

Tuberculosis Status among HIV Positives in Eastern Nepal

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ABSTRACT

Background: TB is an infectious disease caused by the bacteria *Mycobacterium tuberculosis*. TB ranks as the sixth leading cause of death, if not treated, each person with active TB infects on average 10-15 person every year. Tuberculosis is the leading killer among people living with HIV/AIDS. Nepal is considered as high prevalence of tuberculosis, and HIV is emerging as a major public health problem. This cross sectional study was carried among HIV patients receiving anti retroviral treatment from BPKIHS a tertiary level hospital with objective to know the status of tuberculosis during study period. **Results:** Among the study participants there were 35(58.3%) male and 25(41.7%) female of which 22 patients (36.66%) were found to be suffering from PTB. Out of the total suffering from TB, 12 were male and 10 were female. Majority (41.9%) of participants were of age group 30-39 years, followed by ≥ 40 years (31.7%) and 20-29 years (16.7%). Major constituent in ethnicity were from janjati (71.7%). **Conclusion:** Prevalence of PTB was found to be higher among the HIV subjects who were taking antiretroviral from BPKIHS. Finding shows concentrated epidemic and major constituent were male. This emphasizes there is need of an active surveillance of TB among HIV population of Eastern Nepal.

Keywords: TB, HIV, Co-infection, Mycobacterium

INTRODUCTION

Tuberculosis (TB) is a chronic granulomatous disease caused by *Mycobacterium tuberculosis* and human immunodeficiency virus (HIV) infection is the single greatest risk factor for TB. A person living with HIV is about 26 to 31 times more likely to develop active TB. TB is the leading killer of people living with HIV [1]. In 2016, 0.4 million people with HIV died with TB and the proportion of known HIV-positive TB patients on antiretroviral therapy was 85%. Only 39% of the total number of people living with HIV estimated to have developed TB in 2016 had been placed on antiviral therapy [2]. Tuberculosis (TB) and human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) constitute the main burden of infectious disease in Low and Middle income Countries (LMICs). Estimates by the World Health Organization (WHO) indicate that there are more than 9 million new active cases of TB and close to 2 million deaths per year, and those 2.6 million new cases of HIV infection and 1.8 million AIDS-related deaths occur per year. *Mycobacterium tuberculosis*–HIV co-infections pose particular diagnostic and therapeutic challenges and exert immense pressure on health care systems of LMICs [3]. The modern resurgence of tuberculosis (TB) in

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conjunction with the HIV pandemic remains a major public health problem. Despite declines in TB incidence and associated deaths with use of highly active antiretroviral therapy (HAART), TB remains the leading cause of death among persons with HIV/AIDS [4]. Tuberculosis is the most common HIV-related opportunistic infection and caring for patients with both diseases is a major public health challenge [5]. From the very beginning of diagnosis of AIDS in 1981, many co-infections, opportunistic infections and HIV-related conditions have been described. Among the major manifestation of AIDS, fever, weight loss and diarrhoea are considered important for the surveillance purpose in high prevalence countries. In HIV infection, as the level of immunity transferred by T-cells goes down, the chances of reactivation of dormant tuberculosis increases.

Nepal is considered as one of the countries with high prevalence of tuberculosis, and HIV is emerging as a major public health problem. WHO estimates that more than 12 million people, 98% of who are in the developing countries are co-infected with HIV and TB, of which 1.8 million are in SAARC region. TB is considered the biggest killer of people who are infected with HIV accounting for 40% of AIDS deaths in Asia. So, examination of these "two-deadly duos" is deemed necessary in Nepalese context [6]. Evidences show tuberculosis and HIV/AIDS are supposed to fuel each other in a deadly spin. One in every three HIV infected person is supposed to be co-infected with TB bacteria, and every third of them is considered to be dying of this coinfection. It is reported that case fatality rates have increased from 20% in the worse affected countries. In 2012, it was estimated that there were 3.4 million people living with HIV in the South-East Asia region, constituting nearly 10% of people living with HIV globally. There were an estimated 230,000 new HIV infections and 200,000 AIDS-related deaths in South-East Asia region in 2012; this level has remained stable since 2001 (3.4 million). Women (aged 15 years and above) account for nearly 37% of the total number of people living with HIV in the region. A significant proportion of people living with HIV are also infected with tubercle bacilli and are thus at a high risk of developing TB. However, most of the incident TB cases continue to emerge among HIV-negative people. In 2012, the estimated incidence of HIV-positive TB cases was 170,000 (9.2 per 100,000 population) in the South-East Asia Region. In Nepal, Incidence of HIV-positive TB cases was 1100 [7]. In Nepal, 45% of the population is infected with TB of which 60% are in the productive age group (15-45 years). The TB-HIV co-infection rate (the prevalence of HIV infection among TB patients) in Nepal is 2.4%. Overall HIV prevalence in Nepal is estimated at 0.30% in the adult population and it is categorized as a concentrated epidemic. Thus HIV prevention and care must be a priority concern for TB Prevention and Control Programmers and TB care and prevention should be a priority concern for HIV/AIDS Prevention and Control programmers [8]. This study was conducted with an objective to measure prevalence of active TB among HIV positives people in patients attending Anti-Retroviral Therapy (ART) clinic at B.P. Koirala Institute of Health Sciences, in eastern region of Nepal.

