

BRIEF COMMUNICATION**SMEAR POSITIVE PULMONARY TUBERCULOSIS (PTB) PREVALENCE AMONGST PATIENTS AT AGARO TEACHING HEALTH CENTER, SOUTH WEST ETHIOPIA****Hussen Ali¹, Ahmed Zeynudin¹, Abiyu Mekonnen², Solomon Abera¹, Solomon Ali^{1*}****ABSTRACT**

BACKGROUND: World Health organization (WHO) declared tuberculosis as a global emergency because it poses a serious public health threat in different countries especially, in Africa. According to WHO report of 2007, Directly Observed Treatment Short course (DOTS) coverage in Ethiopia reached 95 percent of the population; despite this fact the trend of tuberculosis in most of the districts of Ethiopia is not known. Hence, this study has revealed the trend and determined the overall prevalence of smear positive pulmonary tuberculosis in five years (2005/6-2009/10) in Agaro teaching health center, south west Ethiopia.

METHODS: A retrospective study based on record review was conducted at Agaro Teaching Health center on sputum examination record of patient's from 2005/6-2009/10 (five years). Socio demographic data and sputum laboratory results were collected using pre-designed questionnaire and the data was entered into a computer using SPSS version 16 for windows. Finally, cross tab analysis and Chi-square was calculated at P-value less than 0.05 to check possible association between socio-demographic variables and smear positivity.

RESULTS: The overall five years prevalence of smear positive pulmonary tuberculosis was found out to be 10.9%. On the other hand, the percentage of smear positive pulmonary tuberculosis cases showed gradual decrease from 19.5% in 2005/6 to 5.8% cases in 2009/10.

CONCLUSION: Tuberculosis is still the major problem of Agaro health center catchment area even though there is a decrease in trend from year to year. Hence, the respective health bureau and other stake holders should still need to strengthen their effort to control it.

KEYWORDS: Retrospective study, Pulmonary Tuberculosis, prevalence, *Mycobacterium tuberculosis*

INTRODUCTION

WHO declared tuberculosis as a global emergency because of the serious public health threat posed by it. In 1991, the 44th World Health Assembly, adopted the new strategy and formulated the two global targets for the year 2000 of curing 85% of infectious cases detected and detecting 70% of cases and this new strategy subsequently labeled as DOTS (1).

Contrary to the global effort to control tuberculosis; different retrospective studies conducted on trends of PTB in different parts of

the world have shown that pulmonary tuberculosis has continued to be a health problem in both developed and developing countries; Nigeria (2), Taiwan (3), Israel (4), Ethiopia, Gondar (5) and south east Ethiopia (6). The prevalence and incidence rates declined or increase steady from year to year as indicated by those studies.

Ethiopia has adopted DOTS in 1991 and the National Tuberculosis and Leprosy Control Program (NTLCP) began to implement this strategy in two zones (Arsi and Bale zones, Oromia region) of the country and extend the service to other parts of the nation through time.

¹Jimma University, Department of Medical Laboratory Sciences and Pathology

²Haramaya University Department of Medical laboratory Sciences

DOTS has been delivered to all districts in Ethiopia, and is being implemented in 119 hospitals, 519 health centers and 114 health stations across the country (7,8).

According to 2007 WHO report, DOTS coverage in Ethiopia reached 95 percent of the population. However, due to limited health infrastructure in the country, only approximately 60 to 70 percent of the population has access to the DOTS services even though the treatment has been integrated into the general health services and the geographical coverage is 95 percent (9).

Despite this reality the trend of the infection in most districts is not known. Thus, this study has revealed the trend and determined the overall prevalence rate of smear positive pulmonary tuberculosis in the last five years (2005/6-2009/10) in Agaro Health Center, South West Ethiopia.

