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Magnitude of pulmonary tuberculosis-human immunodeficiency virus co-infections among patients who had sputum examination at Minjar Health Center in Eastern Ethiopia: A retrospective study

Tadesse Hailu*, Wondemagegn Mulu, Mulat Yimer and Bayeh Abera

Department of Microbiology Immunology and Parasitology, College of Medicine and Health Science, Bahir Dar University, Ethiopia.

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Tubercle bacilli infection is a considerable medical and public health problems in Ethiopia. The disease burden is exacerbated if tuberculosis infected individuals are co-infected with Human Immunodeficiency Virus (HIV). The aim of this study was to determine the magnitude of pulmonary tuberculosis-human immunodeficiency virus co-infections among clinically suspected tuberculosis patients who examined sputum at the Minjar Health Center. Institution based retrospective data were collected in April, 2014 from those patients who had sputum examination from October 2012 to September 2013. Descriptive statistics were computed to get summary values for most variables. Chi-square was calculated to see the association between tuberculosis-human immunodeficiency virus co-infections with socio-demographic variables. A total of 329 participants (54.7 males and 45.3% females) were included in the study. The overall prevalence of tuberculosis and human immunodeficiency virus infections from the total cases was 9.4 and 2.7%, respectively. The prevalence of tuberculosis-human immunodeficiency virus co-infection among tuberculosis infected cases was 29%. Patients in the age range >18 years had higher distribution rate of 7/28 (25%) tuberculosis-human immunodeficiency virus co-infections. The prevalence of pulmonary tuberculosis infection and co-infection with human immunodeficiency virus was higher in males than females. The prevalence of pulmonary tuberculosis-human immunodeficiency virus co-infections is high among clinically suspected cases. Hence, this high prevalence calls for routine screening of tuberculosis patients for human immunodeficiency virus to minimize the disease burden of tuberculosis and human immunodeficiency virus co-infections.

Key words: Tuberculosis, HIV, Minjar Health Center, TB-HIV co-infection.

INTRODUCTION

Tuberculosis (TB) is considered as a disease of the past in many developed countries. However, the impact of this disease can be devastating even today, especially in those resource poor countries like Africa suffering from

*Corresponding author. E-mail: tadessehailu89@yahoo.com.

high burdens of both TB and human immunodeficiency virus (HIV) (Parsons et al., 2011). TB-HIV co-epidemics remain a major public health challenge, particularly in resource-limited settings. There were an estimated 1.1 million TB-HIV co-infected patients worldwide in 2011. Of which, 79% of the cases were in the African Region (WHO, 2012). Malnutrition in resource-limited settings (Cegielski et al., 2004) and the virulent synergy between HIV and TB co-infection especially in sub-Saharan Africa are the most important factors influencing the current TB epidemic (Karp and Auwaerter, 2007). Of the 9.27 million incident cases of TB in 2007, an estimated 456,000 deaths among incident TB cases who were HIV positive, 1.37 million (14%) were HIV positive; 79% of these HIV-positive cases were in the African region and 11% were in the Southeast Asia region (WHO, 2009). Infection with HIV-1 increases the risk of reactivating latent TB infection by 80- to 100-fold. Tuberculosis can occur at all points in the immunosuppressive spectrum of HIV disease, with variable presentations particularly in high-burden countries (Parsons et al., 2011).

Lack of diagnostic capacity and awareness in the community has been a crucial barrier preventing an effective response to the challenges of TB-HIV co-infections. Data on direct observation treatments (DOTS) implementation demonstrate the continuing progress achieved in basic TB control. The global detection of TB cases has increased over the years but still falls short of the 70% target. Limitation of detection is due to patients to seek TB care, poor diagnostic capacity and ineffectual reporting of diagnosed cases in the African and South East Asia Regions (WHO, 2011). Although, many studies previously conducted in developing countries like Ethiopia, where economic imbalances are extreme and basic health service delivery is insufficient, determining the prevalence of TB-HIV co-infections among clinically suspected patients is ideal to minimize the diseases burden. However, little work has been done on the burden of TB-HIV co-infected cases. Therefore, the aim of this study was to determine the magnitude of TB-HIV co-infections among clinically suspected cases at Minjar Health Cener in Eastern Ethiopia.

