ASSESSMENT OF THE INTEGRATION OF TB AND HIV SERVICES AT DIFFERENT LEVELS OF SELECTED HEALTH FACILITIES IN ILALA DISTRICT, DAR-ES-SALAAM

Edna Bahaye Maselle

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ASSESSMENT OF THE INTEGRATION OF TB AND HIV SERVICES AT DIFFERENT LEVELS OF SELECTED HEALTH FACILITIES IN ILALA DISTRICT, DAR-ES-SALAAM.

By

Edna Bahaye Maselle, MBchB

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Public Health of

Muhimbili University of Health and Allied Sciences.
October, 2017

CERTIFICATION

The undersigned certifies that she has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled *"**Assessment of the integration of TB and HIV services at different levels at Different Levels of Selected Health Facilities in Ilala District, Dar-es-Salaam."*** in partial fulfilment of the requirements for the degree of Master of Public Health of the Muhimbili University of Science and Allied Sciences.

_____

Dr GH Leyna (MD, MPhil, Ph.D.)

(Supervisor)

Date_____

DECLARATION AND COPYRIGHT

I, **Edna Bahaye Maselle,** declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature……. **Date……..**

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DEDICATION

To my late father Prof S.Y. Maselle, my mother Mrs G.J. Maselle, my husband Andrew, my son Elijah and my daughter Audrey.

ABSTRACT

Background: In 2015, there were an estimated 10.4 million new cases of Tuberculosis (TB) worldwide of which 1.2 million (11%) were associated with HIV. In Tanzania, the prevalence for TB is estimated at 164 per 100,000 population and about 50% of all TB patients are HIV positive. TB and HIV are overlapping epidemics where HIV is known for being the strongest risk factor for developing TB disease. TB disease is also more common in people living with HIV and accelerates progression of HIV infection. Several studies have shown early antiretroviral therapy (ART) reduces both morbidity and mortality in TB patients co-infected with HIV, hence improving the quality of life. Tanzania started offering HIV services in TB clinics in 2008 as per the World Health Organization recommendations; however no systematic assessment on the extent of integration of HIV services in TB clinics has been done to date.

Objective: To determine the level of integration of HIV services in TB clinics in different levels of selected health facilities and associated factors in Ilala district, Dar-es-Salaam.

Methodology: A retrospective cohort was established with all adult TB infected patients registered in selected TB clinics from January to December 2016. Data was extracted from facility records using a data compilation sheet and qualitative interviews were held with TB focal persons. Cumulative proportion of TB registered clients provided with HIV counselling and testing and/or initiated on ART was calculated. Survival analysis to determine time to integration was run. Cox regression models were used to identify independent predictors of overall integration of HIV services. Significance level was set at alpha = 5%.

Results: A total of 1138 patients, ≥18 years who initiated on TB treatment between January and December 2016 were included in the study after excluding 12 patients with incomplete data. The median age (IQR) of study participants was 35 (28-45) years and 31% were females. Prevalence of TB/HIV co-infection among adult TB patients in our study was 33.7%. Of the 228 co-infected ART naïve patients, 6.6% were not initiated on ART during the TB treatment period. The level of CD4 cell count at the start of TB treatment was strongly associated with timely initiation of ART. Fifty percent (50%) of those with CD4 cell count<100 cells/mm^3 were started on ART within 2 weeks after

commencing TB treatment as compared to 17.2% of those with CD4 cell counts >300 cells/mm^3 (HR = 5.09, 95%CI: 1.82-14.18, p = <0.001).There was no significant association between age, sex or type of TB and timely ART initiation. All TB/HIV patients already on ART were linked to HIV clinics within the recommended time.

Conclusion and recommendations: The overall integration of TB/HIV services in TB clinics was at 100%, 98% and 93.4% for HIV screening, CPT coverage and ART coverage respectively. Delays in starting ART were substantial with more than half of ART naive TB/HIV co-infected patients initiated on ART more than 2 weeks post TB diagnosis contrary to the WHO and National guidelines of within 2 weeks and some did not start ART at all during TB treatment. More collaborative and coordinative efforts at district level is needed to ensure all newly diagnosed TB patients are timely started on ART and other HIV care and management services as per WHO and National guidelines.

Keywords: Integrated TB/HIV services, TB, HIV, ART, Tanzania

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ABBREVIATIONS

AIDS	-	Acquired Immune Deficiency Syndrome
ART	-	Anti-Retroviral Therapy
ARV	-	Antiretroviral drugs
CD4	-	Cluster of Differentiation 4
CTC	-	Care and Treatment Centre
CPT	-	Cotrimoxazole Preventive Therapy
DTLC	-	District Tuberculosis and Leprosy Coordinator
EMB	-	Ethambutol
EPTB	-	Extra Pulmonary Tuberculosis
HIV	-	Human Immunodeficiency Virus
HIV/AIDS	-	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IDI	-	In-Depth Interview
IEC	-	Information Education Communication
INH	-	Isoniazid
IRIS	-	Immune Reconstitution Inflammatory Syndrome
MUHAS	-	Muhimbili University of Health and Allied Sciences
NACP	-	National AIDS Control Program
NTLP	-	National Tuberculosis and Leprosy Program
PI	-	Principal Investigator
PITC	-	Provider Initiative Testing and Counselling
PLWH	-	People Living With HIV/AIDS
PTB	-	Pulmonary Tuberculosis
PZA	-	Pyrazinamide
RMP	-	Rifampicin
RTLC	-	Regional Tuberculosis and Leprosy Coordinator
SOP	-	Standard Operating Procedure
TB	-	Tuberculosis

TB DOT - Tuberculosis Directly Observed Therapy

TB/HIV - Tuberculosis/Human Immunodeficiency Virus

TB/IRIS - Tuberculosis/Immune Reconstitution Inflammatory Syndrome

THMIS - Tanzania HIV/AIDS and Malaria Indicator Survey

UNAIDS - United Nations Programme on HIV and AIDS

WHO - World Health Organization

OPERATIONAL DEFINITIONS

TB/HIV co-infection - TB/HIV co-infection is when a person is infected with both Mycobacterium Tuberculosis and HIV infection at the same time.

TB/HIV co-management - TB/HIV co-management is when a person is receiving concurrent treatment and care for both TB and HIV infections.

TB/HIV integration - TB/HIV integration in our study is when a patient with TB disease is offered HIV counselling and testing services, and if found to be HIV positive then s/he is to receive care and treatment for HIV as per World Health Organization and National treatment guidelines.

Early Anti-Retroviral Therapy (ART) initiation - Early ART initiation in our study will focus on starting ART to TB patients living with HIV or newly diagnosed with HIV within 2 weeks of commencing TB treatment.

CHAPTER ONE

1.0 Introduction

Tuberculosis (TB) continues to be one of the greatest public health challenges globally significantly contributing to morbidity and mortality with the most affected region in the world being sub Saharan Africa. Globally, there were 10.4 million TB cases (active TB) in 2015, of which 1.8 million died from the disease with over 95% of deaths occurring in middle- and low- income countries. Majority of TB cases in 2015 occurred in Asia with 61% of new cases followed by Africa with 26% of new cases (1).

Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) is still a major public health problem, and has been the main cause of morbidity and mortality globally since it was discovered three decades ago. Since then it is reported that there have been more than 70 million people infected with the HIV virus and about 35 million people have died of HIV. Current global statistics indicate approximately 36.7 million people were living with HIV infection at the end of 2015, majority of them living in sub Saharan African countries including Tanzania (2). In Tanzania, it is estimated that 1.6 million people are living with HIV as of 2015. The current HIV prevalence is 5% (6% in women and 4% in men) among adults aged 15-49 years. Majority of HIV infections are found in urban settings as compared to rural settings (7% versus 4%) (3).

The burden of TB worsens with the increase in HIV infection. In 2015, of the estimated 10.4 million new cases of TB worldwide, 1.2 million (11%) were associated with HIV (1). TB is still the commonest opportunistic infection among people living with HIV infection in majority of high TB burden countries. TB and HIV are overlapping epidemics where HIV is known for being the strongest risk factor for developing TB disease and commonest cause of death in patients with TB/HIV co-infections (4)(5). TB disease is also more common in people living with HIV and accelerates progression of HIV infection. In many countries TB cases have been drastically increasing proportionally with increase in HIV infections. In 2015, 55% of notified TB patients had a documented HIV test result globally. In the Africa region where the highest burden of HIV-associated TB is, only 81% of notified TB patients had a documented HIV test result by the end of 2015 (1). The number of TB cases in Tanzania has been rising with increase in HIV prevalence. TB

prevalence is reported to be at 164 per 100,000 populations as of 2015. The 2011-2012 Tanzania HIV/AIDS and Malaria Indicator Survey (THMIS) showed about 50% of all TB patients are HIV positive (3). For TB infected patients in care, 36% are HIV positive and know their HIV status and 85% of them are on anti-retroviral therapy (ART) as of 2015 (6).

Several studies have shown that proper usage of antiretroviral therapy reduces the risk of progression from latent TB to active TB hence reducing TB incidence among people living with HIV/AIDS (7). At the same time, ART reduces both morbidity and mortality in TB patients who are co-infected with HIV infection hence improving the quality of life (8)(9). Previously, treatment of TB disease and HIV infection have been carried out in separate settings (clinics) and provided by separate health care providers. This had been associated with several challenges such as delays in case identification of TB patients in HIV clinics, delays in diagnosis of HIV in TB clinics, delays in ART initiations to patients who are HIV positive with TB disease amongst others. Due to this fact, the World Health Organisation (WHO) formulated an interim policy on implementation of collaborative TB/HIV activities in 2004, which was last updated in 2011. The policy aims at providing coherent health response that involves all stakeholders in TB and HIV care. The policy has three objectives: 1) establishing and strengthening the mechanisms for delivering integrated TB and HIV services, 2) reducing the burden of HIV in patients with presumptive and diagnosed TB disease and 3) reducing the burden of TB in people living with HIV (the Three I's for HIV/TB) and early initiation of antiretroviral therapy. Activities to reduce the burden of HIV in patients with presumptive and diagnosed TB include providing HIV testing and counselling; providing HIV prevention interventions for patients with presumptive and diagnosed TB; providing Cotrimoxazole preventive therapy (CPT) for TB patients living with HIV; ensuring HIV prevention interventions, treatment and care for TB patients living with HIV and provision of antiretroviral therapy for TB patients living with HIV (10).

In Tanzania, the process of reviewing implementation of collaborative TB/HIV activities was done in 2005 however there was no framework for the implementation process at that time (11). Collaborative TB/HIV management is necessary to ensure TB patients who are HIV positive are identified and treated accordingly, and preventing TB in HIV infected

patients (10). Integrated TB/HIV services enable presumptive and diagnosed TB patients to receive timely diagnosis and treatment of HIV infection that would otherwise have had a delayed diagnosis or died of undiagnosed HIV infection. It allows TB/HIV co-infected patients to receive HIV treatment and care at TB clinics during the period of TB treatment. This leads to timely ART initiation as well as preventing TB transmission in HIV care settings, by limiting contact of TB patients with large number of persons with HIV infection (who are already at higher risk of acquiring TB) during early TB treatment when they are most infectious. Hence an integrated TB/HIV service not only lead to TB and HIV control, but also leads to dramatic scaling up of life saving HIV care and treatment in the population.

