

ORIGINAL ARTICLE

THE PREVALENCE OF TUBERCULOSIS AMONG HIV/AIDS PATIENTS
ATTENDING THE ART CLINIC AT GONDAR HEALTH CENTER,
NORTHWEST ETHIOPIA

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ABSTRACT

Background: TB and HIV are the leading causes of death from infectious disease among adults worldwide, and the number of tuberculosis cases has risen significantly since the start of the HIV epidemics, particularly in Sub-Saharan Africa, where HIV is a pandemic. In Ethiopia, TB and HIV/AIDS have become diseases of major public health importance. However, the magnitude of pulmonary tuberculosis (PTB) among ART attendants is not well known at Gondar health center.

Objective: The main aim of this study was to assess the magnitude of smear PTB among HIV/AIDS patients attending the ART clinic at Gondar health center, northwest Ethiopia.

Methods: An institution-based retrospective cross-sectional study employing quantitative methods was conducted at the clinic from September 1, 2012 to August 15, 2016. Data were collected from the ART register, using a structured data extraction format. All of the 780 HIV/AIDS consecutive patients who were enrolled as pre-ART and ART were included in the study. Descriptive statistics were analyzed using SPSS version 20.

Results: Out of a total 780 HIV/AIDS patients who were attending the clinic, 418 (53.6%) and 362 (46.4%) were females and males, respectively. The overall prevalence of tuberculosis among ART enrolled patients was 51.15% (399/780). Of these, 216 (54.14%) were PTB, whereas 183 (45.86%) extra pulmonary tuberculosis cases (EPTB). Females (211/399 (52.88%)) were co-infected more than males (188 (47.12%)).

Conclusion and recommendations: High prevalence (53.6%) of TB/HIV co-infection was reported; pulmonary tuberculosis co-infection was more common than Extra pulmonary Tuberculosis. Early case detection, adequate provision of isoniazid preventive therapy as a prophylaxis should be provided to ART enrolled patients to prevent TB infection.

Key Words: Tuberculosis, HIV, TB/HIV co-infection, ART.

BACKGROUND

Tuberculosis is an infectious disease caused by infection with *Mycobacterium tuberculosis*. A bacterium that typically affects the lungs can also infect any other organ of the body. It is spread from person to person through the air when a patient with an active infection of the lungs or the throat coughs, sings, laughs or sneezes [1].

HIV is an enveloped ribonucleic acid virus belonging to the lenti virus sub-group of retrovirus which caus-

es a progressive impairment of the body cellular immune system, leading to increased susceptibility to infection. HIV breaks down the body's defense against infection and attacks the body's immune system by infecting specific white blood cells (CD4), leading to a weakened immune system. The HIV pandemic presents a massive challenge on the control of TB at all levels. The synergy between TB and HIV is so strong that in high HIV prevalence population, TB is a leading cause of morbidity and mortality. HIV is driving the tuberculosis epidemic in many countries, especially in Sub-Saharan Africa. The association between HIV and TB presents a grave public

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health and socio-economic problem and may cause death. The spread of tuberculosis and HIV is aggravated by socio-economic factors, such as poverty, age and low levels of literacy [2].

HIV/AIDS leads to immune suppression and is the strongest of all known risk factors for the development of tuberculosis. Indeed, after decades of consistent decline in incidence, a resurgence of tuberculosis is occurring globally; 9% new TB infections worldwide are attributable to HIV; in regions with high HIV prevalence, about 31% new TB cases are attributable to HIV [3].

HIV increases the risk of progressive disease following primary TB and leads to the reactivation of later bacilli and can also increase the risk of TB from exogenous infection. The course of HIV infection is accelerated subsequent to the development of tuberculosis risk of death and the development of other opportunistic infections in high HIV/TB co-infected patients. Even increases in the replication of HIV has been demonstrated locally in such patients [4].

TB and HIV/AIDS prevention and control programs share mutual concerns. Therefore, the prevention, of HIV is a priority for tuberculosis control and prevention, and the care of TB is priority concern for HIV/AIDS prevention and control programs [5]. The best approach to decrease the burden of TB/HIV co-infection requires more effective, efficient and comprehensive health service delivery [6].

