

Tuberculosis and HIV Co-infection among Patients on Tuberculosis Treatment at Fenote Selam District Hospital, Amhara Regional State, Northwest Ethiopia

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7 Abstract

8 Introduction: Tuberculosis is the leading cause of death for HIV-infected patients, and HIV is
9 the most important risk factor for developing active TB. The risk of death from TB is
10 significantly higher in the HIV-infected population. The interaction between TB - HIV
11 co-infected person is bidirectional and synergistic: HIV-1 infection predisposes to the
12 development of active TB, and the course of HIV-related immunodeficiency is worsened by
13 active TB infection. Objective: The aim of this study was to assess the level of TB - HIV
14 co-infection at Fenote Selam district Hospital, Amhara, Northwest Ethiopia, 2014. Methods
15 and materials: Fenote Selam district hospital is 378 km from capital city of Ethiopia, Addis
16 Ababa. The study was conducted in May 2014. To determine the level of TB-HIV
17 co-infection, retrospective data review method was used. Medical records of all TB patients
18 who were on anti tuberculosis treatment from March, 2009 to March, 2014 were included in
19 the study. The patients? records in the five years were 651. Data were collect from patients?
20 medical record. Ethical approval and clearance was obtained from Debre Markos University
21 Medicine and Health Science College of Ethical Review Committee (ERC).

Index terms— Tuberculosis, HIV, TB/HIV Co-infection, retrospective, TB treatment outcome.

24 1 I. Introduction

lobally, HIV kills more than 8000 people daily while more than 5000 people die of tuberculosis (TB) every day. It is estimated that one-third of the world's population are infected with TB, and 40 million people currently living with HIV/AIDS [1]. In addition, without proper treatment, 90% of HIV-infected individuals could die within months of contracting TB. Four million people infected with HIV have also TB disease worldwide making TB the major killer in HIVinfected patients [1].

Tuberculosis is the leading cause of death for HIV-infected patient and HIV is the most important risk factor for developing active TB [2; 3]. The double epidemic of TB and HIV is great concern, especially in sub-Saharan Africa where 80% of the burden of coinfection resides and health systems are already weak and overstretched [4]. The risk of death from TB is significantly higher in the HIV-infected population even if the organism is sensitive to and responsive to anti-TB medications [5]. The convergence of the tuberculosis (TB) and the HIV epidemics has posed new public health challenges [6].

The interaction of HIV and TB in co-infected persons is bidirectional and synergistic: HIV-1 infection predisposes to the development of active TB and the course of HIV-related immunodeficiency is worsened by active TB infection [7].

39 The HIV/AIDS pandemic is a major challenge to the control of TB in Ethiopia. The dual epidemic has a
40 number of impacts on the health sector because it increases TB and HIV burden, demands for more care and
41 worsens the situation of the already overstretched health care delivery system in the country. HIV increases
42 susceptibility to infection with *M. tuberculosis*, the risk of progression to TB disease, and the incidence and
43 prevalence of TB. The life time risk of HIV positive individuals to develop TB is 20-37 times greater than HIV

4 A) SOCIO-DEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS

44 negative individuals. It also increases the likelihood of re-infections and relapses of TB. In a population where
45 TB/HIV is common, health services struggle to cope with the large and rising number of TB [8].G Year 2015 ©
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47 Volume XV Issue V Version I () F Furthermore, 22 high burden countries (HBCs) with TB accounted for
48 approximately 80% of the estimated number of new all form of TB cases which rising worldwide on the same
49 year. Ethiopia was ranked seventh among the world 22 high burden countries (HBCs). In Africa, those countries
50 with high rates of TB-HIV co-infection are the main focus of intensified efforts in directly observed treatment
51 short course (DOTS) expansion [9]. Ethiopia adopted the DOTS strategy since 1997 after success of the pilot
52 program with the development of the first combined Tuberculosis and Leprosy Prevention and Control Program
53 manual. TB-HIV collaborative activities was piloted in 2004 and afterward scaled up nationally. The STOP TB
54 strategy was launched by World Health Organization (WHO) in 2006 to achieve the millennium development
55 goals (MDGs) for TB in 2015. Ethiopia also adopted this strategy to achieve the national TB-leprosy and
56 TB/HIV targets [8].