At the time of this assessment and in accordance with the national guidelines of the Ministry of Health Tanzania, all HIV infected patients including TB/HIV co-infected patients are to receive daily CPT and ART irrespective of their CD4 cell count or WHO clinical stage (12).

The delivery of integrated TB and HIV services involves referral of TB suspects from all care points in health facilities to the laboratory for sputum microscopy and/or radiological examinations. Adults newly diagnosed with TB were to be initiated on 2 months of Rifampicin (RMP), Isoniazid (INH), Ethambutol (EMB) and Pyrazinamide (PZA), followed by 4 months of RMP and INH. All presumptive TB cases and newly diagnosed TB patients are to be offered HIV testing and, if found positive, initiated on CPT and ART within 2 weeks of commencing TB treatment. For those who are already HIV positive at the time of TB diagnosis, are to be linked to CTC.

1.1 Problem Statement.

Tanzania is one of the 30 countries with a high TB and TB/HIV burden and a high HIV associated TB case fatality rate. Following the WHO recommended collaborative TB/HIV services to improve TB/HIV service delivery; Tanzania started to implement integrated TB/HIV services in 2008 to reduce the dual burden of TB and HIV in the country. As of 2015, 64% of TB patients remain unaware of their HIV status and up to 15% of those eligible are not on ART, indicating multi-factorial challenges with integration. In some

parts of Tanzania, there is still program cross referrals for management of TB and HIV co-infections with some projects promoting integration of TB and HIV services.

Poor implementation of integrated TB/HIV services has been linked to poor advocacy of the existing policy, poor dissemination of guidelines, poor knowledge of health care providers on management of TB/HIV co-infections, staff attitude towards offering both services, staff overload, no availability of ARVs in TB clinics, and patients' reluctance to take both anti TB drugs and ARVs at the same time leading to missed opportunity in HIV case identification among TB patients. Several studies have been conducted on TB screening among HIV patients, ART adherence and CPT prophylaxis coverage.

However, few studies have systematically assessed the status of HIV screening and integration into care and treatment in TB patients with unknown HIV status.

Therefore, using a retrospective cohort study we aimed to assess the extent of integration of HIV services in TB clinics and identify factors that may influence integration. Our findings will inform existing policies and give recommendations for improving practice.

1.2 Conceptual Framework.

In order to achieve full integration of TB/HIV services, a multi-disciplinary approach has to be applied. Patient factors and health facility factors, all contribute towards successful integration of TB/HIV services. Other factors that may influence integration of TB and HIV services include health care provider factors and government factors. Under this model of care, both HIV and TB treatments are to be offered concomitantly. In resource constraint countries like Tanzania, implementation of integrated TB/HIV activities can be faced with multi-factorial barriers- failure to implement HIV testing, failure to prescribe ART or other basic elements of HIV care as well as post ART loss to follow up in centres offering TB care. However these challenges can easily be addressed in order to have optimal outcomes hence improving quality of life of patients with TB/HIV co-infections

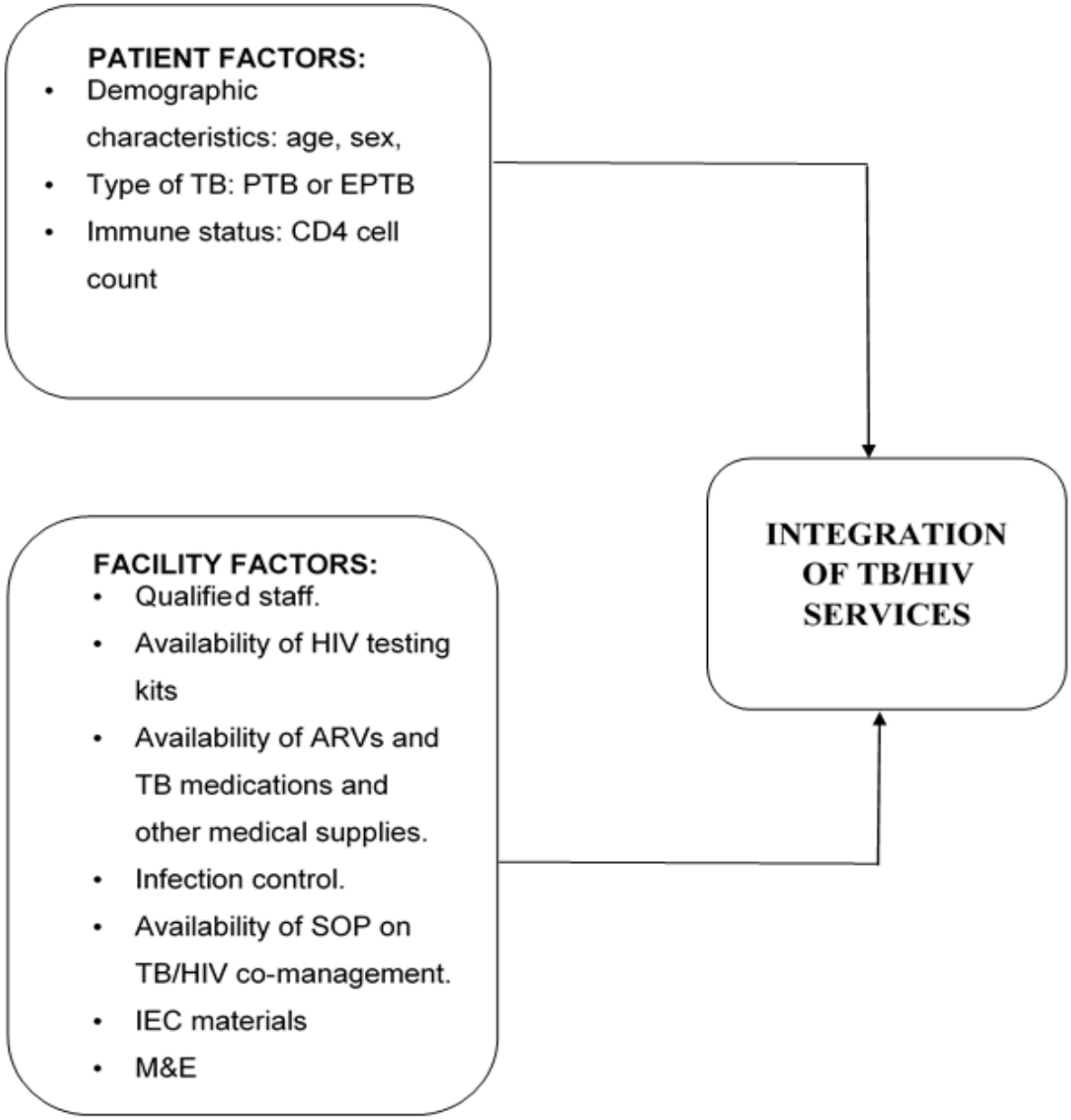


Figure 1 : Conceptual framework of the study

1.3 Rationale of the study:

Integrating TB and HIV activities in health care provision is crucial so as to reduce the burden of HIV infections in patients with TB disease to reach the 90/90/90 UNAIDS goal. Early detection of HIV among patients with presumptive and diagnosed TB is important to improve prognosis hence improve quality of life. It is also a gateway into the HIV care continuum.

Findings from this study will inform stakeholders and policy makers on the performance of this initiative and identify areas that need to be addressed to improve and scale up integration of TB/HIV services. It will provide local information on how to design effective interventions to promote provision of integrated TB/HIV services. It will also create awareness on integrated TB/HIV services.

1.4 Research question:

To what extent is the integration of TB/HIV services in TB clinics at different levels of selected health facilities reached and what are the factors influencing integration in Ilala district, Dar-es-Salaam?

1.5 Objectives

1.5.1 Broad objective.

To determine the level of integration of TB/HIV services in TB clinics at different levels of selected health facilities and associated factors in Ilala district, Dar-es-Salaam.

1.5.2 Specific objectives.

1. To describe the cascade of HIV services from HIV testing, diagnosis and initiation of ART among newly diagnosed TB patients attending TB clinics in Ilala district, Dar es Salaam.
2. To identify patient factors (demography, clinical) associated with integration of HIV services in newly diagnosed TB patients attending TB clinics in Ilala district, Dar es Salaam.
3. To explore facility factors that influence integration of HIV service in newly diagnosed TB patients attending TB clinics in Ilala district, Dar es Salaam.

CHAPTER TWO

2.0 Literature Review.

It is estimated 10.4 million TB cases were diagnosed in 2015 of which 1.2 million (11%) TB cases were associated with HIV worldwide. TB is still the leading cause of mortality among people living with HIV that accounted for 390,000 (one third) of HIV-associated TB deaths in 2015. Africa region accounted for 75% of all deaths. Globally people living with HIV are 19 times (17 – 22) more likely to fall ill with TB than those without HIV(1)(13). Tanzania is among 30 countries listed as TB/HIV high Burden Countries based on the 2015 WHO report (1).The number of people living with HIV (PLWH) who presented with TB and received treatment for HIV and TB increased from 25.9% in 2012 to 54% in 2013. Nonetheless, there is still a large portion of people with TB/HIV co-infection without comprehensive treatment (13).Delays in identifying HIV cases among TB patients leads to delays in offering care and treatment to those in need hence increase in morbidity and mortality(10), an economic burden to families and country in terms of health financing and planning.

2.1 HIV screening services among TB patients.

HIV testing in TB patients is an important route into integrating TB and HIV services meaning that a new TB diagnosis presents an important opportunity to detect and treat HIV. Active screening for HIV infection among patients with TB disease is recommended to be done on a routine basis once the TB diagnosis is made (14). This is crucial in the reduction of burden of HIV in TB patients thus improving the quality of TB care. There is greater risk of death for patients with unknown HIV status than patients with HIV negative test results (the group with unknown HIV sero-status probably contained people with undiagnosed HIV), this was revealed in another study. Screening for HIV among TB patients has been shown to be feasible with high acceptability rate (>90%) among patients who were offered this service. Studies have also revealed a higher prevalence (threefold) of HIV among TB patients compared with the general population (15)(16).

In 2004, WHO together with United Nations Programme on HIV and AIDS (UNAIDS) issued a joint policy statement recommending routine provider-initiated HIV testing and counselling (PITC) for all TB patients as a standard of care (10). PITC is when health care

providers offer HIV counselling and testing to all people attending health facilities. This presents an opportunity to ensure that patients have access to the needed HIV prevention, treatment, care and support services hence increasing uptake of HIV testing among TB patients. This strategy has enabled TB treatment centres to serve as an important media for identifying patients with HIV infection hence increasing uptake of HIV testing among TB patients.

Studies done on acceptability of PITC at TB health facility level revealed a high acceptance rate (>90%) among patients and willingness to test and receive their HIV status results. They also showed majority of the health care workers were willing to offer HIV testing services to TB patients. For patients who did not accept HIV testing their reasons were mainly to wait until finishing TB treatment and not being able to cope with positive results (16)(17). This shows that expanding HIV screening services among TB patients is feasible thus scale up of life saving HIV care and treatment services that coincides with a decline in the risk of death among patients with TB/HIV co-infections.

