ASSESSMENT OF THE FACTORS INFLUENCING IMPLEMENTATION OF SYSTEMATIC TUBERCULOSIS SCREENING AT HEALTH FACILITY LEVEL IN TEMEKE DISTRICT

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By

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CERTIFICATION

The undersigned certify that they have read and hereby recommended for acceptance to Muhimbili University of Health and Allied Sciences a dissertation report entitled "ASSESSMENT OF THE FACTORS INFLUENCING IMPLEMENTATION OF SYSTEMATIC TUBERCULOSIS SCREENING AT HEALTH FACILITY LEVEL IN TEMEKE DISTRICT" in (Partial) Fulfilment of the Requirements for the Degree of Masters of Public Health Implementation Science of Muhimbili University of Health and Allied Sciences.



Prof.Deodatus Kakoko

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Date



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(Co-Supervisor)

Date

DECLARATION AND COPYRIGHT

I, **David Solomon**, hereby declare that this **dissertation** is my original work and that it has never been presented and will not be presented to any other university for a similar or any other degree award.

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DEDICATION

This work is dedicated to my parents, Mr. Solomon Munuo and Mrs. Grace Munuo. Their unwavering prayers, support, and encouragement have been the foundational pillars that propelled me toward the successful completion of this work. Their boundless love and understanding have continually nurtured my spirit, providing the strength needed to overcome challenges and accomplish the demanding tasks that lay before me. With the deepest love and appreciation, this work is dedicated to them.

ABSTRACT

Background: Tuberculosis (TB) remains a global health challenge, with millions of cases going unreported annually. Significant gaps in case detection, further worsened by the COVID-19 pandemic, persist. In Tanzania, a high-burden TB country, 100,000 cases are missed yearly. Despite efforts to implement systematic TB screening, challenges persist, including data recording deficiencies and insufficient diagnostic resources. Temeke District, with the highest TB cases in 2022, presents a critical research gap as the effectiveness of systematic TB screening in such settings is inadequately understood.

Objective: The study aims to evaluate the implementation of systematic TB screening at health facility in Temeke District. It focuses on determining the proportion of eligible individuals were reached, assessing documentation fidelity, and identifying operational facilitators and barriers.

Materials and Method: This study employed a mixed-methods, convergent parallel approach to evaluate the implementation of systematic TB screening at health facilities in Temeke District. For the quantitative component, a cross-sectional design assessed the proportion of eligible individuals registered in the presumptive TB screening register and the completeness of documentation within the TB register. Concurrently, the qualitative component explored the experiences and perceptions of healthcare workers and patients using a phenomenological design. It encompassed multistage sampling for quantitative analysis and purposive sampling for qualitative insights, targeting a sample size of 384 records for the quantitative component and 11 participants for the qualitative component. A structured data abstraction form for quantitative data and a semi-structured interview guide for qualitative data were used. Quantitative data was analysed descriptively, while qualitative responses were content analysed to identify key facilitators and barriers.

Results: During the study period from April 2023 to March 2024, the hospital registry recorded 402,119 patient visits, with 51.5% being first-time visits. Among these, the median age of patients was 35 years, IQR of (4 – 49) and 11.29% were related to upper respiratory infections. The health facility Presumptive TB Register identified 8,464 patients as presumptive TB cases, of which 26.3% were confirmed through bacteriological tests. The highest confirmation rates were observed in Mbagala Rangi Tatu and Mbande

hospitals at 37% and 36%, respectively. Only 14.48% (n=8464) of patients displaying TB symptoms were registered in the presumptive TB register. Males demonstrated a significantly higher registration rate of 19.17%, (n=5397) ($p<0.001$), compared to females), and the highest registration rate was noted significantly among older adults over 60 years at 56.32% (n=1790) ($p < 0.01$). The overall documentation completeness for essential TB variables was at 21.60% (95% CI: 20.72% - 22.47%), with particular challenges in the documentation of the TB Score Chart, which recorded a completeness of 14.33% (95% CI: 11.74 - 16.91). Education and awareness campaigns, supervision by district and regional coordinators, training and multisectoral collaboration were identified facilitators. However, barriers such as high workload, staffing shortages, and historical TB program perceptions as a vertical program negatively impacted the efficiency and thoroughness of TB screening processes.

Conclusion: There is a significant gap in the implementation of systematic TB screening, with variations across health facilities due to factors like resource availability and staff training. Women were particularly affected, reflecting broader systemic barriers. The study highlighted low data completeness in TB registers, particularly for TB score charts, suggesting a need for integrated electronic data systems and ongoing training.

Recommendations: The Ministry of Health should enhance healthcare worker training, especially in documentation. Health facility management should implement supervision and mentorship programs. A digital TB screening system integrated with existing health records should be developed, while local governments should focus on outreach to reduce stigma and improve health-seeking behaviors. Regular evaluations of TB screening programs are essential to refine TB control strategies.

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ABBREVIATIONS

CHW	Community Health Worker
DHMT	District Health Management Team
DOT	Directly Observed Treatment
DTLC	District TB and Leprosy Coordinator
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
MUHAS	Muhimbili University of Health and Allied Sciences
NGO	Non-Governmental Organization
NIMR	National Institute of Medical Research
NTLP	National Tuberculosis & Leprosy Programme
PMTCT	Prevention of Mother-to-Child Transmission
PORALG	President's Office, Regional Administration and Local Government
QI	Quality Improvement
RE-AIM	Reach, Effectiveness, Adoption, Implementation, and Maintenance Framework
TB	Tuberculosis
WHO	World Health Organization

DEFINITONS

Health Facility Entry Point: The health facility entry point refers to the initial point of contact for patients in a healthcare facility (1)**.**

Intensified Case Finding: Intensified Case Finding (ICF) is a case finding approach where individuals coming in contact with the health system through healthcare related activity are screened actively for symptoms of TB and referred for testing (2).

Presumptive TB Register: A Presumptive TB Register is a record maintained by healthcare facilities to track individuals who show symptoms suggestive of TB (2).

Passive TB case-finding: A patient-initiated pathway to TB diagnosis involving a person with active TB experiencing symptoms that he or she recognizes as serious, and decide to visit health facility for treatment spontaneously (2).

Screening Algorithms: Screening algorithms are systematic procedures used in screening programs to identify individuals at risk of a specific disease (3).

Systematic TB Screening: This is an organized way to identify people with presumptive TB in a predetermined group using questionnaires, tests, examinations, or other procedures that can be applied rapidly (2, 4).

TB Screening: TB screening is to look for signs of TB germs in people who have been exposed to someone with active TB disease or who have a high risk of exposure (4).

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

An estimated 4 million people who fell ill with Tuberculosis (TB) in both 2020 and 2021 were not reported according to World Health Organization (WHO) (5). This gap in case detection, exacerbated by the COVID-19 pandemic, led to a 21% drop in TB notification globally compared to 2019 (6). According to WHO, an estimated 10.6 million people fell ill with TB worldwide in 2022, including 5.8 million men, 3.5 million women, and 1.3 million children (7).

In Africa, the shortfall in active case finding initiatives significantly impacts TB control, with the region's TB case detection rate at a 61% in 2023 (8). This is particularly a concern for Tanzania, classified as one of the 30 high-burden countries for TB. A national survey revealed that over 100,000 TB cases are missed each year in Tanzania, in 2019, while the estimated TB incidence was about 137,000 cases, only 81,208 cases, which accounts for 59 percent, were actually diagnosed and reported. As of 2022, the TB incidence rate in Tanzania is estimated at 125 cases per 100,000 population (9, 10).

To effectively address TB case detection gap, the National Tuberculosis & Leprosy Programme (NTLP) in Tanzania has been implementing systematic TB screening, which is a provider-initiated approach at the health facility level, alongside other active case-finding efforts in the community and passive case finding, as recommended by the World Health Organization (WHO) (2). This approach is pivotal for identifying and diagnosing individuals with TB who might otherwise go undetected (4). In support of this, the Quality Improvement (QI) TB Model, initiated in 2016, has been instrumental in scaling up provider-initiated screening at all entry points of health facilities (11). However, despite these efforts, approximately 21% of TB cases remaining unidentified (12).

NTLP faces critical challenges in data recording and documentation, as of 2022, only 70% of routine data indicators in the NTLP's Monitoring and Evaluation Plan were reported (13). The absence of quantifiable data for the TB under-reporting rate indicator, hinders a clear understanding of the extent of unreported TB cases. Inconsistencies and delays in producing quarterly analytical reports, as mandated nationally, further contribute to the

inaccuracies in data representation (13). This situation is exacerbated by a high turnover of staff and the absence of a comprehensive data use guide, hindering effective data management and analysis at health facility levels (13).

In Dar es Salaam, a home to over 8 million people, accounted for 17% of the nation's TB cases in 2022 (14). The city's challenges in TB control are intensified by its high population density and urban poverty (15). TB screening despite being predominantly supported by donors and NGOs at the community level, it also faces limitations due to insufficient diagnostic tools, a significant human resource gap, and financial constraints (16, 17).

In 2022, Temeke District, located in Dar es Salaam, recorded the highest number of tuberculosis (TB) cases compared to other districts, totaling 4,946 (14). It’s diverse socio-demographic population and established healthcare system marks a comprehensive context for systematic TB screening at health facility level (18). The lack of comprehensive research focusing on systematic TB screening in settings similar to Temeke highlights a critical gap in the literature, emphasizing the urgency and relevance of this study. Therefore, this study focuses on the process evaluation of the implementation of the systematic TB screening in health facilities within Temeke District.

1.2 Definition of Intervention

Upon arrival at entry point of a health facility, all patients undergo systematic TBscreening, irrespective of their HIV status or clinical presentation (2). This universal approach includes screening at both outpatient and inpatient diagnostic and special clinics.Special emphasis is placed on screening clinical risk groups, such as people living with HIV, children, the elderly, and individuals with diabetes mellitus or other conditions that elevate their risk for TB (2, 11, 19, 20).

Every patient receives a thorough physical examination to identify any signs indicative of TB. This is followed by recording individuals with at least one symptom of tuberculosis in the Presumptive TB Register, a crucial step for tracking and subsequent follow-up (2).

The sputum specimens are then promptly submitted to the laboratory for analysis. The results from the laboratory are channeled back to the health facility and the TB focal person for appropriate management of the cases (2).

In addition to TB screening, provider-initiated HIV testing and counseling are essential to all presumptive TB patients. Once TB is diagnosed, patients are referred and escorted to the TB clinic or directly observed treatment (DOT) center for registration and the initiation of treatment. For patients with negative TB test results but persistent symptoms, further assessments are conducted using additional diagnostic tool. Additionally, a contact investigation is initiated for all bacteriologically confirmed TB patients to identify and screen close contacts (2).

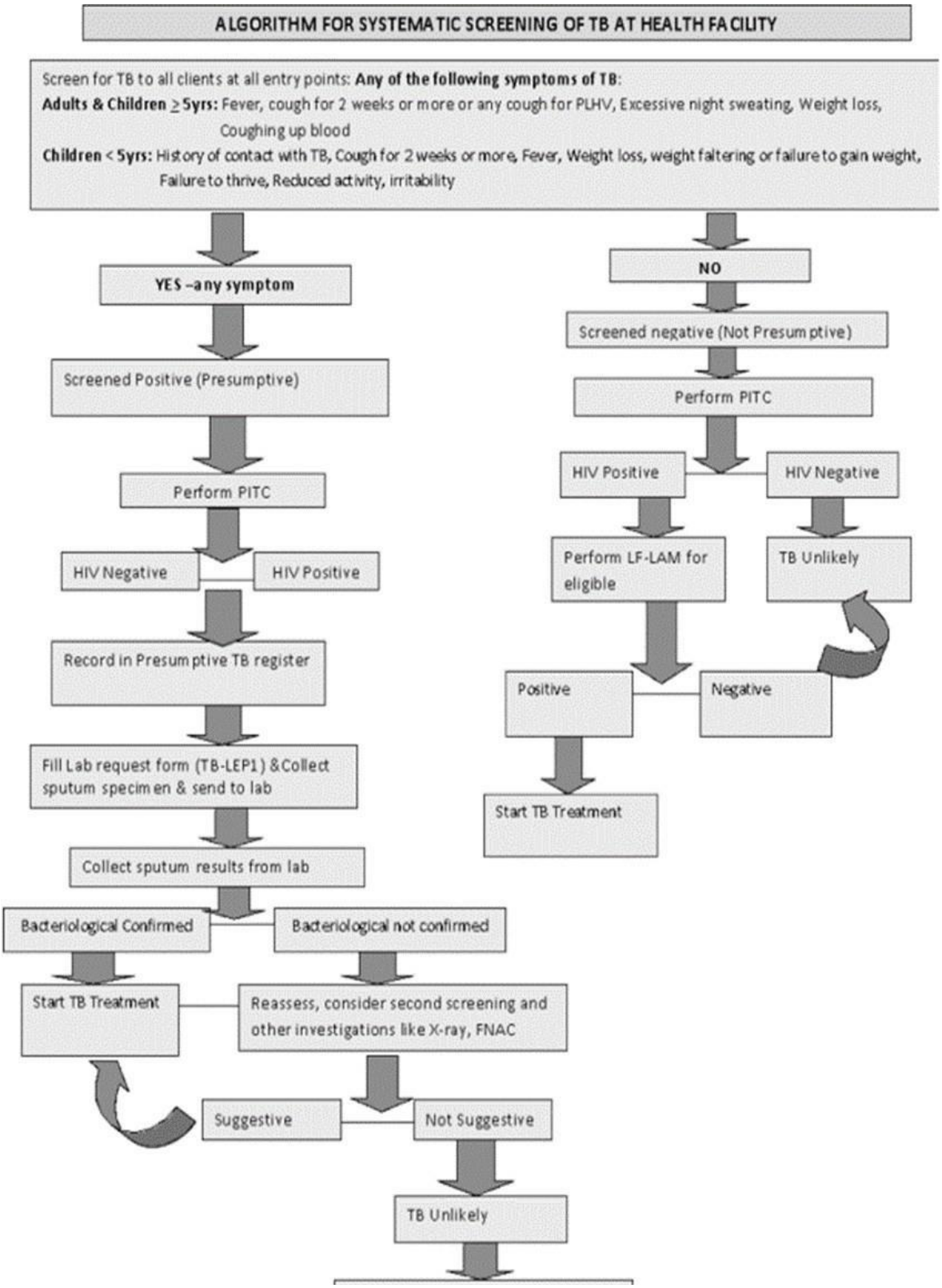


Figure 1: Algorithm for systematic TB screening at Health Facility

1.3 Problem Statement

In 2022, out of 100,747 TB cases reported nationwide in Tanzania, a 49.6% were diagnosed clinically, this points to deficiencies in the effectiveness of TB screening approaches. Dar es Salaam, accounting for approximately 17% of Tanzania's TB cases in 2022 (14). Temeke District, which represents 33% of the city's TB cases, faces specific challenges (21). Despite having 14 TB diagnostic centers, the district struggles with delayed and often inaccurate TB case identification heightening the risk of transmission. A 2022 study in Temeke District identified 108 symptomatic but GeneXpert negative controls among presumptive adult TB patients, underscoring a risk of missing TB cases, which could contribute to ongoing transmission (22). While some studies have examined TB screening, particularly at the community level, no studies have focused on understanding systematic TB screening at the health facility level, especially in high-burden areas. (22, 23).

Furthermore, the latest, 2022 national evaluation reports lack data on TB underreporting rates, while health facilities predominantly use paper-based data collection, with only 70% of routine data indicators being reported (13). This system faces challenges with delayed updates and inefficient data entry processes (13). The absence of a comprehensive data entry guide for health care workers, particularly at the sub-national level, exacerbates these challenges, resulting in underutilization of available data for program improvement (13). Additionally, challenges including high staff turnover at health facilities, adversely affects the continuity and quality of TB data management (13). Although there are gaps in timely and accurate data availability nationalwise, no studies have specifically assesed the challenges at the health facility level, highlighting the need for further investigation.

1.4 Conceptual Framework

This study adopts the RE-AIM Framework to guide the evaluation which stands for Reach, Effectiveness, Adoption, Implementation, and Maintenance. This framework was selected for its comprehensive approach to evaluating health interventions (24).