Tuberculosis (TB) is the commonest opportunistic infection and the number one cause of death in HIV patients in developing countries and accounts for about 40% of all manifestations seen in HIV patients [7]. About 25% to 65% of patients with HIV/AIDS have tuberculosis of any organ and accounts for about 13% of all HIV related deaths worldwide [8-12]. While tuberculosis prevalence has declined by more than 20% worldwide, the rates in Africa have

tripled since 1990 in countries with high HIV prevalence and are still rising across the continent at 3–4% per year [13]. Between 1998 and 1999, a 20% increase of tuberculosis cases was reported in countries severely affected by HIV/AIDS in Africa [14].

Correct diagnosis and treatment of tuberculosis help to reduce the burden of tuberculosis, provided that infectious cases are detected and treated successfully. However, there are difficulties in achieving the goal of reducing the tuberculosis burden due to challenges, such as difficulties in diagnosing tuberculosis in HIV infected patients due to unusual clinical pictures with increases in smear negative acid fast bacilli (AFB negative) pulmonary tuberculosis disease, and atypical findings on chest radiography [15,16].

People with HIV are increasingly infected with tuberculosis because HIV weakens their immune system [17]. HIV/AIDS fuels the tuberculosis epidemics in ways, such as promoting the progression to active tuberculosis, increasing the risk of reactivation of latent tuberculosis infection as well as increasing the chance of tuberculosis infection once exposed to tubercle bacilli [9, 18].

In Ethiopia, TB has become a disease of a major public health importance. Hospital reports compiled and analyzed by a health processing documentation team of the Federal Ministry of Health around 2001 indicate that tuberculosis is among the leading causes of morbidity and mortality in the country. For instance, according to the report, pulmonary tuberculosis is the third leading (7.8%) cause of admission and the first leading (10%) cause of patient deaths [19]. So, this study was conducted with the aim of assessing the magnitude of Tuberculosis among ART enrolled HIV patients in the ART Clinic and the six-year trend of TB.

METHODS

Study design, area, data collection and analysis:

An Institutional retrospective cross-sectional study design was employed to determine the prevalence of tuberculosis among HIV/AIDS patients attending the ART Clinic at Gondar health center from September 1, 2012 to August 15, 2016. Gondar is one of the major ancient, cultural and tourist attracting cities in Ethiopia and the capital of North Gondar zone. It is located 12o36'1N 37o28'1E latitude and longitude with an elevation of 2133m above sea level. It has twelve sub-cities and 22 urban and 11 rural kebeles with a projected population of 323,900 according to the Central Statistical Agency of Ethiopia 2015 report. The town had 8 public health centers and a specialized comprehensive hospital, whereas more than 13 private clinics and a general hospital also provided services. Gondar health center is the second major facility in terms of patient flow and the provision of comprehensive care and support next to Gondar University specialized referral hospital.

The data were collected by the principal and co-investigators using a structured data extraction sheet. Incomplete and inconsistent data were identified and rejected. The data were coded and entered into SPSS version 20 and cleaned and edited before analysis. Descriptive statistics were applied and findings were interpreted and presented in tables, graphs and narrations/texts.

RESULTS

Socio-demographic characteristics: Out of the 780 HIV/AIDS patients enrolled for ART, 418 (53.6%) were females and 362 (46.4%) males. Their mean age was 32.4 years with a standard deviation of 11.7, ranging from 1-96 years. Of the participants, 305(39.1%) were in the predominant 21-30 years of age group, followed by 251(32.18%) in the 31-40

years, and 101(12.95%) in the 41-50 years of age groups. Of these, 211/399 (52.88%) were females and 188 (47.12%) males; 723 (92.69%) of the HIV/AIDS patients were urban, while 57(7.31%) were rural dwellers (Table1).

Table 1: Socio-demographic characteristics of HIV positive ART attendants in Gondar health center from September 2012 to August 2017, Gondar Town, Northwest Ethiopia, 2016.