It is recommended to emphasize provision of HIV counselling and testing to all TB patients to ensure proper management and early initiation of ART to TB/HIV co-infected patients in order to improve treatment outcome and reduce mortality.

2.2 HIV treatment cascade in TB patients.

HIV testing and counselling acts as a gateway towards accessing care, treatment and prevention services for HIV/AIDS that includes diagnosis of HIV infection, linkage to care, initiation of Cotrimoxazole prophylaxis and antiretroviral therapy (ART) to achieve and maintain viral load suppression status as illustrated in Figure 2 below (18). Most countries with high burden of TB/HIV infections have policies and guidelines on promoting HIV testing to all presumptive and confirmed TB cases and initiating ART to all ART naïve TB/HIV co-infected patients irrespective of their immunological status (CD4 cell count)(19).

Early ART initiation in TB/HIV co-infected patients is needed in order to contribute towards improving their quality of life. Several studies have attributed early ART initiation to better treatment outcomes especially in patients with severe immune suppression (CD4 cell count<50cells/µl) and improved uptake and continuation of ART(20)(21)(22). The

WHO and Ministry of Health Tanzania guidelines recommend TB/HIV co-infected patients to be initiated on ART within the first 2 weeks of starting TB treatment irrespective of the CD4 cell count or clinical stage (23)(12). This enables scaling up of ART coverage even in low and middle income countries where CD4 measurement is not widely available. Much as several studies have showed ART to TB patients improves survival, when to start ART is still a debate. Clinicians' decisions to start ART early in TB/HIV co-infected patients may be compromised based on their fears of drug-drug interaction, TB-Immune reconstitution inflammatory syndrome (TB-IRIS), pill burden as well as programmatic challenges (20). However, early ART initiation has been found to lower mortality in TB/HIV patients as compared to those who started late. This was showed by a meta-analysis evaluation where 122 deaths occurred in the early ART initiation group and 155 deaths occurred in the delayed ART initiation group (pooled IRR =0.75, 95%CI: 0.59 to 0.95) (24)(25).

With the presence of both WHO guidelines and national guidelines supporting co-management of TB/HIV patients, ART initiation is still deferred until completion of the first 2 months of TB treatment. Several barriers have been associated with early ART initiation including poor integration between Inpatient and Outpatient HIV and TB care, lack of trained staff during weekends, and lack of awareness and/or acceptance of new WHO guidelines was cited in a study done in Bugando hospital (26). However such barriers can be tackled through continuing medical education for healthcare workers.

ART usage in HIV infected patients is attributed with reduction of risk of TB disease by approximately more than 50% (27). Other benefit of early ART to TB patients with CD4 count <50 cells/µl was reduction of mortality as shown in a study done in Kenya (21). A study done in South Africa revealed uptake of ART during TB treatment was significantly associated with improved mortality rates (28). This was inconsistence with another study in Rwanda that showed an increased risk of death during anti-TB treatment for people living with HIV.

There has been marked reduction in TB mortality with increase in ART coverage among high TB/HIV burden countries (29)(9). However other studies showed no difference or increase in mortality rate in spite of high ART coverage among TB/HIV co-infected

patients (28)(30). This could be as a result of other confounding factors contributing towards high case fatality rate among TB/HIV co-infected individuals.

Improved data management system in terms of linkage between HIV documentation and TB data has been associated with increase in uptake of HIV identification, care and treatment among patients with TB disease (31). All the above stresses the importance of routine HIV testing that aids in minimizing delays in HIV diagnosis in addition to initiation of ART to reduce the risk of death among TB/HIV co-infected patients. This can effectively be achieved through integrated TB/HIV services.

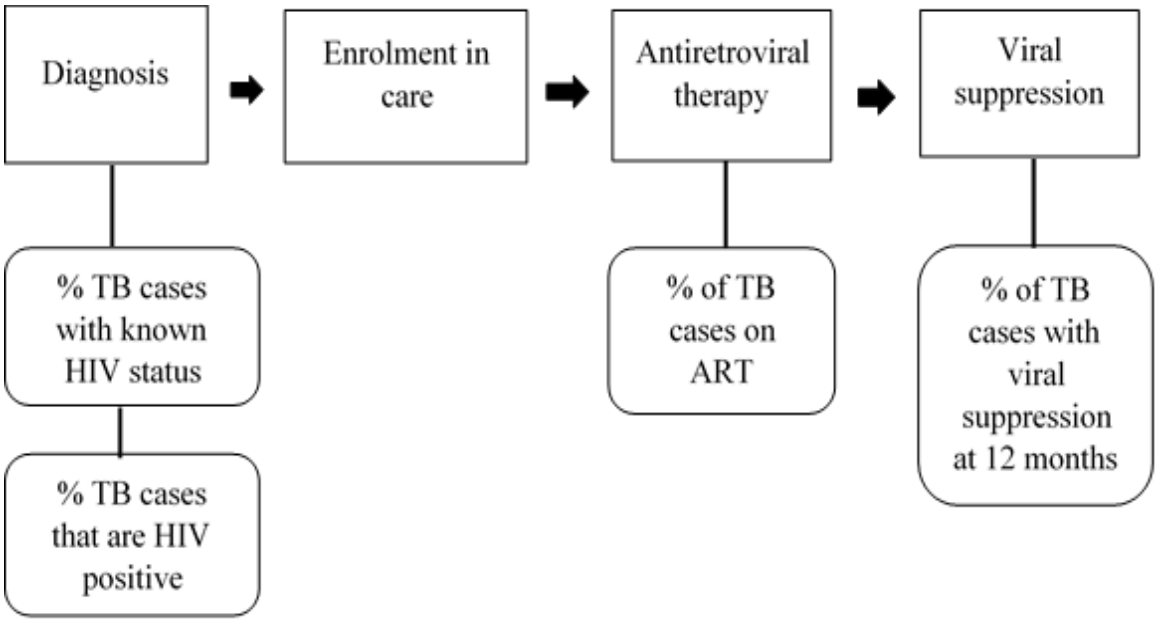


Figure 2: HIV treatment cascade in TB patients and indicators used to evaluate the cascade.

(Courtesy of Richard J. Lessells et al.)

2.3 Facility factors and Integration of TB/HIV services.

In order for the integration of TB/HIV services to be successful, a multi-disciplinary approach has to be applied. Management of TB/HIV co-infections remains a major problem especially in sub-Saharan Africa, causing challenges to HIV programmes in terms of infection control and risks of TB transmission and acquisition to the HIV population.

Hence a drive towards integrated services for TB and HIV infections (10) i.e. providing services for both infections at the same health facility. This has been associated with scale up of HIV screening services and ART uptake in TB facilities (16)(32).

The integration process involves relocation of clinics under one roof or in close proximity, improving staff interaction, TB/HIV focal person, pharmacy services (TB, ART, CPT and other drug refills), laboratory services (HIV testing, sputum examination and other laboratory tests), synchronised clinic appointment dates, training and mentorship, supervision as well as joint record keeping (10)(33).

The lack of knowledge and skills of health providers on TB/HIV co-management, under-staffing, lack of infection control measures, lack of guidelines on TB/HIV co-management, lack of laboratory technicians amongst others were identified as hindrance towards provision of TB/HIV integrated services. However, strengthening of infrastructure and improving health care worker capacity can improve integration of TB/HIV services (34)(35).

In the view of patient perspective, receiving mixed information regarding co-management of the diseases, challenges in coordinating TB and HIV appointments and reluctance to disclose HIV status to non-HIV health providers unless asked were some of challenges identified. In spite of this, majority of patients prefer to access TB and HIV care from a single health facility (36).

Different measures especially at the health facility level have to be put in place to facilitate effective implementation and strengthening of integration of TB/HIV services in order to deliver health care services effectively and efficiently to patients co-infected with TB and HIV.

CHAPTER THREE

3.0 MATERIALS AND METHODS.

This chapter describes the study setting, study design, study population, sample size and selection. It also illustrates data collection methods, processing and data analysis techniques.

3.1 Study design and setting:

A retrospective cohort study using both quantitative and qualitative methods of data collection was carried out in August 2017. Due to limited resources, one public health facility was purposively selected from each level of facilities. Amana Regional Referral Hospital, Mnazi Mmoja District Hospital and Buguruni Health Centre were selected and included in the study.

Dar-es-Salaam is among the leading regions in the country with high HIV prevalence 6.9% higher than the national prevalence (5.5%) (THMIS 2011/12) and contributes 25% of notified TB cases in the country (NTLP Annual report-2013). Ilala municipality is one of the five municipals of Dar-es-Salaam city, others being Kinondoni, Temeke, Kigamboni and Ubungo. It is comprised of 10 public clinics and 9 private clinics. As of 2012 National population census, the municipal had a total population of 1,220,611 (51% females). According to the NACP annual report of 2009, total number of patients enrolled in Ilala municipal was 28, 660 (35%) of all enrolled patients in Dar-es-Salaam region.

3.2 Study population, sample size and sampling:

The study populations for this study were two as described below:

1) All adult patients diagnosed with active TB disease between January and December 2016 who attended TB clinics in the selected health facilities (Amana Regional Referral Hospital, Mnazi Mmoja District Hospital and Buguruni Health Centre). Inclusion of all TB patients diagnosed between January and December 2016 eliminated traditional sampling errors. The power of the cohort study was calculated to assess whether the existing sample size was adequate to assess integration of TB/HIV services: A study by Njozing et al, assessed accessibility of HIV care packages among tuberculosis patients was used as a basis for our assumption (37).

Assuming having a new TB diagnosis (never been treated before) was the least likely exposure to influence accessibility of HIV care among TB patients (90.3%), the risk of accessibility of HIV care among those without new TB was 9.7%, a risk ratio of 0.58 and error of margin of 5%. Using OpenEpi version 3.0 open source calculator the power of the study was approximately 100%.

Inclusion criteria: All adult patients newly diagnosed with TB disease registered in selected health facilities between January and December 2016.

Exclusion criteria: Patients who were treated at the clinics but do not appear in the TB registers during study period and those with incomplete data and patients < 18 years of age.

2) Key informants: in-charges of TB clinics or TB focal persons actively working in the selected health facilities participated in the qualitative component of this study.

3.3 Variables

Dependent variables:

Integration of TB/HIV services

Early ART initiation

Independent variables:

Socio-demographic characteristics: age (years), sex (male/female),

Clinical features: type of TB (pulmonary/extra pulmonary), CD4 cell count (continuous), HIV status (positive/negative), ART status (on ART/not on ART), screened for HIV (yes/no), Timing of screening and/or ART initiation (weeks)

3.4 Data collection procedures:

Quantitative method:

Upon receiving permission to access selected health facility data and patient files, data was extracted from TB registers (Appendix 6) and patients` cards and files using data compilation sheets. The PI developed the data compilation sheet taking into account data needs and type of data available from facility records. All TB patients aged ≥18 years who were registered and commenced on TB treatment from January to December 2016 were involved. Missing and incomplete variables were assessed daily and attempts to fill in the blanks from patient files and TB cards were done.