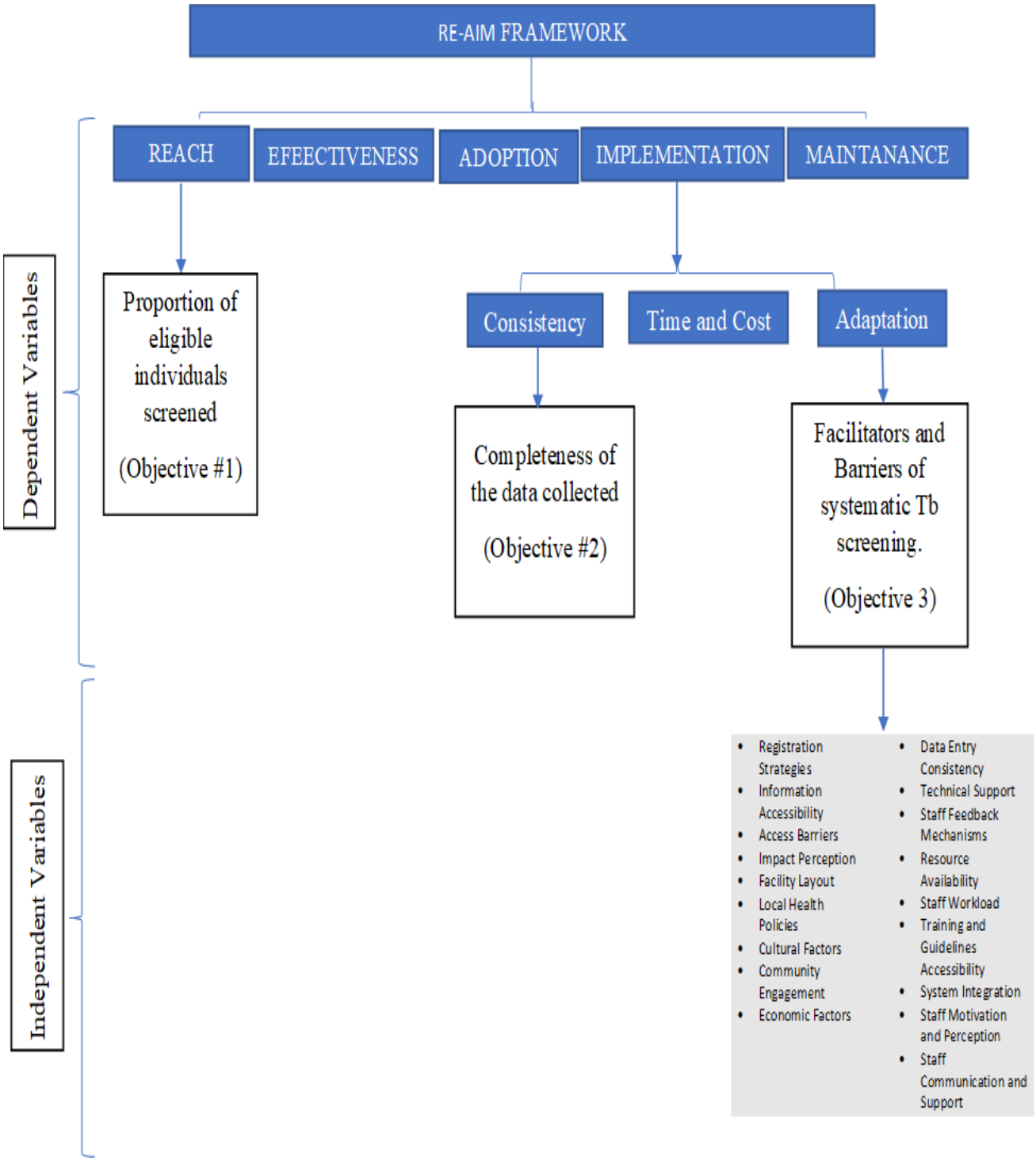


Figure 2: Conceptual Framework

1.5 Rationale

The findings of this study guide NTLP in refining its screening strategies, ultimately improving national TB control measures. Healthcare workers, including those in Temeke District, benefit from these insights, gaining a clearer understanding of screening progress and areas for improvement, thereby enhancing patient care. The findings on documentation in the presumptive TB register, is beneficial for District Health Management Teams (DHMTs) and Community Health Workers (CHWs), providing them with insights to improve the accuracy and completeness of TB case records. Additionally, understanding the facilitators and barriers to systematic TB screening implementation provides valuable information for NGOs and international health agencies, in tailoring interventions and support mechanisms, leading to more efficient planning and resource utilization. For academic and research institutions, these findings provide a rich source of data to inform public health research and education, particularly in areas of infectious disease control and health systems strengthening. Patients and local communities stand to benefit from the overall improvements in TB control strategies these findings.

1.6 Research Question

General Research Question:

How effective is the systematic tuberculosis (TB) screening process in health facilities within Temeke District, in terms of proportion of eligible individuals who were reached, the documentation fidelity, and its operational facilitators and barriers?

Specific Research Questions:

1. What is the proportion of individuals registered in the presumptive TB screening compared to all individuals identified with at least one symptom of tuberculosis in hospital register?
2. How complete is the documentation among individuals in the presumptive TB register in health facilities?
3. What are the key facilitators and barriers to the implementation of the systematic TB screening in health facilities?

1.7 Objectives

General objective:

To conduct a process evaluation of the systematic tuberculosis (TB) screening program in health facilities within Temeke District, focusing on reach, documentation fidelity, and the identification of operational facilitators and barriers.

Specific objective:

1. To determine the proportion of individuals registered in the presumptive TB register out of all with at least one symptom of tuberculosis in the hospital register.
2. To assess the completeness of documentation among individuals in the presumptive TB register in health facilities.
3. To identify facilitators and barriers to the implementation of the systematic TB screening in health facilities.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction to Tuberculosis and Systematic Screening

Tuberculosis (TB), caused by the bacterium *Mycobacterium tuberculosis*, is highlighted in the study by Smith et al. (2020) as one of the most significant infectious diseases globally, particularly affecting the respiratory system (25). Tuberculosis (TB) remains a significant global health problem, with the WHO's Global Tuberculosis Report (2022) noting that in 2020, approximately 10.6 million people contracted TB worldwide (26, 27).

In Tanzania, TB detection and reporting gaps are significant. In 2019, the estimated TB incidence for was 137,000 cases; in the same year only 81,208 cases (59 percent) were diagnosed and notified (9, 10). The TB case notification trends in Tanzania also showed an increase to 154,000 in 2020, indicating persistent challenges in TB control (27).

Systematic screening for TB, as advocated by the World Health Organization (2019), plays a critical role in early TB detection and treatment (28). This proactive approach, particularly in high-burden areas, involves identifying individuals with presumptive TB through various diagnostic tools. A study conducted in Tanzania, Kenya, Uganda, and Ethiopia, reported that the systematic screening for TB led to increased TB case detection, reduced diagnosis delays, and improved healthcare workers' decision-making (29).

The NTLP has adopted systematic screening as a pivotal component of its national TB control strategy. This strategy, operational in both health facilities and community settings, mandates health care providers to screen all patients at every entry point, irrespective of their symptoms (2, 10, 12, 30). It marks a significant shift from the traditional patient-initiated approach to a proactive provider-initiated screening (13). This change is crucial in identifying cases among high-risk groups, including those living with HIV, children, the elderly, and individuals with comorbidities like diabetes (2). Diagnostic tools recommended for this screening, including chest X-rays, sputum smear microscopy, and GeneXpert test (2, 31).

Health facilities are also directed to meticulously record all screenings in the Presumptive TB Register (2). These records are vital for tracking and evaluating TB control efforts at both the facility and national levels. The overarching goals of systematic screening are to reduce TB-related suffering, prevalence, death, and transmission (2). Its main focus is on early detection of active TB among individuals and targeted risk groups, exclusion of active disease in those eligible for latent TB infection treatment, and identification of those at heightened risk of developing active TB in the future (2).

2.2 Proportion of Individuals Registered in the Presumptive TB Screening

The accurate registration of individuals in the presumptive TB screening register is a cornerstone of effective TB control strategies (19, 31). The World Health Organization (WHO) underscores the importance of TB case notification as a metric for assessing the effectiveness of TB control programs (32). Notably, a gap exists in many countries, including Tanzania, between the estimated number of TB cases and those reported and registered (20, 27). A study by Lungu et al. (2019) highlighted that this discrepancy is partly due to underdiagnosis and underreporting, which significantly hampers TB control efforts (33).

In Tanzania, the use of the presumptive TB register as part of the systematic screening strategy is designed to address these gaps (2). However, the effectiveness of this initiative is contingent upon the accurate and comprehensive registration of individuals showing TB symptoms or belonging to high-risk groups (34). A report by the NTLP (2021) indicated a significant variation in the proportion of individuals registered across different regions and healthcare facilities in Tanzania (12). This variation can be attributed to factors such as variability in healthcare worker training, availability of diagnostic tools, and the level of TB awareness in the community (12).

Numerous investigations have been undertaken to comprehend the dynamics of TB registration in presumptive TB screening. For example, a study conducted in the Dar es Salaam region by Said. K et al (2017) discovered that factors such as the availability of trained healthcare workers, community engagement, and the integration of TB screening with other health services had a significant impact on the registration rates (35). Moreover, a comparative analysis conducted by the World Health Organization across various East

African countries, including Tanzania, underscored the differences in registration proportions and attributed them to varying health system capabilities and community health strategies (20).

2.3 Completeness of Documentation in the Presumptive TB Register

In-depth studies and reports have underscored the importance of thorough documentation in TB registers. For instance, a comprehensive analysis by the World Health Organization (WHO) emphasized the significance of effective and accurate recording and reporting systems, whether paper-based or electronic, to ensure high-quality care of TB patients (36). In Tanzania, a study by Langa. E et al (2020) highlighted disparities in health care utilization between rural and urban areas, indicating potential gaps in record-keeping in rural health facilities (37). These gaps can hinder the ability to effectively track TB cases and make informed decisions for TB control (36). Similarly, an evaluation by the WHO on TB in the African Region (2023) revealed variations in the quality and completeness of data recorded in TB registers across several African countries (20). These barriers specifically affect the completeness of documentation at health facility level. The factors influencing the completeness of documentation are multifaceted. The availability of trained healthcare workers who are proficient in TB diagnosis and understand the importance of detailed record-keeping is paramount (38). Moreover, the integration of TB registers with existing health information systems can play a significant role in enhancing documentation quality (39). A study conducted by Myburgh (2020), have shown that the implementation of electronic health record systems in TB control programs significantly improves the completeness and reliability of data (39).

Another critical factor is the ongoing training and support for healthcare workers in TB documentation (40, 41). Continuous education programs, as suggested by a study in China and Zambia that continuous education can enhance healthcare workers' skills in accurate and complete data entry (40, 41). This training should be coupled with regular audits and feedback mechanisms to ensure adherence to documentation standards (42).

A study on the completeness of tuberculosis (TB) notification in six European Union countries highlighted the importance of consistent data entry processes (43). Feedback

mechanisms as well are essential for improving the quality of data in the TB register. The study in the Kyrgyz Republic also highlighted the importance of feedback mechanisms in ensuring the completeness and reliability of data (43). The availability of necessary resources, such as computers and internet access, is crucial for maintaining the TB register (43).

Staff workload and time management can significantly impact the use of the TB register. The study in the Kyrgyz Republic found no significant difference in the time taken from symptom onset to diagnosis and treatment initiation between the electronic and paper-based systems. However, the study noted that the electronic system had a significantly lower proportion of individuals with outcomes that were not evaluated or recorded, suggesting that staff workload and time management can impact the use of the TB register, highlighting the specific barriers for implementation of the systematic tuberculosis screening at health facility level (43).

2.4 Facilitators and Barriers to the Implementation of Systematic TB Screening

A study by Zulu et al. (2021) on the implementation of TB screening in Zambia highlighted the critical role of healthcare workers' training and awareness in facilitating effective screening (44). The study underscored the need for continuous education programs to enhance the healthcare workers' understanding of TB screening processes and the importance of timely registration.

In Tanzania, community engagement has emerged as a significant facilitator. A study by Kazaura et al. (2021) in rural Tanzanian settings found that community outreach programs significantly improved the awareness and participation in TB screening (45). These programs included educational workshops and collaboration with local leaders to address cultural barriers and misconceptions about TB. These facilitators directly support the implementation of systematic TB screening at health facility level.

Accessibility of information about TB screening for patients is another crucial factor. Studies in Ghana, have shown that clear, visible information in healthcare settings can encourage more people to participate in TB screening (46). A report by the WHO and TDR highlights the financial and economic barriers to tuberculosis diagnosis and care. Patients with TB often incur large costs related to illness and disability, including medical and non-medical costs associated with seeking and receiving health care, and costs related to loss of income. Such costs can create access barriers to TB services and increase the risk of

disease transmission (47). Cultural barriers also exist. Stigma surrounding TB and its association with HIV, gender roles, and status in the family are some of the sociocultural factors that can prevent people from accessing TB services (48). In resource-poor countries, these barriers intertwine with poor and ineffective health systems to create serious challenges for TB control (49). These barriers primarily impact the ability of patients to access TB screening service in the health facility.

The physical layout of health facilities can significantly influence the accessibility of TB screening services. A study conducted in public health facilities in the Upper East Region of Ghana by Desmond Kuupiel and his team revealed that the arrangement of screening services within the facilities had a substantial impact on patient flow and accessibility (50). The study found that the geographical accessibility to health facilities providing TB testing services was poor, with the majority of the population residing more than 10 km away from a health facility providing TB testing services (46). This highlights the importance of considering the physical layout and geographical location of health facilities when planning for improved TB screening services.

CHAPTER THREE

3 MATERIALS AND METHODS.

3.1 Study Design

A mixed-methods, convergent parallel approach is adopted for this study, the descriptive cross-sectional design was used for the quantitative component, assessing the proportion of individuals registered in the presumptive TB screening register among the eligible individuals who visited the health facility and evaluating the completeness of documentation within the TB register. In parallel, the qualitative component adopted a phenomenological design, focusing on exploring the lived experiences and perceptions of healthcare workers and patients regarding the facilitators and barriers to the implementation of the TB register. The mixed-methods, convergent parallel approach is particularly suitable for this study as it allows the study to address both "what" is happening with the TB register and "why" these outcomes are occurring.

3.2 Study Setting

It was conducted in Temeke District, located within Dar es Salaam region in Tanzania (51). Temeke has a population of approximately 1.3 million people, with a high population density of 9,000 people per square kilometer. The district is rapidly urbanizing and known for its industrial activities, key infrastructures include the National Stadium and Port of Dar es Salaam. The district is served by a total of 126 health facilities (52). The selection of health facilities was based on the level of public health services they provide, including dispensaries, health centers, and the district level facility. The study was carried out across selected health facilities.

3.3 Study Population

The study population for the quantitative component consists of data obtained from the hospital registry, which was used to identify all eligible patients, as well as data from the presumptive TB registers at entry points of the health facilities. This component involved a thorough analysis of records for all patients who visited the health facility with at least one TB symptom, were screened for TB, and subsequently entered into these registers over a one-year study period. Simultaneously, the qualitative aspect of the study included healthcare workers including the District TB and Leprosy Coordinator (DTLC), health

facility in-charges, TB focal persons, and frontline healthcare workers, along with patients registered. These participants were engaged in in-depth interviews to gain comprehensive insights into their experiences and perspectives regarding the TB screening process and the implementation of the TB register.

3.4 Sampling and selection of health facilities

The quantitative sampling employed a multistage sampling approach, specifically targeting public health facilities within Temeke District. At the district level, district hospital was purposively selected due to its significant role in TB control, high patient volume, and comprehensive range of services (53–55). At a ward level 8 health facilities were included. To ensure a representative sample from each ward, a systematic random sampling method was used. Temeke has a total of all 126 public health centers and dispensaries which serves as our sampling frame, the source from which we draw our sample. The sampling interval, denoted as ‘k’. was calculated by dividing the total number of facilities by the desired sample size 10, giving us a sampling interval of approximately 13 (re. A random starting point on a comprehensive list were selected and following every 13th facility (as per our calculated ‘k’ value) to be included in our sample (56, 57). This could mean, for example, selecting the 1st, 14th, 27th, and so on, facilities from the comprehensive list until we reach the desired sample size of 10. At these selected facilities, the data collected included a record of all patients screened for TB within a specified one-year period.

The qualitative component utilized a purposive sampling to select participants who can provide rich, detailed insights into the implementation of the TB register. This includes healthcare workers involved in TB screening at various levels, such as the DTLC, health facility in-charges, TB focal persons, and frontline staff. Additionally, patients who have been registered in the TB register were selected to participate in in-depth interviews.

3.5 Sample size

For a quantitative aspect of the study, the standard sample size formula for proportions were used, chosen for its ability to provide reliable estimates when the actual proportion of individuals registered in the TB screening process is unknown (58).

For this calculation, a confidence level of 95% and a margin of error of 5%. Additionally, since the exact proportion (p) of individuals registered in the TB screening process is

unknown, a conservative estimate of 50% to maximize the sample size was used, ensuring it is sufficiently large to detect differences (59).

The formula for calculating the sample size (n) is given by $n = \frac{Z^2 \cdot p \cdot (1-p)}{E^2}$. Where: Z is the Z-score, which corresponds to the confidence level (1.96 for 95% confidence), p is the estimated proportion of individuals registered in the TB screening process (0.5 for 50%), and E is the margin of error (0.05 for 5%).

Based on the calculation, $n = \frac{(1.96)^2 \cdot 0.5 \cdot (1-0.5)}{(0.05)^2}$ the sample size required for the quantitative component of the study, to determine the proportion of eligible individuals registered in the TB screening process with a 95% confidence level and a 5% margin of error, is approximately 384 records.