MATERIALS AND METHODS

Study design, period and area

An institution based retrospective study was conducted in April 2014 from clinically suspected TB cases who attended at Minjar Health Center in Minjarshenkora Woreda, North Shoa, Amhara Regional State from October 2012 to September 2013. The Minjarshenkora Woreda is found 130km away from Addis Ababa and 695km away from Bahir Dar, the capital city of Amhara Regional State. Minjar Health Center is a public health center found in Minjarshenkora Woreda. The health center provides sputum examination for pulmonary tuberculosis suspected cases and treatment for confirmed pulmonary tuberculosis cases. Directly observed treatment (DOT) was given at the health center. It also confirms the HIV status of TB patients and gives ART service.

Study participants

All pulmonary tuberculosis suspected cases who visited the outpatient outpatient departments (OPD) of Minjar Health Center were included in this study. Eligible study subjects for the study were those patients clinically suspected of tuberculosis infection who showed cough, weight loss, night sweating and fever. Sputum negative patients were excluded as sputum negative pulmonary tuberculosis if and only if three of the sputum slides were negative for tubercle bacilli.

Data type and method of collection

Acid fast bacilli (AFB) microscopy result and socio-demographic variables were collected from the laboratory registration book. HIV status of TB positive cases was also collected from the registration book of TB treatment center. In Ethiopia, detection of TB in sputum is conducted according to a standard operating procedure (SOP) in all health centers throughout the country.

One year data on pulmonary tuberculosis infection was collected from the Minjar Heath Center TB diagnostic registration book. In this Health Center, appropriate sputum specimens were collected from suspected cases using a sterilize sputum cup. Three sputum samples (spot-morning-spot) from a single patient were processed for AFB microscopy using Ziehl Nelson staining technique to confirm the presence of TB. The results were interpreted as positive or negative depending on the presence of AFB. Hence, the anti-TB treatment regimen for TB positive cases is different from TB patients infected with HIV. For instance, thiacetazone is not administered to HIV-positive TB patients because it increased risk of severe and sometimes fatal skin reactions (USAID, 2007). So, all TB positive cases were checked for their HIV status after an informed consent was collected from each TB patient. Then anti-TB treatment was started. For those TB positive cases, HIV infection was determined using anti-HIV antibody test (rapid tests currently used for national HIV test algorithm in Ethiopia). KHB (Shangai Kehua Bio-enginnering Co, Ltd. China) was used for the first screening and positive samples were re-tested with STAT PAK (Chembio HIV1/2 STAT PAK Assay, USA). Samples giving discordant results in the two tests (KHB and STAT PAK) were re-tested using tie-breaker (Unigold).

Statistical methods

Data entry and analysis was performed using SPSS version 20 statistical software package. Frequency and percentage were calculated for the study variables. Chi-square and two tail Fisher's exact test were used to generate the p-value. In all statistical tests, the differences were considered to be statistically significant if p-value less than 0.05.

Ethical consideration

The department ethical review committee of Microbiology, immunology and Parasitology, College of medicine and Health Science, Bahir Dar University approved the project. The researchers obtained informed consent from the Minjar Health Center.

RESULT

Socio-demographic characteristics of study subjects

A total of 329 clinically suspected TB cases who attended

Table 1. Frequency of pulmonary tuberculosis based on their socio-demographic status in Eastern Ethiopia, 2013.

Variable	Pos [N,%]	Neg [N,%]	Total [N,%]	P-value, χ^2
Age				
<18	3 (13)	20(87)	23 (7.0)	0.26, 2.71
18-44	21 (11.2)	167 (88.8)	188 (57.1)	
≥45	7 (5.9)	111 (94.1)	118 (35.9)	
Sex				
Male	18 (10)	162 (90)	180 (54.7)	0.69, 0.16
Female	13 (8.7)	136 (91.3)	149 (45.3)	
Address				
Urban	19 (10.6)	160 (89.4)	179 (54.4)	0.40, 35.36
Rural	12 (8)	138 (92)	150 (45.6)	
Total	31 (9.4)	298 (90.6)	329 (100)	

Table 2. HIV infection status among pulmonary tuberculosis positive cases in relation to their age and sex in Eastern Ethiopia, 2013