Qualitative method:

In-depth interviews (IDIs) using a well-designed interview guide was held with TB focal persons and health facility in-charge at each selected health facility after obtaining informed consent. The interview guide was developed in English then translated to Swahili for easy communication with the study participants. The interview guide consisted of open-ended and non-directive questions on key heath facility issues in the integration of TB and HIV services such as: health care and health facility factors affecting integration. The interviews were held by the PI in a separate room in each health facility to ensure privacy and confidentiality. Each interview took about 20-30 minutes after informed consent was obtained. The interviews were recorded and notes taking then later the recorded information was transcribed using verbatim and translated into English. Qualitative data verification for accuracy and completeness was done through reading and re-reading to ensure all recorded information and variations were identified.

3.5 Data management

Quantitative data was checked and cleaned daily to ensure its quality, correctness, completeness and consistency. Qualitative data was reviewed daily to identify key issues that were validated or included in subsequent interviews. Audio-recorded data and other collected data were stored in a safe box under lock and key accessed by the principal researcher only.

3.6 Data processing and analysis.

Quantitative data:

Data was entered, cleaned and analysed using SPSS version 20. Descriptive statistics was used to summarize the data. Proportion of participants who received service (screening, or ART initiation) at each level was calculated. Only TB patients who were HIV positive and ART naïve at time of TB diagnosis were included in the survival analysis to assess timing of ART initiation and identify factors associated with timing. Kaplan Meier survival curves were generated. Multivariable cox regression model was done to determine patient (demographic and clinical) factors influencing integration of HIV services in TB clinics. All variables with P value < 0.1 on the univariate analysis were included in multivariable

models. Risk ratios and their 95% confidence interval were presented. Statistical significance was set at 5%.

Qualitative data:

The qualitative data was analyzed using thematic analysis approach. This approach involves identifying, analyzing and reporting patterns (themes) within data. The themes to be discussed in interview guide included availability of trained staff, availability of HIV diagnostic services and HIV screening tools, availability of ARVs and CPT, availability of guidelines and SOP on TB/HIV co-management and IEC materials on TB/HIV co-infections: posters, fliers. The analysis involved six main steps. 1) Verbatim transcription was done for the audio-recorded data from the in–depth interviews. This enabled both the researcher and research assistant to become familiar with the data and concept. 2) After transcription, a list of potential and initial codes was created through data reduction. Codes helped the researcher identify features that were interesting hence get the meaning of data. 3) Then themes were searched from the general list of codes created; the focus here was on broad patterns in the data, combining coded data with the proposed themes and examined how relationships are formed between codes and themes and between different levels of existing themes. 4) After identifying themes, the researcher read and reviewed the coded data to see if they form coherent patterns. 5) The existing themes were defined and refined for presentation in the final analysis. 6) The final analysis entailed report writing to convince the reader on the merits and validity of the analysis.

3.7 Ethical issues.

Ethical approval for conducting the study was obtained from Muhimbili University of Health and Allied Sciences Research and Publication committee. Then permission to conduct the study was requested from Ilala district medical officer`s office and in-charges of the health facilities. Processing and analysis of secondary data was done after patients' identification had been anonymized. Informed consent was sought from the key informants identified in each selected health facility. Code names were used to maintain confidentiality of key informants', while ID numbers were used for patients' information.

CHAPTER FOUR

4.0 RESULTS

In this chapter, results of this study are presented. The results are organised section wise starting with quantitative results followed by qualitative results.

4.1 Demographic profile of the respondents

A total of 1150 patients, ≥18 years started TB treatment between January and December 2016 and only 1.04% (12) had incomplete data and were excluded. Of the remaining 1138 who were enrolled in this study, 31% (353) were females. Amana hospital had the most number of TB patients 39.3% (447), followed by Mnazi Mmoja hospital 33.1% (377) then Buguruni health centre 27.6% (314). The median age (IQR) of study participants was 35 (28-45) years with most of the study participants in the 25-34 years of age category (31.5%). The oldest participant was 90 years old and the youngest, 18 years old (**Table 1**).

Table 1: Demographic characteristics of study participants (N = 1138).

Variable	**Number**	**Percent (%)**
Health Facilities of study		
Amana	447	39.3
Mnazi Mmoja	377	33.1
Buguruni	314	27.6
Age (years)	**Median (IQR) = 35 (28-45)**	
18 – 24	167	14.7
25 - 34	359	31.5
35 – 44	319	28.0
45 – 54	181	15.9
55+	112	9.8
Sex		
Male	785	69.0
Female	353	31.0

4.2 HIV treatment cascade in TB patients.

Figure 3 below summarizes the distribution of TB patients diagnosed between January and December 2016 in the selected study centres during the study period. All patients were screened and had documented HIV status. Of which 66.3% (755) were HIV negative. One in three, 33.7% (383) TB patients were HIV positive, of these, 40.5% (155) were already receiving ART at the time of TB diagnosis. Most of the patients (98%) were started on CPT. Overall, 59.5% (228) TB patients who were HIV positive, were ART naïve hence formed the patient cohort for further analysis in this study that were followed up to determine if ART was initiated appropriately during TB treatment. Of these, 87.3% (199) had CD4 cell count information available. Of the 228 ART naïve patients at the time of TB diagnosis, 93.4% (213) were started on ART during the course of TB treatment and 6.6% (15) did not start ART. All patients who were already on ART were linked to CTC on the day of registration at the TB clinic.

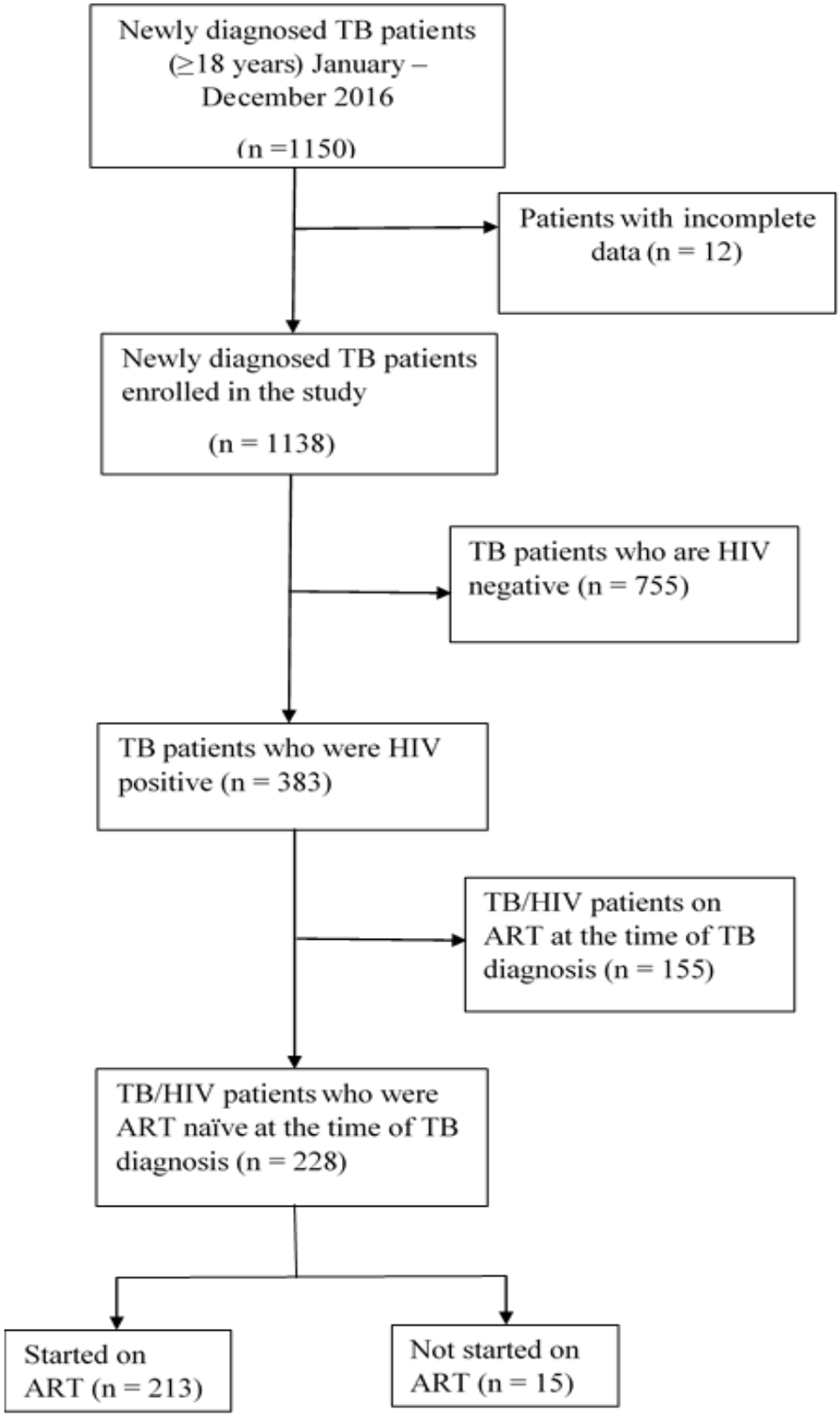


Figure 3: Flow chart of TB patients enrolled in care from January to December 2016 in the three study health facilities

Among the 213 patients known to have started ART during TB treatment, all had ART initiation dates recorded in patient records. Of these, the overall median time between starting TB treatment and ART initiation was 19 days (Interquartile range [IQR] 13 – 21 days). The shortest and longest time taken to ART initiation being 1 day and 6 months respectively.

The overall incidence rate of ART initiation was 61.6 (52.7-71.9) per 100 persons-months of follow up. Patients who attended TB clinic at Mnazi Mmoja were more likely to be initiate on ART earlier than those in Amana or Buguruni (the rates of TB/HIV integration in Mnazi Mmoja were higher (97.2/100) than in Amana (52.9/100) and Buguruni (53.8/100; P = 0.0038), these are diagrammatically illustrated in Figure 5. The rate of early ART initiation was strongly determined by baseline CD4 count. The rates of TB/HIV integration were higher in patients who had CD4 counts <100 cells/mm^3 than those who had CD4 cell count >500 cells/mm^3 (169.2/100 vs. 34.6/100 patient-months of follow up; p = 0.0002). The rate of initiation of ART for TB/HIV co-infected patients did not differ by sex, age or type of TB (Table 2).

Due to the survival benefit to starting ART within 2 weeks of TB treatment especially in patients with CD4 counts <100 cells/mm^3 as mentioned in the literature review, we examined timing in ART initiation stratified by CD4 cell count. In general, patients with CD4 cell count <300 cells/mm^3 had similar patterns and were more likely to be initiated on ART earlier than those with CD4 cell count >500 cells/mm^3 as shown in Figure 4. Among those with CD4 cell counts <100 cells/mm^3, we found that only 50% (32/64) of them had started ART within 2 weeks after commencing TB treatment as compared to 17.2% (11) of those with CD4 cell counts >300 cells/mm^3. Early ART initiation was particularly in the group of patients with CD4 cell counts <100 cells/mm^3. Majority of patients with CD4 cell count <100 cells/mm^3 were initiated on ART between 2-4 weeks. Patients who started ART after 4 weeks of commencing TB treatment with CD4 cell count <100 cells/mm^3 were 11.8% (6/51) as compared to 47.1% (24/51) of those with CD4 cell count 100-300 cells/mm^3 and 41.1% (21/51) of those with CD4 cell count >300 cells/mm^3.