METHODOLOGY

This cross sectional study was carried among HIV patients receiving anti retroviral treatment from BPKIHS a tertiary level hospital. Data were collected by a trained health care officer among participant coming to receive treatment for HIV during study period of six months. Sixty participants were interviewed using semi structured questionnaire and further lab investigation of sputum reports were collected and evaluated for the diagnosis of PTB.

Data analysis

Data were entered in to Microsoft office Excel 2003 and univariate and bivariate analysis were performed with software SPSS version 15.0. Chi-square test was used to test the significance between the categorical variables.

Ethical considerations

The study was conducted after acceptance by ethical committee of B.P. Koirala Institute of Health Sciences before conducting the study, Verbal and written consent was obtained from each participant and confidentiality was maintained.

RESULTS

As shown in Table 1; among the 60 HIV patients screened for PTB there were 35(58.3%) male and 25(41.7%) female of which 22 patients (36.66%) were found to be suffering from PTB. Among the 22 HIV patients suffering from TB, 12 were male and 10 were female. Majority (41.9%) of patients were of age group 30-39 years, followed by ≥ 40 years (31.7%) and 20-29 years (16.7%). Major constituent in ethnicity were from janjati (71.7%) followed by Brahmin/Chettri (15%), Dalit (8.3%) and least were Madhesi which constituted 5% of study population. Majority of participants were Hindu (83.3%), followed by other religions (16.7%). In terms of marital status 54(90%) patients were married and majority of patient were residing in Sunsari District (55%) followed by Morang (30%) and other area (15%). About 56.7% of study population was literate. Large proportion of participants were housewife 25(41.7%) followed by those engaged in business 31.7%, agriculture 8.3%, others 16.7% and salaried job 1.7%. Risk group were divided into four categories ; People who Inject Drugs (PWID) 15(25%), Male Labour Migrant 10(16.7%) and Men having Sex with Men (MSM)/Transgender (TG) One (1.7%) and others 34(56.7%). The prevalence of PTB among males was 34.3% and female was 40%. Most of the cases were found in the age group of 30-39 years (41.9%) followed by ≥ 40 years (31.6%), and 20-29 years (13.6%). PTB among married was 38.9% and among unmarried it was 16.7%. The prevalence of PTB was found slightly higher in illiterate 38.5% than literate 35.3%. In the different risk groups PTB was seen higher among others (41.2%) followed by male labour migrants 40%, PWID 26.7% and only one falling under MSM/TG risk group who was not diagnosed with PTB.

Figure 1 shows the risk group according to age intervals. Among 20-29 years age groups, the high risk groups were others followed by male labour migrant, similarly in age group 30-39 years majority of high risk were MSM/TG followed by PWID, others and male labour migrant. In participants of age group ≥ 40 years majority of high risk group were male labour migrant followed by PWID and others.

Table 1: Socio demographic characteristics, association between PTB +ve and HIV/AIDS participants (n=60)

Characteristic	Categories	HIV/AIDS		Total N (%)	p-value
		TB +ve N (%)	TB-ve N(%)		
Gender	Male	12 (34.3)	23(65.7)	35 (58.3)	0.651
	Female	10 (40.0)	15(60)	25 (41.7)	