METHODS AND SUBJECTS

A retrospective study based on record review was conducted at Agaro Teaching Health Center on sputum examination result of patients from 2005/6-2009/10 (five years). Agaro is found in Jimma Zone, 45 km away from Jimma town, Southwest Ethiopia. Data were collected by laboratory technologists who have been working in the health center for several years and they were given training on how to completely collect data

from AFB record books as accurately as possible. The study was conducted from November to December, 2010.

The collected data was first checked and then entered into Epi Data version 3.1. It was then transferred into SPSS version 16 for windows. It was summarized and the proportion of Smear positive cases for the overall AFB screened were determined for each year first and then for the five years period to indicate the overall prevalence rate and the trend of PTB. Moreover, the distribution of smear positive pulmonary tuberculosis between gender and among age groups were calculated. The study was ethically approved by Jimma University Institutional Research and Ethical Committee, and the data collection was carried after submitting the ethical clearance letter to the responsible bodies including the woreda health bureau, Health center administration and to the health center laboratory department.

RESULTS

A total of 2880 suspected patients for pulmonary Tuberculosis were registered and examined for AFB microscopy. From these 1361 (47.3%) were males and the remaining 1519 (52.7%) were females. In the last five years a total of 314 (10.9%) were positive for AFB and out of these 158 (5.5%) were males and the rest 156 (5.4%) were females (Table 1).

Table 1. Percent distributions of smear positive pulmonary TB prevalence rate by gender and Age at Agaro health centre from 2005/6-2009/10, Southwest Ethiopia.

Characteristics	Total examined	Smear positive	Percent (%)	P -value
Gender				
Male	1361	158	5.5	P=0.25
Female	1519	156	5.4	
Total	2880	314	10.9	
Age (year)				
<15	245	30	1.04	P<0.001
15-24	590	100	3.5	
25-34	719	92	3.2	
35-44	539	42	1.5	
45-54	410	29	1	
>55	377	21	0.7	
Total	2880	314	10.9	

Majority 100(3.5%) of the smear positive cases were found among age group of 15-24 years. In addition, smear positive Pulmonary tuberculosis prevalence distribution is significantly different among classes of age groups ($p < 0.001$) (Table 1). On the other hand, the number of smear positive pulmonary tuberculosis cases appear to show gradual decrease from 69(19.5%) cases in 2005/6 to 59(5.8%) of cases in 2009/10 (Table 2). Most of

all, it appears that there has been a steep decrease of PTB during these five years in 2007 to 2009 from 15.8% to 8.6% (Table 2). In line with this, the number of patients examined for AFB in each year showed an increment from 354 suspects in 2005/6 to 1026 suspects in 2009/10. Within these years, sharp increase was observed in 2008/2009 (731 suspects) (figure 1 and Table 2).