57 The main reason of this study was to assess the level of TB-HIV co-infection and factors associated with
58 TB-HIV co-infection at Fenote Selam district hospital, Amhara, Northwest Ethiopia, 2014.

59 2 II. Methods and Materials

60 Study settings: The study was conducted at Fenote Selam district hospital, which is about 378 km from capital
61 city of Ethiopia, Addis Ababa, and data collection, was conducted in May 2014.

62 Study design: retrospective cohort study was employed to identify the level of TB-HIV co-infection and factors
63 associated with TB-HIV co-infection.

64 Study population: the population of the study was medical records of all TB and TB-HIV co-infection patients
65 who were on anti tuberculosis treatment at TB clinic from March, 2009 to march, 2014.

66 Sample size: Medical records of all TB patients who were on anti tuberculosis treatment from March, 2009
67 to March, 2014 were included in the study. There were a total of 651 patients in the TB clinic in a given five
68 years. Of these, 602 of patients were included in the study. One hundred thirty three (133) of them were TB-HIV
69 coinfected cases and the remaining 469 were diagnosis only TB cases. Exclusion criteria: Unknown HIV status
70 and incomplete records were excluded in the study.

71 Data quality control: Before study conducted, orientation was given for supervisor and data collector nurses
72 concerning to standardized checklist, the purpose of the study, techniques and procedures of data collection
73 methods. The researcher gave a guideline for data collectors and the supervisor for data collection process. The
74 supervisor was monitoring the data collection process.

75 Data processing and Analysis: Before data entry, data were monitored and checked for its completeness by the
76 supervisor and each completed checklist was coded on pre-arranged coding sheet by the researcher. Data were
77 entered into Epi Info version 3.5.1, then exported and analyzed by using SPSS Windows software (version 16.0).
78 Data were cleaned for its consistency by running simple frequencies and percentage. Then, printed frequencies
79 were used to check for outlier and to clean data. Tables and graphs were used to present data frequencies and
80 percentage. It also used to describe the study population in relation to relevant variables.

81 Stepwise bivariate and multivariate logistic regressions techniques were used to analyze data and control the
82 adverse effects of confounding variables. The crude and adjusted odds ratios together with their corresponding
83 of 95% confidence intervals were computed. A P-value < 0.05 was considered to declare a result as statistically
84 significant.

85 Ethical consideration: Ethical approval and clearance was obtained from Debre Markos University, medicine
86 and health Science College ethical review board. A formal letter for permission and support were obtained to
87 Fenote Selam district hospital administrator. Then, the hospital administrator wrote a letter to the TB clinic
88 focal person.

89 3 III. Results

90 4 a) Socio-demographic characteristics of study participants

91 A total of 651 patients were registered in the TB clinic from 2009 to 2013/14.

92 Of the total, 602 participants were included in this study. Of these patients, 133 (22.1%) were TB-HIV co-
93 infected and 469 (77.9%) were only TB cases. The majority of participants were in the age groups of 15-24 and
94 25-34 years old which accounts 160(26.6%) and 163 (27.1%) respectively. Of the total participants 328(54.5%)
95 were males. The urban participants were accounted about 367(61%) (Table1).

96 Table1: General characteristics of the study participants registered at Fenote Selam district Hospital TB clinic,
97 Amhara, Northwest Ethiopia, 2014. In bivariate analysis, age group from 15-24 and 25-34 years old were 2.544
98 and 3.409 times likely to be risk of TB-HIV co-infection ,respectively, as compare to age groups ?55 years old.
99 And also cured and died were 2.733 and 4.603 times risk for TB-HIV confection, respectively, as compare to
100 completed treatment outcomes.

101 5 Characteristics of variables

102 After controlling the confounder variables through multivariate logistic regression analysis, age groups 15-24 years
103 (AOR: 2.586, 95% CI: 1.010, 6.617) and 25-34 years (AOR: 3.370, 95% CI: 1.332, 8.525) were independently
104 associated with TB-HIV co-infection. Died (AOR: 4.326, 95% CI: 2.039, 9.176) and cured (AOR: 2.758, 95% CI:
105 1.456, 5.227) were independently associated with TB-HIV co-infection (Table ??).

