (sheeg)_____	
115	Dakhliinteedhanayaadheshaa (Jawaabta ’114)? (u badaldakhligaagasanadlaha ah bille mar dhaw)	Dakhligasanadkii (Birr)_____ Marka loo badalobishii _____	

116	Waa imsadhaligaagabishii?	1._____Birr ama _____agabahaan	

Qaybta 2aad: Kharashkabaadhitaanka ka hor.

S. N	Su'aalo	Jawaabahalaga bixin karo iyokoodhka	Ka bood
201	Mudo inteele'egayaadqabtaycabasho ka horintaaadan u noqonbukaangoobtancaafimaad?	1._____ malmood	
202	Imisamaalmoodayaad ka hadhay/habsaantayshaqadaadii?	1._____ malmood	
203	Lacagahaanmaxaa ka khasaaraymaalmihiiaadanshaqayn?	1._____	
204	Ma booqataygoob kale oolagaheloadeega, ka horintiiaanalagaahelinxanuunkaqaaxada?	1.Haa 2. Maya	
205	Haahadaytahay, Jawaabta su'aasha204, waaimisagoobahacaafimaadka ee aadbooqatahay/tagtayintaaanalagaahelinx anuunkaQaaxada?	1._____	
206	Waa ku wee goobahaadeegbixintaaadbuuqatay?	1.ku wadawlada2.kuwahayadeed 3. Ku washaqsi 4.goob cilaaj 5. Meelkale (sheeg)__	
207	Wadartakharashkakaagabaxay	1._____Birr	
208	Wadartakharashkakaagabaxaybaadhitaan ka(sheybaadhada,	1._____Birr	

	X-rayga, IWM.)		
209	Wadartakharashkadawada	1._____Birr	
210	Qaabkee/sideedkutagtaygoobtacaafimaadka?	1. Lug 2. Waxaansiifulayneef (dameer, Awar, IWM) 3.Taksi/Bas 4. si kale (sheeg)_____	
211	Wakhtiinteele'egayaykuguqaadatay in aadgaadhogoobtacaafimaadka?	1._____saac _____daqiiqo _____KM	
212	Weligaa ma kuweydeymushaharkaagakadibmarkaad maalmotagiweydeyshaqada?	1.Haa 2. Maya	
213	Haahadaytahay, Jawaabtasu'aasha 212? Waa imisacadadkamushaarkalagaa Jarey Maalmihiaadshaqada ka hadhay?	1._____ Birr	
214	Qaabkee/sidayayaykutagaandaryeelayaas hugoobahacaafimaadka?	1. Lug 2. Waxaysiifulaanneef (dameer, Awar, IWM) 3.Taksi/Bas 4. si kale (sheeg)_____	
215	Wakhtiinteele'egayaykuqaadataa in aadgaadhogoobtacaafimaadka?	1._____saac /____Daqiiqo_____KM	
216	Waa imisauskudarkakharashkaaadkutagto ama aadkagasoonoqotogoobtaadeegacaafimaadka?	1._____ Birr	

Qaybta 3aad.

Kharashkakaabaxamarkaadnoqotobukaansucodkaadeegadaawayntaqaaxada ka dib markaalagaaheloxanuunkaqaaxada.

S. N	Su'aalo	Jawaabahalaga bixin karo iyokoodhka	Ka bood
301	Intee in le'egayaadahaydbukaansocod ee lagaadaweeynayeyxanuunkaqaaxada?	1._____ maalmood	
302	Imisabooqashoayaadsamaysaywakhtigaas?	1._____	
303	Imisamaalmoodayaad ka hadhayshaqadamaadaamaaadbukaansocodahayd?	_____ maalmood	
304	Cadadkakharashkaaadwayday/lagajaraymaalmahaaads haqada ka hadhay	1._____Birr	
305	Maadaamaaadahayd/tahaybukaansocod wax kharasha ma kaagabaxdaaadeega, dawada ama cabiraada?	1.Haa 2. Maya	Haday tahay maya, kuboo d 315
306	Haahadaytahay, Jawaabtasu'aasha305,waaimisakharashkakaagabaxayd awadaintiiaadbukaansocodkaahayd?	1._____Birr	
307	Haahadaytahay, Jawaabtasu'aasha305,waaimisakharashkakaagabaxayb aadhitaankaintiiaadbukaansocodkaahayd??	1._____Birr	
308	Haahadaytahay, Jawaabtasu'aasha305,waaimisakharashkakaagabaxay wax yaabo kale (mushqaayadadhakhtarka, isdwaangalinta, dharka, IWM)?	1._____Birr	