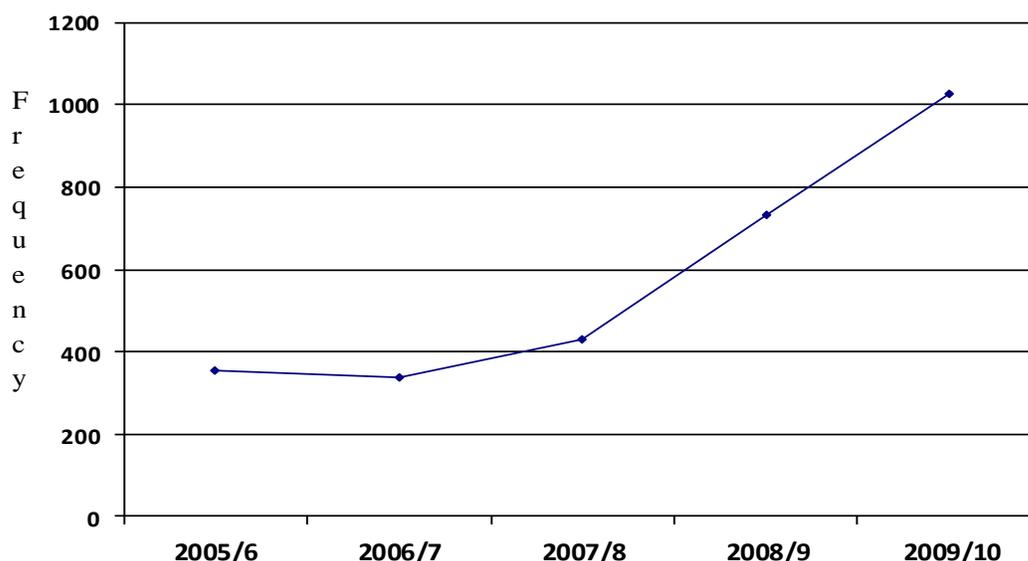


Figure 1. Trend number of patients examined at Agaro health centre from 2005/6-2009/10, Southwest Ethiopia.

Table 2. Year specific percent distribution on prevalence of smear positive pulmonary TB by gender at Agaro health center from 2005/6-2009/10, Southwest Ethiopia

Year	Total examined	Positive (%)	Male		Female	
			Examined	Positive (%)	Examined	Positive (%)
2005/2006	354	69 (19.5)	157	35 (22.3)	197	34 (17.3)
2006/2007	338	55 (16.3)	168	26 (15.5)	170	29 (17.1)
2007/2008	431	68 (15.8)	206	33 (16)	225	35 (15.6)
2008/2009	731	63 (8.6)	353	37 (10.5)	378	26 (6.9)
2009/2010	1026	59 (5.8)	477	27 (5.7)	549	32 (5.8)
Total	2880	314 (10.9)	1361	158 (11.6)	1519	156 (10.3)

Regarding the gender specific prevalence of PTB, out of the total cases examined for AFB in 2005/6, 22.3% of the males and 17.3% of the females were smear positive for acid fast bacilli. However,

statistically significant difference was not observed between gender and Pulmonary tuberculosis ($p=0.25$) (table 2). The trend of gender specific prevalence of PTB during the five

years appears to indicate there has been a continuous decrease from 2005/6 to 2009/10 in

both genders (fig 2).