Table 2: Rates of TB/HIV patients initiated on ART by select characteristics

Variable	Person-months	Started on ART	Incidence density per 100 person-months (95%CI)*	P value
Sex				
Male	159	92	58.0 (47.3 71.2)	
Female	101	68	67.1 (52.9 – 85.2)	0.364
Age, years				
18 – 24	7	7	95.4 (45.5 – 200.2)	
25 - 34	78	40	51.1 (37.5 – 69.6)	
35 – 44	92	61	66.0 (51.4 – 84.8)	
45 – 54	64	38	59.0 (42.9 – 81.1)	
55+	17	14	80.8 (47.8 – 136.4)	0.411
Type of TB				
PTB	236	146	61.8 (52.5 – 72.6)	
EPTB	23	14	59.9 (35.5 – 101.1)	0.913
CD4 (cells/mm^3)				
<100	33	56	169.2 (130.2- 219.9)	
101 – 300	74	69	93.6 (74.0 – 118.6)	
300 – 500	37	22	60.3 (39.7 – 91.5)	
>500	12	4	34.6 (13.0 – 92.3)	**0.0002**
Health facility				
Amana	49	48	97.2 (73.3 – 129.0)	
Mnazi Mmoja	80	43	53.8 (39.9 – 72.5)	
Buguruni	131	69	52.9 (41.8 – 66.9)	**0.0038**

*95% Confidence interval

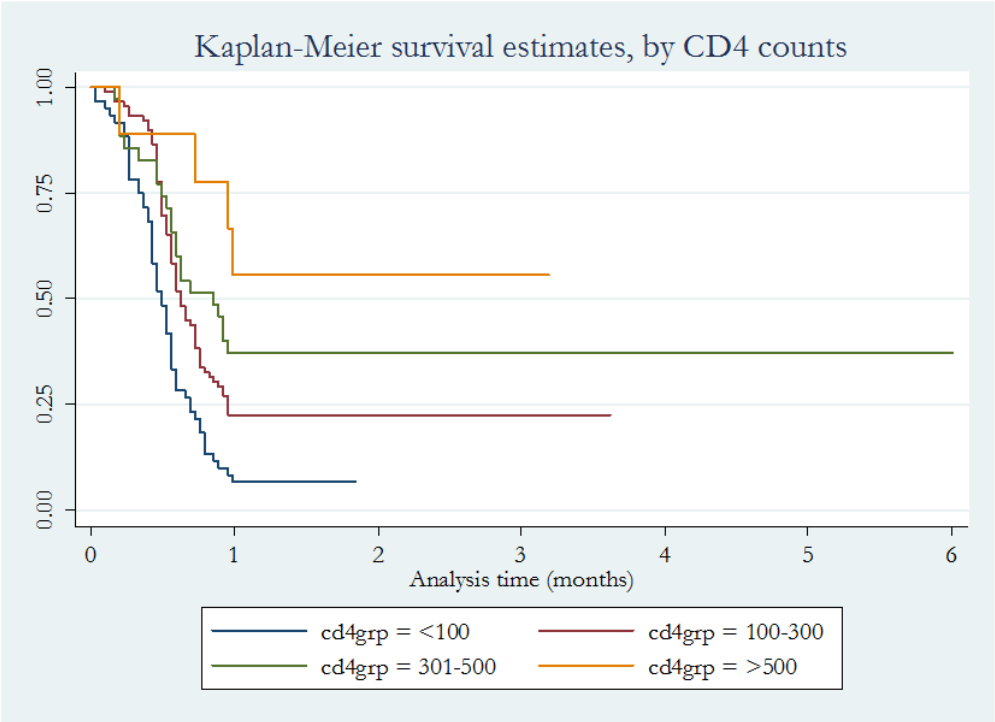


Figure 4: Kaplan Meier survival curves of time to ART initiation stratified by CD4 count

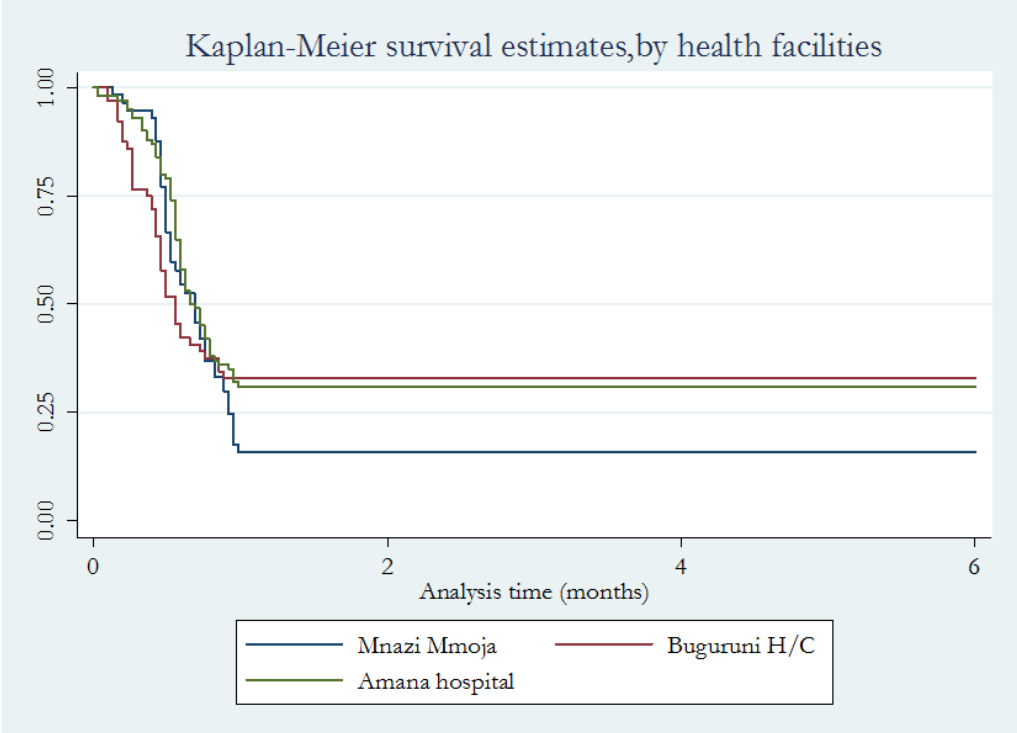


Figure 5: Kaplan Meier survival curve of time to ART initiation by health facility

4.3 Effect of patient factors (demographic and clinical) on integration of TB/HIV services

Early initiation of ART was significantly associated with the level of CD4 count at the start of TB treatment. TB/HIV co-infected patients with CD4 count <100 cells/mm^3 were five times more likely to be initiated on ART early (within 2-4 weeks) compared to those with CD4 cell count >300 cells/mm^3 (HRR = 5.09; 95%CI: 1.82-14.18; p = <0.001).

Female patients had a 27% higher chance of being initiated on ART early compared to male patients, but this did not reach statistical significance (HRR = 1.27; 95%CI: 0.91-1.77, p = <0.149). Age did not have a statistically significant effect on early ART initiation (P = 0.438). Health facility was statistically associated with early ART initiation in the univariate analysis. However, when adjusted for sex, age and CD4 counts there was no association (P = 0.337).

Table 3: Risk Ratios for early ART initiation among ART naïve TB/HIV patients

Variables	Model 1[±]	Model 2[§]
Sex		
Male	1.0	1.0
Female	1.16 (0.84-1.58)	1.27 (0.91-1.77)
Age, years		
18 – 24	1.0	1.0
25 - 34	0.54 (0.24-1.19)	0.76 (0.32-1.83)
35 – 44	0.69 (0.32-1.51)	0.94 (0.41-2.21)
45 – 54	0.62 (0.28-1.38)	0.93 (0.39-2.23)
55+	0.85 (0.34-2.10)	0.88 (0.34-2.31)
Type of TB		
PTB	1.03 (0.60-1.78)	NA
EPTB	1.0	NA
CD4 (cells/mm^3)		
<100	4.89 (1.77-13.47)	5.09 (1.82-14.18)
101 – 300	2.70 (0.99-7.41)	1.79 (0.61-5.24)
300 – 500	1.74 (0.60-5.05)	1.79 (0.61-5.24)
>500	1.0	1.0[***]
Health facility		
Amana	1.0	1.0
Mnazi Mmoja	1.84 (1.27-2.66)	1.24 (0.83-1.84)
Buguruni	1.02 (0.70-1.49)	1.31 (0.88-1.95)

[±]Crude Hazard Ratios (95% Confidence Interval);
[§]Hazard Ratios adjusted for sex, age,CD4 count and health facility
[*]P value < 0.05; [**]P value < 0.01; [***]P value < 0.001

4.4 Facility factors and Integration of TB/HIV services.

Three key informants participated in the in-depth interviews; 2 were medical doctors (In-charges) and one was a nurse (TB DOT nurse) and all had a working experience of more than two years in TB clinic. Throughout the IDI, respondents identified health facility factors that were enablers and challenges they encountered when offering integration of TB/HIV services at their health facilities. Described in this subsection are the themes identified during the respondent's interviews. These were triangulated with evidence from the thematic analysis. Some points have natural overlap because of the interdependence of these factors.