309	Haahadaytahay, Jawaabtasu'aasha305,waaimisakharashkakaagabaxayd awodhaqameed?	1._____Birr	
310	Haahadaytahay, Jawaabtasu'aasha305,waaimisakharashkakaagabaxayd awooyinaanuqorindhakhtar?	1._____Birr	
311	Haahadaytahay, Jawaabtasu'aasha305,waaimisakharashkaadiga ama cidkusoobooqataykagabaxayraashinkaaga/cuntadaada?	1._____Birr	
312	Qaabkee/sidayayaadku timid goobtacaafimaadka?	1. Lug 2. Waxaansiifulayneef (dameer, Awar, IWM) 3.Taksi/Bas 4. si kale (sheeg)_____	
313	Wakhtiinteele'egayaykuguqaadataa in aadgaadhogoobtacaafimaadka?	1.___saac/__ Daqiiqo ___KM	
314	Wadartakharashkakaagabaxasafarka/socdka	1._____Birr	
315	Qofehalka ah ama saxiibkaa ah ookusaacidayxiligaaaadisdawaynaysaymajiraa?	1.Haa 2. Maya	Hadiiay tahay maya kubood Su'401
316	Haahadaytahay, Jawaabtasu'aasha 315, imisamaalmoodayuu/ayayshaqada ka habsaameensi ay adikuuraacaan?	1._____ maalmood	

317	Haahadaytahay, Jawaabtasu'aasha 315 waaimisadakhligoodubishii?	1._____ Birr	
318	Haahadaytahay, Jawaabtasu'aasha 315, qofdaryeelahaaga ahi ma waayaadakhligisamaadaamaoouuadidaryeelkaagakuha wlanyahay?	1.Haa 2. Maya	Hadii ay tahay maya kuboo d Su'401
319	Haahadaytahay, Jawaabtasu'aasha 318, waaimisadakhliga ka go'a/luma maanlinkastaoouushaqada ka hadho?	1._____ Birr	
320	Qaabkee/sidayayaykuyimaadaandaryeelayaashaadugoo btacaafimaadka?	1. Lug 2. Waxaysoofulaanneef (dameer, Awar, IWM) 3.Taksi/Bas 4. si kale (sheeg)_____	
321	Wakhtiinteele'egayaykuqaadataa in ay soogaadhaangoobtacaafimaadka?	1.__saac ama __daqiiqo –KM	
322	Haahadaytahay, Jawaabtasu'aasha 318, waaimisakharashkasafarkakagabaxa?	1._____ Birr	
323	Haahadaytahay, Jawaabtasu'aasha 318, waaimisakharashkakagabaxa wax yaabaha kale?	1._____ Birr	

Qaybta 4aad. XaaladaDhaqaaleiyokharasheed ee QoyskaBukaanka

SN	Su'aalo	Jawaabahalaga bixin karo iyokoodhka

401	Qoyskiinu/gurigiinu maleeyahay?. Hubi/doorodhamaan wax yaala/uuleeyahay	1) Qasabadabiyaha 2) Koranto 3) Radyow 4) TV 5) Gaadhi aanleenahay 6) Baaskiilaanleenahay 7) Guri aanleenahay 8) Wax kale (sheeg) _____
402	Maxaadshidataan?	9) Xaabo 10) Dhuxul 11) Digadaxoolaha 12) Gaas 13) Koronto 14) Wax kale (specify)_____
403	qoyskiinaKharashka muxuukagabaxaa?	15) Raashinka_____ 16) Korontada_____ 17) Biyaha_____ 18) Wax barashada___ 19) Dharka_____ 20) Safarka_____ 21) Telefoonka_____ 22) Kiradaguriga_____ 23) Gaaska___ 24) Ridiqaraashinka__ 25) Taxsida``_____ 26) Hagbada``_____ 27) kayd_____ 28) Agabka_____ 29) Caafimad_____ 30) Cashuur_____ 31) Wax kale____

Qaybta 5aad. KharashkalagabuuxindoonaDiwaanadalafiirindoono/la eegidoono ee xogahasiijiray (Secondary Record Review)

SN	Kharashkatoos ka ah	# Visit		Unit cost	Total cost	
		TB	MDR TB		TB	MDR TB
501	Direct medical cost					
502	HIV test					
503	CBC					
504	Sputum-test					
505	X-ray					
506	Ultrasound					
507	ESR					
508	Blood chemistry					
509	A) TB drugs (strength, dosage, form)					

7.8 Curriculum vitae (CV)

ABDIRIZAK AHMED

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Summary

I am a seasoned humanitarian and development professional with over 14 years of diverse experience, supported by a strong educational background in Nursing, Public Administration, and Health Service Management.

