

## Prevalence and Predisposing Factors for TB Disease at Dilla Referral Hospital, Ethiopia

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### Abstract

Tuberculosis is a major cause of death but infected people with effective immunity may remain healthy for years, suggesting long-term co-existence of host and pathogen. Tuberculosis (TB) patients were not visiting health facility but transmit disease to healthy individuals in the community for longer time in Ethiopia. This study was focused to determine the prevalence of TB among patients at Dilla Referral Hospital and exploring predisposing factor to TB Disease. The study was conducted at Dilla Referral Hospital which found in Gedeo zone. Primary data around 158 respondents were by randomly and systematically selected for interview at Dilla Referral Hospital. Secondary data were collected from Dilla Referral Hospital from registration documents where the patients were examined for tuberculosis infection. The date ranged from year 2008-2014 and about 5572 patients were examined for tuberculosis infection. According to respondents response, majority of respondents of males 44 (27.85%) were calmed for availability of drugs and equipments for TB, whereas the least number of respondents of females 14 (8.86%) were calmed for availability of drugs and equipments for TB. The most infected individuals with TB at 2012 and 2013 year, at the age of 6-20 years old, 89 (38.70%) and 88 (38.77%) respectively. The males infected with TB disease 59.84% , 59.38% , 58.99% , 58.90% , 58.75% , 58.15% , 56.52% were 2010, 2009, 2014, 2008, 2011, 2013 and 2012 respectively. Therefore, TB disease were predominated on males than females at Dilla Referral Hospital from 2008-2014 years and some of respondents calmed for predisposing factor which enhance for TB disease among them.

**Keywords:** Dilla Referral Hospital; Females; Males; Respondents; TB disease; TB negative; TB positive

### Introduction

*Mycobacterium tuberculosis* (*M. Tuberculosis*) is complex bacteria which causes an infectious disease tuberculosis (TB). It includes *M. tuberculosis*, *M. bovis*, *M. africanum* and the recent additions of *M. canetti* and *M. microti*, which are genetically closely related subspecies. *Mycobacterium tuberculosis* is a fastidious, slow growing, lipid-rich, hydrophobic and acid fast bacterial rod shape which resists decolorization with acid alcohol. The principal bacterium responsible for the disease is *Mycobacterium tuberculosis* (the Koch bacillus), which was isolated by Robert Koch in 1882. The natural reservoir of *M. tuberculosis* and *M. africanum* is limited to humans while that of *M. microti* is rodents and *M. bovis* is a wide range of wild, domestic animals and occasionally humans.

TB is an infectious disease that is caused by a bacterium called *Mycobacterium tuberculosis* complex and primarily affects the lungs, but it can also affect organs in the central nervous system, lymphatic system, and circulatory system among others [1]. The source of infection is a patient with pulmonary TB who coughs and spreads tiny droplets. A single cough may produce up to 3000 droplets where each one contains one or more tubercle bacilli [2]. It is estimated that 200 million additional people are at risk of developing the disease in the next 20 years, if the current trends are conserved [3]. TB is a chronic infection disease that has a major health problem over the centuries and it has accounted for more human misery suffering and loss of earning and failure of economic and social development than any

other disease [4]. According to World Health Organization (WHO) estimation, about one third of the world's population is infected with tuberculosis bacteria, about ten million cases of active disease are estimated to occur each year, and annually three million people die of tuberculosis [5]. According to WHO estimation, nearly one third of the world's population is infected with tuberculosis bacteria which is at risk of developing active disease, 8.4 million people develop active tuberculosis disease every year and 2.3 million die of the disease [6]. Sub Saharan Africa is the region most severely affected by tuberculosis disease [7].

TB accounts for 2.5% of the global burden of diseases, for 26% of preventable death and a leading infections cause of death among young women [8,9] and among the top ten causes of global mortality [10]. Approximately 80% of tuberculosis cases are from 22 countries the highest incidence rate found in Africa and East Asia [5,11]. The global incidence rate of tuberculosis is growing at approximately 0.4% per year, but much faster in sub-Saharan Africa including Ethiopia, which is 5% per year probably linked to spread of HIV [12], and this fact realizing the rapid spread of HIV infection simultaneously with tuberculosis in the country.