4.4.1 Enabling Environment

All the respondents reported to have heard about the recommendation of integration of TB/HIV services and were knowledgeable about what needs to be done in integration of TB and HIV services that aids in reducing HIV burden in TB patients and its details. As explained by the following respondent:

> *"It's TB/HIV integration where by a patient with TB disease is supposed to be investigated whether he/she has HIV. And if found to be HIV positive, he/she is supposed to be initiated on ARVs as soon as possible, (pause) like it is in our case here (TB clinic)…."* R1H2

One respondent agreed and explained that at their health facility, they have implemented under one roof model for more than three years:

> *"Under one roof mmh, here (at the facility) it is more than three years."* R3H1

Respondents reported to be practising integration of TB and HIV services at their facilities and that it helps in proper management and monitoring of their patients:

> *"Eeh! Yes. Like if we get a new TB patient, when s/he reaches here we ourselves must do HIV screening. Eeh.... If found to be HIV positive, we enrol the patient, do CD4 and initiate the patient on ARVs ourselves to continue with them. We continue with the patient until s/he finishes six months then transfer the patient to CTC. They call it under one roof."* R2H3

And they all agreed that this recommendation was a good thing to patients since before its implementation, patients had to seek care for both disease from different health facilities or clinics. This was associated with delays in HIV diagnosis as well as linkage to care. They added that it enables them to manage and monitor them effectively. The importance of this recommendation was explained by one of the respondents, stating:

> *"It is a good thing because it reduces burden to the patient so s/he feels good. A patient takes drugs for HIV, eeh.... takes drugs for TB at the same time. So s/he does not have another queue from one clinic then another. To some extent it enables treatment to be eeh...., friendly treatment to the patient."* R3H1

None of the respondents in the three health facilities stated challenges with availability of drugs for both diseases and laboratory consumables or procurement for TB and HIV drugs. This is supported by one respondent who said:

> *"All the drugs are available and we never get stock outs. And all the laboratory tests are there. For example, for now we do CD4 count at the beginning. (Pause) We do CD4 count, Syphilis and Hepatitis. Then after six months we do viral load."* R2H3

However, one of the respondents reported that much as the tests were available, they were unable to do them from their clinic. The staffs have to take the samples to other laboratory like central lab or CTC:

> *"…all the laboratory tests are not completed here. So when we need to do laboratory tests we take samples there (central lab). Staff themselves take samples to central lab."* R3H1

Respondents in all the three health facilities reported to have guidelines, SOP and IEC materials at their clinics on management of TB and HIV. They reported to be using them once in a while for service provision. As explained by the following respondents:

> *"They are all available here. I normally use them if I want to refer or to be sure with something when offering care to a patient. (Pause) They also help new staff and we give them to read."* R3H1

> *"Eeeh.... all those are available and they are in the doctor`s room. So if anyone wants to use them they are there, you take when you are done you return them."* R2H3

All the respondents reported that they received support supervision from the district and regional health authority and even the ministry of health. Few respondent reported support from the ministry is mainly during the quarterly meetings with other health facilities and provides them with updates.

> *"Yes we get. We get supervision. There is DTLC and RTLC. We even get supervision from the ministry of health. I am not very sure about their timetable but for example they attend meetings that involve different health facilities that are usually held every quarter."* R2H3

> *"...yes! We get from the regional health authority and from the Ministry. They come to see how we perform our work and provide guidance where there is a need."* R1H2

4.4.2 Challenges

Majority of the respondents reported lack of space at the TB clinics as one of the challenges they face while offering services for both infections under one roof. They reported that lack of space leads to congestion and compromises infection control at the clinic. One respondent expressed:

> *"And then, us here another challenge is space. Space… Like yesterday patients were full with no place to sit others were outside. We quarrel with patients why they are outside. But that is it space is not enough."* R2H3

However, the respondents urged the management to consider their clinic when planning for expansion of the health facility. A respondent stated:

> *"Now I don`t know… may be that open space there since there is a plan for expansion may be they will consider also expanding our place."* R2H3

Another concern that was raised by most respondents was about the absence of training opportunities especially on TB and HIV co-infections and co-management. Most respondents felt there was a need for training opportunities since very few have been

trained especially with regards to TB/HIV co-infection and co-management. Those who have received training, it was more than two years ago. They also added that most times they learn on the job especially for the new staff:

> *"Mmh! Those trainings, they are not there. May be once in a while. But ever since I came here I have not seen or received any training…"* R2H3

> *"No. For the new staff they will learn here at work may be later when there is a training opportunity. Mmh! because there is no proper timetable that says after a specific period of time there will be training."* R3H1

The respondents felt the current training strategies were insufficient and suggested intensive training sessions for all existing and the new staff on TB/HIV co-infection and co-management would help in improving the quality of clinical care they offer to their patients.

Another challenge raised by most respondents was the issue of number of healthcare workers as compared to workload. The respondents explained that number of staff is small as compared to the number of patients and workload. One respondent stated:

> *"We are not enough! Mmh..... We are not enough! That is how it is… we staff are very few."* R2H3

Another respondent explained:

> *"The number of staff is small as compared to number of patients. At times at the clinic, you find staff are very few…. Others are sick or on leave so you find there is too much work for those who are available"* R1H2

The issue of shortage of staff was associated with increase in workload by most of the respondents and urged government to consider increasing the number of staff so as to ease on the workload. One respondent stated:

> *"Workload is there though one might not see it. Example, yesterday patients were so many. Today they are few but you can see I am not settled I am here and there, there and there. There are so many things. …So eeh!... May be increasing the number of staff will help to reduce the workload."* R2H3

CHAPTER FIVE

5.0 DISCUSSION

The integration of TB and HIV services in TB clinics is crucial. This assessment of proportion of HIV-associated TB patients who were successfully started on ART and the timing of ART initiation during TB treatment and its associated factors was conducted in order to collect baseline data so as to support and inform the implementation and scale up of the national TB/HIV policy in the country. Multiple data sources were used to gather this data: TB registers, patients files and from the key informants.

5.1 HIV treatment cascade in TB patients.

An initial objective of this study was to describe the cascade of HIV services from time of HIV testing, diagnosis and initiation of ART among newly diagnosed TB patients. From the review of patient records, we found that all the newly diagnosed TB patients registered in the three TB clinics during the study period had been screened for HIV and had documented results. The PITC approach was applied which is quick and allows early diagnosis of HIV and early linkage to HIV care (10), this supports the evidence that TB clinics can be an important entry point for a continuum of prevention, care and treatment for both HIV and TB in Tanzania. The prevalence of HIV among TB patients in our study was 33.7% slightly lower than the national prevalence of 35% as of 2015 (6). This could indicate improvement in performance of prevention strategies but also could be due to the difference in sample size.

Most of the TB/HIV co-infected patients were put on CPT however the coverage was slightly below WHO target of 100% (10). Majority of ART naïve co-infected patients in this study were initiated on ART and some did not start ART during the course of TB treatment. These results indicate suboptimal ART coverage as the WHO recommended target level of 100% coverage is not yet achieved. They also clearly reveal attrition in the cascade from ART eligibility to ART initiation. Due to the retrospective nature of our study, we could not ascertain all the reasons behind patients who were not initiated on ART (6.6%) and CPT (1.6%) from the available routine TB records. Our findings that 6.6% of eligible patients did not start ART was lower than the national figure of 15% as of 2015 as well as what has been reported in previous studies in Africa (6)(38)(39). This

shows some improvement in the performance. Another explanation could probably be due to the difference in sample size and setting of our study as opposed to the national surveillance.

Our study also revealed that only half of the ART naïve TB/HIV patients with severe immune suppression were started on ART 19 days since onset of TB treatment exceeding the recent WHO recommendation and the national ART guidelines (10)(12). The recommendation is 14 days (2 weeks) ~5 days delay; and majority of other eligible patients-75% after 21 days. However, this was much lower compared to earlier report from a study done in South Africa where they reported an overall median delay in starting ART of 51 days (38). Whilst this median delay is lower than in other studies, more must be done within health systems to ensure earlier ART initiation since majority of these patients have advanced HIV.

The integration of TB and HIV services among TB/HIV co-infected patients already on ART at the time of TB diagnosis was not a challenge since most of them were linked to CTC on the same day of registration at TB clinics. This indicates good implementation and performance of the existing policies and strategies.

Complete integration of TB and HIV care (under one roof) in urban TB clinics leads to early and more prioritized ART initiation in ART-naïve TB/HIV co-infected patients, especially in patients with CD4 count <100/mm^3 who are most likely to benefit from early ART initiation (21). This is in line with WHO recommendation which emphasizes ART naïve co-infected patients with CD4 count <50 cells/mm^3 to be initiated on ART within the first 2 weeks after starting TB treatment (10).

Despite co-location of TB and HIV services, there are substantial delays in starting ART during TB treatment with some patients not starting ART at all. Regardless of our results showing some improvement, there are still barriers to successful uptake and timing of ART initiation in TB clinics regardless of the model of care being implemented. Therefore, the referral process together with tracking of TB patients for ART needs to be improved for all TB/HIV co-infected patients.

5.2 Patient factors and integration of TB/HIV services.

We also explored the association between patient characteristics and the overall time taken to start ART from the start of TB treatment. With the availability of both WHO and National guidelines, it is expected that ART coverage among TB patients who are HIV positive to be at 100%. In general, few eligible patients were started on ART within the first 2 weeks of commencing TB treatment with majority being started after 2 weeks. However on further analysis, this study found that only 50% of co-infected patients with CD4 cell count <100 cells/mm^3 were started on ART within two weeks as recommended (10)(12) with majority of patients with CD4 cell count >500 cells/mm^3being initiated on ART after 4 weeks of commencing TB treatment. This clearly indicates that priority of early ART initiation is with patients who have severe immune suppression.

Early initiation of ART in our study was most pronounced amongst patients with CD4 cell count <100 cells/mm^3 however this does not mean that those with CD4 cell count >500 cells/mm^3 should not be initiated on ART early as per guidelines. This shows that there are still challenges to successful uptake of ART in TB clinics hence further measures must be implemented to facilitate effective and efficient treatment integration. Delays in ART initiation or failure to initiate ART in ART naïve co-infected patients, could partly be explained by lack of training of health care workers on TB/HIV co-infected and co-management as well as work overload. This was strongly complimented by the qualitative component of this study. Health care worker lack of knowledge about when to initiate ART in co-infected patients could be addressed by TB and HIV training on TB/HIV co-management. The Ministry of Health, TB and AIDS programmes and regional/district health authorities should jointly plan and organise frequent trainings and capacity building on TB/HIV co-management to all health providers working in TB clinics. The delays in initiating patients ART could represent an important indicator of quality of care that can be used by monitoring and evaluation of programmes offering TB and HIV services.

In both crude and adjusted analyses, shorter time to ART initiation was strongly associated with lower CD4 cell count. Patients with CD4 cell count <100 cells/mm3 were more likely to be integrated faster than those with CD4 cell count >500 cells/mm3. The association between greater delays and higher CD4 cell counts in this study, these results are consistent with data obtained in another study done in Cape Town, South Africa among

patients accessing separate TB and ART (40). This is mainly because the emphasis is to prioritize ART initiation to severely immune-compromised patients as soon as possible after commencing TB treatment. This could be an indicator of health care workers being more compliant in early initiation of ART to patients with severe immune suppression, to prevent occurrence of serious opportunistic infections.

Contrary to expectations, there was no significant association between sex or age and ART initiation in our study. However, the trend was towards female patients being integrated earlier than male patients, which was similar to other studies (41)(42). A possible explanation for this observation might be due to the fact that women have more regular contact with the health facility than men, as well as differential health seeking behaviours between the sexes. Another possible explanation for this is health care workers may naturally favour women over men.

The relationship between age and integration was linear in nature, where by the older the person the higher the chance of integration even though it was not statistically significant. These results were consistent with data obtained in other studies that demonstrated the association of young age with delayed ART (42)(39). This could partly be explained by the fact that patients in older age groups were more frequent as compared to those aged 18-24 years as well as possible stigma issues among young patients. The level of CD4 cell count could not be used to explain this finding since the distribution of CD4 cell levels was not age oriented meaning there was no relationship between older patients and low CD4 cell counts. More emphasis should be put to the young patients to increase uptake of ART. Further studies focusing on challenges in offering integrated TB/HIV services among young patients is recommended.