Characteristics		Numbers (Percentage)
Sex	Female	418(53.59%)
	Male	362(46.41%)
Address	Urban	723(92.69%)
	Rural	57(7.31%)
Age	Less than 10 year	30(3.85%)
	11-20	53(6.79%)
	21-30	305(39.10%)
	31-40	251(32.18%)
	41-50	101(12.95%)
	51-60	30(3.85%)
	Greater than 61 year	10(1.28%)
Total		780(100)

The trend of the prevalence of Tuberculosis:

Among the 780 HIV/AIDS patients, the prevalence of tuberculosis was 399 (51.15%), of whom 216/399 (54.14%) were pulmonary tuberculosis and the re-

maining 183/399 (45.86%) extra pulmonary tuberculosis victims. The trends showed that the number and the prevalence of TB/HIV co-infection decreased from 2012 to 2016 (Figure1).

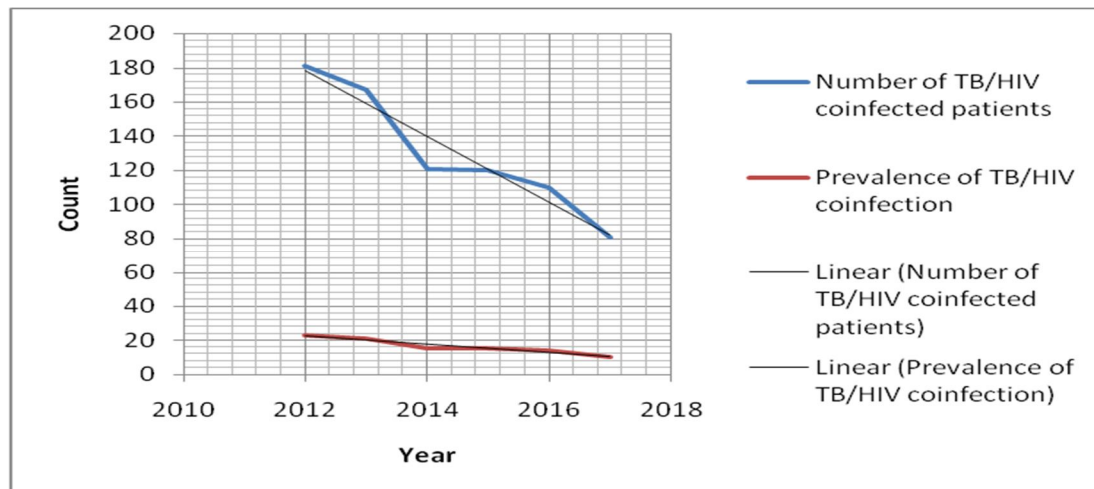


Fig .1Six years of trend of TB/ HIV co-infection in Gondar health center, Gondar Town, Northwest Ethiopia, 2016

The associations of the prevalence rate of TB with address ,sex and age group distribution frequencies of HIV/AIDS patients is shown in Table 4. No statistically significant association was observed among sexes, addresses and prevalence rates of TB. The analysis of age specific prevalence of TB showed

that HIV/AIDS patients in the 21-30 years of age group were the most affected, followed by 31-40years. There was a statistically significant association between age groups and the prevalence rates of TB ($X^2=38.77$ $P<0.00$) (Table 2).

Table 2: Association of Socio-demographic characteristics with TB/HIV co-infection in Gondar Health Center, Gondar Town, Northwest Ethiopia, 2016.

Characteristics		TB/HIV co-infection no (%)	TB/HIV non co-infection no(%)	Values X^2 and P
Sex	Male	188(51.93)	174(48.07)	$X^2 =0.164$ $P=0.685$
	Female	211(50.48)	207(49.52)	
Address	Urban	367(50.67)	356(49.24)	$X^2 =0.612$ $P=0.434$
	Rural	32(56.14)	25(43.86)	
Age	Less than 10 years	2(6.67)	28(93.3)	$X^2 =38.77$ $P=0.00^*$
	11-20	25(47.17)	28(52.83)	
	21-30	168(55.08)	137(44.91)	
	31-40	125(49.8)	126(50.19)	
	41-50	60(59.41)	41(40.59)	
	51-60	10(33.33)	20(66.67)	
	Greater than 61 years	9(90.0)	1(10)	
Total		780(100)	780(100)	

DISCUSSION

This study investigated the prevalence rate of Tuberculosis among HIV/AIDS patients seen at Gondar health center. Out of the 780 patients, 399 (51.15%) had HIV/TB co-infection, while the remaining 381 (48.85%) were only HIV positive. Out of the 399 (51.15%), 216 patients had pulmonary tuberculosis, showing a prevalence rate of 54.14% and 183 had extra pulmonary tuberculosis, the prevalence rate of which was 45.86%. This high prevalence rate suggests strong associations between TB and HIV infections in this environment.