106 Trend of TB-HIV co-infection increased from 23.9% to 35% in the years 2009/10 -2010/11 and decreased from
107 35% to 12% in the years 2011/12 -2013/14 (See figure 2 below).

108 This study showed that the prevalence of HIV co infection among TB patients was 22.1%. This is nearly
109 similar to a study done by Daniel G D et.al. [10]. However, this finding is higher than a report by WHO in
110 2012(13%), report of WHO in 2012 for Ethiopia (8%) [11] , in northwest Ethiopia (Dabat) 11.4 % [12]. On
111 the other hand, this is lower than the studies conducted in sub-Saharan African countries which were 70%[13],
112 a study conducted in Nigeria (44.2 %) [14] and study conducted in Debre Markos, Ethiopia 44.8% [15]. This
113 discrepancy might be due to a preference of patients towards quality of care at referral hospital, especially, when
114 the disease becomes serious and complicated, as compare to care in district hospital. The other possible reason
115 might be due to fear of stigma and discrimination that they may seek care away from their village in the bigger
116 town.

117 In this study, that treatment success was 71.9%. In line with this, a report showed in India, treatment success
118 of TB-HIV co-infection was 74.5% [16]. This may be due to similar in socio-economical status of the study
119 participants and universal implementation of DOTS program throughout the world.

120 Gender had no significant difference on TB-HIV co-infection. Similarly, the study conducted in Addis Ababa,
121 Ethiopia, showed that no significant difference between male and female [17]. This could be due to similarity in
122 socio-cultural perspective of study participants.

123 In contrast, the study conducted in Dabat, Ethiopia [12], Northwest Ethiopia [18] and São Paulo state [19]
124 indicated that TB-HIV co-infection case was higher in men than women. Besides, Tabarsi et al. found that the
125 TB-HIV co-infected intravenous drug user were males [20]. This attributed that males are economically active
126 and influential in the community and they may smoke, drink and have multi-sexual partners.

127 This study showed that 8.5 % of patients were died. This is lower than study conducted in Malaysia 23.3%
128 [21], Thailand 29 % [22], and in Vietnam 26% [23]. This may be due difference sample size and may be due to
129 socio-cultural and economical difference.

130 This study showed that there is no significant difference in the rate of HIV infection among type of TB.
131 Similarly, study conducted in Ethiopia showed that there was no significant difference among type of TB ??10;
132 24]. However, other studies indicated that rates of HIV infection among smear-negative and EPTB cases were
133 higher than smear-positive cases ??25; 26]. This could be due to the relatively low prevalence of HIV infection in
134 the catchment area of the study population. Another possible explanation could be under diagnosis of TB This
135 study revealed that study participants in age groups of 15-24 and 25-34 years old were independently associated
136 with outcome variables. This is similar to previous study conducted at Debre Markos referral hospital [15]. The
137 fact is that these age groups are more active for sexual activity and they are vulnerable to HIV infection than
138 any other part of the population.

139 According to the study conducted at Debre Markos referral hospital showed that TB-HIV co-infection was
140 49.2% in 2008/9, 42.7% in 2009/10, 39.3% in 2010/11, 32.9% in 2011/12, 44.6% in 2012/13, and 44.8% in 2013.
141 This result showed that there was a decreasing trend from 2008 to 2011 and some increasing trend from 2012 to
142 2013 of TB-HIV coinfection [15]. This study revealed that the trend of TB-HIV co-infection was increased from
143 23.9% to 35% from 2009/10 to 2011/12, respectively; then decreased from 35% to 12% from 2011/12 to 2013/14.
144 This is due to intensive provision of INH prophylaxis to prevent opportunistic infection of TB as soon as they
145 detect HIV positive. The other possible explanation may be due to the current strategic plan of the ministry of
146 health in Ethiopia, which expands health facilities across the country and increased awareness of the community
147 through health education and mass media on prevention and control of HIV.