The burden of TB in Ethiopia is one of the highest in the world and based on estimated number of cases the country is placed to rank 10th among the 22 high burden countries (HBC) [13]. According to WHO report 2003, the estimated incidence of all forms of TB in Ethiopia has now reached to 292 per 100000 population [13]. According to the WHO Global TB Report 2009 (used as background document for the development of this study protocol), Ethiopia ranked seventh in the world for TB burden and third in Africa in 2008, with an estimated TB

incidence (all forms) of 378 new cases per 100,000 persons, 163 new smear positive cases per 100,000 persons, and a prevalence (all forms) of 579 per 100,000 population [14]. TB in Ethiopia are major public health problems and accurate information about the extent and trends (comparing results from different years) is important for effective prevention as well as for control programs. However, there are only limited studies that on prevalence of TB in Ethiopia. Therefore, this study was focused to determine the prevalence of TB among patients at Dilla Referral Hospital and exploring predisposing factor for TB Disease.

## Methodology

### Study design, area and population

This study was conducted in Dilla University and Dilla Referral Hospital was found in Gedeo zone in the south west of the country. Dilla is located on the main road from Addis Ababa to Nairobi. The Dilla town is 361 Km and 90 Km away from Addis Ababa and Hawassa town, respectively. The study employed mixed methods of quantitative and qualitative approaches for gathering information from randomly selected respondents at Dilla Referral Hospital. Around 158 respondents were by randomly and systematically selected for interview at Dilla Referral Hospital.

### Method of data collection

Primary data were collected through randomly interviewing the voluntary respondents at Dilla Referral Hospital. Around 158 voluntary respondents were interviewed Dilla Referral Hospital. Secondary data were collected from Dilla Referral Hospital from registration documents where the patients were examined for tuberculosis infection. The date ranged from year 2008-2014 and about 5572 patients were examined for tuberculosis infection. Among examined patients were 3653 males and 1919 females at Dilla Referral Hospital.

### Ethical clearance

The study protocol was reviewed and ethically approved by Dilla University ethical and clearance committee. Before data collection, an informed consent was obtained from respondents. The confidentiality of the respondents were maintained.

### Data analysis

Data entry and analysis was performed using the statistical package for Social Sciences for Windows SPSS (version 16.0). For analysis of the percentage and total HIV infected individuals tested at Dilla Referral Hospital. The results were expressed graphically and as tabules.

Type of question to the respondents (interview questions)	Way of answering the interview question	Sex	
		Male (n,%)	Female (n,%)
Is there an available of drugs and equipments	High	34 (21.52%)	20 (12.66%)
	Medium	44 (27.85%)	26 (16.45%)
	Low	20 (12.66%)	14 (8.86%)
What is /are the major risk factors at your locality	Immigration with high prevalence	32 (20.25%)	31 (19.62%)
	Overcrowded living style	34 (21.52%)	28 (17.72%)
	Common utensil use	20 (12.66%)	13 (8.23%)
Do you awared about TB	High	35 (22.15%)	30 (18.99%)
	Medium	34 (21.52%)	36 (22.78%)
	Low	13 (8.23%)	10 (6.33%)
Do the community service was geiven by health worker's about TB?	High	35 (22.15%)	33 (20.89%)
	Medium	45 (28.48%)	37 (23.42%)
	Low	3 (1.90%)	5 (3.16%)
What are the diagnosis and treatment facilities for TB at this Hospital?	High	38 (24.05%)	25 (15.82%)
	Medium	42 (26.58%)	39 (24.69%)
	Low	9 (5.70%)	5 (3.16%)
Do you close contact with smear positive TB case?	High	26 (16.46%)	25 (15.82%)
	Medium	38 (24.05%)	33 (20.89%)
	Low	20 (12.66%)	16 (10.12%)
Do you give a better care to TB patients?	High	35 (22.15%)	34 (21.52%)
	Medium	38 (24.05%)	28 (17.72%)
	Low	13 (8.23%)	10 (6.33%)