Variable	HIV infection status			P-value, χ^2
	Positive [N,%]	Negative [N,%]	Total [N,%]	
Age				
1-17	2 (75)	1 (25)	3(9.7)	0.16, 3.73
18-44	4 (19.1)	17 (80.9)	21(67.7)	
45-85	3 (42.9)	4 (57.1)	7 (22.6)	
Sex				
Male	6 (33.3)	12 (66.7)	18 (58.1)	0.54, 0.39
Female	3 (23.1)	10 (95.5)	13 (41.9)	
Address				
Urban	5 (26.3)	14 (73.7)	19 (61.3)	0.47, 10.69
Rural	4 (33.3)	8 (66.7)	12 (38.7)	
Total	9 (29)	22 (71)	31 (100)	

Minjar Health Centre were enrolled in this study. The mean age of the attendants was 38.7 ± 16.13 SD ranging from 5 to 85 years (Table 1). There were more males (54.7%) (54.7%) than females (45.3%). About 7% of the cases were under eighteen, 57.1% of the cases were between 18 and 44, and the rest 35.9% of the cases were ≥ 45 years old. The majority of the study participants were urban dwellers (54.4%) (Table 1).

Pulmonary tuberculosis distribution

The overall prevalence of TB was 9.4%. Higher numbers of TB cases (21) were infected with TB in the age group 18 to 44 years followed by seven TB cases in patients who were ≥ 45 years of age. Though there was no statistical significance difference (P>0.05), the prevalence of TB was higher among males (10%) than females (8.7%) and urban (10.6%) than rural (8%) dwellers (Table 1).

Pulmonary TB-HIV co-infection

The overall prevalence of TB-HIV co-infection was 2.7% (n=329). However, the prevalence of HIV infection among TB cases was 29% (n=31) (Table 2). High numbers of TB cases (4) were infected with HIV in the age range 18 to 44 followed by 3 cases in 45 to 85 age range (Table 2). The distribution of HIV among TB cases was higher in male (33.3%) than females (4.5%) but the difference was

not statically significant (P = 0.54; χ^2 = 0.39). The number of TB cases co-infected with HIV were (33.3%) in rural and 26.3% in urban settings (Table 2).

DISCUSSION

Pulmonary tuberculosis is a major health problem in Ethiopia especially in remote areas of the country. In this study, the prevalence of TB among clinically suspected cases was (9.4%). This was in agreement with previous pre-valence result obtained 10.4% in Northwest of Ethiopia (Moges et al., 2012) and 9.7% in Cape Town (Boon et al., 2007). However, higher report (25.2%) was obtained in India (Singhal and Jaiswa, 2011). In the present study males have high prevalence of TB than females. A similar result was obtained in a study conducted in Kenya (Sitienei et al., 2013) and India (Kadri et al., 2003). This might be less number of female TB cases in the present study or females appear to be less likely than males to present with symptoms of cough or sputum production, social isolation, economical factors, close contact and lower rates of notification may also be a consequence of a smaller proportion of females than males with tuber-culosis visiting a health facility and/or submitting sputum specimens for testing (WHO, 2002). HIV infection among TB patients is well recognized as a major public health problem worldwide.

In this study, the distribution of HIV infection among TB cases was 29%. A comparable 34.6% result was obtained in Northwest Ethiopia (Moges et al., 2012). However, our result was higher than previous reports (11.4%) in Gondar (Tadesse and Tadesse, 2013) and 5.91% in Niger Delta regions of Nigeria (Nwabuko, 2012) but lower than the result obtained (44.2%) in Nigeria (Datiko et al., 2008). This high prevalence of HIV co-infection among TB patients in the study area signifies the urgent need for program revision, strengthening the health system, staff capacity building, increasing public awareness, better diagnosis and treatment approaches. In the present study, greater number of TB-HIV co-infected cases was obtained in the age range between 18 to 44 years. Similar finding was obtained in previous study (Singhal and Jaiswa, 2011). High prevalence of TB-HIV co-infection was reported among males (33.3%) than females (4.55%) in our study. A comparable high TB-HIV co-infection among males than female was also obtained in Ukraine (Van der Werf et al., 2006). However, low prevalence of TB-HIV co-infection among males than females was obtained in Nigeria (Nwabuko., 2012).