For the qualitative aspect of the study, the sample size was guided by the principle of saturation (60, 61). Interviews were conducted with a purposive sample of 8 healthcare workers and 3 patients who has been registered in the TB register when there was no new information emerging.

3.6 Inclusion Criteria

Quantitative:

- Patient entries in the presumptive TB register during the study period.
- Patient entries in the health facility registry that have at least one TB symptom during study period.

Qualitative:

- Healthcare workers who are involved in the TB screening process, including nurses, doctors, and health officers.
- Key stakeholders such as the DTLC, health facility in-charges, and TB focal persons.
- Patients who have been screened and registered in the presumptive TB register.

3.7 Exclusion Criteria

Quantitative:

- Entries from periods outside the designated study timeframe.
- Duplicate entries.

Qualitative:

- Patients and healthcare workers unable to provide consent.
- Patients and healthcare workers unable to communicate effectively due to language barriers, cognitive impairments, or severe illness.

3.8 Identification of eligible cases (Screening Algorithm):

To guarantee an inclusive process of identifying eligible cases from the hospital registry, a structured approach was adopted, following the National TB guidelines and WHO recommendations (2, 34, 62).

The process begun by gathering all patient entries within the hospital registry from 1st April 2023 to 31st March 2024. This registry contains a wide range of individuals, including those both with and without HIV, children under five, adults, individuals living with HIV/AIDS, recent contacts of confirmed TB cases, healthcare workers, prisoners, migrants, people with diabetes, those exposed to silica, undernourished individuals, smokers, and people with other conditions that may compromise their immunity.

Given the varied TB symptom presentation across different groups, especially among people living with HIV and children who may exhibit atypical or more severe symptoms, patients were categorized following WHO's primary TB screening algorithms (62). These algorithms encompass the general population and high-risk groups (excluding those living with HIV), adults and adolescents living with HIV, and children (62). This categorization allows for the application of specific screening protocols tailored to the unique symptomatology and needs of each group.

Symptom screening for the general population and high-risk groups included a comprehensive evaluation of the following symptoms: persistent cough lasting more than two weeks, hemoptysis (coughing up blood), unexplained fever, night sweats, significant

unexplained weight loss, and chest pain. Additionally, the presence of lymphadenopathy (swollen lymph nodes) and pleuritic pain was considered (2, 62).

In adults and adolescents living with HIV, symptom screening adapted to recognize both typical and atypical presentations of TB. Alongside the symptoms listed for the general population, particular attention was paid to fewer specific manifestations such as prolonged fever without a known cause, recurrent or severe bacterial infections, and atypical chest radiographic findings. The screening also considers extrapulmonary TB symptoms, given their higher prevalence in HIV-infected populations, such as abdominal pain, headache (potentially indicating TB meningitis), and altered mental status (2, 62).

TB screening in children encompass a broad spectrum of symptoms, recognizing the subtler presentation of TB in this group. Along with the general symptoms, additional signs such as a failure to gain weight or weight loss, a history of contact with an active TB case (especially within the household), and nonspecific signs such as fatigue, reduced playfulness, or a decrease in school performance were evaluated. For infants and young children, parental reports of poor feeding, irritability, or a history of BCG vaccination with recent lymph node swelling were also considered (2, 62).

In addition to symptom screening, an evaluation of further TB risk factors was carried out. This evaluation involves assessing patients for recent contact with TB cases, history of TB treatment, underlying health conditions such as diabetes, malnutrition, chronic renalfailure, and substance abuse, along with other risk factors such as being a healthcare worker, living in a crowded setting like prisons or refugee camps, exposure to silica in occupations such as mining, and smoking, which could elevate their risk for TB (2, 62, 63).Patients who do not exhibit TB-related symptoms or relevant risk factors were excluded. Those who meet the criteria for presumptive TB, based on their symptom and risk factor assessment, were listed for inclusion in the Presumptive TB Register. Any cases identified but not yet recorded in the Presumptive TB Register were notified to the health facility's TB focal person for follow-up, ensuring that all potential cases are captured.

3.9 Variables

Quantitative

Dependent Variables.

- **Proportion of Individuals Registered:** This is the ratio of the number of eligible individuals who are registered in the presumptive TB screening register to the total number of individuals who visited the health facility with TB symptoms during a given period of time.
- **Completeness of Documentation:** A score out of 9 mandatory variables of the Presumptive TB register, the completeness score for each patient record is calculated based on the number of these components that are fully documented (31).

Independent Variables

- **Patient Demographics:** Includes age and gender.
- **Type of Health Facility:** Includes hospitals, health centers, and dispensaries.
- **Entry Point:** Identifies the exact department or clinic within the health facility where the patient was registered, including outpatient departments, inpatient wards, voluntary counseling and testing centers for HIV, PMTCT clinics, specialized clinics including for diabetes and cancer (if available), TB clinics, and laboratories.

Qualitative

The qualitative component focus into a range of factors based on the study framework. These include:

- **Registration Strategies:** Approaches used to register eligible individuals.
- **Information Accessibility:** How easily patients can access information about TB screening.
- **Access Barriers:** Obstacles faced by patients in accessing TB screening services.
- **Impact Perception:** Staff views on the effectiveness of the TB register in improving patient outcomes and TB case identification.
- **Facility Layout:** How the physical structure and arrangement of health facilities affect access to the TB register.

- **Local Health Policies:** The influence of local health policies on TB screening practices.
- **Cultural Factors:** Cultural influences on patient registration and data collection.
- **Community Engagement:** The role of community involvement in raising TB screening awareness.
- **Economic Factors:** Economic conditions that impact patients' health-seeking behavior and registration.
- **Data Entry Consistency:** Regularity and uniformity in entering data into the TB register.
- **Technical Support:** Availability and quality of technical assistance for the TB register.
- **Staff Feedback Mechanisms:** Systems in place for staff to provide feedback on TB register usage.
- **Resource Availability:** Accessibility of necessary resources for maintaining the TB register.
- **Staff Workload:** The effect of workload on staff's ability to use the TB register effectively.
- **Training and Guidelines Accessibility:** Availability and accessibility of training and guidelines for staff on TB register use.
- **System Integration:** How well the TB register is integrated into existing health facility workflows.
- **Staff Motivation and Perception:** The motivation of staff and their perception of the TB register's value in patient care.
- **Staff Communication and Support:** The level of communication and support among staff regarding TB screening processes.

3.10 Data Collection Method

For the quantitative component, data was systematically extracted from the hospitalregistry and the presumptive TB registers of the health facilities. Each patient's record in the presumptive TB register were examined for the presence of 9 specified components (31), providing a comprehensive overview of the TB register's implementation and data quality. The data extracted from both hospital registry and presumptive TB register covereda one-year period from 1st April 2023 to 31st March 2024.

The qualitative data were collected through in-depth interviews with healthcare workers and patients. Healthcare workers, including the District TB and Leprosy Coordinator (DTLC), health facility in-charges, TB focal persons, and frontline staff, were interviewed. Interviews explored their experiences and perceptions regarding the facilitators and barriers to the implementation of the TB register. Similarly, patients who are registered in the TB register were selected for interviews to gain insights into their experiences with the TB screening process. In the interviews responses were recorded and transcribed for analysis, ensuring that all relevant perspectives and experiences are captured and analyzed. Data collection were conducted in a period of six weeks, from 15th May 2024 to 28th June 2024.

3.11 Data Collection Tool

In this study, two primary data collection tools were utilized for different needs of the quantitative and qualitative components.

A designed Data Abstraction Form was used for the quantitative component to ensure uniformity of answers. The form included fields to record the total number of individuals who visited the health facility with TB symptoms and the number of these individuals who were subsequently registered in the TB screening register. The form includes fields for each of the 9 components required to assess the completeness of documentation in the TB register. It also captured patient demographics, and type of health facility.

For the qualitative component, an open-ended semi structured interview guide developed by the researcher were used. This guide included open-ended questions and prompts based on the factors identified in the study framework.

3.12 Pre-testing of the Tools

Prior to the main data collection, a pilot study was conducted in Msewe Health Centre located in Ubungo District. Aim was to pre-test the Data Abstraction Form and the interview guide for the relevance and clarity of the questions, and to identify any potential errors with the tools. Feedback from the pilot study was used to refine and optimize the tools, ensuring they are well-suited for the main data collection phase.

3.13 Data analysis Plan

Data Preparation

All collected data were thoroughly verified for completeness and accuracy immediately after the completion of data collection. Qualitative data from interviews were transcribed verbatim. Throughout this process, strict measures was employed to ensure the privacy and security of the data, including the use of secure storage and anonymization of personal identifiers.

Data Analysis

For objective one descriptive statistics was used to analyze the data related to the proportion of individuals registered in the presumptive TB screening register.

For objective two each record was evaluated against the 9 specified components in the presumptive TB register. Descriptive statistics was applied to determine the average completeness score and to identify patterns in missing data.

For the third objective, content analysis was employed to analyze qualitative data. Data familiarization involved transferring recorded audio to a computer for secure storage and repeated listening to ensure comprehensive capture of all participant explanations, followed by verbatim transcription and translation from Swahili to English. The next step involved generating codes to identify significant information, searching and reviewing themes to reflect healthcare providers' perspectives on facilitators and barriers, accurately, defining and classifying themes based on frequency and recurrence of specific quotes, and ultimately generating narrative statements to convey personal perceptions effectively.

3.13.1 Integration of Results

In this study, the integration of quantitative and qualitative results occurred at both the interpretation and discussion phases. The quantitative findings, gathered through cross-sectional analysis, provided a numerical assessment of registration rates and documentation completeness. Simultaneously, qualitative findings derived from phenomenological interviews offered contextual insights into the experiences and perceptions of healthcare workers and patients. The integration process involved a side-by-side comparison of findings to identify convergences and divergences between the two datasets. The results were synthesized to draw comprehensive conclusions that leveraged the strengths of both methodological approaches. Importantly, the integration helped to triangulate findings, thereby increasing the robustness and validity of the study's conclusions.

3.14 Trustworthiness of the Findings

Credibility: It was ensured through the establishment of a strong rapport with participants and ensuring the confidentiality of their responses, which encourages the sharing of genuine insights. The data collection tool was carefully designed and pilot-tested to ensure it effectively captures accurate information. Moreover, the tool was translated into Swahili to eliminate language barriers and further improve the clarity of communication. This multilayered approach ensures that data collected from participants are reliable and reflect their true experiences and opinions.

Reliability: To guarantee reliability, the research process-maintained consistency in the data collection methodology. The data collection tool tested through a pilot test to assess and ensure its reliability, allowing for any necessary adjustments to be made prior to the commencement of the main study. This ensures that the tool consistently captures the required information across different instances of its application.

Transferability: It was ensured through a thorough explanation of the selection and engagement of participants, as well as the settings in which the research is conducted. The study's findings was cross-referenced against existing public reports to demonstrate their broader applicability, helping readers to understand how the insights might be applied in similar contexts.

Dependability: A detailed study log was maintained, documenting the research process, including the pilot testing of the data collection tool and any methodological adjustments made in response to changes in the context. This comprehensive documentation ensures that the study's methodology is transparent and can be followed or replicated in future research, contributing to its dependability.

Confirmability: Confirmability was achieved through triangulation, comparing data from multiple sources, including DHIS 2-ETL, HMIS records, public reports, and previous studies. This process helps to validate the findings independently of the researcher's bias. Cross-referencing data with HMIS records also allows for the correction of any discrepancies, further strengthening the study's validity and confirmability.

3.15 Ethical Consideration

Ethical clearance was obtained from the Muhimbili University of Health and Allied Science (MUHAS) in the Directorate of Research and Publication through the Ethical Review Committee, certificate number Ref.No.DA.282/298/01.C/2187 (Annex IX). This ensures that the study adheres to the highest standards of research ethics.

Permission for conducting the study in Temeke District was sought from the President's Office, Regional Administration and Local Government (PORALG) in Tanzania. This facilitated by obtaining an introductory letter and ethical approval from Muhimbili University of Health and Allied Science (MUHAS)

At each selected health facility, written informed consent were obtained from healthcare workers and patients before their participation in the study. The consent process involved educating participants about the study's goals, their role in the study, and the potential risks and benefits of participation. They assured that participation is voluntary and that they can withdraw at any time without any consequences.

Participants' confidentiality and privacy were strictly maintained throughout the study. Personal identifiers were removed from all study records, and data were stored securely. Access to the data was limited to the researcher who is directly involved in data analysis. All information collected during the study were used solely for the purpose of achieving the study objectives. No information was disclosed to third parties without the explicit consent of the participants.

Additionally, any potential risks to participants were clearly communicated during the consent process. Measures to mitigate these risks include the provision of psychological support for participants who may experience distress and the implementation of strict data protection protocols to prevent unauthorized access to sensitive information.

Throughout the study, any ethical concerns that arise were notified to the ethical board and promptly addressed. The researcher is well trained in ethical research practices to ensure that all aspects of the study are conducted responsibly and respectfully.

CHAPTER FOUR

4.0 FINDINGS

4.1 Quantitative results

4.1.1 Characteristics of patients enrolled in the hospital registry.

A total of 402,119 patient visits were recorded in the hospital registry from April 2023 to March 2024. Of these, 207,178 were first-time visits for new health issues, accounting for 51.5% of all visits. Repeat visits totaled 194,941, comprising 48.5% of the patient encounters (Figure 3). All these records were included to analysis to enable adequately measure the proportion of individuals registered in the presumptive TB screening register compared to those identified with at least one symptom of tuberculosis.

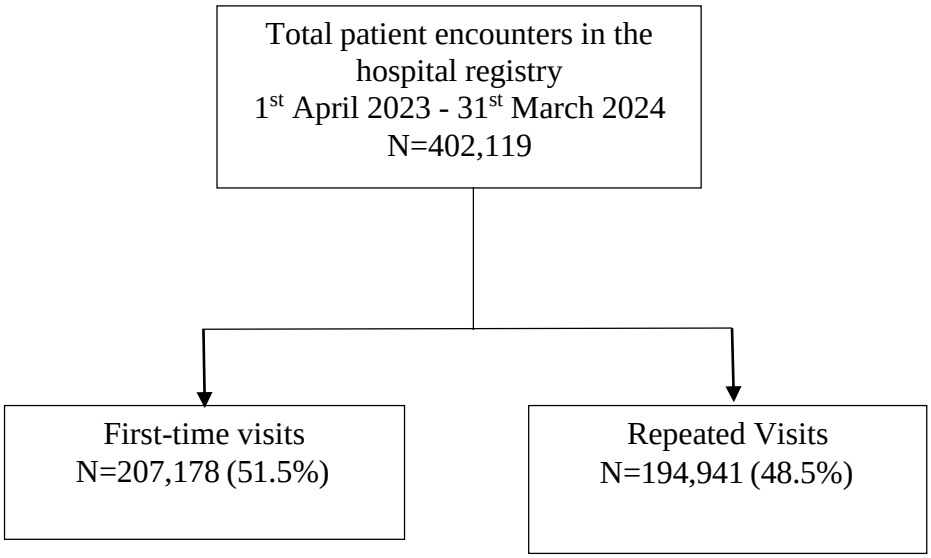


Figure 3: Schematic diagram for the enrolled patients in hospital registry.

Of the 402,119 total records in the hospital registry, the median age was 35 years, and the interquartile range (IQR) which spans from 4 years to 49 years. 147,205 (36.61%) of the records correspond to males, 119,296 (29.67%) records were of patient attendance at

Mbagala rangitatu hospital, and 45,409 (11.29%) of records corresponded to patients with upper respiratory infection (Table 1).

Table 1: Characteristics of records in Hospital registry (N = 402,119)

Variable (N=402119)	Number	Percentage (%)
Age Group		
< 1	48,928	12.2
1 to 5	75,144	18.7
5 to 60	251,231	62.5
> 60	26,816	6.7
Gender		
Male	147,205	36.6
Female	254,914	63.4
Diagnosis		
Tuberculosis	888	0.2
Bronchial Asthma	1,906	0.5
Pneumonia, Severe	10,104	2.5
Upper Respiratory Infections	45,409	11.3
Other	343,812	85.5
Hospital Attendance		
Kilwa Road	47,930	11.9
Kingungi	20,115	5.0
Kizuiani	33,918	8.4
Majimatitu	31,763	7.9
Mbande	50,093	12.5
Rangi Tatu	119,296	29.7
Tambuka Reli	21,820	5.4
Yombo Vituka	51,396	12.8
Kijichi	25,788	6.4

4.1.2 Characteristic of patients enrolled in the Heath facility Presumptive TB Register

From April 2023 to March 2024, a total of 8,464 patients were identified as presumptive tuberculosis (TB) cases and recorded in the health facility tuberculosis presumptive

register. All of these patients, were investigated for TB to confirm their diagnoses and 2,226 (26.3%) patients were bacteriologically confirmed to have TB. (Figure 4)

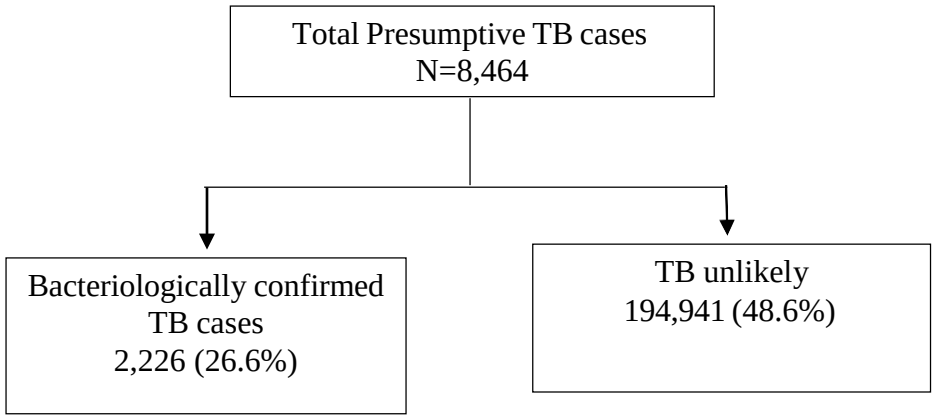


Figure 4: Schematic diagram for the enrolled patients in the Heath facility Presumptive TB Register

Mbagala Rangi Tatu and Mbande hospitals reported the highest percentages of bacteriologically confirmed TB cases among presumptive Tb cases, at 37% and 36% respectively, while Majimatitu had the lowest percentage of bacteriological confirmation at 14% (Figure 5).

