ERASMUS MUNDUS SCHOLARSHIP PROGRAMME

The Prevalence of HIV among Registered TB Patients in Public DOTS Clinic of Ethiopia's Capital, Addis Ababa

Mesfin Haile Assfaw

Centre for International Health

Faculty of Medicine and Dentistry

University of Bergen, Norway

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Mesfin Haile Assfaw

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DECLARATION

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ABBREVIATIONS

AFB - Acid-Fast Bacilli

AIDS – Acquired Immune Deficiency Syndrome

ART- Anti Retroviral Therapy

CDR- Case Detection Rate

CPT- Cotrimoxazole Preventive Therapy

DALYs- Disability Adjusted Life Years

DOTS - Directly Observed Therapy Short-course

DST - Drug Sensitivity Testing

EPTB- Extra Pulmonary Tuberculosis

FMoH - Federal Ministry of Health

GDP-Gross Domestic Product

HAPCO- HIV/AIDS Prevention and Control Office

HIV/ – Human Immunodeficiency Virus

IEC- Information Education and Communication

IPT- Isoniazid Preventive Therapy

MDGs- Millennium Developmental Goals

MDR-TB – Multi-Drug Resistant Tuberculosis

NACP- National AIDS Control Program

NTPs - National Tuberculosis control Program

NGO-None Governmental Organisation

PLWHA – People Living With HIV/AIDS

PTB – Pulmonary Tuberculosis

TB - Tuberculosis

TSR- Treatment Success Rate

UNAIDS – Joint United Nations Programme on HIV/AIDS

VCT- Voluntary Counseling and Testing

WHO – World Health Organization

XDR-TB – Extensively Drug Resistant Tuberculosis

ABSTRACT

HIV and TB are major public health problem undermining socio-economic development. HIV is the main reason for failure to meet tuberculosis control target. Considering this fact, a descriptive study was conducted in Addis Ababa City Administration. This study aimed to assess uptake of VCT, the current prevalence of HIV and uptake of ART and CPT among registered TB patients in public DOTS clinic of Addis Ababa City Administration, and to identify potential barriers and opportunities in the collaboration between national TB and HIV control programmes.

Data were collected from TB register logbook and TB/HIV quarterly report format of 24 DOTS clinic, found in Public Health Centres. All registered TB patients over the period of one year were included in the study. Literature, annual plans and reports were reviewed to identify barriers and opportunities to the collaborative TB and HIV control programmes.

During one year period a total of 8272 patients were registered in the DOTS clinics, 7036 (85%) of them were tested for HIV/AIDS. The overall prevalence of HIV was 23.3%, almost equal proportion of males and females found to be HIV positive and the prevalence was high in age group between25-34. Pulmonary tuberculosis patients had higher HIV prevalence, 24.7% compared to extra pulmonary, which had 22%. VCT uptake among registered TB patients was on the way of the global target, 85%; however, the uptake of ART and CPT were unsatisfactory. While sound policies and political commitment were identified as an opportunity, lack of well organized HIV surveillance system among tuberculosis patients was the major barrier for collaborative TB/HIV programme in the city administration. It was concluded that HIV prevalence among TB patients was moderate and uptake of ART and CPT were unsatisfactory. Finally, further quantitative and qualitative studies that investigate TB/HIV collaborative programme should be needed.

1. INTRODUCTION

1.1 Background

The rapid growth of the human immune deficiency virus (HIV) epidemic is the main reason for failure to meet tuberculosis (TB) control targets, particularly in countries which have high HIV prevalence. The HIV pandemic is a forceful contributor to the incidence of tuberculosis. Globally, from the year 1990 to 2004, TB incidence increased from 125 cases to 142 cases per 100,000 populations, primarily because of the HIV pandemic [21]. In some sub Saharan African Countries, like Tanzania, Malawi, Zambia and Burundi, which had strong TB control programmes, the HIV epidemic has led to a 100- 300% increase in TB notification [22]. Approximately, greater than 30%, and 60-80% of TB cases are HIV sero positive in the more northern and the southern part of the African region, respectively [23]. In 2006, in 112 countries about 700,000 people with TB were tested for HIV, on average half of them found to be HIV positive [1]. From year 2002-2006, 50% of HIV positive people with TB were accounted in 11 sub Saharan Africa countries, including Ethiopia [2].

Death rates among HIV infected TB patients are much higher than non-HIV infected patients. Among a million of TB deaths a quarter is HIV associated, with most of them in the African region [24]. In this regard Brazil and South Africa were typical examples. In Brazil the case fatality rates for TB was 13%, where as in South Africa 27%, this large difference was due to the difference in HIV infection rate [25]. In HIV infected smear-positive pulmonary TB patient's case fatality rates can be of the order of 20-30% and in smear-negative pulmonary TB or disseminated extra-pulmonary TB can be higher, because there may be difficulties in making accurate and timely diagnoses and patients in these latter categories are often more immunosuppressed [26]. Worldwide, in 2009 about 1.68

million deaths occurred due to TB, including 0.38 million patients infected with HIV. Of these deaths the African region accounted for 20% [2, 4].

TB is the most common opportunistic infection and, one of the major causes of morbidity and mortality among people living with HIV. And also it is a very common presentation of HIV/AIDS, and in most cases, it is the earliest manifestation in high HIV and TB prevalence settings. In the range of 20 to 45% of AIDS patients had TB in high HIV prevalence countries of the African region [22]. According to WHO, globally, 11.5 million HIV infected people are co infected with mycobacterium tuberculosis. Of these, 24 % are found in South East Asia, Latin America and the Caribbean but 70% of co infected people are found in the most badly affected countries of the African region [1]. In sub Saharan Africa TB contributes between 30-40% of deaths in HIV positive adults [23].

Human Immunodeficiency Virus and Mycobacterium Tuberculosis are among the leading causes of morbidity and mortality in Ethiopia. Among the list of 22 TB high burden countries Ethiopia ranks 8th in the world and 3rd in Africa, next to Nigeria and South Africa, and the 10th highly affected country by the HIV/AIDS pandemic in the world [2, 3, and 14]. Like other sub Saharan African countries Ethiopia is badly hit by the HIV/TB co- epidemic. From July 2005 to June 2006 routine data collected from 44 sites of the country showed that 41% of the TB patients were HIV positive. However, official data for HIV/TB co-infection are lacking, some unpublished internal reports at FMoH indicate that the prevalence of HIV among TB patients is rapidly increasing. A few previous studies conducted in the country have shown that HIV/TB co infection is higher in urban setting including the capital city, Addis Ababa [6, 7]. This rapidly growing dual epidemic problem requires well integrated TB/HIV activities; however, too often NTP and NACP are not working together. This study is, therefore undertaken to determine the current prevalence of HIV among TB patients,

the five year's trends, and to identify the potential barriers and opportunities for the collaborative TB and HIV programmes.