Age (Years)	Group	20-29 years	3(13.6)	7(86.4)	10 (16.7)	0.679
		30-39 years	13(41.9)	18(58.1)	31 (51.7)	
		≥ 40 years	6(31.6)	13(68.4)	19 (31.7)	
Ethnicity	Dalit	1(20)	4(80)	5(8.3)	0.242	
	Janajati	19(44.2)	24(55.8)	43(71.7)		
	Madhesi	1(33.3)	2(66.7)	3 (5.0)		
	Brahmin / Chhetri9	1(11.1)	8(88.9)	9(15.0)		
Religion	Hindu	19(38)	31(62)	50(83.3)	0.632	
	Others	3(30)	7(70)	10(16.7)		
Marital Status	Unmarried	1(16.7)	5(83.3)	6(10)	0.284	
	Married	21(38.9)	33(61.1)	54(90)		
Place of residence	Morang	5(27.8)	13(72.2)	18(30)	0.369	
	Sunsari	12(36.4)	21(63.6)	33(55)		
	Others (sankhuwasava, saptari, udaypur, khotang, bhojpur, jhapa)	5(55.6)	4(44.4)	9(15)		
Education	Illiterate	10(38.5)	16(61.5)	26(43.3)	0.801	
	Literate	12(35.3)	22(64.7)	34(56.7)		
Occupation	Agriculture	3(60)	2(40)	5(8.3)	0.430	
	Housewife	9(36)	16(64)	25(41.7)		
	Salaried job	1(100)	0(0)	1(1.7)		
	Business	5(4.5)	14(95.5)	19(31.7)		
	Other	4(40)	6(60)	10(16.7)		
Risk group	PWID	4(26.7)	11(73.3)	15(25)	0.776	
	MSM/TG	0(0.0)	1(100)	1(1.7)		
	Male Labour Migrant	4(40)	6(60)	10(16.7)		
	Other	14(41.2)	20(58.8)	34(56.7)		

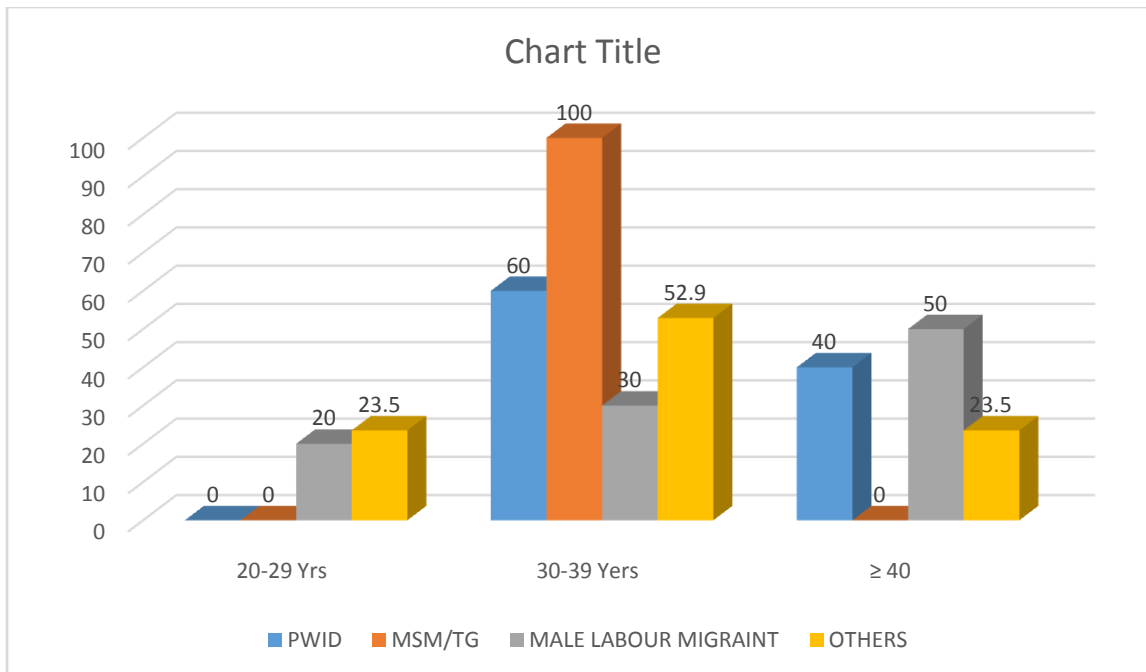


Figure 1: Distribution of the possible risk of HIV transmission with age interval of participants