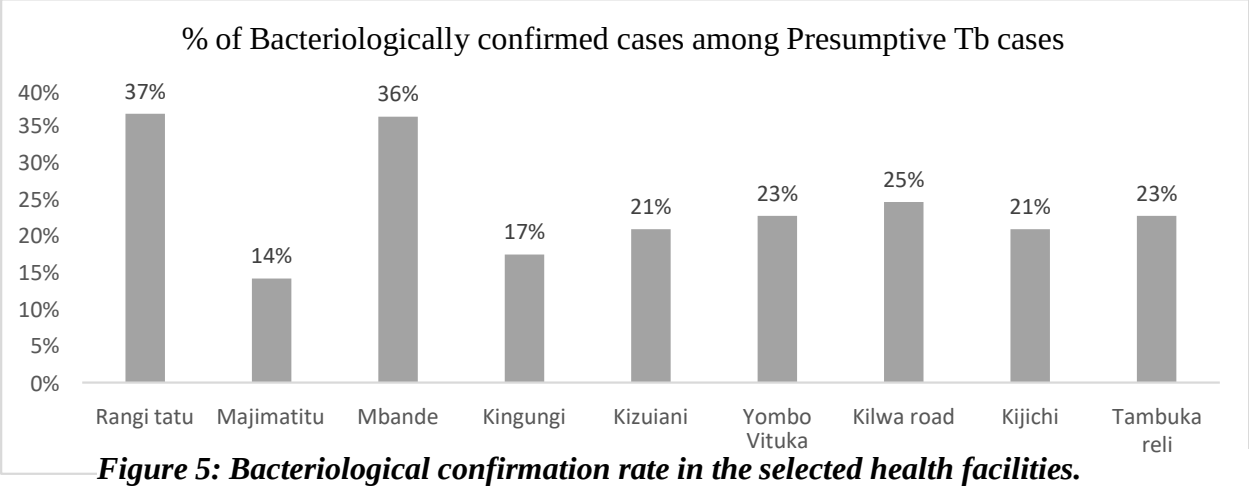


Figure 5: Bacteriological confirmation rate in the selected health facilities.

Of the 8,464 total records in the presumptive Tb register, the median age was 41 years and the interquartile range spans from 29years to 59 years. 6,165 (84.1%) were aged between 5 to 60 years. Males represented a larger proportion of TB cases, with 5,391 (63.7%) cases. The Outpatient Department (OPD) served as the principal entry point for TB screening, with 4,522 cases (53.5%). Mbagala rangitatu Hospital had the highest number of TB cases, with 2,404 (28.42%) (Table 2).

Table 2: Characteristics of records in Heath facility Presumptive TB Register (N = 8,464)

Variable (N=8464)	Number	Percentage (%)
Age (Years)		
< 1	-	-
1 to 5	511	6.0
5 to 60	6168	72.9
> 60	1785	21.1
Gender		
Male	5395	63.7
Female	3069	36.3
Entry point		
CTC	1384	16.4
OPD	4528	53.5
RCH	226	2.7
IPD	43	0.5
Other	2283	27.0
Hospital Attendance		
Kijichi	413	4.9
Kilwa Road	401	4.7
Kingungi	150	1.8
Tambuka Reli	1657	19.6
Kizuiani	618	7.3
Yombo Vituka	1648	19.5
Mbande	409	4.8
Majimatitu	763	9.0
Rangi Tatu	2405	28.4

4.1.3 Proportion of individuals registered in the presumptive TB register out of all with at least one symptom of tuberculosis in the hospital register.

From April 2023 to March 2024, the hospital registry documented 58,462 patient visits with at least one TB symptom, of which 14.48% (n=8464) were registered in the health facility presumptive TB register. The study revealed a statistically significant higher registration rate for males at 19.17%, (n=5397) (p<0.001) compared to females. The significantly highest registration rate was observed in older adults over 60 years, registering at 56.32%, (n=1790) (p<0.001),. Among the hospital attendance locations, Tambuka Reli recorded the highest registration rate at 68.11%, (n=1657) (p<0.001), significantly outperforming Kizuiani, which had the lowest rate at just 4.67%, (n=618) (p<0.001) (Table 3).

Table 3: Individuals registered in the presumptive TB register out of all with at least one symptom of tuberculosis.

Category	**Total with at least one TB symptom (N=58462)**	**Not registered in presumptive TB register (N=49,998)**	**Registered in Presumptive TB Register (N=8464)**	***P-value***
Gender				
Male	28,149	22752 (80.8)	5397 (19.2)	<0.001
Female	30,313	27246(89.9)	3067 (10.1)	
Age Group				
Less than 1 Year	15,506	15506 (100.0)	-	<0.001
1 to 5 Years	23,065	22556 (97.8)	509(2.2)	
5 to 60 Years	16,713	10548(63.1)	6165(36.9)	
More than 60 Years	3,178	1388(43.7)	1790(56.3)	
Hospital Attendance				
Kijichi	2,198	1785(81.2)	413(18.8)	<0.001
Kilwa Road	4,649	4248 (91.4)	401(8.6)	
Kingungi	2,641	2491(94.3)	150(5.7)	
Tambuka Reli	2,433	776(31.9)	1657(68.1)	
Kizuiani	13,236	12618(95.3)	618(4.7)	
Yombo Vituka	4,679	3031(64.8)	1648(35.2)	
Mbande	6,249	5840(93.5)	409(6.5)	
Majimatitu	13,421	12658(94.3)	763(5.7)	
Rangi Tatu	8,956	6551(73.2)	2405(26.8)	

4.1.4 Completeness of data in the health facilities presumptive TB register.

Overall completeness of records for all mandatory variables (Information of the Suspected Tuberculosis Case, Symptoms of TB, Sputum Test, X-Ray Image, Other Tests, TB Score Chart, Examination Results, HIV Testing, and Actions Taken) was 21.60% (95% CI: 20.72% - 22.47%). Upon examining individual variables, Information of the Suspected Tuberculosis Case, Symptoms of TB, and Sputum Test demonstrated a completeness of 100% (95% CI: 100.00 - 100.00). Conversely, the TB Score Chart exhibited significantly lower documentation completeness at 14.33% (95% CI: 11.74 - 16.91) among others. (Table 4).

Table 4: Completeness of data in the health facility presumptive TB register

Mandatory variables (N=8464)	**complete n (%)**	**missing n (%)**	**95% CI for Complete Records**
For Adults population (n=7759)			
Information of the Suspected Tuberculosis Case	7759 (100.00)	-	100.00 - 100.00
Symptoms of TB	7759 (100.00)	-	100.00 - 100.00
Sputum Test	7759 (100.00)	-	100.00 - 100.00
X-Ray Image	4684 (60.35)	3075 (39.65)	59.31 - 61.39
Other Tests	5060 (65.19)	2699 (34.81)	64.18 - 66.21
Examination Results	2118 (27.30)	5641 (72.70)	26.35 - 28.25
HIV Testing	3447 (44.39)	4312 (55.61)	43.33 - 45.45
Actions Taken	4491 (57.94)	3268 (42.06)	56.89 - 58.99
For Pediatric population (n=705)			
TB Score Chart	101 (14.33)	604 (85.67)	11.74 - 16.91

4.2 Qualitative findings

4.2.1 Socio-demographic characteristics of the participants

A total of 11 participants were interviewed, with ages ranging from 26 to 54 years. 6 were males. The participants included one DTLC, seven TB focal, and three patients. Among the TB focal persons, the experience working in TB screening varied from 3 year to 20 years (Table 5).

Table 5: Socio-demographic characteristics of the study participants (N=11)

Participant Number	Sex	Age	Hospital name	Profession	Years of experience in TB
No. 1	F	45	Rangitatu	DTLC	9
No. 2	M	48	Kilwa Road	TB focal person	3
No. 3	F	41	Kijichi	TB focal person	9
No. 4	M	53	Kizuani	TB focal person	20
No. 5	M	28	Kingungi	TB focal person	3
No. 6	M	44	Mbande	TB focal person	6
No. 7	M	47	Tambukareli	TB focal person	9
No. 8	F	43	Majimatitu	TB focal person	8
No. 9	F	30	Rangitatu	Patient	-
No. 10	M	26	Kingungi	Patient	-
No. 11	F	54	Mbande	Patient	-

4.2.2 Categories, sub-categories and codes

Two major categories were identified: 1) Facilitators to Systematic TB Screening, 2) Barriers to systematic TB screening (Table 6). Under Facilitators, the subcategories included Education and Awareness; Supervision and Support; Collaboration with healthcare facilities and NGOs; Training on accurate documentation and screening practices; and Resource Availability. Under barriers the subcategories were Attitudinal & Misinformation Challenges; Workload and Staffing issues; Historical Program Mentality that segregated TB tasks; and Data System Integration challenges.

Categories	Subcategories	Codes
Facilitators to Systematic TB Screening.	Education and Awareness	Patient education sessions; Emphasis on providing accurate contact information; Ongoing education on the importance of TB screening.
	Supervision and support	Regular supervision by district and regional coordinators; Quality Assurance and Improvement (QAE) team involvement; Collaboration with external partners for mentorship.
	Collaboration	Cooperation with hospitals and health centers; Engagement with quality improvement teams; Partnership with organizations like MDH and AMREF.
	Training	Continuous training of healthcare workers; Workshops on proper registry documentation; Education on the usage of GeneXpert machines.
	Resource Availability	Adequate supply of TB registers and documentation materials; Availability of testing kits and GeneXpert machines; Support from stakeholders to maintain sufficient resources.
Barriers to systematic TB screening	Attitudinal &Misinformation challenges	Reluctance to provide complete and accurate information; Negative attitude towards documentation and record-keeping; Difficulty in changing patient and staff attitudes. Patients

		providing false contact information; Difficulty in tracking patients due to incorrect addresses and phone numbers; Mistrust and lack of engagement from the community.
	Workload and staffing	High workload and multiple responsibilities for healthcare workers; Shortage of staff to handle TB screening and follow-up; Overlapping duties leading to neglect of TB-related tasks.
	Historical Program Mentality	TB screening and treatment historically seen as separate from general healthcare; Resistance to integrating TB tasks into general healthcare duties; Perception of TB tasks as additional and burdensome.
	Database System Integration	Challenges in integrating paper-based documentation with digital systems; Desire for automated systems to reduce manual record-keeping; Inconsistencies in data entry and registry management.

4.2.3 Facilitators and barriers to the implementation of the systematic TB screening.

Category 1: Facilitators to Systematic TB Screening.

Education and Awareness.

Patient education sessions were essential for informing individuals about TB symptoms, transmission, and the importance of early detection and treatment. Also, the need for accurate contact information were found to be crucial, as it enables healthcare workers to follow up with patients and ensure continuity of care. Ongoing education about the significance of TB screening helps to maintain public awareness and encourage consistent screening practices. Community health workers (CHWs), who are well-trained on TB, played a pivotal role in this regard by educating patients in waiting areas, thus ensuring that individuals exhibiting TB symptoms are promptly identified and tested as one of the participants added;

"We have these Community Health Workers (CHWs). What we do in the morning or any time when there are many patients in the waiting area is that these CHWs, who have been well-trained on TB, go around those areas and provide education related to TB issues. They focus more on TB symptoms and how it spreads. So, in that area, if someone has these symptoms and mentions it, they are immediately taken and written up for tests." (IDI participant 3).

Supervision and Support.

Regular supervision by district and regional coordinators, alongside the involvement of Quality Assurance and Improvement (QI) teams, ensured that TB screening processes are adhered to and continuously improved. This supervision helped maintain high standards of care and ensures that healthcare workers are supported in their roles. Collaboration with external partners for mentorship provides additional layers of support and expertise, enhancing the overall quality of TB screening, participant added;

"Supervisions are at the regional, district levels, when they come to do supervision, the coordinator who is from the municipality wants to see the registers, so if he finds a challenge maybe the person involved is failing maybe because of understanding, then he provides direct mentoring, even the regional they pass through, when they come, they look at those registers and they provide mentoring." (IDI participant 6).

Collaboration.

Successful TB screening initiatives often hinged on effective collaboration with hospitals, health centers, and quality improvement teams. Partnerships with organizations like MDH and AMREF brought additional resources, expertise, and support to TB screening efforts. The engagement of the community through local leaders, traditional healers, and schools, and conducting house-to-house TB screening services, leveraged local representatives, enhanced screening coverage and effectiveness. This community-based approach not only raises awareness but also ensures that TB screening services reach underserved populations, participant added.

"Sometimes we set up a specific location for a few days, like a field or an office, where we conduct TB screening and provide treatment. We select three areas and collaborate with local representatives to announce our presence. For example, we might inform the community that doctors will be at a particular location for TB screening and treatment for a few days. Additionally, if we find students with TB, we ask which school they attend. If multiple students from the same school have TB, we notify the education officer and go to the school to conduct TB screening." (IDI participant 1).

Furthermore, traditional healers, in particular, played a crucial role in referring patients to health facilities for TB screening, demonstrating increased community awareness and collaboration. This was highlighted by one of the healthcare workers;

"Oh yes, we have engaged the community a lot. We work with local leaders, traditional healers, and even schools. We go into these places and conduct house-to-house TB screening services. We knock on doors with a local representative leading us to the houses, explain the purpose of our visit, and provide education. This way, we identify people with symptoms and educate them, so we are well-engaged." (IDI participant 1).

Training.

Continuous training of healthcare workers was essential for maintaining a high standard of TB screening practices. Stakeholders actively provide training, focusing particularly on the accurate filling of registers and effective screening techniques. Most doctors have received

this training, ensuring they are well-equipped to perform TB screening duties. On-the-job training supplements these efforts, further enhancing the competency of healthcare workers.

“For training, stakeholders really try to provide training there are very few doctors who have not received training on filling these registers the stakeholders are doing this work but also on the job, we do a lot, training is available especially on the filling and screening side.” (IDI participant 4).

Resource Availability.

Ensuring the availability of adequate TB registers, documentation materials, testing kits, and GeneXpert machines was critical for effective TB screening. Support from stakeholders helps maintain sufficient resources and ensures that healthcare facilities can continue providing these services. The provision of free TB treatment was particularly important, as it encourages patients to seek care without financial concerns, thus increasing screening uptake.

“These registers for these suspected cases are available, we have plenty of them, I mean we have plenty even if they say every doctor wants their own, we have enough.” (IDI participant 1).

Additionally, the use of technology, such as TVs to display TB symptoms in waiting areas, aids in educating patients about TB and promotes screening.

"We use TVs to display TB symptoms in waiting areas, so patients get to know more about TB and the importance of screening." (IDI participant 3).

Category 2: Barriers to Systematic TB Screening.

Attitudinal and Misinformation Challenges.

Patients providing false contact information and community mistrust hinder follow-up and case management efforts. Additionally, stigma associated with TB, particularly among women, complicates treatment adherence and continuity, as societal pressures may force women to recover away from their homes, disrupting care.

"Stigma is a big problem, especially for women. They are often sent to their parents' homes for recovery, which disrupts treatment and leads to abandonment." (IDI participant 7).

Workload and Staffing.

High workload and multiple responsibilities for healthcare workers contribute to the challenges in TB screening. The shortage of staff to handle TB screening and follow-up tasks exacerbates the problem, leading to incomplete documentation and neglected TB-related duties. Overlapping responsibilities further strain healthcare workers, reducing the time they can dedicate to TB education and screening activities.