**Table 1:** Patients and professional workers respond to the following interview at Dilla Referral Hospital, Ethiopia at 2014 year.

n: Number of respondents; %: Percentage

## Results

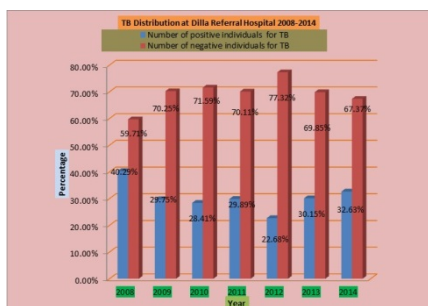
### Socio-demographic data

This study was conducted between January and June 2014. One hundred fifth eight (158) respondents were participated. All of them responded to the interview on the knowledge, care for TB patients, attitude, resources use for TB diagnosis and drug availability and other related variables of the assessment. The number of individuals examined for TB diseases at Dilla Referral Hospital at 2008, 2009, 2010, 2011, 2012, 2013, 2014 were 725, 753, 859, 803, 1014, 753 and 665 respectively. The number of TB positive individuals at 2008, 2009, 2010, 2011, 2012, 2013 were 292, 224, 244, 240, 230, 227 and, 217 accordingly.

### Interview results

Table 1 shows that the majority of respondents of males 44 (27.85%) were calmed for availability of drugs and equipments for TB, whereas the least number of respondents of females 14 (8.86%) were calmed for availability of drugs and equipments for TB. On the other hand majority of respondents of males 34 (21.52%) were thinks the major risk factors for TB were overcrowded living style while the least respondents of females 13 (8.23%) were thinks major risk factors for TB were common utensil use. As shown in the Table 1, the majority of respondents of females 36 (22.78%) were awarded about TB while least of the respondents of females 10 (6.33%) had said low awarded about TB.

**Note:** During interview the concerning respondent was answer the interview question by said High, Medium and Low based on they had perception.



**Figure 1:** TB distribution among individuals from 2008-2014 years at Dilla Referral Hospital.

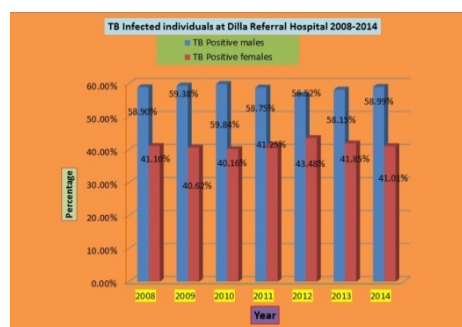
The second TB infected individuals were examined at 2014 (32.63%) while the second least of TB infected individuals were examined at 2010 (28.41%) as shown in Figure 1.

The least males infected with TB at 2012 (56.52%) whereas the females were 43.48%. The males infected with TB disease 59.84% , 59.38% , 58.99% , 58.75% , 58.15% , 56.52% were 2010, 2009, 2014, 2008, 2011, 2013 and 2012 respectively as indicated in Figure 2.

## Discussion

Majority of the respondents of males 45 (28.48%) were said there was a community service on TB diseases which were given by health workers. The majority of respondents of males 42 (26.58%) were

thinks there were a better diagnosis and treatment facilities for TB at Dilla Referral Hospital, but least of the respondents of females 5 (3.16%) were think, there is less diagnosis and treatment facilities for TB at Dilla Referral Hospital. Tuberculosis (TB) is one of the major health challenges in the world [15]. It is bacterial disease transmitted from an infectious patient to the other susceptible individuals through air droplets. An infectious patient can infect 10-15 individuals per year [16]. Fortunately, only 5-10% of the infected individuals develop active TB. The burden of TB is high in developing countries like Ethiopia [16,17]. Ethiopia ranks the 8th among 22 TB-high burden countries with an estimated incidence and death of 230, 000 TB cases of all forms. However, it has been suggested that, due to historical and geographical reasons, human tuberculosis has recently been imported into Ethiopia [18].