1.2 Global Situation of Tuberculosis

Globally, TB is one of the major public health problems undermining development. Epidemiologically, TB is disease of poverty; however, many industrialised countries are also hit by TB, including Scandinavia and the United States of America. Previously the proportion of infected people with mycobacterium tuberculosis was similar both in industrialized and developing nations. Around one third of the world's population, more than 2 billion peoples, are or have been infected with mycobacterium tuberculosis [2, 11]. The three diseases of poverty, TB, Malaria, and HIV/AIDS kill 6 million people every year; of those nearly 2 million deaths are due to TB. Even if TB is a curable disease, it kills 5000 people every day [24]. Socio economic status, age and geography are highly associated with infection of mycobacterium tuberculosis. To support this association, in developing countries 75% of infected individuals are less than 50 years old while 80% of those in industrialized countries are aged 50 or more in the year1990 [11].

In this, Millennium Developmental Goals (MDGs) and the stop TB Partnership's reference year, 1990, 7.6 million (95%) and 400,000 (5%) new cases of TB were found in developing and industrialized countries respectively [11] and also TB was the 7^{th} leading cause of disability adjusted life years (DALYs) and the 7^{th} leading cause of death in the world. The largest number of cases where found in the western pacific regions of WHO 2.6 million. The African region accounted for 1.4 million. In that year, TB was the largest cause of death from a single pathogen, worldwide, leading to 2.9 million deaths. of these, 660,000 occurred in the African region [27].

After two decades, TB is being continues to be a cause of morbidity and mortality, despite the global scale-up of the stop TB strategies to control tuberculosis. It caused an estimated 9.4 million incident cases, 14 million prevalent cases, and 1.68 million deaths, and also a notified cases of 5,800,000 in the year 2009. 85% of cases were found in South-East Asia, African and Western Pacific regions of WHO. In addition to this approximately 250,000 MDR-TB cases were included in the estimated TB cases [2, 11]. Currently, Africa accounted for more than 25% of the global tuberculosis burden, although it has only 11% of the world's population. Today the African region accounts for an estimated 2.4 million tuberculosis cases, and 540,000 tuberculosis deaths, the leading number of annual deaths in the world [28]. Particularly, Southern and Horn of Africa owing to endemic poverty, weak health systems, poor tuberculosis control strategies, and generalised HIV epidemic, has resulted in MDR and X-MDR TB, which radically raises treatment costs, duration of treatment and lower chance of treatment success. Out of the 22 TB high burden countries in the world 9 of them are in the African region [29].

1.3 Ethiopian Situation of Tuberculosis

Approximately 80% of the estimated number of new TB cases accounted in 22 high TB burden countries, including Ethiopia. More than half a century ago tuberculosis has been recognized as a major public health problem in Ethiopia. From infectious disease TB is one of the leading causes of death in the country. According to FMoH, TB was the leading cause of morbidity, the second cause of death, and the third cause of hospital admission (next to deliveries and malaria), in the year 2007 [12]. According to the Global Report 2010 by WHO, with an estimated incidence of all forms of TB of 300 new Cases/100,000 pop/year, Prevalence of all forms of TB is 480/100,000 population and 12% HIV prevalence in incident TB cases, Ethiopia is one of the high TB burden countries in the

world [2]. Currently, due to HIV and MDR TB, TB is the major public health threat in the world; this is also the case in Ethiopia.

Despite 6.9 million cases diagnosed, notified and treated not only for smear positive TB, but also for all forms of TB, and 90% treatment success rate of smear positive TB are the current indicators of the stop TB strategy [41]. It is questionable whether Ethiopia can meet the target by 2015. For the last decade national routine surveillance of TB data have shown that every year more than 100,000 all forms of TB cases were detected in the country. From 1 July 2000 to 30 June 2010, 392,319 smear positive TB and 430 274 extra pulmonary TB (EPTB) cases were reported. Within this decade the case notification of all forms of TB increased from 89,642 to-149 508, the case detection rate (CDR) of all forms of TB moved from 43% to 50%, and the treatment success rate (TSR) increased from 76% to 84% [3]. These increments were not significant comparing with the international target.

Addis Ababa City Administration annually contributed on average 13,500 [13,000-14,000] new TB cases of the approximated 100,000 annual national TB cases, over the last three years. The city has a case detection and treatment success rate of 63% and 80%, respectively, comparing with the stop TB target of case detection 70% and treatment success rate 85%, it is lower. This success rate mainly registered through DOTS, and some privates and NGOs clinics. Of the estimated 5000, MDR TB cases in the country Addis Ababa city have 400 registered MDR TB cases. Currently St. Peter General Specialized Hospital is providing treatment for 180 MDR TB patients [43].

1.4 Global and Regional Burden of HIV/AIDS

HIV/AIDS is one of the major public health challenges undermining socio-economic development in the world, and low-income countries, in particular. Globally, there were an estimated 33.3 million

people living with HIV in 2009. In the same year 2.6 million people became infected with HIV and 1.8 million people died of AIDS related causes. Young people aged 15-25 account for 45% of new cases of HIV infection worldwide. Above 50% of all people living with HIV globally are women. An estimated 370, 000 and 260,000 children were newly infected with HIV through mother-to-child transfer and died from AIDS related illness in the year 2009, respectively. Furthermore, 5.2 million people were under antiretroviral therapy in low and middle income countries and US$ 15.9 billion was spent on HIV/AIDS [14]. Since the beginning of the HIV epidemic more than 25 million people have died, globally [28].

The impact of HIV and AIDS in the African continent has been massive. Annually, it reduces GDP growth by an estimated 0.5 and 2.6, respectively in the continent [28]. Unlike Asia, the HIV/AIDS epidemic level is generalised in this resource constraint continent. In 2007, 64% of people living with HIV/AIDS were in Africa, which accounts for 11% of world's population [15]. Sub Saharan Africa is the most heavily affected region by the HIV pandemic. According to UNAIDS (2010) report an estimated 1.8 million people living in sub Saharan Africa became newly infected with HIV in 2009, bringing the total number of people living with HIV to 22.5 million, which accounted 68% of HIV infections worldwide. In the same year an estimated 2.3 million children living with HIV were in Sub Saharan Africa, which accounted for 90% of the world's children living with HIV [14]. Due to HIV/AIDS more than 14.1 million children in the region estimated to have lost one or both parents in 2008 [16]. In 2009 an estimated 1.3 million AIDS related deaths occurred in the region, which accounted for 72% of the worlds AIDS related deaths. The proportion of women living with HIV in Sub Saharan Africa is higher than men. Although the number of adults and children living with HIV is high in sub Saharan Africa, antiretroviral therapy coverage in the region is low. An estimated 63% of people eligible for ART were unable to access life saving medicines in 2009; this was the highest

next to Eastern Europe and central Asia region. Ethiopia, Nigeria, South Africa, Zambia and Zimbabwe accounted the largest epidemic in the region [14].