"…So, there is one doctor who sees patients and within the TB unit, there are other activities, not just TB alone, there are receiving new patients who come to start treatment, there are those who come for check-ups brought by their relatives, they all depend on this one doctor, there are patients with HIV, they must see a doctor, there are those with respiratory issues, they are here they must see a doctor, there are MDL TB patients he must see them, so one doctor moving around all those units is not enough. But also, we have one nurse, the same one who does counsel, testing, dispenses drugs, this same one sits down and writes reports, that same one person. When you go to OPD where they fail to fill reports, it's true we cook up excuses but at the end of the day when I go there even you yourself, when you look at how they work, they are few out there, you find people are packed up go inside you find two doctors here, one is doing something here, another one is filling in the register for suspected cases and the tally sheet, he is supposed to enter it in GoTHoMIS he starts from here on the table, the patient is the same one, he goes to GoTHoMIS when he comes from GoTHOMIS he enters into the register for suspected cases from there so you find they are failing…" (IDI participant 1).

Historical Program Mentality.

One significant barrier to systematic TB screening is the lingering historical perception of TB as a vertical program, separate from general healthcare. This mentality creates resistance to integrating TB tasks into the broader healthcare responsibilities of staff. Healthcare workers often perceive TB-related tasks as additional and burdensome,

preferring automated systems over manual documentation due to their heavy workloads and numerous responsibilities. This attitude, fueled by the historical separation of TB services, where all TB-related work was handled exclusively by the TB department, continues to influence current practices.

"…. TB in the past, TB was like it isolated itself, so you find all the work of TB is done by those people in the TB department, whether it is screening or what, everything related to it even if it is a disease, they use TB drugs if he goes there with a headache he will be told go to TB, that's how it used to be in the past because we say it is a vertical program. Now, this vertical program we are going to delete it so that everyone participates so there are still people whose mentality is still asleep these are not theirs these are for TB people so they are just burdened with these tasks they are supposed to handle TB patients that's the challenge we still have, he tells us these are your tasks, for TB people, and they believe because you work for the program." (IDI participant 1).

System Integration.

Challenges in integrating paper-based documentation with digital systems, the desire for automated systems to reduce manual record-keeping, and inconsistencies in data entry and registry management present significant barriers. Overcrowded and small healthcare facilities hinder private consultations, reducing TB screening due to the associated stigma. Patients prefer privacy, which is often not available in these settings, leading to reluctance in undergoing TB screening.

"If possible, I suggest integrating the TB screening questionnaire into our GoT-HOMIS system, which we use to see patients. This means that when a doctor takes a patient's history and orders tests, before ordering, the system should prompt the TB screening questions. These questions include if they have ever lived with a TB patient, night sweats, weight loss, etc. This should force the doctor to conduct the screening. Additionally, there should be an easy way to access reports through the system because registers are often not filled out. They do the screening, but it doesn't reflect in the registers. So, my suggestion is to have a system that requires the doctor to do the screening." (IDI participant 1).

CHAPTER FIVE

5.0 DISCUSSION

5.1 Key findings of the study

The findings highlight considerable variations in TB confirmation rates across health facilities, with Mbagala Rangi Tatu and Mbande hospitals exhibiting notably high rates. These differences likely reflect the impact of distinct facility protocols, the availability of resources, and the varying levels of staff expertise. Such facility-specific factors are pivotal in determining the effectiveness of TB diagnostic processes. In line with this observation, research by Vasiliu et al., (2021) underscores the critical role that enhanced resource allocation and targeted staff training play in improving infectious disease control, suggesting that similar interventions could bolster TB management strategies within the region (64).

The overall TB registration rate within the presumptive register, observed at approximately fourteen percent signals a substantial disconnect between the number of patients showing TB symptoms and those officially registered. This gap may stem from both systemic issues, including of the paper-based data collection system for tb screening, high staff workload and lack of awareness and stigma among patients. This under-registration underscores the urgency for enhanced training for providers and robust patient education campaigns to improve early detection rates. Such strategic enhancements are essential for closing the gap in TB case detection, as evidenced by the work of researchers by Thomas et al., (2018) who have highlighted similar challenges and the need for systematic improvements to optimize TB screening and registration processes (65).

The study also revealed significant gender disparities in TB registration rates, with males more frequently registered than females. This finding could reflect underlying socio-cultural barriers or inherent differences in health-seeking behaviors that influence how males and females approach TB screening and treatment. Give, (2024) provide insights into how societal norms and stigma may inhibit timely health-seeking behaviors,

particularly among females, potentially leading to lower registration rates in this demographic (66). Addressing these disparities is crucial for ensuring equitable health care access and effective TB control.

Interestingly, the data indicate that older adults over sixty years exhibit the highest registration rates, suggesting either more pronounced symptoms in this demographic or a higher efficiency in symptom recognition among older patients. This age-related trend in TB registration aligns with findings from Choi et al., (2023). who note that older adults typically present more distinct clinical manifestations, potentially prompting more assertive screening efforts by healthcare providers (67).

Finally, the completeness of TB documentation was found to be notably deficient, with a general completeness rate around twenty one percent, and particularly poor recording observed in TB Score Charts. The inadequate documentation hampers effective TB management and hinders accurate disease monitoring and surveillance. The importance of meticulous and thorough documentation is emphasized in literature from various African contexts, where Safdar et al., (2011) argue that robust record-keeping is fundamental to enhancing public health responses and facilitating effective disease control strategies (68).

Study highlights the critical role of education and awareness programs in facilitating effective TB screening practices. Community health workers (CHWs), instrumental in these initiatives, play a vital role in educating patients about TB symptoms and the importance of early detection and treatment. This approach not only increases patient engagement but also enhances the likelihood of early diagnostic and treatment measures. The effectiveness of such educational interventions is supported by Suryasa et al., (2022), who assert that health education significantly influences patient behaviors and outcomes, particularly in disease prevention and management (69).

Regular supervision and support from district and regional health coordinators have been found to improve the adherence to TB screening protocols. Quality Assurance and Improvement (QI) teams are essential in maintaining high standards of care, which our

study identifies as pivotal in reinforcing healthcare practices. This finding is corroborated by Perlman et al., (2001) who note that consistent supervision not only enhances procedural compliance but also fosters an environment of continuous improvement in healthcare settings (70).

The study underscores the importance of collaboration among healthcare facilities, community leaders, and health organizations like MDH and AMREF. Such partnerships enrich resource pools and broaden the scope of TB screening, reaching more individuals and potentially underserved populations. This communal approach ensures that TB screening is not only more comprehensive but also more inclusive Heuvelings et al., (2018) highlight that collaborative health efforts lead to better health outcomes and more sustainable health practices, reflecting the potential of community engagement in enhancing TB control strategies (71).

Significant challenges to TB screening implementation include attitudinal barriers and misinformation among patients and staff. Negative attitudes towards documentation,stigma associated with TB, and reluctance to share accurate information can severely impede the effectiveness of TB screening efforts. Such challenges are indicative of broadersocietal issues that affect health service delivery. According to Lorent et al., (2015), addressing these attitudinal barriers requires targeted interventions that not only focus on information dissemination but also on changing societal norms and behaviors (72).

Findings also point to high workload and insufficient staffing as major barriers to effective TB screening. Overlapping responsibilities and the consequent strain on healthcare workers can lead to neglected duties and incomplete documentation, impacting the overall quality of TB care. These findings align with those of Dall'Ora et al. (2020) and Meese et al. (2021) who argue that adequate staffing levels and manageable workloads are crucial for the delivery of quality healthcare services, especially in resource-constrained settings (73, 74).

Lastly, the lingering perception of TB programs as vertical, isolated services rather than integrated health efforts poses a significant challenge. This outdated mentality can hinder the effectiveness of TB screening and control measures. Furthermore, difficulties in integrating paper-based and digital systems exacerbate these challenges, as noted by Dawson et al., (2021). who emphasize the need for system integration to enhance the efficiency and accuracy of health registries (75).

5.2 Strength and limitations of the study

Strength:

First, the integration of both quantitative and qualitative research methods offers a comprehensive understanding of the implementation of systematic tuberculosis screening landscape. This mixed-methods approach allows for a detailed analysis of the data, where quantitative findings provide statistical grounding, and qualitative insights add depth and context to the numerical results.

The engagement of key stakeholders in tuberculosis management during the validation phase of the findings ensures that the results are not only grounded in empirical data but also resonate with current practice and policy considerations. This collaboration helps tailor the recommendations to be actionable and relevant to practitioners and policymakers within the Temeke District and potentially beyond.

Limitations:

Despite its strengths, the study faces several limitations that merit consideration. The primary concern is the reliance on data derived from hospital registries and TB registers, which are subject to variable data quality issues such as inconsistencies and incomplete entries. These challenges could impact the validity of the study findings. To mitigate this, the study employed cross-referencing approach with multiple data sources, including the HIMS and DHIS 2 ETL, to validate and corroborate the registry data, aiming to ensure a more robust dataset for analysis.

Another limitation involves the selection of health facilities, which may not fully capture the diversity of TB screening practices across the Temeke District. This selection bias could affect the external validity and generalizability of the findings. In response, the studyutilized randomization techniques during the facility selection process to minimize bias and enhance the representativeness of the sampled facilities, thereby striving to ensure thatthe findings are reflective of varied screening environments.

Additionally, the qualitative component of the study was susceptible to the risk of socially desirable responses, which could compromise the credibility of the findings. To address this, the research team established a trusting rapport with interview participants, ensured confidentiality, and employed indirect questioning approach to foster a more open and honest dialogue.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

Despite the challenges encountered, this study successfully identified critical insights into the tuberculosis (TB) screening process within Temeke District's health facilities. The key findings reveal a significant discrepancy between the number of patients exhibiting TB symptoms and those registered in the presumptive TB register, with only one out of ten of symptomatic patients recorded. This low registration rate underscores a crucial gap in the implementation process of systematic TB screening at heath facility, particularly affecting females and highlighting systemic challenges in health-seeking behaviors and access contributed by prevailing stigma.

The study also demonstrated that while older adults over sixty years are more likely to be registered, the overall level of implementation of TB screening varies significantly across different health facilities, influenced by factors such as resource availability, staff expertise, and facility-specific protocols. This variation in practice not only affects the immediate effectiveness of TB control but also reflects broader systemic inefficiencies that must be addressed.

The findings from this research imply that enhancing TB screening and documentation practices is essential for improving TB control efforts. Strengthening the training of healthcare providers to recognize and register TB symptoms comprehensively, coupled with improving public health initiatives to educate and encourage communities, especially vulnerable groups like women, to seek treatment, could substantially increase the detection and management of TB.

Education and awareness campaigns, supervision by district and regional coordinators, training and multisectoral collaboration were identified facilitators. However, barriers such as high workload, staffing shortages, and historical program perceptions negatively impacted the efficiency and thoroughness of TB screening processes.

6.2 Recommendations

6.2.1 ; To elevate the implementation of tuberculosis (TB) screening, the Ministry of Health, along with local health authorities, should significantly enhance the frequency and depth of training programs aimed at healthcare workers. These trainings should primarily focus on the accurate recognition of TB symptoms and the thorough documentation of patient encounters. Specific emphasis needs to be placed on improving the documentation practices in critical areas such as TB Score Charts and Examination Results, where deficiencies have been notably high. The expected outcome of this enhanced training is a notable improvement in the accuracy of TB screening and registration, facilitating better management and meticulous tracking of TB cases across the healthcare system.

6.2.3 ; Health facility management, supported by district health officials, is recommended to implement a continuous supervision and mentorship program. This should involve regular visits by experienced TB specialists who will mentor and supervise healthcare workers, ensuring strict adherence to the most recent TB screening protocols and high documentation standards. The anticipated outcome of this initiative is an increase in the consistency with which screening protocols are applied, as well as an enhancement in the quality of patient records. Such measures are expected to contribute to more reliable TB control measures within the healthcare infrastructure.

6.2.4 ; There is a critical need for the national health information systems agency to collaborate with health technology providers to develop and deploy a digital TB screening system. This system should be integrated with existing electronic health records to automatically prompt healthcare workers to complete TB screening for patients exhibiting symptoms. This digital approach aims to streamline screening processes, reduce human error in documentation, and improve overall compliance with TB screening protocols. The integration of such technology is expected to facilitate more efficient and error-free healthcare service delivery.

6.2.5 ; Local government units and community health departments should work in concert with NGOs and community leaders to amplify outreach and education programs about TB.

These initiatives should focus on increasing public awareness about the symptoms of TB, its transmission, and the critical importance of early screening. Efforts should be made to specifically address and reduce stigma and socio-cultural barriers that impede health-seeking behaviors, particularly among women. The goal of these educational outreaches is to enhance public knowledge and participation in TB prevention and screening, thereby improving early detection rates and overall public health outcomes.

6.2.6 ; The District Health Office, in collaboration with research institutions including National Institute of Medical Research (NIMR), should regularly evaluate the implementation of TB screening programs. This evaluation should employ data analytics to gauge the impact of the interventions on TB screening and management and to pinpoint areas needing further improvement. Regular assessments will facilitate a continuous improvement loop, ensuring that TB control strategies are consistently refined and adapted to meet evolving healthcare needs. The ultimate aim is a reduction in TB prevalence and a boost in the quality of public health systems.

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Appendixes

Appendix I: Consent Forms - English

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS

CONSENT FORM

ID NO: ……

Consent to Participate in the Study

Greetings! My name is David Solomon. I am a student pursuing a Master's in Public Health Implementation Science at Muhimbili University of Health and Allied Sciences. I am conducting a study on the effectiveness of systematic TB screening at health facility entry points in Temeke District, Dar es Salaam.

Purpose of the Study: This study aims to evaluate the reach, documentation fidelity, and operational facilitators and barriers of the systematic TB screening program within Temeke District's health facilities. Your participation is highly valued as it is believed that you possess crucial insights that will contribute significantly to achieving the study's objectives.

Confidentiality: Please be assured that all information you provide will be treated with the utmost confidentiality. Access to this information will be restricted to individuals directly involved in this study. Your name or any other identifying information will not be disclosed.

Requirements for Participation: If you agree to participate, you will be asked to respond to a series of questions related to your experiences and perceptions of the systematic TB screening process. Additionally, depending on your role in the health facility, participation may also involve activities related to data extraction. Please be informed that, for the

purpose of accurate data collection and analysis, the interviews conducted as part of this study will be audio-recorded.

Benefits: Your input will offer valuable insights into the current practices, challenges, and perceptions surrounding the TB screening program. This information is crucial for identifying strategies to enhance the effectiveness of TB control efforts, contributing to improved public health outcomes.

Interview Duration: The interview should not exceed 40 minutes. Please feel comfortable to express your views openly, as there are no right or wrong answers.

Right to Withdraw: Participation in this study is entirely voluntary. You may choose not to participate or withdraw at any point, even after consent has been given, without any consequences.

Risks: While no harm is expected from participating in this study, should you have any concerns, please reach out to the contact provided below.

Whom to Contact: For any questions or concerns regarding this study, please contact Principle Investigator, David Solomon, at Muhimbili University of Health and Allied Sciences, P.O. Box 65001, Dar es Salaam, mobile number 0767834638. For inquiries about your rights as a participant, please contact Dr. Nahya Masoud, Chairperson of the Research and Publications Committee, MUHAS, at the same address, Tel. +25521503026.

Statement of Voluntariness:

	Yes	No
I understand the main goal of this research.		
I am aware of the methods the researchers will use.		
I've been informed about any potential risks and benefits of participating.		
I've had the opportunity to ask and get answers to my questions about the study.		
I know whom to contact for further questions or concerns related to the study.		
I have read and understood the information in this consent form.		

I know I can leave the study at any point without any consequences.		
I'm aware I will receive a signed and dated copy of this consent form for myrecords.		

Signatures

Do you agree to participate?

Participant: Agree / Not Agree

I,_____, have read the contents of this form. My questions have been answered, and I agree to participate in this study.

Signature of Participant: _____

Signature of Research Assistant: _____

Date of Signed Consent: _____

(*Please ensure you receive a copy of this consent form for your records)*

Annex II Consent Form-Swahili

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI

IDARA YA UTAFITI NA UCHAPISHAJI

Fomu ya Ridhaa

Na. ya utambulisho: ……

Ridhaa ya Kushiriki katika Utafiti

Habari! Jina langu ni David Solomon. Ni mwanafunzi ninayesoma Shahada ya Uzamili katika Sayansi ya Utekelezaji wa Afya ya Umma katika Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili. Ninafanya utafiti kuhusu ufanisi wa uchunguzi wa kifua kikuu wa kimfumo katika Wilaya ya Temeke, Dar es Salaam.

Lengo la Utafiti: Utafiti huu unalenga kupima ufanisi, uadilifu wa uandikishaji, na vikwazo na visaidizi vya operesheni vya programu ya uchunguzi wa TB wa kimfumo katika vituo vya afya vya Wilaya ya Temeke. Ushiriki wako unathaminiwa sana kwani inaaminika kuwa una taarifa muhimu zitakazochangia kwa kiasi kikubwa kufikia malengo ya utafiti huu.

Usiri: Tafadhali uwe na uhakika kuwa taarifa zote utakazotoa zitashughulikiwa kwa usiri mkubwa. Ufikiaji wa taarifa hizi utazuiliwa kwa watu walio moja kwa moja wanaohusika na utafiti huu. Jina lako au taarifa nyingine yoyote inayokutambulisha haitafichuliwa.