I excel in challenging humanitarian contexts, with expertise in program management and team leadership. My commitment to ethics and professionalism fosters a culture of trust and collaboration. Driven by a passion for community impact, I have a proven track record of exceeding targets and implementing operational changes to revitalize teams, serving as a decisive leader and strategic planner in Program Operations.

Experience

DIRECTOR OF PROGRAM OPERATIONS, June 2025 to Current
SAVE THE CHILDREN – Addis Ababa, Ethiopia,

AREA DIRECTOR- EAST ETHIOPIA Feb 2023 to May 2025
SAVE THE CHILDREN - JIGJIGA, Ethiopia,

- Lead the development of Area Strategic Plans, operationalize to goals and objectives, and follow up its implementation.
- Ensure the Area Office has an up-to-date, context-based and achievable Emergency Preparedness Plan (EPP)
- Responsible for leading and managing 3 Field Offices and a project office, overseeing Save the Children's program implementation, staff, resources, and partner relationships.
- Coordinates Area office strategies, operational plans, and consistent application of policies/procedures, while facilitating key relationships between Country Office teams.
- Serves as overall budget holder, ensuring rigorous program budget monitoring and adherence to financial guidelines.
- Responsible for SCI policy/procedure compliance on HR, Supply Chain, Finance, Programs, and Security; plans and implements Risk Management, and responds to audits.

- Collaborates closely on security management, monitoring situations, maintaining plans, and ensuring staff involvement in security processes.

AREA MANAGER - EAST ETHIOPIA Jan 2021 to Jan 2023
SAVE THE CHILDREN - JIJIGA, Ethiopia,ETHIOPIA

- Ensure clear objectives, accountability, and regular coordination for area/field office leadership teams.
- Lead continuous improvement of ways of working to enhance staff accountability and collaboration.
- Develop, operationalize, and monitor Area Strategic Plans and Emergency Preparedness Plans.
- Ensure program implementation aligns with Save the Children's principles, values, and compliance procedures.
- · Oversee robust finance, compliance, security, and partnership management practices across the area.

FILED OPERATIONS MANAGER (FOM) Jan 2019 to Jan 2021
SAVE THE CHILDREN - GODE, Ethiopia,ETHIOPIA

- Lead and oversee SCI's Program Operations in Across three Zones (Provinces) in the Somali region.
- Facilitate effective supervision and quality implementation of program components.
- Ensure integration of programs with local stakeholders like government, community, and NGOs.
- Facilitate participatory monitoring, evaluation, and sustainability of programs.
- Manage smooth handover and phase-out of completed programs.
- Liaise and network with local stakeholders to enhance relationships and program ownership.
- Facilitate participatory project conceptualization and resource mobilization efforts.
- Ensure wise and prudent utilization of all types of resources in the field office.
- Ensure timely communication, representation, networking, and human capital development.
- Developed detailed reports on field operations, highlighting achievements and areas for improvement.
- Continuously evaluated employee performance, conducting training sessions when improvements were needed.

SENIOR HEALTH AND NUTRITION PROGRAM MANAGER Jun 2016 to Jun 2019
SAVE THE CHILDREN INTERNATIONAL - Gode , Ethiopia

- Provided technical support for Health, Nutrition, and WASH emergency responses by establishing integrated nutrition components in target locations.
- Ensured effective start-up, management, implementation, monitoring, reporting, and evaluation of emergency health, nutrition, and WASH programs.
- Develop and review detailed implementation plans to uphold quality standards in line with Save the Children strategies and donor guidelines.
- Lead coordination and preparation of timely donor reports and manage budgets effectively.

NUTRITION PROJECT COORDINATOR May 2015 to Jun 2016
SAVE THE CHILDREN INTERNATIONAL - Gode , Ethiopia

- Ensure that the program is implemented in ways that are responsive to the targeted communities and children, in line with the Health, Nutrition, and WASH thematic strategic plan; Save the Children's principles, values, and compliance procedures.