1.5 The Burden of HIV/AIDS in Ethiopia

Ethiopia is one amongst other countries heavily hit by the HIV pandemic. In 2004 there were approximately 1.5 million people living with HIV of which 817,000 women and 96,000 were children under 15 year, which makes it the fifth nation in the world with the largest population of HIV infected persons [17]. From July 2009 to June 2010, approximately 1.1 million people were living with HIV and 44,750 AIDS related deaths occurred. In the same year, 796,009 mothers visited health facilities, out of which 653,065 pregnant women received an HIV test and, 13,257 were found to be HIV positive, and about 14,140 babies were expected to be born as HIV positive. There are also more than 855,720 orphans due to HIV/AIDS out of the estimated total 5.4 million orphans in the country. Furthermore, 268,934 HIV/AIDS patients have been ever started on anti retro viral treatment in the country [4].

HIV prevalence in Ethiopia is quite different in the urban and rural settings. The spread of HIV/AIDS started and was initially localized in major urban areas located along major roads and commercial routes of the country [17]. In 2010, the national HIV prevalence was 2.4%, where as the urban prevalence was 7.7%. Addis Ababa city administration is the most highly affected cities of the country. There were 22,214 new HIV infections and 5,948 annual deaths in the year 2009. In 2010, 210,306 people were living with HIV and 70,097 HIV positive peoples were in need of ART, in the city. The estimated HIV prevalence of the city was 9.2%, above 10 times higher than the rural prevalence, which is 0.9% [20].

1.6 The Impact of HIV on TB[6]

Among many risk factors for the progression of TB infection to active disease HIV is the most potent one. Risk of developing TB is 10 times higher in individuals infected with HIV compared with not infected with HIV. HIV increases relapses and the likelihood of re-infections of TB. It also increases the rate of progression of recent or latent tuberculosis. On the life time HIV positive individuals have 50% lifetime risk of developing TB compared with 5-10%, -of those who have negative HIV status [6].

In countries where HIV/TB is common like Sub Saharan African countries, health services struggle to cope with the large and rising number of TB. In East and southern Africa the HIV/AIDS epidemics have increased the tuberculosis case load by five or more times [30]. In such type of countries HIV/AIDS has a number of impacts on prevention and control of TB. HIV increases the number of TB patients and suspects. The impact includes the following [6]:

- infrastructural and Human capital problem in the health sector
- Risk of health facility based TB infection
- Services for case detection and treatment
- Illness and death in health care workers owing to HIV related TB and high turnover of health professionals due to fear of the risk consequently reducing staff numbers, and increasing the workload of remaining staff. Which in turn compromise quality of service
- Low staff morale due to conditions of service, anxiety and powerlessness
- The risk of getting MDR & XDR-TB among health care workers could be high
- Over diagnosis of sputum smear-negative PTB, because of difficulties in diagnosis
- Due to excess laboratory workload, under diagnosis of sputum smear-positive PTB
- Insufficient monitoring of anti-TB chemotherapy;
- Very low cure rates in advanced immunosupressed individuals

- Morbidity during treatment is high
- Due to other opportunistic infections, high mortality rates during treatment
- High default rates because of adverse drug reactions;
- High side effects and high rates of drug-drug interactions
- High rates of TB relapse

1.7 Rationale of the Study

HIV and TB prevention and control programs share mutual concerns. TB prevention and treatment should be priority concern for HIV prevention and control program; HIV prevention, care and treatment should be a priority for TB control program [6]. Integrated HIV/TB activities are essential to tackle the burden of TB among people living with HIV and the burden of HIV among TB patients and should be priority for both HIV and TB control programmes; especially in countries were TB and HIV prevalence are high like Ethiopia.

HIV is an important risk factor for development of TB by destroying the immune defence mechanism of the body. Furthermore, HIV further aggravates TB in countries like Ethiopia were socioeconomic status is fragile, and subsequent change of attitude and behaviour are low. In addition to this HIV changes the frequency, distribution and determinants of TB.

The findings of HIV/TB as well as TB/HIV co-infection assessment can lead to concerted effort for the design of further collaborative co-infection programming, implementation and monitoring and evaluation. Therefore, it is important to analyze the prevalence of HIV among TB patients. This study will explore the prevalence of HIV among TB patients in public DOTS clinic of Addis Ababa. In addition, identifying the opportunities and barriers to TB and HIV/AIDS interaction enables how to

promote effective interaction in the future. The end outcome of this study is probably essential to increase the commitment to provide integrated HIV/AIDS care, support and treatment to HIV positive TB patients.

2. LITERATURE REVIEW

2.1 HIV-TB Co-Infection Prevalence Studies

Several health institutions based and few community based HIV-TB co-infection prevalence studies were conducted in the world, including sub Saharan Africa. In 2006, the sero prevalence of HIV among 6,533 registered TB patients in USA was 12% [31]. In 2010 an institution based study conducted in Guangxi, China showed that the prevalence of HIV among pulmonary tuberculosis patients was higher than in the general population [32]. A recent study conducted at DOTS centres of rural Haryana, India revealed that HIV sero prevalence was 1.3 times higher in male TB patients than female patients [33].

Different sub Saharan African countries were reported greater than 40% of HIV sero prevalence rates among TB patients. In Kenya and Uganda, 60% and 30% of newly diagnosed tuberculosis patient were HIV positive, respectively [34]. In 2005 another study conducted in Kampala, Uganda revealed 42% HIV sero prevalence among TB patients [35]. Twenty five percent of TB patients were found HIV sero positive in a recent institution based study from Nigeria, and the prevalence of HIV was higher in females, and in the age group 38-47 [36].

Few studies have been conducted regarding the prevalence of HIV among TB patients in Ethiopia; most of them are health institutions based cross- sectional. In the year 2003 the study conducted in Arsi, Oromiya regional state revealed that the sero prevalence of HIV among registered TB patients was 37.2%. Almost equal proportions of females and males found to be HIV sero positive, 36.3% and 37.9%, respectively. HIV prevalence was significantly higher in subjects in the 20-39 years age group [34]. A similar study in Shashemena, in the same region, indicated that 44.4% of tuberculosis patients were HIV positive in 1994 [39]. Another study done in Harar, Eastern Ethiopia in 1997 showed 22%

of sero positive among smear positive and 20.4% of sero positive in culture positive TB patients [42]. In 2000 a study conducted in Addis Ababa revealed 45.3% of sero prevalence among 236 AFB confirmed TB patients [7].

2.2 Diagnosis and Treatment of HIV Associated TB

Diagnosis of tuberculosis is more difficult in HIV infected TB patients comparing with non infected individuals. The HIV epidemic has power to change the clinical feature (course) of the disease tuberculosis. In addition, HIV reduces smear positive TB cases of both pulmonary and extra pulmonary TB [37]. Still now, many TB high burden countries are using the 125 years old sputum smear microscopy test method of TB detection. Such method has a number of drawbacks. Low sensitivity in HIV positive individuals and unable to detect rifampicin drug resistance which is a reliable indicator for MDR TB are major drawbacks. Xpert MTB/RIF is the newly promising fully automated rapid TB diagnostic test. It should be and may be used as the initial diagnostic test in individuals suspected of MDR-TB or HIV/TB in high burden countries and a follow-on test to microscopy in settings where MDR-TB and or HIV is of lesser concern, respectively [38].