Mahitaji ya Kushiriki: Ikiwa utakubali kushiriki, utaulizwa kujibu maswali kadhaa yanayohusiana na uzoefu wako na mtazamo kuhusu mchakato wa uchunguzi wa TB wa kimfumo. Zaidi ya hayo, kutegemeana na nafasi yako katika kituo cha afya, ushiriki wako unaweza kuhusisha shughuli zinazohusiana na uchimbaji wa data. Tafadhali ufahamu

kwamba, kwa lengo la kukusanya data kwa usahihi na uchambuzi, mahojiano yatakayofanyika kama sehemu ya utafiti huu yatarekodiwa kwa njia ya sauti.

Faida: Maoni yako yatatoa mtazamo muhimu kuhusu mazoea ya sasa, changamoto, na mtazamo unaokuzunguka programu ya uchunguzi wa TB. Taarifa hii ni muhimu kwa kutambua mikakati ya kuboresha ufanisi wa juhudi za kudhibiti TB, hivyo kuchangia matokeo bora ya afya ya umma.

Muda wa Mahojiano: Mahojiano hayatazidi dakika 40. Tafadhali jisikie huru kueleza maoni yako kwa uwazi, kwani hakuna majibu sahihi au yasiyo sahihi.

Haki ya Kujitoa: Ushiriki wako katika utafiti huu ni hiari yako kabisa. Unaweza kuchagua kutoshiriki au kujitoa wakati wowote, hata baada ya kutoa ridhaa, bila madhara yoyote.

Madhara: Hatutarajii madhara yoyote kwako au familia yako kutokana na kushiriki kwako katika utafiti huu.

Mtu wa Kuwasiliana Naye: Iwapo una maswali au wasiwasi kuhusu utafiti huu, usisite kuwasiliana na mtafiti mkuu, David Solomon, kutoka MUHAS, S.L.P 65001, Dar es Salaam, namba ya simu 0767834638. Iwapo una maswali kuhusu haki zako kama mshiriki, tafadhali wasiliana na Dr. Nahya Masoud, Mwenyekiti wa Kamati ya Utafiti na Uchapishaji, MUHAS, S.L.P 65001, Dar es Salaam - Tanzania, Tel. +25521503026.

Sentensi ya Uhihari

	Yes	No
Naelewa lengo kuu la utafiti huu.		
Nimefahamishwa kuhusu mbinu zitakazotumika na watafiti.		
Nimejulishwa kuhusu faida na hatari zozote zinazoweza kutokea kutokana na kushiriki.		
Nimepata fursa ya kuuliza na kupata majibu ya maswali yangu kuhusu utafiti.		
Najua nani wa kuwasiliana naye kwa maswali zaidi au wasiwasi kuhusu utafiti.		
Nimesoma na kuelewa taarifa zilizomo kwenye fomu hii ya ridhaa.		

Najua naweza kujiondoa kwenye utafiti wakati wowote bila matokeo yoyote kwangu.		
Nafahamu kuwa nitapokea nakala iliyosainiwa na kudhibitishwa ya fomu hii ya ridhaa kwa kumbukumbu zangu.		
Nimepata fursa ya kuuliza na kupata majibu ya maswali yangu kuhusu utafiti.		
Najua nani wa kuwasiliana naye kwa maswali zaidi au wasiwasi kuhusu utafiti		
Nimesoma na kuelewa taarifa zilizomo kwenye fomu hii ya ridhaa.		
Najua naweza kujiondoa kwenye utafiti wakati wowote bila matokeo yoyote kwangu.		
Nafahamu kuwa nitapokea nakala iliyosainiwa ya fomu hii ya ridhaa kwa kumbukumbu zangu		

Saini

Unakubali kushiriki?

Mshiriki: Ndiyo / Hapana

Mimi,_____, nimesoma maudhui ya fomu hii. Maswali yangu yamejibiwa, na nakubali kushiriki katika utafiti huu.

Saini ya Mshiriki: _____

Saini ya Msaidizi wa Utafiti: _____

Tarehe ya Kusaini Ridhaa: _____

(*Tafadhali hakikisha unapokea nakala ya fomu hii ya ridhaa kwa kumbukumbu zako*)

Appendix III: Data Abstraction Form

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS

Data Abstraction Form

Health Facility Study ID: _____

Date of Data Collection:____/____/_____

Section 1: Facility Information

1. Ward: _____
2. Facility Name: _____
3. Facility Type: (Circle one) Hospital / Health Center / Dispensary
4. Entry Point Name:_____(e.g., OPD, MCH Clinic, TB Clinic)

Section 2: Hospital Registry Data

Please fill in the following details from the hospital registry for the past 12 months:

4. Total Number of Patient Entries in the hospital registry for the past 12 months: _____
5. Please indicate the number of patients registered in the hospital registry for each age group for the past 12 months:
    - 0-4 years: _____
    - 5-9 years: _____
    - 10-14 years: _____

- 15-19 years: _____
- 20-24 years: _____
- 25-29 years: _____
- 30-34 years: _____
- 35-39 years: _____
- 40-44 years: _____
- 45-49 years: _____
- 50-54 years: _____
- 55-59 years: _____
- 60-64 years: _____
- 65-69 years: _____
- 70-74 years: _____
- 75-79 years: _____
- 80 years and above: _____

6. Please indicate the number of patients registered in the hospital registry by gender for the past 12 months:
    - Male:_____(Total number of male patients)
    - Female:_____(Total number of female patients)
7. Please indicate the number of patients registered in the hospital registry by HIV status for the past 12 months:
    - HIV Positive:_____(Total number of HIV positive patients)
    - HIV Negative:_____(Total number of HIV negative patients)
8. Please specify the total number of individuals in the hospital registry in each category for the past 12 months:
    - General population and high-risk groups excluding those living with HIV (10 years and older): _____
    - Adults and adolescents living with HIV (10 years and older): _____
    - Children without HIV (less than 10 years): _____
    - Children with HIV (less than 10 years): _____

Section 3: Symptom Screening Data

For each category below, please fill out the detailed information regarding the number of patients who presented with the following symptoms over the past 12 months:

9. **General Population and High-Risk Groups (Excluding Those Living with HIV):**
    - Total Number of Patients with for Persistent Cough (Cough lasting more than two weeks): _____
    - Total Number of Patients with for Fever: _____
    - Total Number of Patients with for Night Sweats (Excessive sweating during sleep unrelated to an overheated environment): _____
    - Total Number of Patients with for Unexplained Weight Loss: _____
    - Total Number of Patients with for Other Symptoms (e.g., hemoptysis, pleuritic pain, lymphadenopathy): _____
10. **Adults and Adolescents Living with HIV:**
    - Total Number of Patients with for Persistent Cough (Cough lasting more than two weeks): _____
    - Total Number of Patients with for Fever: _____
    - Total Number of Patients with for Night Sweats (Excessive sweating during sleep unrelated to an overheated environment): _____
    - Total Number of Patients with for Unexplained Weight Loss weight loss: _____
    - Total Number of Patients with for Other Symptoms (e.g., abdominal pain, altered mental status) _____
11. **Children without HIV:**
    - Total Number of Patients with for Persistent Cough (Cough lasting more than two weeks): _____

- Total Number of Patients with for Fever (An elevated body temperature indicating potential infection): ___
- Total Number of Patients with for Night Sweats (Excessive sweating during sleep unrelated to an overheated environment): _____
- Total Number of Patients with for Weight Loss/Failure to Gain Weight/Stunting in Children (Unexplained weight loss or inadequate growth in children): _____
- Total Number of Patients with for Other Symptoms (Specify other symptoms) _____

12. Children with HIV:

- Total Number of Patients with for Persistent Cough (Cough lasting more than two weeks): _____
- Total Number of Patients with for Fever: _____
- Total Number of Patients with for Night Sweats (Excessive sweating during sleep unrelated to an overheated environment): _____
- Total Number of Patients with for Weight Loss/Failure to Gain Weight/Stunting in Children (Unexplained weight loss or inadequate growth in children): _____
- Total Number of Patients with for Other Symptoms (Specify other symptoms) _____

13. Overall Total Number of Patients with at Least One Symptom in the Past 12 Months: _____

Section 4: Risk Factor Assessment

For each category, detail the total number of individuals assessed for TB risk factors and the specific count identified with each risk factor over the past 12 months:

14. **General Population and High-Risk Groups (Excluding Those Living with HIV):**
    - Total Number Assessed for Risk Factors: _____
    - Total Number with Recent Contact with TB Case: _____
    - Total Number with History of Previous TB Treatment: _____
    - Total Number with Underlying Health Conditions (Specify conditions such as diabetes, malnutrition, chronic renal failure, etc.): _____
    - Total Number with Other Risk Factors (Specify any additional risk factors assessed such as healthcare worker, living in crowded conditions, exposure to silica, smoking, etc.): _____
15. **Adults and Adolescents Living with HIV:**
    - Total Number Assessed for Risk Factors: _____
    - Total Number with Recent Contact with TB Case: _____
    - Total Number with History of Previous TB Treatment: _____
    - Total Number with Underlying Health Conditions (Specify conditions such as diabetes, malnutrition, chronic renal failure, etc.): _____
    - Total Number with Other Risk Factors (Specify any additional risk factors assessed such as healthcare worker, living in crowded conditions, exposure to silica, smoking, etc.): _____
16. **Children without HIV:**
    - Total Number Assessed for Risk Factors: _____
    - Total Number with Recent Contact with TB Case: _____
    - Total Number with History of Previous TB Treatment: _____

- Total Number with Underlying Health Conditions (Specify conditions such as diabetes, malnutrition, chronic renal failure, etc.): _____
- Total Number with Other Risk Factors (Specify any additional risk factors assessed such as healthcare worker, living in crowded conditions, exposure to silica, smoking, etc.): _____

17. Children with HIV:

- Total Number Assessed for Risk Factors: _____
- Total Number with Recent Contact with TB Case: _____
- Total Number with History of Previous TB Treatment: _____
- Total Number with Underlying Health Conditions (Specify conditions such as diabetes, malnutrition, chronic renal failure, etc.): _____
- Total Number with Other Risk Factors (Specify any additional risk factors assessed such as healthcare worker, living in crowded conditions, exposure to silica, smoking, etc.): _____

18. Total Number of Individuals with at Least One Identified Risk Factor in the Past 12 Months: _____

Section 5: Presumptive TB register data

Please fill in the following details from the presumptive TB register for the past 12 months:

19. Total Number of patient entries in the presumptive TB register for the past 12 months: _____
20. Please indicate the number of patients registered in the presumptive TB register for each age group for the past 12 months:
    - 0-4 years: _____
    - 5-9 years: _____
    - 10-14 years: _____
    - 15-19 years: _____
    - 20-24 years: _____
    - 25-29 years: _____

- 30-34 years: _____
- 35-39 years: _____
- 40-44 years: _____
- 45-49 years: _____
- 50-54 years: _____
- 55-59 years: _____
- 60-64 years: _____
- 65-69 years: _____
- 70-74 years: _____
- 75-79 years: _____
- 80 years and above: _____

21. Please indicate the number of patients registered in the presumptive TB register by gender for the past 12 months:
    - Male:_____(Total number of male patients)
    - Female:_____(Total number of female patients)
22. Please indicate the number of patients registered in the presumptive TB register by HIV status for the past 12 months:
    - HIV Positive:_____(Total number of HIV positive patients)
    - HIV Negative:_____(Total number of HIV negative patients)
23. Please specify the total number of individuals in the presumptive TB register in each category for the past 12 months:
    - General population and high-risk groups excluding those living with HIV (10 years and older): _____
    - Adults and adolescents living with HIV (10 years and older): _____
    - Children without HIV (less than 10 years): _____
    - Children with HIV (less than 10 years): _____

Section 6: Completeness of Documentation in Presumptive TB Register

14. Total Number of Records Reviewed: _____

15. Number of Records with Complete Documentation: (Based on 29 essential variables) ____
16. Variables Missing Data and Quantity Identified for Each Variable: (List the variables and corresponding numbers). _____

Thank you

Annex IV: Interview Guide-Healthcare Providers

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS

Interview Guide-Health Care Providers

Healthcare provider study ID: _____

Date of Data Collection:____/____/_____

Participant's information

Occupation	
Years in the current position	
Age	
Gender	
Marital status	
highest level of education	
Interview Start time	
Interview finish time	

Section 1: Registration Strategies

1. How are patients registered for TB screening at your facility? Please describe the process.

   Probe:

   - *What factors facilitate effective registration for TB screening?*
   - *What obstacles hinder efficient registration for TB screening?*

Section 2: Information Accessibility

2. How is information about TB screening disseminated among patients and healthcare workers?

   Probe:

- *What strategies have been successful in ensuring information accessibility?*
- *What are the main challenges in accessing TB screening information?*

Section 3: Impact Perception

3. As per your perspective, what is the impact of TB screening TB case identification and on patient outcomes?

   Probe:

   - *Can you share instances where the TB screening significantly impacted patient outcomes?*
   - *What aspects of the TB screening could be improved to enhance its effectiveness?*

Section 4: Facility Layout.

4. How does the layout of the health facility influence the TB screening process and register use?

   Probe:

   - *Are there layout features that facilitate TB screening in your health facility?*
   - *What layout aspects hinder effective TB screening in your health facility?*

Section 5: Local Health Policies

5. As per your experience, how do local health policies affect TB screening practices?

   Probe:

   - *Which policies have supported TB screening efforts in your health facility?*
   - *Have any policies limited TB screening effectiveness in your health facility?*

Section 6: Cultural Factors

6. What cultural factors influence TB screening participation?

   Probe:

   - *How have cultural aspects positively influenced TB screening?*
   - *What cultural challenges have been encountered?*

Section 7: Community Engagement

7. Could you describe the community engagement strategies used for TB screening, implemented in your health facility?

   Probe:

- *What community engagement efforts have been particularly successful?*
- *Where have community engagement efforts fallen short?*

Section 8: Data Entry Consistency

8. As per your knowledge, how is data entry consistency into the TB register maintained, in your health facility?

   Probe:

   - *What practices ensure data entry consistency?*
   - *What are the common challenges in maintaining data entry consistency?*

Section 9: Technical Support

9. As per your experience, what technical support is available for the TB register management?

   Probe:

   - *How does technical support facilitate the TB register's efficient operation?*
   - *What technical challenges have been encountered?*

Section 10: Staff Feedback Mechanisms

10. As per your experience, how is staff feedback on the TB register collected and used, in your health facility?

    Probe:

    - *How has staff feedback led to improvements in the TB screening process?*
    - *What challenges exist in collecting or implementing staff feedback?*

Section 11: Resource Availability

11. Are resources for maintaining the TB register sufficient, in your health facility/district?

    Probe:

    - *How are resources effectively used in TB register maintenance?*
    - *What resource limitations have been faced?*

Section 12: Staff Workload

12. How does staff workload impact TB register use in your health facility/district?

    Probe:

    - *What strategies help manage workload to facilitate TB register use?*

- *What workload-related issues affect TB register utilization?*

Section 13: Training and Guidelines Accessibility

13. How accessible are training and guidelines for TB register use to staff in your health facility/district?

    Probe:

    - *What training programs have been effective?*
    - *What challenges are faced in accessing or implementing guidelines?*

Section 14: System Integration

14. How well is the TB register integrated into existing health facility workflows?

    Probe

    - *Can you provide examples of successful integration?*
    - *What barriers have been encountered in integrating the TB register?*

Section 15: Staff Motivation and Perception

15. What motivates staff to use the TB register, and how do they perceive its value in your health facility/district?

    Probe:

    - *What aspects of the TB register work motivate staff?*
    - *Are there any misconceptions or negative perceptions about the TB register?*

Thank you for your cooperation

Annex V: Interview Guide: Patients

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS

Interview Guide-Patients

Healthcare provider study ID: _____

Date of Data Collection:____/____/_____

Participant's information

Occupation	
Years in the current position	
Age	
Gender	
Marital status	
highest level of education	
Interview Start time	
Interview finish time	

Section 1: Experience with TB Screening

1. Can you share your experience with the TB screening process at the health facility?

   Probe:

   - *In your perspective, what aspects of the TB screening were helpful?*
   - *In your perspective, were there any parts of the screening process that were challenging or unpleasant?*

Section 2: Access Barriers

2. As per your experience, what challenges have you faced when trying to access TB screening services?

Probe:

- *How have you or others managed to overcome these barriers?*
- *Are there any ongoing challenges that make accessing TB screening difficult?*

Section 3: Information Accessibility

3. As per your experience, how did you receive information about TB and TB screening?

   Probe:

   - *Is the information provided easy to understand and accessible?*
   - *How could information about TB screening be made more accessible or clearer?*

Section 4: Economic Factors

4. As per your experience, how did your economic condition affect your ability to seek and complete TB screening?

   Probe:

   - *Are there any financial assistance or support systems that have helped you with TB screening?*
   - *What financial challenges have made it difficult for you to access TB screening?*

Section 5: Cultural and Social Factors

5. As per your experience, are there any cultural or social factors influenced your decision to seek TB screening?

   Probe:

   - *What are cultural or social supports that encourage TB screening?*
   - *Have you encountered any cultural or social barriers to TB screening?*

Section 6: Experience with Healthcare Staff

6. As per your experience, can you describe your interactions with healthcare staff during the TB screening process?

   Probe:

- *Have you had positive experiences with healthcare staff that made the screening process easier?*
- *Have there been any difficulties or misunderstandings with staff during TB screening?*

Section 7: Community Engagement:

7. As per your experience, is TB screening and awareness discussed or promoted within your community?

   Probe:

   - *Are there areas where you feel the community could be more informed or engaged regarding TB screening?*

Section 8: Health Facility Environment

8. As per your experience, how does the environment and layout of the health facility affect your TB screening experience?