148 6 V. Conclusion

149 The overall result of TB-HIV co-infection was 22.1%. The age groups of15 -24 and 25-34 years old which accounts
150 27.2% each, TB-HIV co-infection was strongly associated with death, defaulted and TB categories. The age groups
151 15-24 and 25-34 years old were 2.544 and 3.409 times likely to be risk of TB-HIV co-infection as compared to the
152 age groups ??5 years old. Died and cured were independently associated with TB-HIV co-infection as compared
153 to completed treatment outcome.

154 This study showed that there was increasing rate of TB-HIV co-infection from 23.9% to 35% in the year
155 2009/10 to 2011/12 then decreasing from 35% to 12% in the year 2011/12 to 2013/14. The main reason is
156 that provision of INH prophylaxis to prevent opportunistic infection of TB as soon as they detect HIV positive.
157 The other reason may be due to expanded health facilities across the country, the increased awareness of the
158 community through health education according to current strategic plan of the federal ministry of health of
159 Ethiopia. Generally this study shows relatively lower TB-HIV co-infection than a number of other studies held
160 in different countries in sub-Saharan African.

9 ACKNOWLEDGEMENT

161 7 VI. Recommendations

162 The author of this study suggested that health education should be given for the community on mode of
163 transmission of TB, prevention of HIV infection, impact of TB-HIV co-infection on TB treatment outcomes and
164 productivity of population and national country. Besides this, regional health bureau, zonal health department,
165 higher officials should create networking the health facilities each other to identify treatment outcome of the
166 referred patients. In addition, the data registration system of patients should be improved to include patients'
167 personal practice like smoking habits, alcoholism and chronic illness. This should also be collected by health
168 professionals as they interview patients.

169 8 VII.

170 9 Acknowledgement

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Figure 1:

175

¹Tuberculosis and HIV Co-infection among Patients on Tuberculosis Treatment at Fenote Selam District Hospital, Amhara Regional State, Northwest Ethiopia

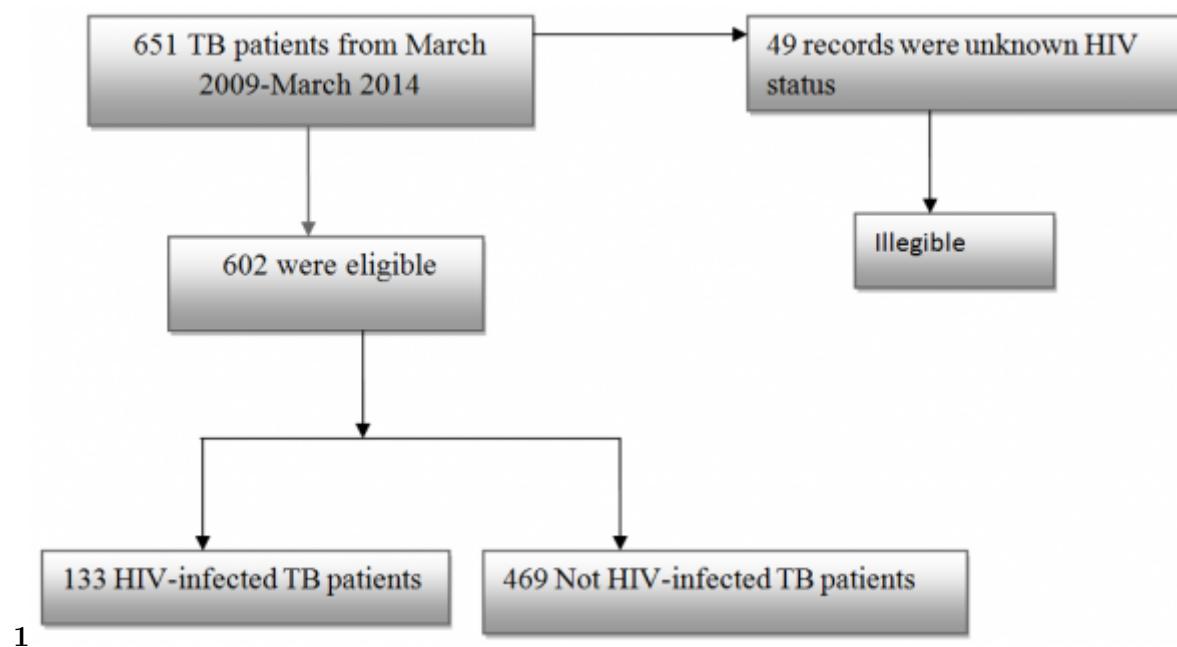


Figure 2: Figure 1 :