Principally, there is no unique treatment for HIV positive TB patients; it is the same to non co-infected individuals. Occurrence of immune reconstitution, overlapping toxic effects, drug interactions, and regimen length and schedule of administration of anti tuberculosis drugs, timing and drug combinations of antiretroviral drugs are exceptional issues associated with co-infected individuals. Isoniazid, Rifampicin, Pyrazinamide, and Ethambutol are the drugs of choice for the treatment of tuberculosis, irrespective of HIV status. According to WHO, TB treatment, parallel with co-trimoxazole and immediately followed by anti retroviral therapy within 8 weeks is the first priority for HIV positive TB patients. Co-trimoxazole has a number of impacts in HIV positive TB

patients; it prevents Pneumocystis jirovecii, malaria, different bacterial infections and reduces death. ART should be recommended for all HIV positive TB patients, regardless of CD4 cell count in order to improve their survival. Furthermore, ART reduces TB rate by 90% and 60% at the individual and population levels, respectively [37].

2.3 Global Tuberculosis Control Strategies

The six principal components of the global stop TB strategies are:

1. Pursue high-quality DOTS expansion and Enhancement;

2. Address TB/HIV and MDR-TB and other special challenges;

3. Contribute to health system strengthening,

4. Engage all care providers;

5. Empower people with TB, and communities;

6. Enable and promote research. Among those DOTS is the backbone of the strategy, which was launched in 1994. Worldwide, more than 49 million patients had been treated in DOTS programmes from 1995 to 2009; of them more than 41 million had been treated successfully. It is the basic for the other five principles of stop TB strategy [41, 13].

The following five points are required to further strengthen DOTS strategy [13].

Political commitment with improved and persistent financing at all levels, from the higher to the smallest unit of government administration system;

Case detection through quality-assured bacteriology test of sputum smear microscopy, culture and drug susceptibility test;

Standardized treatment by following the WHO guidelines, including supervision, patient support and access to treatment;

An effective drug supply and management system; essential anti TB drugs should be available at relevant health facilities without payment;

Monitoring and evaluation system, and impact measurement; recording and reporting of all TB patient data and cohort outcomes are crucial.

Addressing collaborative TB/HIV, MDR and other challenges are the second principal component of the stop TB strategy. HIV not only increases the rate of recurrent TB, but also promotes the progression of recent and latent mycobacterium tuberculosis infection to active TB disease. The HIV epidemic has caused a significant decrease in the percentage of cases of smear- positive pulmonary and extra pulmonary TB. MDR-TB, which partly is caused by the widespread misuse of second-line anti-TB drug; and the absence of new effective drugs to treat TB, is a treat to the stop TB strategy. Thus screening of all HIV patients to TB and the vice versa and effective prevention and control of MDR-TB should be integrated in the national TB control programmes, especially in highly TB prevalent countries.

The third principal component of the stop TB strategy is; contribute to health system strengthening. Health system consists of; health work force, finance, information, management, vaccine and medical products and service delivery that could be disease specific, such as maternal and child health, HIV/AIDS programmes, lung health and NTPs. Thus TB control strategies should be integrated, share and adopt innovations with other parts of the broader health care system.

DOTS and STOP TB strategy for TB control in Ethiopia was adopted since 1990s. DOT facility assessment was conducted in the country in February 2011, the result of the assessment indicates that, 2,367 health centres out of 2,480 health centres (95%) and 110 hospitals out 119 hospitals (92%) are implementing DOTS-based services. In addition, 2,100 health posts across the country; 15% of total

existing health posts provide TB treatment follow up under the DOTS strategy. Currently, the Health Facility coverage is 95% whereas the geographic coverage of DOTS reaches 100% [3]. The other five components of the stop TB strategy are also implemented in the country together with other parts of the health system.

2.4 Collaborative TB and HIV/AIDS Activities

The co-existence of the HIV pandemic accelerates the global burden of TB and TB has a significant impact on the life expectance of PLWHA.

Strong collaborative programme between the national TB and HIV/AIDS programmes key to address the two diseases in one person. Successful integration of National TB and HIV/AIDS programmes is an entry point to the collaborative TB/HIV or HIV/TB activities. Thus to reduce the burden of TB among people living with HIV/AID (PLWHA) and the burden of HIV/AIDS among TB patients WHO recommends 12 essential activities under the umbrella of three categories. These are [13, 40, and 41]:

A) Establishing the mechanism for collaboration between the programmes, NTP and NACP

1. Form a joint national TB and HIV coordinating body that includes TB and HIV patient support groups from the top to the bottom level of health services;
2. Prepare and execution of a joint national plan between NTP and NACP, including budgeting;
3. Conduct surveillance of HIV among TB patient and the vice versa depend on the prevalence of HIV in the country;
4. Effective monitoring and evaluation mechanism for the collaborative TB/HIV activities;

   B) Reduce the burden of HIV among TB patients
5. Provide counselling and testing of HIV for All TB patients: Without the HIV epidemic level of the countries, the world health organisation recommends HIV counselling and testing for

all patients with or without confirmed TB but who present with sign and symptoms of tuberculosis [37]. According to the global stop TB plan by 2010 and 2015, 85% and 100% TB patients should be tested for HIV, respectively;

6. Provision of HIV/AIDS prevention services; ensure TB patients know how to prevent HIV, including methods to reduce transmission of HIV and TB;
7. Provision of co-trimoxazole preventive therapy (CPT) for HIV positive TB patients, according to the global stop TB plan to provide 95% and 100% CPT to HIV positive TB patient by 2010 and 2015, respectively;
8. Provision of ART to HIV positive TB patient, all HIV positive TB patients should put on ART regardless of their CD4 status;
9. Provision of care and support to HIV positive TB patients;

   C) Reduce the burden of TB in people live with HIV/AIDS

10. Intensified TB case finding, 100% screening of PLWHA for TB, by 2015
11. Provision of isoniazid preventive therapy (IPT), all HIV positive peoples without active TB should put under IPT, by 2015
12. Ensuring TB infection control in health care and congregate settings, HIV positive peoples are at risk of developing TB, thus infection control at health facilities is critical to protect PLWHA from getting TB.

2.5 Surveillance of HIV among TB Patients [5]

As the HIV pandemic continues to fuel the global tuberculosis epidemic, it is more significant to conduct surveillance of HIV among TB patients and it is a sensitive indicator for the spreading of HIV in to the general population. Surveillance of the prevalence of HIV among TB patients will provide information on the level of the dual epidemics, TB and HIV and useful to give ART, CPT,

IPT, and general HIV/AIDS care and support. According to the World Health Organisation there are 3 methods of surveillance of HIV prevalence among TB patients: data from the routine testing of tuberculosis patients for HIV, sentinel surveillance and special surveys. These are depending on: previous surveillance system, a countries state of the underlying HIV prevalence; the situation of tuberculosis, and ART implementation status [5].