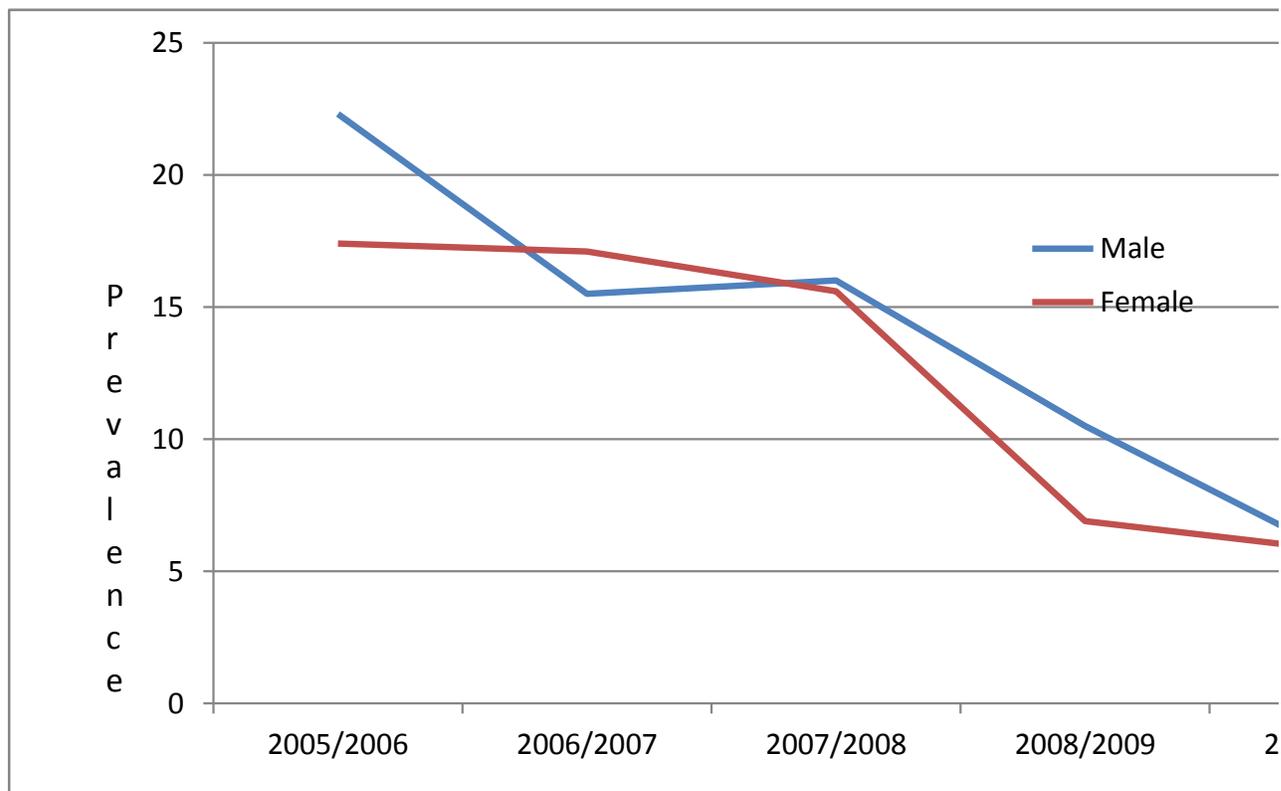


Figure 2. Trend of sex specific prevalence of PTB during five years period at Agaro teaching health centre, Jimma Ethiopia 2010

DISCUSSION

The five years overall prevalence of smear positive pulmonary tuberculosis in this study was found to be 10.9%, which indicates that the disease is of major clinical significance in the study area and also in the country Ethiopia. The prevalence rate in this study is a little bit higher than the finding from Jimma University Specialized hospital, (8.5%) (10), however, it is very high when compared with a study from Southern part of Ethiopia which found a prevalence rate of 3% (11). This could be attributed to differences in awareness level of the patients leading to passive detection in those who had sign and symptoms of the disease. This study revealed a finding lower than that of Nigeria, which had a prevalence of 14.7% (2), this could be due to the effectiveness of a community based

program launched several years ago using home to home community health workers, who are capable of creating awareness better than the previous strategies in Ethiopia.

On the other hand, this study revealed a statistically strong association between smear positivity and age of the patient (p value < 0.001). Similar to the findings from various studies throughout the world the finding in this study showed that tuberculosis is affecting every one regardless of age, but 100(3.5%) of smear positive PTB cases were in the age group between 15-24 years (12,13,14). This might be due to the fact that individuals of this age in their life tend to be more active and more interactive with other people than the elderly and the very young. Also this could be related to the higher association of pulmonary tuberculosis with HIV/AIDS. As studies have shown, TB infection has been directly related to

HIV/AIDS where it has been affecting people in their 20's and 30's, the primary age group who are dying of AIDS (14,15).

The prevalence of smear positive PTB in relation to year of examination appears to be declining steadily from 2005/6 onwards to 2009/10 with year specific prevalence rates being 19.5%, 16.5%, 15.8%, 8.6% and 5.8% ,respectively. This is comparable with a study conducted in Taiwan (9).The decreasing prevalence could be attributed to the health extension program designed to achieve significant basic health care coverage in Ethiopia over five years through the provision of a staffed health post to every 5000 people where the program incorporates strategies to prevent the spread of tuberculosis by increasing community awareness on the modes of transmission of TB.

Moreover, the number of patients examined has remarkably increased from 345 in 2005/6, to 1026 in 2009/10. This difference might be due to the increased awareness of people about the disease through health information dissemination programs where health extension workers provide home to home instruction. The efforts to encourage HIV screening and initiating antiretroviral therapy for TB/HIV co - infected patients at various parts of the country could have played a role to the increased flow of patients to TB laboratory. In addition, Directly Observed Treatment, Short Course (DOTS) program, which was started in 1991 in Ethiopia have had a strategy focusing on passive case finding and self-presentation of symptomatic patients. Therefore, the increase in the number of patients examined in the subsequent years could be the cumulative outcome of the various strategies. Furthermore, there was a statistically significant association between smear positivity and year of examination (p. value <0.001).