Patients attending TB clinic in Mnazi Mmoja Hospital (district hospital) were more likely to be integrated earlier than those who attended TB clinics in Amana Regional Referral Hospital and Buguruni Health Centre. A possible explanation for this result could be due to high motivation and regular training of staff at Mnazi Mmoja as compared to the other two health facilities. It could also be explained by the overall number of HIV patients they see as well as good hospital management. A further study with more focus on comparing the level of knowledge of healthcare workers in different levels of health facilities is therefore suggested.

5.3 Facility factors and Integration of TB/HIV services.

Our study shows that availability of HIV screening services and tools, availability of drugs, availability of guidelines, SOP, IEC materials and good support supervision were enablers whereas lack of space, lack of training and inadequate number of staff were challenges in provision of integrated TB/HIV services in health facilities offering TB treatment. Although these enablers and challenges were identified in a few health units of different levels offering TB treatment in Ilala district, they may be common to many other public health facilities in urban Tanzania.

The issue of staffing gaps was more common in lower level health facility. Similar challenges with human resource have been cited in Uganda, DRC and South Africa (34)(43)(44), which are also providing integrated TB/HIV services in health facilities offering TB treatment. Such staffing gaps may compromise the quality of patient care, planning, monitoring and evaluation processes and implementation of interventions like task shifting which have been found to be effective in improving health services delivery in health facilities faced with understaffing as well as overtime payment (45).

Lack of space was another challenge that was identified by our respondents. Inadequate infrastructure contributes in compromising not only infection control at the health facility but also implementation of TB and HIV services (43). Lack of adequate space can interfere with undisturbed counselling sessions in privacy. Counselling is being performed in rooms where health workers/patients walk in and out hence compromising privacy when wanting to offer HIV counselling. Expansion of such facilities will create adequate space to operate when offering both services under one roof without interference.

Training of staff was an issue to all the study health facilities, echoing earlier findings in other African countries (44)(46). Inadequate training of health care workers is an important challenge, which may result into knowledge deficiencies among new staff. Training on TB/HIV co-management should be ensured before placement of new staff. In addition to that, the introduction of refresher courses/training could contribute to the consolidation of knowledge over the course of placement as well as advanced in management of the two conditions. Much as there were challenges in integrated TB/HIV services, majority of co-infected patients were integrated even though not timely.

5.4 Strengths and Limitation of the study.

Our study was a retrospective cohort of TB patients admitted over a period of one year. This design allows us to assess causal influences to early ART initiation in TB/HIV co-infected patients. Not sampling study participants eliminated errors associated with sampling hence a representative sample of TB patients attended in the selected facilities. The largest limitation to our study is the quality of the data used to address these objectives. Use of secondary data limits analysis to the variables available in the databases. Also, the quality of routine collected data in African settings questionable. Selection bias may have occurred due to missing information. However, inclusion of all patients registered in the clinic in the specified time frame, and training of research assistants to search for missing or incomplete information from other sources such as patient files may have minimized this bias.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATION

6.1 Conclusions

The overall integration of TB/HIV services in TB clinics was at 100%, 98% and 93.4% for HIV screening, CPT coverage and ART coverage respectively. Delays in starting ART were substantial with more than half of ART naive TB/HIV co-infected patients initiated on ART more than 2 weeks post TB diagnosis contrary to the WHO and National guidelines of within 2 weeks and some did not start ART at all during TB treatment. Early ART initiation was strongly associated with low CD4 cell count at the start of TB treatment. Delays in time to ART initiation should be used as an important indicator for monitoring and evaluation of the performance of TB services in the country.

6.2 Recommendations

1. More collaborative and coordinative effort at district level is needed to ensure timely initiation of ART to all newly diagnosed TB patients found to be HIV positive and other HIV care and management services as per WHO and National guidelines.
2. Training and refresher courses on TB/HIV co-infection and co-management should be offered to all health care workers offering TB services in all levels of health facilities.
3. More operational research is needed in other regions and nationally to evaluate the magnitude of integration of TB/HIV services to assist NTLP and NACP improve their collaboration on TB/HIV co-management.

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APPENDICES

Appendix 1: Informed consent form (English version)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS

CONSENT FORM

Greetings, My name is DR EDNA MASELLE, I am from Muhimbili University of Health and Allied Sciences and working on a research project with the objective of DETERMINING THE LEVEL OF INTEGRATION OF HIV SERVICES IN TB CLINICS AND ITS ASSOCIATED FACTORS IN ILALA DISTRICT, DAR-ES-SALAAM, 2017.

Purpose of the study

The purpose of this study is to determine the level of integration of HIV services in TB clinics and its associated factors in Ilala district, Dar-es-Salaam.

What participation involves.

If you agree to participate in this study you will be required to answer a series of questions that have been prepared for the study through interview.

Confidentiality.

All information collected from you will be kept confidential and used only for this study. Your name will not be used anywhere in the interview guide. Only authorised persons will have access to the data collected. They study will need to write a report of its findings. Code names and group summaries will be presented.

Risks.

This study involves no invasive procedures so we expect that no physical harm will be done to any participants.

Benefits.

If you agree to participate in this study, the information collected from this study will be beneficial to you, health care workers in Tanzania. It will also improve the quality of health services resulting in improved quality of life for people with TB/HIV co-infections.

Right to withdraw and alternatives

Participation in the study is entirely voluntary. You have a choice to participate or not to participate in the study and to quit at any time you feel to do so if you agree to participate. Refusal to participate or withdraw from the study will not involve penalty or loss of any benefit.

In case of injury

We do not anticipate that any harm will occur to you or your family as result of participating in this study. There will therefore be no compensations to you or your family.

Who to contact

If you ever have any questions about this study you may ask those now or later. In case you wish to find out more or ask any questions later, you may contact any of the following:

1. The principal investigator Dr Edna Bahaye Maselle, Muhimbili University of Health and Allied Sciences, School of Public Health and Social Sciences, P.O. Box 65015, Dar-es-Salaam.
2. Chairman of Research and Publication Committee P.O. Box 65001, Dar-es-Salaam. Tel: 21503002-6.

This proposal has been reviewed and approved by the Muhimbili University of Health and allied Sciences ethical committee, which is a committee whose task is to make sure that research participants are protected from harm.

Agreement:

Do you agree to participate in this study? **Yes…… No…...** (Tick that applies)

If you agree to participate in this study, please fill in the form below

I _____ have been explained the contents in this form and my questions have been answered. I agree to participate in the study.

Signature of Participant_____ Date _____

Signature of Research

Appendix 2: Informed consent form (Swahili version)

CHUO KIKUU CHA SAYANSI YA AFYA CHA MUHIMBILI

KURUGENZI YA UTAFITI NA MACHAPISHO

FOMU YA RIDHAA

Namba ya Mshiriki ----/----/----

Habari za leo! Jina langu ni DR EDNA MASELLE natoka Chuo Kikuu cha Sayansi ya Afya Muhimbili na nafanya utafiti huu kwa lengo la KUFAHAMU KIWANGO CHA USHIRIKIANO WA HUDUMA ZA VVU KATIKA KLINIKI ZA KIFUA KIKUU NA MAMBO YANAYOHUSIANA KATIKA MANISPAA YA ILALA DAR-ES-SALAAM 2017.

Lengo la utafiti

Lengo la utafiti huu ni kufahamu kiwango cha ushirikiano wa huduma za Virusi Vya Ukimwi (VVU) katika za kliniki za Kifua Kikuu na mambo yanayohusiana katika manispaa ya Ilala Dar-es-Salaam.

Nini kitakacho ambatana

Kama utakubali kushiriki kwenye utafiti huu utahitajika kujibu baadhi ya maswali yaliyoandaliwa kwa utafiti kupitia mahojiano.

Usiri

Taarifa zote zitakazokusanywa kutoka kwako zitawekwa kwa usiri na kutumika tu kwa ajili ya utafiti huu. Watu husika tu watakuwa na uwezo wa kufikia data zilizokusanywa. Utafiti huu unahitaji kuandika ripoti ya matokeo yake. Kanuni za majina na muhtasari wa makundi utawasilishwa.

Madhara

Utafiti huu hauhusishi kitendo chochote cha kudhuru mwili wako kwa hiyo hatutegemei mshiriki yeyote kupata madhara ya kimwili.

Faida

Kama utakubali kushiriki katika utafiti huu itakuwa ni vyema kwa vile taarifa utakazotoa zitasaidia katika kuchangia uboreshaji wa huduma yako, wafanyakazi wa afya wa Tanzania. Pia kuongeza ubora wa huduma za afya na kusababisha kuboresha hali ya maisha ya watu wenye maabukizo ya virusi vya ukimwi pamoja na kifua kikuu.

Haki ya kushiriki au kujitoa au vinginevyo

Ushiriki katika utafiti huu ni wa hiari kabisa. Wewe una uchaguzi wa kushiriki au kutokushiriki katika utafiti na kuacha wakati wowote ukijisikia kufanya hivyo kama wewe utakubali kushiriki. Kutoshiriki au kujitoa kutoka kwenye utafiti hakutakuwa na adhabu yeyote na hutapoteza stahili zako, ambapo utaona ni vema kufanya hivyo.

Endapo utapata madhara

Hatutegemei kama utapata madhara yoyote wewe au familia yako kutokana na kushiriki kwako katika utafiti huu. Hakutakuwa na fidia yoyote kwako au kwa familia yako.

Nani wa kuwasiliana nae

Kama utakuwa na maswali yoyote kuhusu utafiti huu, unaweza kuyauliza sasa au hata wakati mwingine. Ukitaka kuelewa Zaidi au kuuliza maswali wakati mwingine unaweza kuwauliza wafuatao:

1. Mtafiti mkuu wa utafiti huu DR EDNA MASELLE, Chuo Kikuu cha Sayansi ya Afya Muhimbili, P. O. Box 65015, Dar-es Salaam.
2. Mwenyekiti wa Kamati ya Maadili ya Utafiti ya Chuo Kikuu cha Sayansi ya Afya Muhimbili, P. O. Box 65001, Dar-es Salaam Tel 21503002-6

Huu utafiti umehakikishwa na kuhidhinishwa na Kamati ya Maadili ya Utafiti ya Chuo Kikuu cha Sayansi ya Afya Muhimbili ambayo ni kamati inayohakikisha kuwa washiriki wa utafiti wanalindwa wasipate madhara yoyote.

Je, unakubali kushiriki katika utafiti huu? Ndiyo____ Hapana____ (weka alama ya tiki)

Ukikubali kushiriki katika utafiti huu, tafadhali jaza fomu hapa chini

Mimi _____nimeelezwa yaliyomo yote katika fomu hii na maswali yangu yote yamejibiwa. Nakubali kushiriki katika utafiti huu.