1. Data from the routine testing of tuberculosis patients for HIV :- when routine HIV testing data among TB patients available, this method of surveillance should be used at generalised, and concentrated HIV epidemic level and it is highly recommended in countries where the level of HIV is generalised, like sub Saharan African countries. Despite that this method has given contradictory results, in poor countries due to poor testing procedures and inadequate quality control, it provides the opportunity to receive collaborative prevention and care programmes for co-infected patients [5].
2. Sentinel surveillance: - is used when routine HIV testing data among TB patient is lacking, in countries with a generalised, concentrated or low HIV epidemic level. Such method is advantageous for analysis of trends and to provide point HIV prevalence among TB patients estimates. Owing to well established HIV sentinel system this method is the simplest and the cheapest surveillance system. Such method might be biased if the sentinel sites were not selected through probability-based sampling methods [5].
3. Special or periodic survey: - the recommended surveillance method for countries where the prevalence is previously unknown and classified HIV epidemic levels are missing. This is also a typical method in resource constraint with under- developed surveillance systems and in settings where the general HIV prevalence may be high but other methods of surveillance are not practical. Even though such method is expensive and time consuming, with excellent sampling method may provide reliable estimate of HIV prevalence among TB patients. Like sentinel surveillance this

method is used as a calibration in countries where data from routine HIV testing among TB patients used for surveillance purposes [5].

3. OBJECTIVES OF THE STUDY

3.1 General Objective

To assess the prevalence of HIV infection among TB patients in public DOTS clinic and the barriers and opportunities in the collaborative between TB and HIV/AIDS programmes in Addis Ababa city administration, Ethiopia.

3.2 Specific Objectives

- To assess the sero- prevalence of HIV infection, and uptake of ART and CPT among public DOTS clients in Addis Ababa
- To assess uptake of Voluntary Counselling and Testing, among registered TB patients
- To identify potential barriers and opportunities in the collaborative between the national TB and HIV programmes in Addis Ababa

4. METHODOLOGY

4.1 Study Setting

Ethiopia is located in the African continent, which is one the country of Sub Saharan Africa. African oldest and independent country, it is the tenth largest country in Africa covering 1,104,300 square kilometres and is the major constitute of the land mass known as the Horn of Africa. Ethiopia is estimated to have a population of nearly 80 million with a rapid growth rate of 3.2% per year; making it the second populated country in Africa, next to Nigeria .Approximately 15% of the population is urban dwellers while the majority (85%) live in the rural areas. Life expectancy at birth is quite low at 58.38 years for females and 53.28 years for males while the infant mortality rate is high at 79 per 1,000 live births. The median age of the population is 16.8 years, implying that nearly half of the population is aged over 15 years [10].

Ethiopia is a federal democratic republic composed of nine regional states: Oromia, Amhara, Southern Nations, Nationalities, and Peoples, Tigray, Somali, Afar, Benishangul Gumuze, Gambella and Harari and two city administrations council of Addis Ababa and Dire Dawa, which have the power to raise their own revenues. The regional states and city administrations are sub divided in to 817 administrative districts. The 817 districts are further divided in to about 16,253 Kebeles; the smallest administrative unit in the governance [10].TB/HIV co-infection activities at federal and regional level are co-ordinated by both the health ministry and bureaus, and national and regional HIV/AIDS prevention and control offices.

The study area Addis Ababa administrative region is the capital city of Ethiopia covering an area of 540 sq. km, and with a total population of about 2.9 Million. 5046 peoples per square kilo meter,

more of slum and overcrowded. The Administrative region has 10 sub cities and 106 woredas (districts) [8]. There are many different ethnic groups with different living standards. According to Addis Ababa health bureau report of 2010, there were 49 hospitals of which 13 were government owned, 5 NGOs and 31 are private, 27 public health centres, and 130 public health stations, 700 different levels private clinics are found in Addis Ababa city Administrative region [9]. Of them 29 public, and 29 private and NGOs health facilities are currently providing DOTS service.

4.2 Study Design

A descriptive study was conducted to assess the prevalence of HIV among TB patients in 24 DOTS clinics, which are found within public Health centres of Addis Ababa, Ethiopia.

4.3 Source and Study Population

The source population is all TB patients in Addis Ababa City Administration, while DOTS clients were the study population over the period of one year, from July 2010-June 2011**.**

4.4 Data Collection

Secondary data were collected from TB registries, and quarterly TB/HIV reports form of 24 public health centres found in 10 sub cities of Addis Ababa City Administration. All DOTS clinic clients who were screened for TB and documented in the TB registration logbook were included in the study. Annual reports, manuals, guidelines and other literature were reviewed to identify potential barriers and opportunities in the collaboration between the TB and HIV/AIDS programmes. The data was collected by the principal investigator and one public health specialist from 15July – 31July 2011 using a separate registration form. After the required data were collected, the analysis was made using Excel window 2007.

4.5 Study Variables

Dependent variable: HIV status of TB patients.

Independent variables: Age, sex, type of TB case and site of TB infection.

4.6 Operational Definitions

Prevalence: - is given as the proportion of individual in a population having a disease. For example, if all Norwegians, 5million, are screened for TB and 250 of them are found to be positive, then the prevalence of TB in Norway is 0.005% or 5/100,000 population.

Surveillance: - is the ongoing systematic collection, analysis and interpretation of data, and provision of information for effective responses of a disease. For example, the aim of surveillance of HIV among TB patients in health facilities of Addis Ababa, Ethiopia is to analyse, prevent and control HIV among TB patients.

DOTS: - the world health organisation recommended and internationally accepted best strategy for TB control.

5. RESULTS

5.1 Description and Sero Status of TB Patients

During one year period, from July 2010 to June 2011 a total of 8272 tuberculosis patients of all type were registered and under treatment in 24 public health centre DOTS clinic of Addis Ababa City Administration. Among these 4096 (49.5%) were females and 4176 (50.5%) were males, making the female to male ratio nearly 1:1. All of the TB patients agreed and attended the voluntary counselling services, which are providing in the same compound as the DOTS clinic. Of the 8272 registered TB patients 7036 agreed to be tested for HIV. All age group patients registered in the TB register logbook were included in the study. The age group of the HIV positive TB patients was varied from 0-65+ years.

The overall HIV prevalence among the registered TB patients who were voluntarily tested for HIV was found to be 1640 (23.3%). The majority, 575 (35%) of the HIV positive tuberculosis patients were in the age group of 25-34, whereas only 16 (almost 1%) were in the age group above 65. Concerning HIV sero positivity by sex, 810 (22.75%), of the male was found to be HIV positive, while the corresponding figures for females were 830 (23.85%). HIV prevalence was higher in patients had pulmonary site of infection, 24.7%.

Regarding study sites, out of the total study subjects' Yeka sub city contributed the highest followed by Kirkose sub city with 1271 and 1111 registered TB patients over one year period respectively, in 6 public health centres, 3 each. The lowest numbers of study subjects were found in Lideta sub city, which had 317 registered TB patients. The prevalence of HIV sero positives among the registered TB patients varied depending on the total number of cases per public health centres being registered. According to table 6, the highest proportion was found from Beletshachew and woreda 9 Health centres 61 and 70 sero positive out of 171 and 210 registered TB patients respectively. The lowest

HIV prevalence rate was found in Addis Ketema and woreda 3 health centres with 9.85 and 10.17% sero prevalence out of 702 and 314 study subjects.