Conclusion

The magnitude of TB-HIV co-infections is high among clinically suspected TB cases. This high prevalence calls for routine screening of TB patients for HIV. Strong part-nership between TB and HIV programs that promote joint policies on increased access to care has demonstrated that it can positively impact on the disease burden.

Conflicts of Interest

All authors report no conflict of interest.

REFERENCES

Boon S den, Lill SWPV, Borgdorff MW, Enarson DA, Verver S, Bateman ED, Irusen E, Lombard CJ, White NW, Villiers Cde,Beyers N (2007). High Prevalence of Tuberculosis in Previously Treated Patients, Cape Town, South Africa. Emerg. Infect. Dis. 13:8.

Cegielski JP, McMurray DN (2004). The relationship between malnutrition and tuberculosis: evidence from studies in humans and experimental animals. Int. J. Tuberc. Lung Dis. 8:286-298.

Datiko DG, Yassin MA, Chekol LT, Kabeto LE, Lindtjorn B (2008). The rate of TB-HIV co-infection depends on the prevalence of HIV infection in a community. BMC Public Health 8:266.

Kadri AM, Bhagyalaxmi A, Lala MK, Jivrajini P, Vidhani M, Patel T (2003). An epidemiological study of prevalence of tuberculosis in urban slum area of Ahmedabad city. Indian J. Commun. Med. 28:3.

Karp CL, Auwaerter PG (2007). Co-infection with HIV and tropical infectious diseases. I. Protozoal pathogens. Clin. Infect. Dis. 45:1208-1213.

Moges B, Amare B, Asfaw F, Tesfaye W, Tiruneh M, Belyhun Y, Mulu A, Kassu A (2012). Prevalence of smear positive pulmonary tuberculosis among prisoners in North Gondar Zone Prison, northwest Ethiopia. BMC Infect. Dis. 12:352.

Nwabuko CO, Ejele OA, Chuku A, Nnoli MA, Chukwuonye II (2012). Prevalence of Tuberculosis-HIV Coinfection and Relationship between Tuberculosis and CD4/ESR in HIV Patients in Niger Delta Region of Nigeria. J. Postgrad. Den. Med. Sci. 2(4):1-4.

Parsons LM, Somoskovi Ak, Gutierrez C, Lee E, Paramasivan CN, Abimiku A, Spector S, Roscigno G, Nkengasong J (2011). Laboratory Diagnosis of Tuberculosis in Resource-Poor Countries: Challenges and Opportunities. Clin. Micro. Rev. 24(2):314-350.

Singhal S, Jaiswa P (2011). Presentation of tuberculosis in TB-HIV co-infection patients and the treatment outcome with directly observed short course therapy. Asia Pac. J. Trop. Biomed. 1(2):S266-S267.

Sitienei J, Nyambati V, Borus P (2013). The Epidemiology of Smear Positive Tuberculosis in Three TB/HIV High Burden Provinces of Kenya (2003-2009). Epidemiol. Res. Int. 2013:7.

Tadesse S, Tadesse T (2013). HIV co-infection among tuberculosis patients in Dabat, northwest Ethiopia. J. Infect. Dis. Immunol. 5(3):29-32.

USAID (2007). Guidelines for the clinical management of TB and HIV co-infection in Ghana.

Van der Werf MJ, Yegorova OB, Chentsova N, Chechulin Y, Hasker E, Petrenko V, Veen J, Turchenko LV (2006). Tuberculosis-HIV Co-infection in Kiev City, Ukraine. Emerg. Infect. Dis. 12:5.

WHO progressive report (2011). Towards universal access to diagnosis and treatment of multidrug-resistant and extensively drug-resistant tuberculosis by 2015

World Health Organization (WHO) (2002). Gender and other health; Gender and Tuberculosis. Department of Gender and Women's Health 20, Avenue Appia Geneva, Switzerland.

World Health Organization (WHO) (2009). Global tuberculosis control: a short update to the 2009 report. WHO/HTM/TB/2009.426. World Health Organization, Geneva, Switzerland.

World Health Organization (WHO) (2012). Global tuberculosis control. Geneva.