Sahihi ya mshiriki _____ Tarehe_____

Sahihi ya mtafiti msaidizi _____ Tarehe_____

Appendix 3: Data extraction form

S/No	Question	Response	Code
1.	Name of health facility	_____	NAMEHF
2.	Date when data extraction was done	___/___/_____ (dd/mm/yyyy)	INTERVDATE
Section A: Place an X or fill in the space with the most correct information			
3.	ID	_____	PID
4.	Date patient diagnosed with TB	___/___/_____ (dd/mm/yyyy)	DATEDIAGN
5.	Date of registration	___/___/_____ (dd/mm/yyyy)	DATEREG
6.	Age of patient	_____ years	AGE
7.	Sex of patient	1. Male ☐ 2. Female ☐	SEX
8.	Type of TB	1. Pulmonary TB ☐ 2. Extra-pulmonary TB ☐	TYPETB
9.	Was the patient tested for HIV	1. Yes ☐ 2. No ☐	HIVTEST
10.	If patient was tested for HIV, what was the date of testing?	___/___/_____ (dd/mm/yyyy)	DATEHIVTEST
11.	If the patient was tested for HIV, what was the diagnosis?	1. Positive ☐ 2. Negative ☐	HIVSTATUS

12.	Was the patient informed of his HIV status	1. Yes ☐ 2. No ☐	KNOWHIV
13.	Was the patient started on Cotrimoxazole prophylaxis	3. Yes ☐ 4. No ☐	COTRIMOX
14.	What date was the patient started on Cotrimoxazole	___/___/_____ (dd/mm/yyyy)	DATECOTRIMOX
15.	Was the patient started on ART?	1. Yes ☐ 2. No ☐	ART
16.	What date was the patient started on ART?	___/___/_____ (dd/mm/yyyy)	DATEART
17.	Was CD4 count done?	1. Yes ☐ 2. No ☐	CD4
18.	What date was CD4 count done	___/___/_____ (dd/mm/yyyy)	DATECD4
19.	What were the CD4 count results	_____/μL	RESCD4
20.	Was the viral load done	1. Yes ☐ 2. No ☐	VIRALOAD
21.	What date was viral load done	___/___/_____ (dd/mm/yyyy)	DATEVIRALOAD
22.	What were the viral load results	_____/ml	RESVIRALOAD

Appendix 4: INTERVIEW GUIDE (English version)

INTERVIEW QUESTION

1. For how long have you been working in this TB clinic as head of TB unit/TB focal person?
    a. Have you worked in another facility as TB clinic focal person?

- How did it come about that you were given this task?

2. Have you ever heard of integration of TB and HIV services that has been recommended by WHO to aid in reducing the burden of HIV in patients with TB disease?
    a. What is your opinion about integration of TB/HIV services in this facility? Why do you think this way?
3. In your opinion, what are the challenges of implementing this recommendation?
4. Probe. What else?
5. Probe about. (Mention some of the known challenges if he/she does not volunteer)
    a. Training (management of TB/HIV; counseling)
    b. Number of staff and their mix
    c. Work load
    d. Supervision
    e. Infrastructure – HIV testing kits and equipment including data support
    - Availability of ART, Cotrimoxazole, condoms at TB clinic
6. What recommendations do you have for future efforts to scale up the program?

CLOSING

Is there anything more you would like to add?

I'll be analyzing the information you and other respondents give me and submitting a report to the district health authorities. I would appreciate it if you could read and review the report to see if it accurately represents your views. Would you be interested in doing this?

THE END

Appendix 5: INTERVIEW GUIDE. (Swahili version)

MASWALI YA MAHOJIANO

1. Kwa muda gani umekuwa ukifanya kazi kwenye kliniki hii ya Kifua Kikuu kama mkuu wa kitengo/ Mratibu wa Kifua Kikuu?
    a. Je, umefanya kazi katika kituo kingine kama Mratibu wa Kifua Kikuu?
    - Ilikuwaje mpaka ukapewa kazi hii?
2. Je, umewahi kusikia ushirikiano wa huduma za Kifua Kikuu and Virusi Vya Ukimwi (VVU) inayopendekezwa na Shirika La Afya Duniani kusaidia katika kupunguza mzigo wa VVU kwa wagonjwa wa Kifua Kikuu.
    a. Ni nini maoni yako kuhusu ushirikiano wa huduma za Kifua Kikuu and VVU katika kituo hiki?
3. Kwa maoni yako, ni nini changamoto za utekelezaji wa pendekezo hili?
4. Dadisi. Nini kingine?
5. Dadisi kuhusu (Taja baadhi ya changamoto zinazojulikana kama yeye hata jitolea)
    a. Mafunzo (usimamizi wa magonjwa ya Kifua Kikuu na VVU; ushauri)
    b. Idadi ya wafanyakazi na mchanganyiko wao
    c. Uzito wa kazi
    d. Usimamizi
    e. Miundombinu – vifaa vya kupima VVU pamoja na usimamizi wa data.
6. Ni mapendekezo gani unayo kwa juhudi za baadae za kuongeza huu mpango?

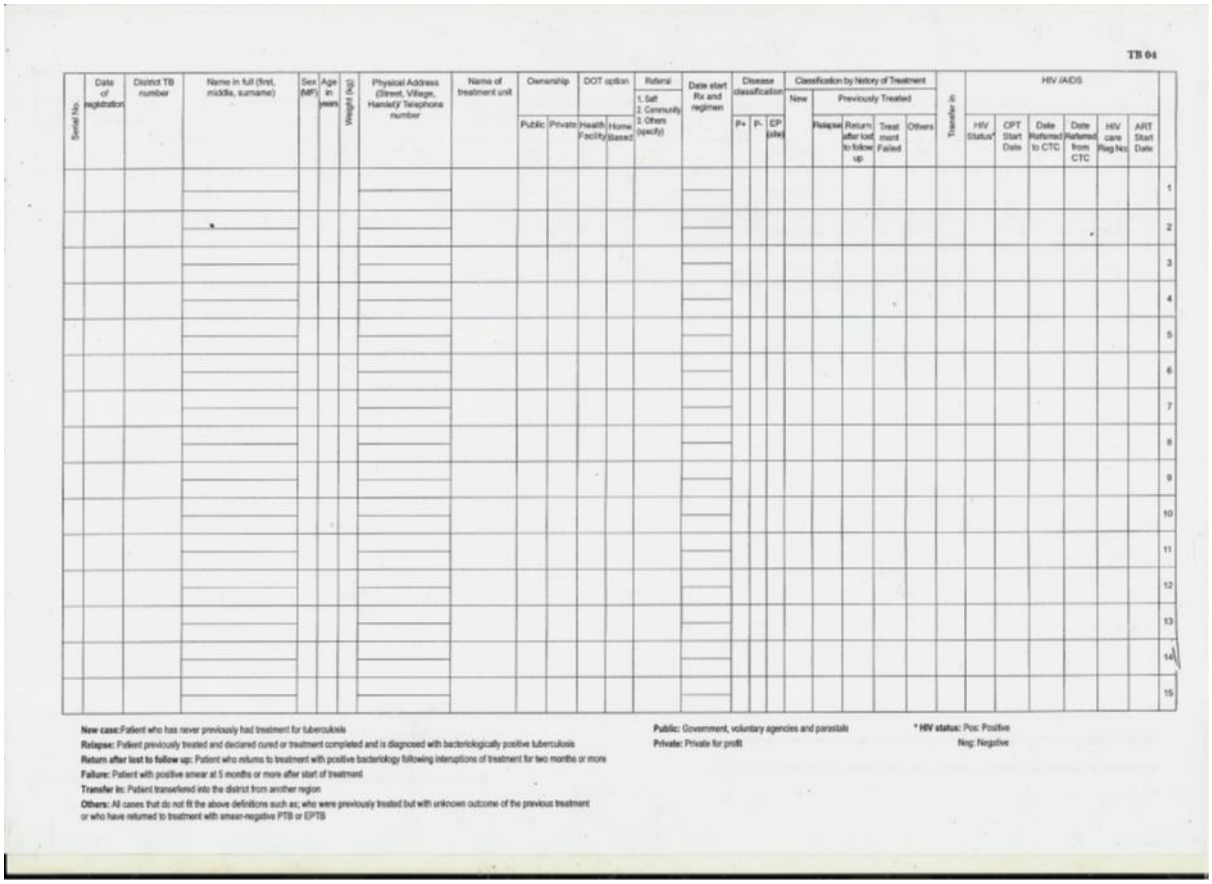
KUFUNGA.

Kuna kitu chochote zaidi ungependa kuongeza?

Mimi nitakuwa nachambua habari wewe na washiriki wengine mlionipa na kuwasilisha ripoti kwa mamlaka za afya za wilaya. Ningependa kufahamu kama unaweza kusoma na kupitia ripoti kuona kama inawakilisha maoni yako sahihi. Je, utatamani kufanya hivyo?

MWISHO

Appendix 6: Copy of TB patients records from district TB unit register.



TB 04

Serial No.	Date of registration	District TB number	Name in full (first, middle, surname)	Sex (M/F)	Age in years	Weight (kg)	Physical Address (Street, Village, Hamlet)/ Telephone number	Name of treatment unit	Ownership		DOT option		Referral	Date start Rx and regimen	Disease classification			Classification by history of Treatment				Transfer in	HIV /AIDS					
													1. Self 2. Community 3. Others (specify)					New	Previously Treated									
									Public	Private	Health Facility	Home Based			P+	P-	EP (site)		Relapse	Return after lost to follow up	Treatment Failed	Others		HIV Status*	CPT Start Date	Date Referred to CTC	Date Referred from CTC	HIV care Reg No:	ART Start Date
																													1
																													2
																													3
																													4
																													5
																													6
																													7
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																													11
																													12
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																													15

New case: Patient who has never previously had treatment for tuberculosis
Relapse: Patient previously treated and declared cured or treatment completed and is diagnosed with bacteriologically positive tuberculosis
Return after lost to follow up: Patient who returns to treatment with positive bacteriology following interuptions of treatment for two months or more
Failure: Patient with positive smear at 5 months or more after start of treatment
Transfer in: Patient transefered into the district from another region
Others: All cases that do not fit the above definitions such as; who were previously treated but with unknown outcome of the previous treatment or who have returned to treatment with smear-negative PTB or EPTB

Public: Government, voluntary agencies and parastals
Private: Private for profit

*** HIV status:** Pos: Positive
Neg: Negative

Appendix 7: Ethical Clearance

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

P.O. Box 65001
DAR ES SALAAM
TANZANIA
Web: www.muhas.ac.tz

Tel G/Line: +255-22-2150302/6 Ext. 1015
Direct Line: +255-22-2151378
Telefax: +255-22-2150465
E-mail: dpgs@muhas.ac.tz

Ref. No. MU/ PGS/SAEC/Vol. X/

18th August, 2017

Dr. Edna Bahaye Maselle
Master of Public Health
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED: "ASSESSMENT OF THE INTEGRATION OF TB AND HIV SERVICES AT DIFFERENT LEVELS OF HEALTH FACILITIES IN ILALA DISTRICT, DAR ES SALAAM"

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from 17th August, 2017 to 16th August, 2018. In case you do not complete data analysis and dissertation report writing by 16th August, 2018, you will have to apply for renewal of ethical clearance prior to the expiry date.

Prof. Andrea B. Pembe
DIRECTOR OF POSTGRADUATE STUDIES

cc: Director of Research and Publications
cc: Dean, School of Medicine
cc: Dr. G. Leyna