   Probe:

   - Have you faced any challenges related to the health facility's environment or layout?

Thank you for your cooperation

Annex VI: Data Extraction form - Swahili

CHUO KIKUU CHA AFYA NA SAYANSI VISHIRIKA MUHIMBILI

KURUGENZI YA UTAFITI NA MACHAPISHO

Fomu ya Uondoaji wa Data

Kitambulisho cha Kituo cha Afya: _____

Tarehe ya Kukusanya Data:_____/_____

Sehemu ya 1: Taarifa za Kituo

1. Kata: _____
2. Jina la kituo: _____
3. Aina ya Kituo: (Mzunguko wa kwanza) Hospitali / Kituo cha Afya / Zahanati
4. Jina la Mahali pa Kuingia:_____(k.m., OPD, Kliniki ya MCH, Kliniki ya Kifua Kikuu)

Sehemu ya 2: Data ya Usajili wa Hospitali

Tafadhali jaza maelezo yafuatayo kutoka kwa sajili ya hospitali kwa muda wa miezi 12 iliyopita:

4. Jumla ya Idadi ya Maingizo ya Wagonjwa katika sajili ya hospitali kwa muda wa miezi 12 iliyopita: _____
5. Tafadhali onyesha idadi ya wagonjwa waliosajiliwa katika sajili ya hospitali kwa kila kikundi cha umri kwa muda wa miezi 12 iliyopita:
    - Miaka 0-4: _____
    - Miaka 5-9: _____
    - Miaka 10-14: _____

- Miaka 15-19: _____
- Miaka 20-24: _____
- Miaka 25-29: _____
- Miaka 30-34: _____
- Miaka 35-39: _____
- Miaka 40-44: _____
- Miaka 45-49: _____
- Miaka 50-54: _____
- Miaka 55-59: _____
- Miaka 60-64: _____
- Miaka 65-69: _____
- Miaka 70-74: _____
- Miaka 75-79: _____
- Miaka 80 na zaidi: _____

6. Tafadhali onyesha idadi ya wagonjwa waliosajiliwa katika sajili ya hospitali kwa jinsia kwa muda wa miezi 12 iliyopita:
    - Mwanaume:_____(Jumla ya idadi ya wagonjwa wanaume)
    - Wanawake:_____(Jumla ya idadi ya wagonjwa wa kike)
7. Tafadhali onyesha idadi ya wagonjwa waliosajiliwa katika sajili ya hospitali kwa hali ya VVU kwa muda wa miezi 12 iliyopita:
    - Mwenye VVU:_____(Jumla ya idadi ya wagonjwa walio na VVU)
    - Haina VVU:_____(Jumla ya idadi ya wagonjwa wasio na VVU)
8. Tafadhali bainisha jumla ya idadi ya watu walio katika sajili ya hospitali katika kila aina kwa muda wa miezi 12 iliyopita:
    - Idadi ya watu kwa ujumla na vikundi vilivyo katika hatari kubwa ukiondoa wale wanaoishi na VVU (miaka 10 na zaidi): _
    - Watu wazima na vijana wanaoishi na VVU (miaka 10 na zaidi): _____
    - Watoto wasio na VVU (chini ya miaka 10): _____
    - Watoto walio na VVU (chini ya miaka 10): _____

Sehemu ya 3: Data ya Uchunguzi wa Dalili

Kwa kila aina iliyo hapa chini, tafadhali jaza maelezo ya kina kuhusu idadi ya wagonjwa waliowasilisha dalili zifuatazo katika kipindi cha miezi 12 iliyopita:

9. **Idadi ya Jumla na Vikundi vya Hatari Kubwa (Ukiondoa Wanaoishi na VVU):**
    - Jumla ya Idadi ya Wagonjwa walio na Kikohozi kisichobadilika (Kikohozi hudumu zaidi ya wiki mbili): _____
    - Jumla ya Idadi ya Wagonjwa walio na Homa: _____
    - Jumla ya Idadi ya Wagonjwa walio na Jasho la Usiku (Kutokwa na jasho kupita kiasi wakati wa kulala lisilohusiana na mazingira ya joto kupita kiasi):

      _____
    - Jumla ya Idadi ya Wagonjwa walio na Kupunguza Uzito Kusikoelezeka:

      _____
    - Jumla ya Idadi ya Wagonjwa walio na kwa Dalili Nyingine (k.m., hemoptysis, maumivu ya pleuriti, limfadenopathia): _
10. **Watu Wazima na Vijana Wanaoishi na VVU:**
    - Jumla ya Idadi ya Wagonjwa walio na Kikohozi kisichobadilika (Kikohozi hudumu zaidi ya wiki mbili): _____
    - Jumla ya Idadi ya Wagonjwa walio na Homa: _____
    - Jumla ya Idadi ya Wagonjwa walio na Jasho la Usiku (Kutokwa na jasho kupita kiasi wakati wa kulala lisilohusiana na mazingira ya joto kupita kiasi):

      _____
    - Jumla ya Idadi ya Wagonjwa kwa Kupunguza Uzito Kusioelezeka:

      _____
    - Jumla ya Idadi ya Wagonjwa wenye Dalili Zingine (k.m., maumivu ya tumbo, mabadiliko ya hali ya akili) _____

11. Watoto wasio na VVU:

- Jumla ya Idadi ya Wagonjwa walio na Kikohozi kisichobadilika (Kikohozi hudumu zaidi ya wiki mbili): _____
- Jumla ya Idadi ya Wagonjwa walio na Homa (Joto la juu la mwili linaloonyesha uwezekano wa kuambukizwa): ____
- Jumla ya Idadi ya Wagonjwa walio na Jasho la Usiku (Kutokwa na jasho kupita kiasi wakati wa kulala lisilohusiana na mazingira ya joto kupita kiasi):

  _____
- Jumla ya Idadi ya Wagonjwa wa Kupunguza Uzito/Kushindwa Kuongeza Uzito/Kudumaa kwa Watoto (Kupungua uzito kusikoelezeka au ukuaji duni wa watoto): _____
- Jumla ya Idadi ya Wagonjwa walio na Dalili Nyingine (Bainisha dalili zingine) _____

12. Watoto wenye VVU:

- Jumla ya Idadi ya Wagonjwa walio na Kikohozi kisichobadilika (Kikohozi hudumu zaidi ya wiki mbili): _____
- Jumla ya Idadi ya Wagonjwa walio na Homa: _____
- Jumla ya Idadi ya Wagonjwa walio na Jasho la Usiku (Kutokwa na jasho kupita kiasi wakati wa kulala lisilohusiana na mazingira ya joto kupita kiasi):

  _____
- Jumla ya Idadi ya Wagonjwa wa Kupunguza Uzito/Kushindwa Kuongeza Uzito/Kudumaa kwa Watoto (Kupungua uzito kusikoelezeka au ukuaji duni wa watoto): _____
- Jumla ya Idadi ya Wagonjwa walio na Dalili Nyingine (Bainisha dalili zingine) _____

13. Kwa Jumla Jumla ya Idadi ya Wagonjwa wenye Angalau Dalili Moja Katika Miezi 12 Iliyopita: _____

Sehemu ya 4: Tathmini ya Sababu za Hatari

Kwa kila aina, eleza jumla ya idadi ya watu waliotathminiwa kwa sababu za hatari za TB na hesabu mahususi iliyobainishwa na kila sababu ya hatari katika kipindi cha miezi 12 iliyopita:

14. **Idadi ya Jumla na Vikundi vya Hatari Kubwa (Ukiondoa Wanaoishi na VVU):**
    - Jumla ya Nambari Iliyotathminiwa kwa Sababu za Hatari: _____
    - Jumla ya Nambari ya Kuwasiliana na Kifua Kikuu Hivi Karibuni: _____
    - Jumla ya Nambari yenye Historia ya Matibabu ya Kifua Kikuu ya Awali: _____
    - Jumla ya Nambari yenye Masharti ya Kiafya (Bainisha hali kama vile kisukari, utapiamlo, kushindwa kwa figo sugu, n.k.): _____
    - Jumla ya Nambari yenye Mambo Mengine ya Hatari (Bainisha vipengele vyovyote vya hatari vilivyotathminiwa kama vile mfanyakazi wa afya, kuishi katika hali ya msongamano wa watu, kuathiriwa na silika, kuvuta sigara, n.k.): _____
15. **Watu Wazima na Vijana Wanaoishi na VVU:**
    - Jumla ya Nambari Iliyotathminiwa kwa Sababu za Hatari: _____
    - Jumla ya Nambari ya Kuwasiliana na Kifua Kikuu Hivi Karibuni: _____
    - Jumla ya Nambari yenye Historia ya Matibabu ya Kifua Kikuu ya Awali: _____
    - Jumla ya Nambari yenye Masharti ya Kiafya (Bainisha hali kama vile kisukari, utapiamlo, kushindwa kwa figo sugu, n.k.): _____
    - Jumla ya Nambari yenye Mambo Mengine ya Hatari (Bainisha vipengele vyovyote vya hatari vilivyotathminiwa kama vile mfanyakazi wa afya, kuishi

katika hali ya msongamano wa watu, kuathiriwa na silika, kuvuta sigara, n.k.):

_____

16. Watoto wasio na VVU:

- Jumla ya Nambari Iliyotathminiwa kwa Sababu za Hatari: _____
- Jumla ya Nambari ya Kuwasiliana na Kifua Kikuu Hivi Karibuni:

  _____
- Jumla ya Nambari yenye Historia ya Matibabu ya Kifua Kikuu ya Awali:

  _____
- Jumla ya Nambari yenye Masharti ya Kiafya (Bainisha hali kama vile kisukari, utapiamlo, kushindwa kwa figo sugu, n.k.): _____
- Jumla ya Nambari yenye Mambo Mengine ya Hatari (Bainisha vipengele vyovyote vya hatari vilivyotathminiwa kama vile mfanyakazi wa afya, kuishi katika hali ya msongamano wa watu, kuathiriwa na silika, kuvuta sigara, n.k.):

  _____

17. Watoto wenye VVU:

- Jumla ya Nambari Iliyotathminiwa kwa Sababu za Hatari: _____
- Jumla ya Nambari ya Kuwasiliana na Kifua Kikuu Hivi Karibuni:

  _____
- Jumla ya Nambari yenye Historia ya Matibabu ya Kifua Kikuu ya Awali:

  _____
- Jumla ya Nambari yenye Masharti ya Kiafya (Bainisha hali kama vile kisukari, utapiamlo, kushindwa kwa figo sugu, n.k.): _____
- Jumla ya Nambari yenye Mambo Mengine ya Hatari (Bainisha vipengele vyovyote vya hatari vilivyotathminiwa kama vile mfanyakazi wa afya, kuishi katika hali ya msongamano wa watu, kuathiriwa na silika, kuvuta sigara, n.k.):

  _____

18. Jumla ya Idadi ya Watu walio na Angalau Sababu Moja ya Hatari Iliyotambuliwa Katika Miezi 12 Iliyopita: _____

Sehemu ya 5: Data ya rejista ya Kifua Kikuu

Tafadhali jaza maelezo yafuatayo kutoka kwa rejista ya TB inayotarajiwa kwa muda wa miezi 12 iliyopita:

19. Jumla ya maingizo ya wagonjwa katika rejista ya TB ya kutegemewa kwa muda wa miezi 12 iliyopita: _____
20. Tafadhali onyesha idadi ya wagonjwa waliosajiliwa katika rejista ya TB inayotarajiwa kwa kila kikundi cha umri kwa muda wa miezi 12 iliyopita:
    - Miaka 0-4: _____
    - Miaka 5-9: _____
    - Miaka 10-14: _____
    - Miaka 15-19: _____
    - Miaka 20-24: _____
    - Miaka 25-29: _____
    - Miaka 30-34: _____
    - Miaka 35-39: _____
    - Miaka 40-44: _____
    - Miaka 45-49: _____
    - Miaka 50-54: _____
    - Miaka 55-59: _____
    - Miaka 60-64: _____
    - Miaka 65-69: _____
    - Miaka 70-74: _____
    - Miaka 75-79: _____
    - Miaka 80 na zaidi: _____
21. Tafadhali onyesha idadi ya wagonjwa waliosajiliwa katika rejista ya TB inayotarajiwa kwa jinsia kwa muda wa miezi 12 iliyopita:
    - Mwanaume:_____(Jumla ya idadi ya wagonjwa wanaume)

- Mwanamke:_____(Jumla ya idadi ya wagonjwa wa kike)

22. Tafadhali onyesha idadi ya wagonjwa waliosajiliwa katika rejista ya TB inayotarajiwa kwa hali ya VVU kwa muda wa miezi 12 iliyopita:
    - Mwenye VVU:_____(Jumla ya idadi ya wagonjwa walio na VVU)
    - Haina VVU:_____(Jumla ya idadi ya wagonjwa wasio na VVU)
23. Tafadhali bainisha jumla ya idadi ya watu binafsi katika rejista ya TB ya kutegemewa katika kila kategoria kwa muda wa miezi 12 iliyopita:
    - Idadi ya watu kwa ujumla na makundi yaliyo katika hatari kubwa ukiondoa wale wanaoishi na VVU (miaka 10 na zaidi): _
    - Watu wazima na vijana wanaoishi na VVU (miaka 10 na zaidi): _____
    - Watoto wasio na VVU (chini ya miaka 10): _____
    - Watoto walio na VVU (chini ya miaka 10): _____

Sehemu ya 6: Ukamilifu wa Nyaraka katika Rejesta ya Kifua Kikuu cha Dharura

14. Jumla ya Rekodi Zilizokaguliwa: _____
15. Idadi ya Rekodi zilizo na Hati Kamili: (Kulingana na vigeu 29 muhimu) _____
16. Vigezo Vilivyokosekana Data na Kiasi Kilichotambuliwa kwa Kila Kigezo: (Orodhesha vigeu na nambari zinazolingana). _____

Asante

Apenndix VII: Interview Guide-Healthcare Providers-Swahili

CHUO KIKUU CHA AFYA NA SAYANSI VISHIRIKA MUHIMBILI
KURUGENZI YA UTAFITI NA MACHAPISHO

Mwongozo wa Mah ıma za Afya
Namba ya ı
Tarehe ya Kukusanya Data:_____/_____

Taarifa za mshiriki

Kazi	
Miaka katika nafasi ya sasa	
Umri	
Jinsia	
Hali ya ndoa	
kiwango cha juu cha elimu	
Muda wa Kuanza Mahojiano	
Muda wa kumaliza mahojiano	

Sehemu ya 1: Mikakati ya Usajili

1. Je, wagonjwa wamesajiliwa vipi kwa uchunguzi wa TB kwenye kituo chako? Tafadhali eleza mchakato.

   Uchunguzi:

   - *Ni mambo gani huwezesha usajili wa ufanisi kwa uchunguzi wa TB?*
   - *Ni vikwazo gani vinazuia usajili wa ufanisi kwa uchunguzi wa TB?*

Sehemu ya 2: Upatikanaji wa Taarifa

2. Je, taarifa kuhusu uchunguzi wa TB husambazwa vipi miongoni mwa wagonjwa na wahudumu wa afya?

   Uchunguzi:

   - *Je, ni mikakati gani imefanikiwa katika kuhakikisha upatikanaji wa taarifa?*
   - *Je, ni changamoto gani kuu katika kupata taarifa za uchunguzi wa TB?*

Sehemu ya 3: Mtazamo wa Athari

3. Kulingana na mtazamo wako, ni nini athari za utambuzi wa kisa cha TB na matokeo ya mgonjwa?

   Uchunguzi:

   - *Je, unaweza kushiriki matukio ambapo uchunguzi wa TB uliathiri sana matokeo ya mgonjwa?*
   - *Ni vipengele vipi vya uchunguzi wa TB vinaweza kuboreshwa ili kuongeza ufanisi wake?*

Sehemu ya 4: Mpangilio wa Kituo.