Table 1 HIV Status Distributions of DOTS follow up Patients in 24 Public Health Centres in Addis Ababa, from July 2010 to June 2011

Study Subject=8272	HIV Status		
Tested		n	%
	Positive	1640	23.3%
	Negative	5396	76.7%
	Total	7036	85%
Not tested		1236	15%

Table 2 Sex Distribution and HIV Status of Registered TB Patients

TB and HIV status	Male	Female	Total
Registered TB patients	4176	4096	8272
HIV tested TB patients	3556	3480	7036
HIV positive TB patients	810	830	1640
HIV prevalence among TB patients	22.75%	23.85%	23.3%

Table 3 HIV status among TB patients, and age group classification, Addis Ababa, from July 2010 to June 2011

Type of Patients	Age Group Classification								
	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65+	Total
No TB Patients	60	212	900	2948	2749	1014	328	61	8272
No HIV+ TB Patients	8	46	188	575	551	195	61	16	1640

Table 4 Site of Infection and HIV Status of TB Patients

Site of Infection	HIV Status			Total
	Positive	Negative	Not Tested	
Pulmonary	1013 (24.7%)	3080	605	4698
Extra pulmonary	543 (22%)	1922	579	3044
Other	84 (17.6%)	394	52	530
Total	1640	5396	1236	8272

Table 5 Distribution of sero status and type of TB case in 24 public DOTS Clinic, Addis Ababa, from July 2010 to June 2011

Sero Status	Study subject= 8272				
	Type of TB patient				
	New Case	Relapse	Defaulter	Not Specified	Total
Positive	1298	270	29	43	1640
Negative	4744	443	78	131	5396
Not tested	1115	95	10	16	1236
Total	**7157**	**808**	**117**	**190**	**8272**

Table 6 Distribution of Registered TB Patients by Sub City and Health Centre, Addis Ababa, 2010/2011

Serial Number	Name of Sub City	Name of Health Centre	Sero Status of the Study Subject=8272			Total =8272
			Positive	Negative	Not tested	
1	Addis ketema	Addis ketema health centre	62	567	73	702
		Woreda 7 health centre	100	238	51	389
2	Akaki kaliti	Akaki health centre	85	228	14	327
		Kaliti health centre	81	189	42	312
		Saries health centre	43	219	0	262
3	Arada	Arada health centre	92	216	84	392
		Gulele health centre	99	244	90	433
		Kebena health centre	30	102	24	156
4	Bole	Bole 17 health centre	60	149	41	250
		Bole 17/20 health centre	49	124	4	177
5	Gulele	Selam health centre	26	141	104	271
		Shiromeda health centre	93	200	132	425
6	Kirkose	Kasanchis health centre	107	259	19	385

Serial Number	Name of Sub City	Name of Health Centre	Sero Status of the Study Subject=8272			Total =8272
			Positive	Negative	Not tested	
		Kirkose health centre	66	302	63	431
		Meshaulekia health centre	20	102	173	295
7	Kolefe keraniyo	Kolfe health centre	87	404	19	510
		Woreda 9 health centre	102	233	86	421
8	Lideta	Beletishachew health centre	61	110	8	179
		Lideta health centre	30	92	16	138
9	Nifas Silk Lafeto	Woreda 3 health centre	29	256	29	314
		Woreda 9 health centre	70	140	22	232
10	Yeka	Entoto health centre	50	232	4	286
		Kotebe health centre	137	433	28	598
		Yeka health centre	61	216	110	387

5.2 Uptake of Voluntary Counselling and Testing among the Study Subjects

For HIV prevention and treatment and to avoid co-infection among TB patients voluntary counselling and testing is an essential intervention. In this study, during one year period out of the total 8272 registered TB patients, 8272 (100%), which was 100% male and 100% female have agreed to voluntary counselling for HIV testing. Regarding voluntary tested clients, out of the total 8272 TB patients who agreed to voluntary counselling for testing only 85% of them, with almost equal proportion of male and female have agreed and tested, and their HIV result recorded in the TB register. The rest 15% they haven't know their HIV status.

Table 7 Uptake of Voluntary Counselling and Testing among Registered TB Patient by Sex

	Male		Female	
	n	%	n	%
Registered TB Patient	4176	50.5%	4096	49.5%
Have agreed for VC	4176	100%	4096	100%
Have agreed for VT	3556	85.5%	3480	84.5%

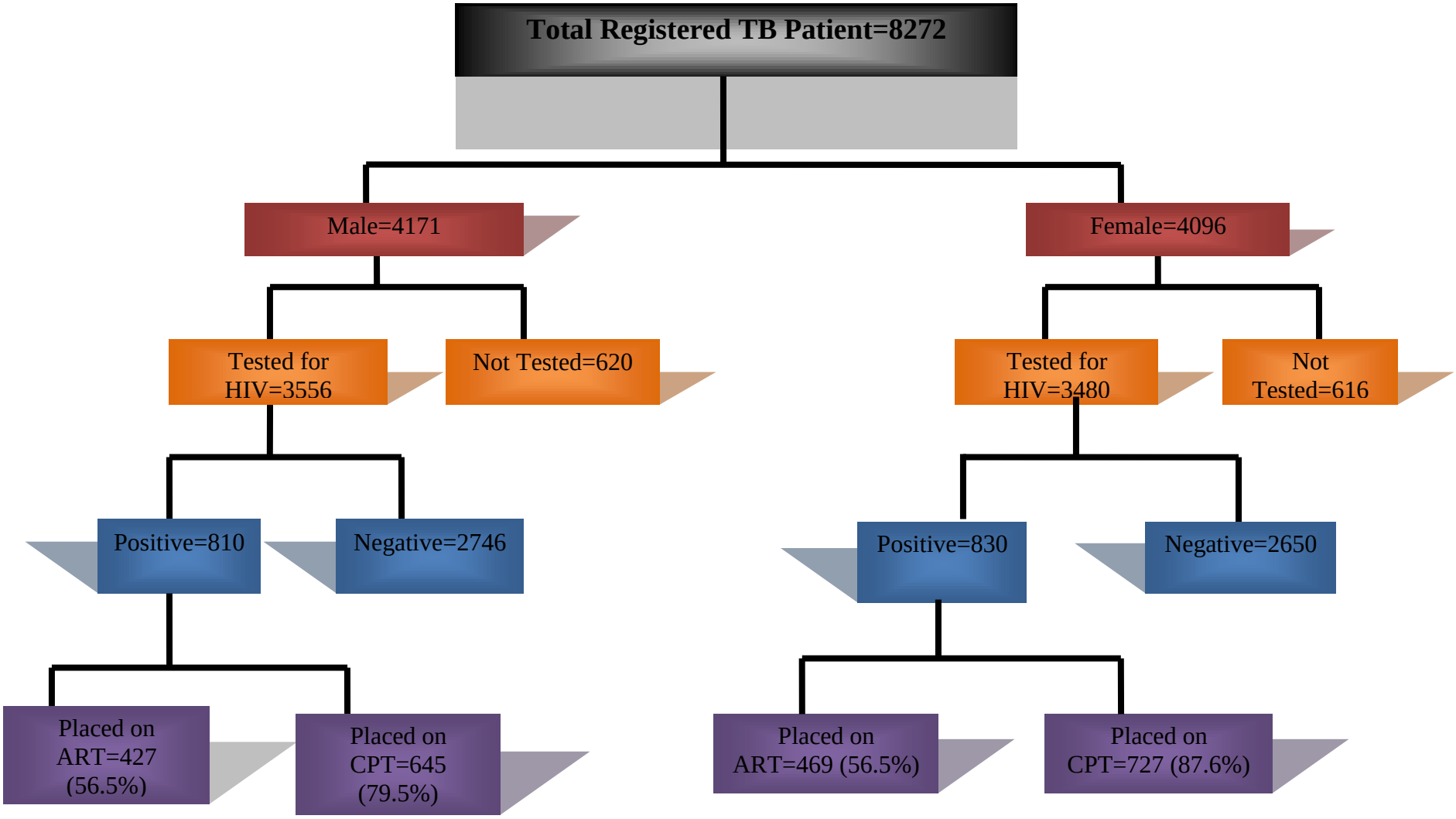
5.3 Uptake of Antiretroviral Therapy and Cotrimoxazole Preventive Therapy

