Full Length Research Paper

Prevalence of smear positive pulmonary tuberculosis among patients visiting Bahir Dar health center, Northwest Ethiopia

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Tuberculosis (TB) remains the world's deadliest communicable diseases, responsible for ill-health among millions of people each year. Early detection and management of the disease is crucial to reduce associated burdens. Cross-sectional survey was conducted from November 2014 to February 2015 at Bahir Dar health centre. Sputum samples were collected stained with Ziehl Neelsen staining technique and examined microscopically. Data were analysed by using SPSS for Windows and descriptive statistics was used to present figures. Of 103 study subjects, the majority 70(67.9%) were males. The mean age of the participants was 36.1 years. The overall prevalence of smear positive tuberculosis was 7 (6.8%). Relatively higher smear positive tuberculosis was observed among males, illiterates, older age groups, family size 5-10, cigarette smokers and alcohol drinkers. Although the numbers of study subjects were quite limited to draw strong conclusions, the observed prevalence calls up the stakeholders to undertake prevention and control measures.

Key words: Prevalence, smear positive tuberculosis, smokers, patients.

INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease. It is still a significant cause of morbidity in countries with limited resources and is the seventh leading cause of death worldwide. It is also a leading killer among people living with human immunodeficiency virus (HIV). The spread of TB is fuelled by several factors notably the AIDS epidemic, multidrug resistance, low socio-economic status, inadequate laboratories, overcrowding and malnutrition, WHO (2010; 2012; 2008), Keeler E et al. (2006), USAID (2014).

Tuberculosis ranks as the second leading cause of death from an infectious disease worldwide, after HIV. The latest estimates in 2013 indicated that, worldwide an estimated 9.0 million people developed TB and 1.5 million died from the disease, 360, 000 of whom were HIV-positive. Tuberculosis is slowly declining each year and it is estimated that 37 million lives were saved between 2000 and 2013 through effective diagnosis and treatment, WHO (2014).

Although the incidence of TB has decreased in many countries over the past decade, case numbers continue to rise in much of sub-Saharan Africa, where HIV is endemic, Keeler E et al. (2006). Africa, home to 11% of the world's population, carries 29% of the global burden of tuberculosis cases and 34% of related deaths, and the challenges of controlling the disease in the region have never been greater, Chaisson R et al. (2008).

Ethiopia ranked seventh among world's 22 high burden countries, with overall prevalence of TB 211 per 100, 1000 population according to world health organization (WHO) global report of the year 2014. In addition, it is one of the five most affected countries in Africa, WHO (2014; 2015).

Without treatment, TB mortality rates are high. Early detection and proper management of TB are very significant in reducing burdens and impacts of TB in the community and especially among people living with HIV. The most common method for diagnosing TB worldwide is sputum smear microscopy, in which bacteria are observed in sputum samples examined under a microscope,

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WHO (2014).

MATERIALS AND METHODS

Study setting and period

The study was conducted from November 2014 to February 2015 at Bahir Dar Health Centre. Bahir Dar city, the capital of Amhara regional state, is situated on the Southern shore of Lake Tana, the source of Blue Nile. The city is positioned approximately 560 Km North-West of Addis Ababa, having an elevation of about 1840 meters above sea level, FDRE population census commission (2008).

Study design, sample size and sampling technique

A cross sectional survey was conducted on 103 presumptive pulmonary TB (PTB) patients who visited the health centre during the study period.

Data collection and analysis

Socio-demographic data were collected by using structured questionnaires. For laboratory investigations, purulent sputum samples were collected three times (spot-morning-spot) according to the national tuberculosis control program guideline. Sputum smears were prepared from each spot and morning samples, air dried, fixed and stained with Ziehl Neelsen (ZN) staining technique and examined by direct microscopy for acid fast bacilli (AFB) using oil-immersion (100x) objectives, Cheesbrough M (2006), Benson (2001), Federal Ministry of Health (2008). All data were entered, cleared, and analyzed using SPSS statistical software package (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.). Descriptive statistics was used to present the data.

Quality assurance

The standard operation procedure (SOP) for sputum smear preparation, staining and microscopic examination was strictly followed based on the national guideline Cheesbrough M (2006), Benson (2001), Federal Ministry of Health (2008). The patients were informed how to collect purulent sputum sample. Labeled and clean microscopic slides were used. As part of performance checking of AFB staining solutions, positive and negative control slides were used. To ensure accuracy, all positive slides and a random sample of 10% of the negative slides were re-examined at Bahir Dar Regional Health Research Laboratory Center by a separate laboratory technologist, who was blinded to the diagnosis of the first slide-reader.