DISCUSSION

In this cross sectional study, a total no. of 60 HIV infected patients were screened for PTB during the study period. The male and female participants enrolled in our study were 58.3% and 41.7% respectively. Similarly in a study done by Verma SC et al. [9], of all the participants (59.8%) were males and (40.2%) were females. In our study majority of patients were of age group 30-39 years 41.9% followed by ≥ 40 years 31.7% and 20-29 years 16.7%. In contrast to this, in a study done by Verma SC et al. [9] the age group 21-30 was predominant accounting for 43.5% of the total followed by 31-40 years with 38.6%. In our study 90% were married, 56.7% were literate and 41.7% were housewife by occupation. This shows that there is families in risk of tuberculosis and the literacy rate among the patients are still low. We found the prevalence of TB among our study subjects suffering from HIV/AIDs to be around 36.66% which is higher than that found by Verma SC et al. in Pokhara (5.97%). Tuberculosis prevalence in our study is even higher than that found in a study done by S. Sharma et al., which was 23 % [11]. The high prevalence found by our study may be because we used gene expert in diagnosis and also included extra- pulmonary TB. The other reason might be that the subjects of our study are more exposed to Tuberculosis and the immune system may be favorable for the bacteria. Similar to our study the study done previously in eastern Nepal [10] found that among the total of two hundred forty two HIV seropositive cases, male to female ratio was 3:1 and majority (48.8%) were between 30-39 years age group. The prevalence of pulmonary tuberculosis was found to be 27.3%. Prevalence in our study is higher (36.66%) than this because we have used gene expert which has more specificity and sensitivity than other methods of detection.

There may be multiple factors behind the high prevalence of Tuberculosis among HIV/AIDs. These factors range from biological to socio-cultural and importantly economic as well. The LMICs need to focus on the specific interventions not only to general population but to key populations as well.

because the elimination of Tuberculosis is not possible if some key populations continue to act as carrier in the community.

CONCLUSION

The study found a higher prevalence of PTB among the HIV patients taking antiretroviral in tertiary center of BPKIHS. This shows a finding of concentrated epidemic. This emphasizes an active surveillance of TB cases among HIV infected on Eastern Nepal. Countries need to intervene and control infectious diseases such as tuberculosis among key populations as well to eliminate them. Further research on large scale is necessary.

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REFERENCES

1. World Health Organization, 2014 (Available from: [www.who.int › tb › challenges › hiv › tbhiv factsheet 2014](http://www.who.int/tb/challenges/hiv/tbhiv_factsheet_2014))
2. WHO | 10 facts on tuberculosis. WHO [Internet]. 2018 [cited 2018 Feb 8]; Available from: <http://www.who.int/features/factfiles/tuberculosis/en/>
3. Pawlowski A, Jansson M, Sköld M, Rottenberg ME, Källenius G. Tuberculosis and HIV co-infection. PLoS Pathog. 2012;8(2).
4. Metcalfe JZ, Porco TC, Westenhouse J, Damesyn M, Facer M, Hill J, et al. Tuberculosis and HIV co-infection, California, USA, 1993-2008. Emerg Infect Dis. 2013;19(3):400-6.
5. Steinbrook R. Tuberculosis and HIV in India. N Engl J Med. 2007;356(12):1198-9.
6. Suvedi BK. HIV-TB co-infection in Nepal. J Inst Med. 2003;25:19-21.
7. World Health Organization. WHO SEARO Annual Report 2014. 2014. 198 p.
8. National Tuberculosis Center - TB HIV Co-infection [Internet]. [cited 2018 Feb 11]. Available from: <http://www.nepalntp.gov.np/index.php?view=page&id=83>
9. Kimerling M, Schuchter J, Chanthol E, Kunthy T, Stuer F, Glaziou P, Ee O. Prevalence of pulmonary tuberculosis among HIV-infected persons in a home care program in Phnom Penh, Cambodia. The International Journal of Tuberculosis and Lung Disease. 2002 Nov 1;6(11):988-94.
10. Y Yadav DK, Jha N, Pokharel PK, Niraula SR, Bhattacharya SK, Nagesh S. Study on the prevalence of pulmonary tuberculosis among Hiv positive attending Hiv clinics in eastern Nepal. SAARC Journal of Tuberculosis, Lung Diseases and HIV/AIDS. 2011;8(1):1-8.
11. Sharma S, Rijal BP, Dhungana GP, Ghimire P. Intensified Case Finding of Active Pulmonary Tuberculosis (TB) Among HIV Positive Persons in Kathmandu. Journal of Nepal Health Research Council. 2008 Dec 30.