Out of the total 1640 sero positive TB patients 859 (52%) and 1309 (80%), were found to be put on ART and CPT, respectively.

Table 8 Distribution of ART and CPT Treatment among HIV Positive TB Patients, Addis Ababa, 2010/2011

Sex	Sero Status	Put on ART		Put on CPT	
	Positive	n	%	n	%
Male	810	427	52.7%	645	79.6%
Female	830	469	56.5%	727	87.6%
Total	1640	896	54.6%	1372	83.65%

Schematic Diagram of TB/HIV Co-infected Patients



5.4 Collaboration between TB and HIV Programmes

After the recommendation of WHO to increase collaboration between TB and HIV programmes in 2004, Ethiopia has worked to increase TB/HIV collaborative activities. Integrated TB/HIV activities have been achieved in Ethiopia from federal to district health facility levels. The federal democratic republic of Ethiopia's ministry of health is responsible to include and address the link between TB and HIV in the national HIV/AIDS and TB programmes. And also, it is responsible for developing national TB/HIV collaborative policies, guidance, strategic planes, guidelines and manuals for implementation of TB/HIV collaborative activities, follow up of implementation, and conducting monitoring and evaluation of the collaborative programme [46]. Based on this mandate, since the last 5 year the ministry has improved performance of the collaborative activities. Since then HIV testing among TB patients increased from 16% in 2006 to 45% in 2010, and the sero prevalence of HIV among tested registered TB patients decreased from 31% to15%. Screened HIV positive clients for TB have increased to 79% in 2009/2010 from 47% in 2006/2007, and the prevalence of active TB among registered HIV positive clients was 11% in the year 2009/10 [3].

Addis Ababa Health Bureau is responsible for adopting the collaborative TB/HIV policies, strategies, guidelines, manuals from the ministry [46] and implementation of the detail activities together with 10 sub city health offices and health facilities those providing the collaborative activities in the city.

Table 9 Opportunities and Barriers for Collaborative TB/HIV Activities in Addis Ababa, Ethiopia

Perspectives	Opportunities and Barriers for Collaborative NTP and NACP		Remarks and Reference	
	Opportunities	Potential Barriers	Remark	Reference
Mechanism for Collaborative NTP and NACP	• Existence of National TB and HIV policy that addresses collaborative TB / HIV linkage and reflects international policy guidance [12,46] • Presence of a TB/HIV coordinating body or mechanism and technical working group at City health bureau level, sub city health office and health facility level, which include UN agencies, NGOs, and religious institutions [47]. • Existence of integrated and harmonized joint the city	• Absence of clear regular system of HIV surveillance among TB patients [52] • All public, private & NGO's health facilities un -able to provide integrated TB/HIV service [48]	• Surveillance of HIV among TB patient is not the government priority (lack of ownership), it is running by CDC	
		• Shortage and inequitable distribution of resources, Huge amount of fund is coming from international sources, the government		

Perspectives	Opportunities and Barriers for Collaborative NTP and NACP		Remarks and Reference	
	Opportunities	**Potential Barriers**	**Remark**	**Reference**
	administration TB/HIV plan with earmarked budget [47] • Presence of an integrated city level Monitoring and Evaluation system for collaborative TB/HIV activities that inform annual and five year HSDP planning [48] • Presence of urban health extension worker's and existence of joint ,comprehensive and linked TB/HIV information, education and communication (IEC) materials to provide health education about the link between TB and HIV, and to	budget for this programme is very small, Much of the funding is allocated to the National AIDS control programme followed by TB, funding for the collaborative activity is less, except the global fund [50]		

Perspectives	Opportunities and Barriers for Collaborative NTP and NACP		Remarks and Reference	
	Opportunities	**Potential Barriers**	**Remark**	**Reference**
	create community awareness [49] • Presence of continuous TB/HIV training for health professionals and quarterly TB/HIV reporting system [50] • Presence of political commitment at all level [50] • Existence of horizontal health care system, NTPs and NACPs managerially horizontal [51]			
Reduce the burden of TB in People live with HIV	• Many public health sector health facilities implementing intensified TB case finding for those found to be HIV positive [48]	• Lack of modern and organised laboratory for diagnosis of TB, only a century old microscopy is	• Delay in amending IPT eligibility criteria	

Perspectives	Opportunities and Barriers for Collaborative NTP and NACP		Remarks and Reference	
	Opportunities	**Potential Barriers**	**Remark**	**Reference**
	• Availability of IPT for HIV positive patients suspected for TB in all public health facilities, which provide TB/HIV integrated services • Availability of TB infection prevention guidelines and implementing committees at health facility level [53] • Availability of free or low cost TB diagnosis and treatment services [51]	available at the public health centres [48] • Absence of a formal referral mechanism between HIV counselling and testing clinics and TB diagnostic and treatment services [4] • Many VCT centres lack TB diagnosis and treatment clinics [48]	• Absence of one stop TB/HIV collaborative service at health facility level	
Reduce the burden of HIV among	• All DOTS clinics of government health facilities have HIV counselling and testing services in the same site	• Lag of adopting WHO guidelines and strategies, that addresses HIV among	Delay in amending CPT and ART eligibility criteria (according to WHO all HIV+	

Perspectives	Opportunities and Barriers for Collaborative NTP and NACP		Remarks and Reference	
	Opportunities	**Potential Barriers**	**Remark**	**Reference**
TB patients	[48] • Availability of CPT for HIV positive TB patients in all public health facilities, which provide TB/HIV integrated services [48] • Availability of ART for HIV positive TB patients in all public health facilities, which provide TB/HIV integrated services [48] • Provision of material and other economic support for sero positive TB patients [4] • Availability of HIV care and support services [4]	TB patients [54]	TB patients are eligible for CPT and ART but this is not applied in Ethiopia)	