Ethical considerations

Ethical clearance was obtained from Amhara Regional Health Bureau Institutional Review Board (IRB). The study participants were informed that participation in the research was voluntarily. Confidentiality of the test results was kept.

Positive results were communicated with the health professionals in charge of attending patients for management.

RESULT

Socio demographic data

A total of 103 subjects were included in the study, of these 70 (68%) were males. The mean age of the participants was 36.1 with standard deviation of 13.1 years. The majority 36 (35%) were in the age group of 31-50. Similarly, most of the study subjects 61(59.2%), 67(55.3%), 53 (51.5%) came from rural areas, were farmers and illiterates, respectively (Table 1).

Prevalence of smear positive PTB

Seven (6.8%) subjects were smear positive for AFB. Although it was difficult to determine the predictors of smear positive tuberculosis statistically due to the limited number of sample size, greater proportion of TB positivity was observed among the following categories; >50 age, males, illiterates, alcohol drinkers and among those patients who had a family size of 5-10 (Table 2).

DISCUSSION

According to WHO 2014 global report of TB, the estimated prevalence of TB in Ethiopia was 211 per 100, 000 population (0.211%), WHO (2014). In the present study, the overall prevalence of TB among presumptive cases was 7(6.8%) which is significantly higher than the above figure. This can be partly explained by our study participants who were of course pulmonary TB suspected cases in which the possibility of being positive for TB is higher than the general population.

On similar studies conducted in South and Eastern part of Ethiopia, among presumptive cases the prevalence of smear positive TB was 9.2%, Tulu B et al (2014) and 21.6%, Mekonnen A (2014), respectively which are higher than the finding of the present study. Our limited sample size and population difference could explain the disparity.

Tuberculosis affects all age and sex groups. According to a study in Ethiopia the age groups 15-45 were more affected than other groups Mekonnen A (2014). In contrast, in the present study relatively high prevalence of TB was observed among people aged above 50. The possible reason might be related with our limited sample size. Certainly, comparable finding was also reported by Tulu et al. study in the country, Tulu B et al (2014).

Similarly in this study, males were relatively more affected than females. According to 2014 World TB report, WHO declared that most TB cases and deaths occur among males, however burden of the disease is also high among women. The global attention to maternal and child health created demand for interest in detection

Table 1. Socio-demographic data of presumptive TB patients at Bahir Dar health center, Feruary 2015.

Characteristics		n (%)
	≤15	4(3.9)
	16-30	33(32)
Age	31-50	36(35)
	>50	30(29.1)
Sex	Male	70(68)
	Female	33(32)
Residence	Urban	42(40.8)
	Rural	61(59.2)
	Illiterate	53(51.5)
Educational level	Primary school	22(21.4)
	Secondary school	14(13.6)
	College and above	14(13.6)
	<5	55(53.3)
Family size	5-10	35(34)
	>10	13 (12.6)
Smoking	Yesl	62(60.2)
	No	41(39.8)
Alcohol drinking	Yes	62(60.2)
	No	41(39.8)
Raw milk drinking	Yes	35(34)
	No	68(66)

and management of TB among women, WHO (2014). Similar finding has also been reported by other studies in the country, Berhe G et al. (2013), Tulu B et al. (2014). Relatively higher smear positive TB cases were observed among smokers, alcohol drinkers, family size >5 and illiterates although it was difficult to determine their statistical significance due to the limited sample size. Analogous findings were reported by different studies Berhe G et al. (2013), Tulu B et al (2014).

CONCLUSION AND RECOMMENDATION

The observed high prevalence of smear positive PTB in the study area calls for the concerned stake holders to promote prevention and control measures. Moreover, the urgency for improved TB case detection and intensified community awareness should be a priority issue.

Declaration of competing interests

The authors declare that there is no financial and non-financial competing interest.

Author's information

Both AD **and** DM are lecturers and researchers of medic-

Table 2. Prevalence of smear positive pulmonary tuberculosis among patients at Bahir Dar Health Center for, February 2015.

Characteristics		Smear positive for AFB
		n (%)
Age	≤15	0
	16-30	1(14.3)
	31-50	2(28.6)
	>50	4(57.1)
Sex	Male	5(71.4)
	Female	2(28.6)
Residence	Urban	3(42.9)
	Rural	4(57.1)
Educational status	Illiterate	3(42.9)
	Primary school	2(28.6)
	Secondary school	2(28.6)
	College & above	0
Smoking	Yes	4(57.1)
	No	3(42.9)
Alcohol drinking	Yes	5(71.4)
	No	2(28.6)
Family size	<5	2(28.6)
	5-10	4(57.1)
	>10	1(14.3)

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