DISTRICT HEALTH OFFICE HEAD AND MEDICAL DIRECTOR Aug 2010 to Sep 2011
SOMALI REGIONAL HEALTH OFFICE - Hudet, Ethiopia

Education

MASTER'S IN IN PUBLIC HEALTH (MHP) IN HEALTH SERVICE MANAGEMENT, **Public Health** 2024
HARAMAYA UNIVERSITY - Harar
Master of Public Health in Health Service Management – **Ongoing.**

BACHELOR OF ART (BA) IN PUBLIC ADMINISTRATION AND DEVELOPMENT MANAGEMENT, **Arts** 01/2015
HARAMAYA UNIVERSITY - Harar
Public Administration and Development Management is a field of study that focuses on the effective and efficient management of public institutions, organizations, and programs to drive social, economic, and political development. Key aspects include Governance and Policy, Public Service Delivery, Organizational Management, Development Strategies, Stakeholder Engagement, and public sector reform.

BACHELOR'S DEGREE IN NURSING, **Nursing** 01/2015
JIGJIGA UNIVERSITY - Jigjiga
BSc nursing program combines theoretical learning in the classroom with hands-on clinical training in various healthcare settings. The core focus of a BSc in Nursing is to develop well-rounded nursing professionals who can provide comprehensive, evidence-based, and patient-centered care. I graduated with a cumulative average score of 3.82.

DIPLOMA IN CLINICAL NURSING, **Clinical Nursing** 01/2010
JIGJIGA HEALTH SCIENCE COLLEGE - Jigjiga
Diploma in Clinical Nursing

Training

- Save the Children Humanitarian Intermediate Program (SHIP)
- Humanitarian response technical training for mid-level Managers
- Project management for Development Professionals (PMD Pro) – Level I
- Project Management Methodology Flex (PMM Flex)
- Evidence to Policy training organized by the Ethiopian Civil Society Coalition for scaling up the nutrition and Fenot project of the University of British Columbia in Dec 2021.
- Procurement Planning and Execution: USAID Grants and Cooperative agreements
- Good Procurement Planning Series – Save the Children
- Hostile Environment and Awareness Training (HEAT) – Save the Children
- QNUK Level 3 Award in Emergency First Aid at Work (Management of Catastrophic Bleeding) (RQF)
- USAID Sub Award Management
- Infant and young child feeding in Emergency trainer of trainees.
- Training on Managing for high-performance programs.
- Training on Advocacy campaigns and child rights governance
- Supply chain management – Trainer of Trainees
- ECHO Compliance and reporting on -ECHO Funded Actions
- Address Your Unconscious Biases – Disaster Ready, online course.

Skills

- Program and Field Operations Management
- Designing and Leading INGO Humanitarian Interventions and Development Programs.
- Overseeing Program Implementations, staff, budget, and resource Mobilization.
- Partnership Management and Coordination
- Operations management
- Financial management
- Strategies and goals

Accomplishments

- I developed and led a Change Management process from 2022 to 2024, introducing a fit-for-purpose structure that transitioned from a project-based management approach to a thematic-based

management approach in program operations in the East Area Office.

- Led the area and field office teams to define objectives and accountabilities and continually improved ways of working to enhance accountability, access to support, and effective collaboration by engaging the Area Office senior Leadership Team.
- Developed and operationalized 2022-2024 Area Strategic Plans – Save the Children EAO
- Maintained an up-to-date Emergency Preparedness Plan (EPP) for the East Area Office for Three Consecutive years from 2021-2024.
- Ensure program implementation follows Save the Children principles and compliance procedures.
- In Gode, I took on the role of FOM and inherited a team in disarray. Through my leadership, I cultivated a sense of collective maturity and capability among them. This involved gradually increasing the group's autonomy, which resulted in improved performance in various key areas, specifically supply chain management, program quality, and budgetary spending.
- In my capacity as a FOM, I effectively managed a portfolio worth 2-5 million USD annually and provided oversight to a staff of at least 100 individuals spread across three provinces within the Somali region of Ethiopia.
- In my role as a Senior Program Manager (Sr. PM), I successfully managed and completed over 9 multi-million USD worth, complex, multisectoral Emergency Health and Nutrition grants funded by UNOCHA, OFDA, ECHO, UNICEF, and KOICA across 37 districts in the Somali, Oromia, and Afar regions of Ethiopia from June 2016 to April 2019.
- As a Senior Program Manager, I provided technical support and guidance to 11 zonal-level project coordinators and project managers for the implementation of high-quality nutrition responses in the Somali, Oromia, and Afar regions through joint supervision, coordination, coaching, and mentoring.
- 2017 - Employee of the Year Award in East-Hub, Save the Children Ethiopia
- 2017 - Certificate of Appreciation for effective coordination and management of health nutrition Programs in the Somali region of Ethiopia during the 2016-17 severe drought.

References

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