4. Je, mpangilio wa kituo cha afya unaathiri vipi mchakato wa uchunguzi wa TB na matumizi ya rejista?

   Uchunguzi:

   - *Je, kuna vipengele vya mpangilio vinavyowezesha uchunguzi wa TB katika kituo chako cha afya?*
   - *Je, ni vipengele gani vya mpangilio vinazuia uchunguzi bora wa TB katika kituo chako cha afya?*

Sehemu ya 5: Sera za Afya za Mitaa

5. Kulingana na uzoefu wako, sera za afya za eneo lako zinaathiri vipi mazoea ya uchunguzi wa TB?

   Uchunguzi:

   - *Ni sera gani zimesaidia juhudi za uchunguzi wa TB katika kituo chako cha afya?*
   - *Je, kuna sera zozote zinazopunguza ufanisi wa uchunguzi wa TB katika kituo chako cha afya?*

Sehemu ya 6: Mambo ya Utamaduni

6. Ni mambo gani ya kitamaduni yanayoathiri ushiriki wa uchunguzi wa TB?

   Uchunguzi:

   - *Je, vipengele vya kitamaduni vimeathiri vipi uchunguzi wa TB?*
   - *Ni changamoto gani za kitamaduni zimekabiliwa?*

Sehemu ya 7: Ushirikiano wa Jamii

7. Je, unaweza kuelezea mikakati ya ushirikishwaji wa jamii inayotumika kupima kifua kikuu, inayotekelezwa katika kituo chako cha afya?

   Uchunguzi:

   - *Je, ni juhudi gani za kushirikisha jamii zimefanikiwa hasa?*
   - *Juhudi za kushirikisha jamii zimepungua wapi?*

Sehemu ya 8: Uthabiti wa Uingizaji Data

8. Kulingana na ufahamu wako, uthabiti wa uwekaji data kwenye rejista ya TB hudumishwa vipi, katika kituo chako cha afya?

   Uchunguzi:

   - *Ni mazoea gani yanahakikisha uthabiti wa uwekaji data?*
   - *Je, ni changamoto zipi za kawaida katika kudumisha uthabiti wa uwekaji data?*

Sehemu ya 9: Msaada wa Kiufundi

9. Kulingana na uzoefu wako, ni usaidizi gani wa kiufundi unaopatikana kwa usimamizi wa rejista ya TB?

   Uchunguzi:

   - *Je, usaidizi wa kiufundi unawezeshaje utendakazi bora wa rejista ya TB?*
   - *Ni changamoto gani za kiufundi zimekabiliwa?*

Sehemu ya 10: Mbinu za Maoni ya Wafanyakazi

10. Kulingana na uzoefu wako, maoni ya wafanyakazi kuhusu rejista ya TB yanakusanywa na kutumika vipi katika kituo chako cha afya?

   Uchunguzi:

   - *Je, maoni ya wafanyakazi yamesaidia vipi kuboresha mchakato wa uchunguzi wa TB?*
   - *Ni changamoto zipi zilizopo katika kukusanya au kutekeleza maoni ya wafanyakazi?*

Sehemu ya 11: Upatikanaji wa Rasilimali

11. Je, rasilimali za kutunza rejista ya TB zinatosha katika kituo/wilaya yako?

    Uchunguzi:

- *Je, rasilimali zinatumika kwa ufanisi vipi katika matengenezo ya rejista ya TB?*
- *Ni mapungufu gani ya rasilimali ambayo yamekabiliwa?*

Sehemu ya 12: Mzigo wa Wafanyakazi

12. Je, mzigo wa wafanyakazi unaathiri vipi matumizi ya rejista ya TB katika kituo/wilaya yako?

    Uchunguzi:

    - *Je, ni mikakati gani inayosaidia kudhibiti mzigo wa kazi ili kuwezesha matumizi ya rejista ya TB?*
    - *Ni masuala gani yanayohusiana na mzigo wa kazi yanaathiri utumiaji wa rejista ya TB?*

Sehemu ya 13: Mafunzo na Upatikanaji wa Miongozo

13. Je, mafunzo na miongozo ya matumizi ya rejista ya TB yanapatikana kwa kiasi gani kwa wafanyakazi katika kituo/wilaya yako?

    Uchunguzi:

    - *Ni programu gani za mafunzo zimekuwa na ufanisi?*
    - *Ni changamoto zipi zinakabiliwa na kupata au kutekeleza miongozo?*

Sehemu ya 14: Ujumuishaji wa Mfumo

14. Je, rejista ya TB imeunganishwa vizuri kwa kiasi gani katika utendakazi uliopo wa vituo vya afya?

    Chunguza

    - *Je, unaweza kutoa mifano ya kuunganishwa kwa mafanikio?*
    - *Je, ni vikwazo gani vimekumbana katika kuunganisha rejista ya TB?*

Sehemu ya 15: Motisha na Mtazamo wa Wafanyakazi

15. Ni nini kinachowasukuma wafanyakazi kutumia rejista ya TB, na wanaonaje thamani yake katika kituo/wilaya yako?

    Uchunguzi:

    - *Je, ni vipengele gani vya kazi ya rejista ya TB vinawapa motisha wafanyakazi?*
    - *Je, kuna imani potofu au mitazamo hasi kuhusu rejista ya TB?*

Asante kwa ushirikiano wako

Annex VIII: Interview Guide: Patients-Swahili

CHUO KIKUU CHA AFYA NA SAYANSI VISHIRIKA MUHIMBILI

KURUGENZI YA UTAFITI NA MACHAPISHO

Mwongozo wa Mahojiano-Wagonjwa

ID namba: _____

Tarehe ya Kukusanya Data:_____/_____

Taarifa za mshiriki

Kazi	
Miaka katika nafasi ya sasa	
Umri	
Jinsia	
Hali ya ndoa	
kiwango cha juu cha elimu	
Muda wa Kuanza Mahojiano	
Muda wa kumaliza mahojiano	

Sehemu ya 1: Uzoefu na Uchunguzi wa Kifua Kikuu

1. Je, unaweza kushiriki uzoefu wako na mchakato wa uchunguzi wa TB kwenye kituo cha afya?

   Uchunguzi:

   - *Kwa mtazamo wako, ni vipengele gani vya uchunguzi wa TB vilisaidia?*
   - *Kwa mtazamo wako, je, kulikuwa na sehemu zozote za mchakato wa uchunguzi ambazo zilikuwa na changamoto au zisizopendeza?*

Sehemu ya 2: Vizuizi vya Ufikiaji

2. Kulingana na uzoefu wako, ni changamoto gani umekumbana nazo wakati wa kujaribu kupata huduma za uchunguzi wa TB?

   Uchunguzi:

- *Je, wewe au wengine wamewezaje kushinda vizuizi hivi?*
- *Je, kuna changamoto zozote zinazoendelea zinazofanya upatikanaji wa uchunguzi wa TB kuwa mgumu?*

Sehemu ya 3: Upatikanaji wa Taarifa

3. Kulingana na uzoefu wako, ulipokeaje taarifa kuhusu uchunguzi wa TB na TB?
   Uchunguzi:
   - *Je, taarifa iliyotolewa ni rahisi kueleweka na kupatikana?*
   - *Je, habari kuhusu uchunguzi wa TB inawezaje kupatikana au kueleweka zaidi?*

Sehemu ya 4: Mambo ya Kiuchumi

4. Kulingana na uzoefu wako, hali yako ya kiuchumi iliathiri vipi uwezo wako wa kutafuta na kukamilisha uchunguzi wa TB?
   Uchunguzi:
   - *Je, kuna usaidizi wowote wa kifedha au mifumo ya usaidizi ambayo imekusaidia katika uchunguzi wa TB?*
   - *Ni changamoto zipi za kifedha zimefanya iwe vigumu kwako kupata uchunguzi wa TB?*

Sehemu ya 5: Mambo ya Utamaduni na Kijamii

5. Kulingana na uzoefu wako, kuna mambo yoyote ya kitamaduni au kijamii yaliyoathiri uamuzi wako wa kutafuta uchunguzi wa TB?
   Uchunguzi:
   - *Je, ni msaada gani wa kitamaduni au kijamii unaohimiza uchunguzi wa TB?*
   - *Je, umekumbana na vikwazo vyovyote vya kitamaduni au kijamii katika uchunguzi wa TB?*

Sehemu ya 6: Uzoefu na Wafanyakazi wa Huduma ya Afya

6. Kulingana na uzoefu wako, unaweza kuelezea mwingiliano wako na wahudumu wa afya wakati wa mchakato wa uchunguzi wa TB?
   Uchunguzi:

- *Je, umekuwa na uzoefu mzuri na wahudumu wa afya ambao ulifanya mchakato wa uchunguzi kuwa rahisi?*
- *Je, kumekuwa na matatizo au kutoelewana na wafanyakazi wakati wa uchunguzi wa TB?*

Sehemu ya 7: Ushirikiano wa Jamii:

7. Kulingana na uzoefu wako, je uchunguzi wa TB na uhamasishaji unajadiliwa au kukuzwa ndani ya jamii yako?

   Uchunguzi:

   - *Je, kuna maeneo ambayo unahisi jamii inaweza kuwa na taarifa zaidi au kushirikishwa kuhusu uchunguzi wa TB?*

Sehemu ya 8: Mazingira ya Kituo cha Afya

8. Kulingana na uzoefu wako, mazingira na mpangilio wa kituo cha afya unaathiri vipi uzoefu wako wa uchunguzi wa TB?

   Uchunguzi:

   - Je, umekumbana na changamoto zozote zinazohusiana na mazingira au mpangilio wa kituo cha afya?

Asante kwa ushirikiano wako

Annex IX: Approval of Ethical Clearance Certificate

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS AND INNOVATIONS

Ref. No.DA.282/298/01.C/2187 Date: 22/04/2024

MUHAS-REC-04-2024-2187
DR. DAVID SOLOMON
SHOOL OF PUBLIC HEALTH AND SOCIAL SCIENCES
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: ASSESSMENT OF THE IMPLEMENTATION OF SYSTEMATIC TUBERCULOSIS SCREENING AT HEALTH FACILITY LEVEL IN TEMEKE DISTRICT

Reference is made to the above heading,

I am pleased to inform you that the Chairperson has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 22/04/2024
EXPIRATION DATE OF APPROVAL: 22/04/2025

STUDY DESCRIPTION:
Purpose:
To conduct a process evaluation of the systematic tuberculosis (TB) screening program at each entry point in health facilities within Temeke District, focusing on reach, documentation fidelity, and the identification of operational facilitators and barriers.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided: https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%2015557.pdf and in the MUHAS archives.

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain Data Transfer Agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain Material Transfer Agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country.
8. Apply for and obtain permission to publish the results from National Institute for Medical Research. The application should be before submitting to a publisher and not concurrently through the email publications@nimr.or.tz.
9. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
10. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
11. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.

Dr. Nahya Salim Masoud,
Chairperson, MUHAS Research and Ethics Committee

Muhimbili University of Health and Allied Sciences
DIRECTOR
Research, Publications & Innovations
Box 65001

Annex X: Introduction letter

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – POSTGRADUATE STUDIES

In reply quote;
Ref. No. HD/MUH/T.786/2022 06TH May, 2024

Temeke Municipal Office of Health
P.O.Box 45232
DAR ES SALAAM.

Re: INTRODUCTION LETTER OF DAVID SOLOMON

The bearer of this letter is David Solomon (HD/MUH/T.786/2022), a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing MPH-Implimentation Science.

As part of him studies he intends to do a study titled: **"Assessment Of The Implimentation Of Systematic Tuberculosis Screening At Health Facility Level In Temeke District.**

The research has been approved by the Chairman of University Senate.

Kindly provide him the necessary assistance to facilitate the conduct of his research.

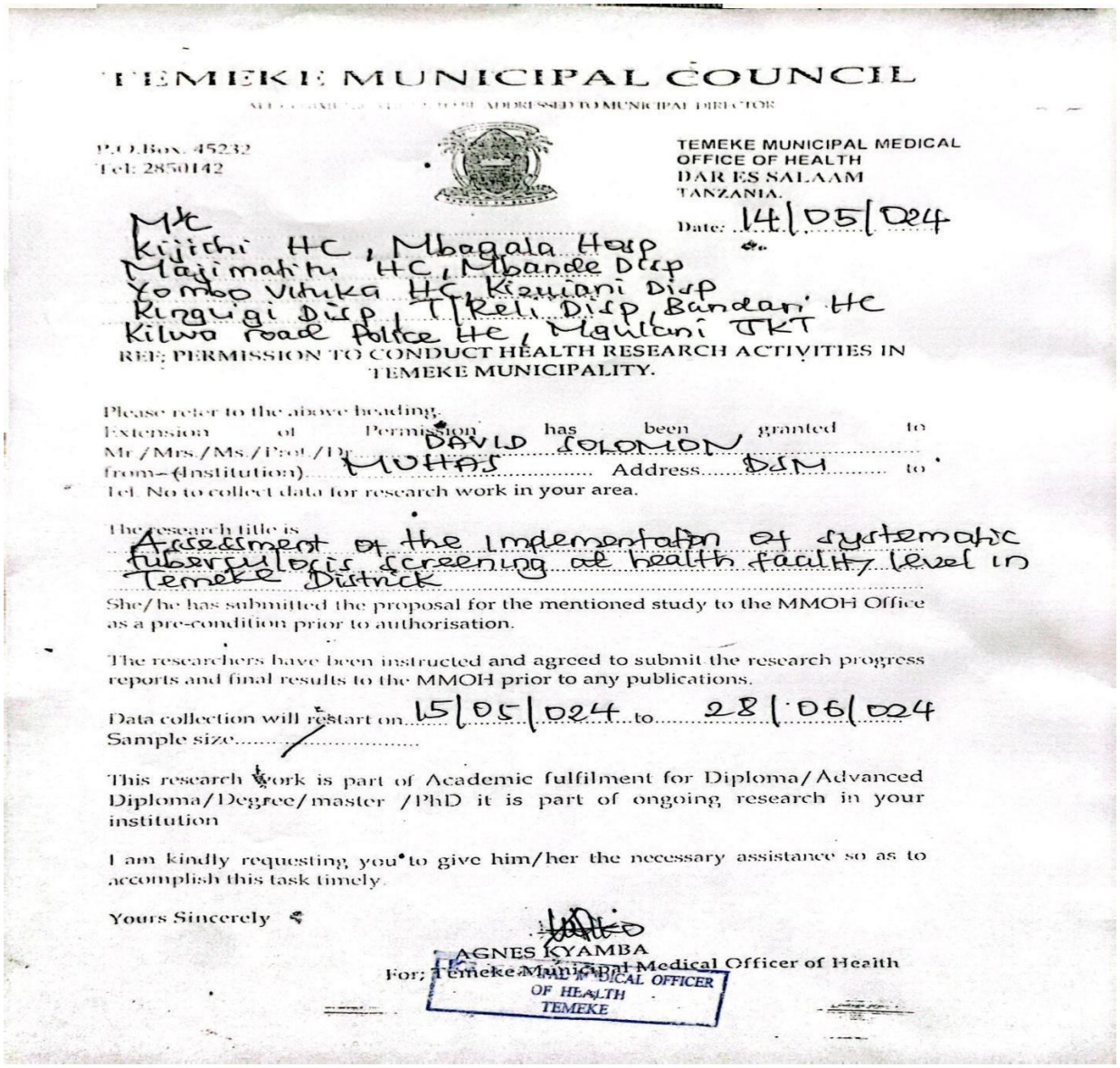
We thank you for your cooperation.

Ms. Victoria Mwanilwa
For: DIRECTOR, POSTGRADUATE STUDIES

c.c. David Solomon

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1015; Direct Line:+255-22-2151378;Telefax:+255-22-2150465;E-mail:dpgs@muhas.ac.tz;Web:https://www.muhas.ac.tz

Annex XI: Permission letter



TEMEKE MUNICIPAL COUNCIL

ALL CORRESPONDENCE SHOULD BE ADDRESSED TO MUNICIPAL DIRECTOR

P.O.Box. 45232
Tel: 2850142

TEMEKE MUNICIPAL MEDICAL
OFFICE OF HEALTH
DAR ES SALAAM
TANZANIA.

Date: 14/05/024

MK
Kijichi HC, Mbagala Disp
Majimatitu HC, Mbande Disp
Yombo Vituka HC, Kiwiani Disp
Kinguigi Disp, TRL Disp, Bandari HC
Kilwa road Police HC, Mgulani JKT

REF: PERMISSION TO CONDUCT HEALTH RESEARCH ACTIVITIES IN TEMEKE MUNICIPALITY.

Please refer to the above heading.
Extension of Permission has been granted to
Mr /Mrs./Ms./Prof./Dr. DAVID SOLOMON
from-(Institution) MUHAS Address DSM to
Tel. No to collect data for research work in your area.

The research title is
Assessment of the Implementation of systematic tuberculosis screening at health facility level in Temeke District

She/he has submitted the proposal for the mentioned study to the MMOH Office as a pre-condition prior to authorisation.

The researchers have been instructed and agreed to submit the research progress reports and final results to the MMOH prior to any publications.

Data collection will restart on 15/05/024 to 28/06/024
Sample size.....

This research work is part of Academic fulfilment for Diploma/Advanced Diploma/Degree/master /PhD it is part of ongoing research in your institution

I am kindly requesting you to give him/her the necessary assistance so as to accomplish this task timely.

Yours Sincerely

AGNES KYAMBA
For; Temeke Municipal Medical Officer of Health

MUNICIPAL MEDICAL OFFICER
OF HEALTH
TEMEKE