**Figure 2:** TB infected individuals at Dilla Referral Hospitals among males and females from 2008-2014 years.

The most infected individuals with TB at 2012 and 2013 year, at the age of 6-20 years old, 89 (38.70%) and 88 (38.77%) respectively. On the contrary, at the year of 2009 and 2010, at age of greater than 60 were least infected individuals with TB 9 (4.02%) and 7 (2.87%) respectively as indicated in Table 2.

Most TB positive infected individuals were examined at 2008 (40.29%) while the least TB infected individuals were examined at 2012 (22.68%). Among the total smear positive TB cases reported in 2009/10, 55.5% were males, 7.5% were children <14 years old, and 2% were above the age of 65. The 15 to 34 age group was found to be the one most affected with TB, accounting for 62% of notified new smear positive TB cases [19]. The most TB infected sex were males than females according to this study. The highest number of males infected with TB diseases were at 2010 (59.84%) while the females were 40.16%. The second year where the most males infected with TB at 2009 (59.38%). Globally, the prevalence of infection with mycobacterium tuberculosis is similar in males and females until adolescent age after which it is higher in males [6,20,21]. Both sexes in present notification in many developing and industrial countries are similar and are ranged between 15-34 years [20,22]. In the year 2009/10 Ethiopia registered 146,172 cases of TB. Among these, 139,261 were new cases; 46,132 new smear-positive (33.1%); 49,037 new smear-negative (35.2%); 44,092 new extra-pulmonary TB (31.6%) [19].

The most individuals were infected with TB at age of 21-40 years old (98 (33.56%)) at 2008 while the least number of infected individuals with TB at age of 1-5 years old. The most infected individuals with TB at year of 2011 (101 (42.08%)) than other years. Worldwide, tuberculosis (TB) kills more young and middle-aged adults than any other infectious disease [23]. Though it is curable and

preventable, more than 5,000 people die of TB every day (2 to 3 million people per year) [23]. TB often strikes the most vulnerable members of society and, if left untreated, causes its victims to lose weight, weaken, and eventually waste away [24]. TB is affecting all

sexes and age groups. Poverty is a risk factor for developing TB, which places Ethiopia as a high-risk environment. The country is one of the least developed in the world.

Age categories	Years						
	2008	2009	2010	2011	2012	2013	2014
1-5 years old	9 (3.08%)	11 (4.91%)	9 (3.69%)	6 (2.50%)	7 (3.04%)	9 (3.96%)	7 (3.23%)
6-20 years old	87 (29.79%)	68 (30.36%)	73 (29.92%)	97 (40.42%)	89 (38.70%)	88 (38.77%)	76 (35.02%)
21-40 years old	98 (33.56%)	91(40.63%)	95 (38.93%)	101 (42.08%)	73 (31.74%)	80 (35.24%)	80 (36.87%)
41-60 years old	74 (25.35%)	45 (20.08%)	60 (24.59%)	25 (10.42%)	42 (18.26%)	34 (14.98%)	33 (15.21%)
>60 years old	24 (8.22%)	9 (4.02%)	7 (2.87%)	11 (4.58%)	19 (8.26%)	16 (7.05%)	21 (9.67%)

**Table 2:** TB distribution among each age categories at Dilla Referral Hospital from 2008-2014 years.

## Conclusion

This study was focused on the Respondents background on TB disease their attitude, knowledge and facility requirements. On the other hand, this study was focused on assessing the prevalence of TB at Dilla Referral Hospital. As the results, majority of respondents of males 42 (26.58%) were thinks there were a better diagnosis and treatment facilities for TB at Dilla Referral Hospital, but least of the respondents of females 5 (3.16%) were think, there is less diagnosis and treatment facilities for TB at Dilla Referral Hospital. TB disease were predominated on males than females at Dilla Referral Hospital from 2008-2014 years and some of respondents calmed for predisposing factor which enhance for TB disease among them.

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