Perspectives	Opportunities and Barriers for Collaborative NTP and NACP		Remarks and Reference	
	Opportunities	**Potential Barriers**	**Remark**	**Reference**
	• Accessibility of universally free anti retro viral treatment, both in governmental and nongovernmental health facilities [4]			

6. DISCUSSION

Addis Ababa city has long been, and still is, affected by tuberculosis. “Its co-infection with the HIV pandemic has been compounded and has further aggravated the situation” [34]. In the city, the prevalence of HIV among the general population varies from year to year. This study revealed that the overall HIV prevalence among registered tuberculosis patients in all age group is 23.3% which is higher than the HIV prevalence in the general population. The result of this study is consistent with other studies conducted in sub Saharan Africa, which is between 20-60% [44]. However, this prevalence rate is lower compared to other previous studies conducted in Southern Ethiopia in 1994, Arsi in Oromiya regional state in 2003, and again with another study reported in Addis Ababa, which revealed 44.4% [39], 37.2% [34], 45.3% [7] sero prevalence among registered TB patients, respectively. This discrepancy would be probably attributed to the type of study, the study time and the study area; all the above studies were conducted 5 years ago when the HIV prevalence had not levelled off and all of them were observational. Thus, this study conducted in public DOTS clinics of the biggest city in Ethiopia, a high risk area, would probably give a representative picture of tuberculosis and HIV co-infection in the city administration.

Globally, some studies concerning HIV sero prevalence among tuberculosis patients have reported highly variable rates. In 2005 the study conducted in Kampala, Uganda revealed 42% sero HIV prevalence among registered TB patients [35], and 12% [31], 0.5% [32], and 0.56% [33] HIV sero prevalence were found among TB patients in USA, Guangxi, China and Haryana, India, respectively.

Unlike Asians, Africans have unusual characteristics of HIV/AIDS, which is generalised and equal distribution of cases among males and females [15]. Similarly the current study is consistent with this finding where HIV prevalence was 22.8% in males and 23.85 in females, nearly the same. Tuberculosis can affect everyone in the population, regardless of age groups. According to the 2010 report of FHAPCO, HIV/AIDS prevalence was high among the age group 15-24 [4]; however, this study revealed that the prevalence of HIV is higher among the age group of 25-34 years. This might reflect the age specific HIV prevalence in the community.

According to the Stop TB plan 2011- 2015, 100% of the TB patients should be tested for HIV by 2015 [41]. The present study found that 3536 (85.5%) male and 3480 (84.5%) female, a total of 7036 (85%), were tested for HIV, this finding is not bad relative to 86% found in Malawi in the year 2007[45]. Comparing with the stop TB target 100% by 2015, this achievement is promising for the city administration to achieve the target in the coming four year; however, there is a need to amend national policies for HIV testing among TB patients and TB suspects, training should be provided for health professionals.

While the uptake of HIV counselling and testing among TB patients in the city administration is promising and on the way to the international target, the extent of anti retro viral therapy (ART) among HIV positive TB patients is unsatisfactory. Out of the total 1640 HIV positive TB patients 896 (54.6%), 427 (52.7%) male and 469 (56.5%) female where placed on ART during one year period, these figures are very far from the Global stop TB 2011-2015 plan, which is to enrol 100% HIV positive TB patients on ART. Three years ago 68% of TB patients in Malawi and 73% in South Africa were immediately enrolled on ART; and

compared to this the current percentage of Addis Ababa is quite low. HIV sero positive TB patients enrolled on cotrimoxazole preventive therapies (CPT) were 1372 (83.65%), 645 (79.6%) male and 727 (87.6%) female. These percentages are close to 100%, the global stop TB targets by 2015 but it is low compared to South Africa, 98% HIV positive TB patients were received CPT in 2006 [45] .

Sound policies and political commitments are an entry point to the collaborative TB/HIV programmes. In addition, the newly implemented horizontal general health care system is a major opportunity to programme collaboration. However, the collaboration needs further strengthening, the 2006-20115 the global plan to stop TB almost achieved, 85% of TB patients screened for HIV, above 10% of HIV positive TB suspects were put on IPT. But the uptakes of ART and CPT among TB patients were under the target, which needs special attention by the city administration.

Lacks of well organised HIV surveillance system among TB patients were found to be one of the biggest barriers in the collaboration between NTPs and NACPs. In addition, shortage and unfair distribution of resources to programmes collaboration were considered as a threat. Furthermore, the present study identified others barriers, like absence of one stop TB/HIV collaborative services at health facility level, lack of formal referral system between HIV and TB clinics, and under capacity laboratory services. These are bottlenecks to further strengthening of the collaboration between the programmes.

7. Strengths and Limitations of the Study

7.1 Strengths

This study has covered 24 (96%) out of 25 of public health centres providing integrated TB/HIV services. The data was collected directly from the TB registry and collected by the principal investigator and one public health specialist. Moreover all registered TB patients during one year period were included in the study. In addition, indicators to identify potential barriers and opportunities for collaborative TB/HIV activities were adopted from the WHO guidelines. Thus, the findings of the study are reliable and can represent the true figure of HIV/TB co-infection in Addis Ababa city.

7.2 Limitations

Due to the nature of the study, we were unable to identify factors associated with low uptake rate of ART and CPT, and other associated factors related to TB/HIV co-infection. Furthermore, due to poor TB registry data management system and high turnover of health professionals from DOTS clinic, one public health centre and four public hospitals providing TB/HIV service were excluded from the study.

8. CONCLUSIONS

- The prevalence of HIV among registered TB patients was moderate
- Despite many opportunities for TB/HIV collaborative activities, there are some barriers
- Uptake of Voluntary Counselling and Testing services among TB patients was promising
- Uptake of ART and CPT were low

9. RECOMMENDATIONS

1. To increase the uptake of ART and CPT, HIV treatment guidelines and ART and CPT eligibility criteria should be amended
2. Regular surveillance of HIV among TB patients is needed
3. Strengthen patient initiated HIV counselling and testing among TB patients
4. “One stop” TB/HIV service should be launched
5. Further quantitative and qualitative studies that investigate collaborative TB and HIV programmes are needed

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Annex 1. Data Registration Form

TB/HIV Data of Public DOTs Clinics of Addis Ababa City, Ethiopia, July/2011

Name of Sub city	Name of health facility	Number of TB patients registered for the last one year		Number of TB patients voluntary for HIV counselling		Number of TB patients tested for HIV		Number of TB patients tested HIV+		Number of TB patients tested HIV-		Number of HIV+TB patients put on ART		Number of HIV+TB patients put on CPT	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F

Age Distribution of TB &HIV+TB Patients

Age (yrs)	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65+	Total
No. of TB patients									
No. of HIV+TB patients									

Type of TB cases and site of TB infection with HIV status

	Type of TB patient				Site of TB infection			Total
	New Case	Relapse	Defaulter	Not Specified	Pulmonary	Extra Pulmonary	Other	
Total TB patient								
HIV Positive TB patient								
HIV Negative TB patient								
Not tested TB patient								