In conclusion, proportion of smear positive pulmonary tuberculosis was 10.9% among suspected TB patients from 2005/6-2009/10 in Agaro Teaching Health center. The majority of people affected were within the age group between 15-24 years. Hence, respective health authorities and government bodies should intensify the preventive strategies and special attention should be given to address tuberculosis prevention among age group of 15-24.

ACKNOWLEDGEMENTS

We would like to acknowledge Jimma University for its valuable ethical clearance and support. We also like to express our heartfelt appreciation to Agaro Health center laboratory department staffs for their unreserved support during the data collection period.

REFERENCES

1. Raviglione MC, Pio A, Evolution of WHO policies for tuberculosis control, 1948-2001. *Lancet*, 2002; 359 (9308):775-80.
2. Imam, TS, Oyeyi T. Retrospective study of PTB prevalence among patients attending in infectious disease hospital. *Bayero Journal of pure and applied science*.2008; 1(1):10-15.
3. Lee LT, Chen CJ, SuoJ, Chen CY. Morbidity and mortality trends of pulmonary tuberculosis in Taiwan. *J Formos Med Assoc*, 1992, 91(9): 867-72.
4. Mor Z, Lerman Y, Levental A. Pre-immigration screening process and pulmonary tuberculosis among Ethiopian immigrants in Israel. *Eur Respir J*. 2009; 33(1):221-2.
5. Belay T, Abebe M, Assegedech B et al. Treatment outcome of TB patients at Gondar University Teaching Hospital, NW Ethiopia. *BMC public Health* 2009;9:371 doi:10.1186/1471-2458-9-371
6. Jose Manual Ramos, Francisco Reyes, Abraham Tesfamariam. Child hood and adult TB in Rural hospital in south Ethiopia; A10 year retrospective study. *BMC public Health* 2010,10:215.
7. WHO (2009). "Epidemiology" Global tuberculosis control: epidemiology strategy, financing PP, 6-33.
8. CDC (2006). Emergence of mycobacterium tuberculosis with extensive resistance to second line drugs worldwide, 200-2004 MMWK mores mortal WKLY rep 55(11); 301-5.
9. http://www.usaid.gov/our_work/global_health/id/tuberculosis/countries/africa/ethiopia_profile.html USAID report May 2009.
10. Gebreselassie S. Evaluation of the concentration sputum smear technique for the lab diagnosis of PTB. *Ethiop Med J* 2003; 33(3):160-162.

11. Shargie EB, Yassin MA, LintJorn B. Smear positive pulmonary TB in rural district of Ethiopia. *Int J tuber Lung Dis* 2006 ; 10(1): 87-97.
12. Holmes CB, Hausler H, Nunn P. A review of sex differences in the epidemiology of tuberculosis. *Int J Tuberc Lung Dis* 1998,2(2):96-104.
13. Claude Mambo Muvunyi, Florence Masaisa, Claude Bayingana, Andre Musemakweri, Leon Mutesa, Teresa Carbone Hernandez. Prevalence and diagnostic aspects of sputum smear positive tuberculosis cases at a tertiary care institution in Rwanda; *African Journal of Microbiology Research* 2010, 4(1):088-091.
14. Paul Jerome, Dual infection. The challenge of HIV/AIDS and TB in Ethiopia. *North East African studies*.2000; 7(1):147-165.
15. Ngowi BJ, Mfinanga SK, Bruun Jn, Morkeve O. Pulmonary tuberculosis among people living with HIV/AIDS attending care and treatment in rural northern Tanzania. *BMC Public Health* 2008; 8: 341.doi:10.1186/1471-2458-8-341.