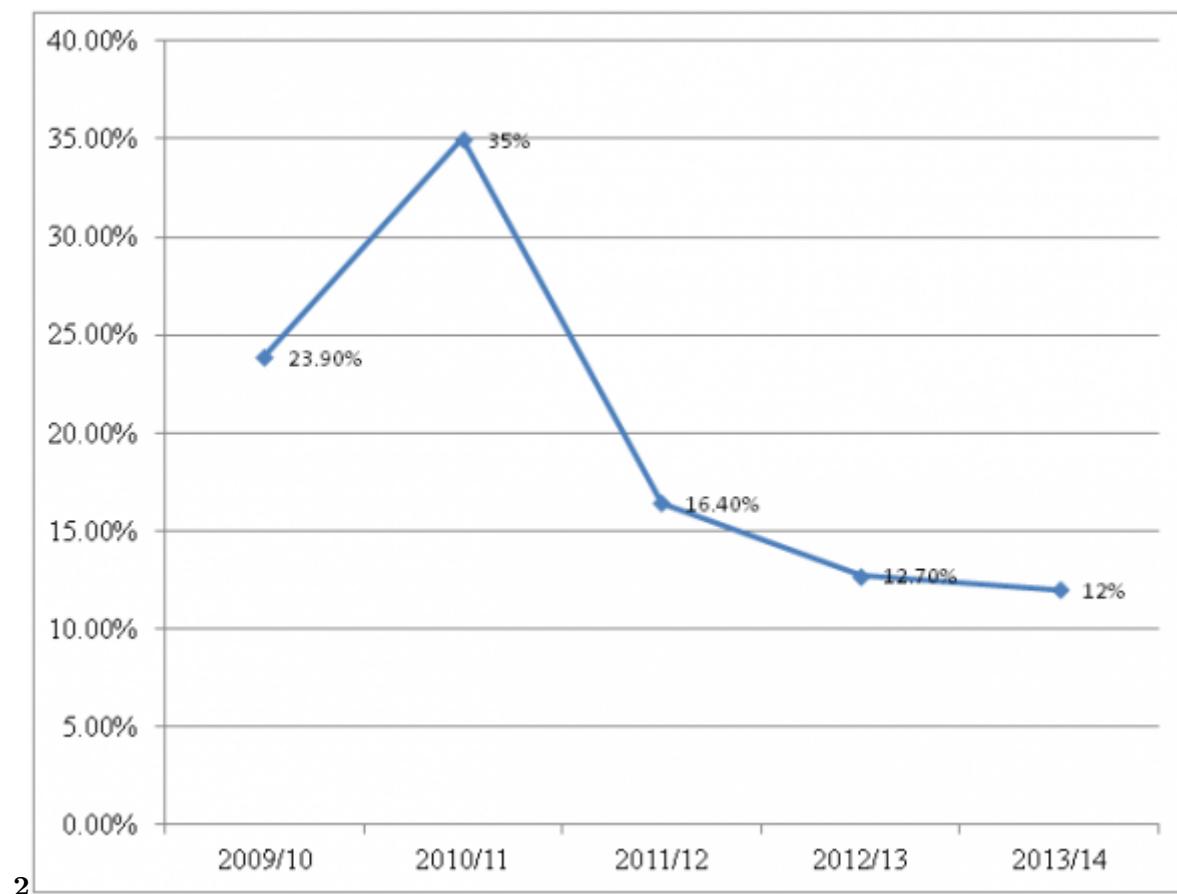


Figure 3: Figure 2 :

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