The finding is more than those of studies in Germany,[24],Pravara [25],Nigeria [26], rural northern Tanzania[27], South African states [28], Obafemi Awolowo Univeresity teaching hospital complex Ile-life [29], Jimma University [30], and Gondar University hospital[31] and reported 1.45%,17.00% [25], 5.91%, 8.50%, 3.50%,13.90%, 45.00% and7.50% respectively. Several factors were suggested to have contributed to the variations in the prevalence of TB among HIV patients, for example, socio-demographic positions of the patients and their immune status.

The number and prevalence of HIV positive patients visiting the Gondar health center was 181(23.2%), 167(21.4%), 121(15.5%), 120(15.4%), 110(14.1%) and 81(10.37%) in the years 2012, 2013, 2014, 2015, and 2016,respectively. The number and prevalence rate of co-infected TB patients was decreasing from the years 2012 to 2016, but the prevalence rate of co-infected TB patients in this study was high. The co-infection of TB and HIV/AIDS might be due to several factors a rising from the host and the organisms. The TB-HIV co-infection coupled with opportunistic infections was more prevalent during a compromised immune status [28].

The prevalence of tuberculosis-HIV infection among females was 53.59%; among males it was 46.41%. The result of this study was greater than those reported in other parts of the country. The prevalence of tuberculosis-HIV infection (51.15%) in this study was higher than what were reported fromJimma University(45%), Germany (1.45%) and Nigeria (5.91%) [24-26].

The associations of the prevalence rate of TB with address ,sex and age group distribution frequencies of HIV/AIDS patients is shown in Table 4. There was no statistically significant association between sex, address and the prevalence rate of TB ($P>0.05$). The analysis of age specific prevalence of TB showed that HIV/AIDS patients aged 21-30 years were the most affected, followed by 31-40years of age. There was a statistically significant association between age groups and the prevalence rate of TB ($X^2=38.77 P <0.05$).

There was a significant association between the prevalence rate of TB and age group distribution frequencies of HIV/AIDS patients. The age distribution revealed the highest prevalence to be in the age group of 21-30years (39.1%), followed by 31-40 (32.18%), representing the most sexually active age group which correlates with the productive age group. This can have a serious negative effect on the socio-economic status of a country.

CONCLUSION AND RECOMMENDATIONS

This study showed that the prevalence of tuberculosis among HIV positive ART attendants was 51.15% at Gondar Poly-health center. Since HIV/AIDS patients are immune compromised, their susceptibility leads to TB infections; so, there has to be a regular provision of isoniazid preventive therapy to prevent TB infection and regular follow ups to decrease TB/HIV co-infection. Moreover, cross-sectional and prospec-

tive studies should be conducted to show the real status of the TB/HIV co-infection to make appropriate interventions in the area because fluctuations of results from year to year were noted in the present study.

Declaration

Abbreviations: ACIPH-Addis Continental Institute of Public Health, ANC-Ante Natal Care, ARHB-Amhara Regional Health Bureau, EDHS-Ethiopian Demographic Health Survey, GCMHS-Gondar College of Medicine and Health Sciences, HI-Health Institution, LNMP-Last Normal Menstrual Period, PMTCT-Prevention of Mother to Child Transmission, SNNPR-Southern Nations and Nationalities of peoples Region, UNFPA-United Nation Fund for Population Agency, WHO-World Health Organization.

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Consent for publication: Not applicable

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Authors' contributions: YG: conception of research idea, study design, data collection, analysis and interpretation, Manuscript writes up and Review. MD: Advising, Research idea, data collection, analy-

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TG: Data collection, analysis and interpretation

YW: Data collection, analysis and interpretation

FM: Data collection, analysis, interpretation, Manuscript write up and review.

All authors read and approved the final manuscript

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