

# Assessment the Prevalence of Pulmonary Tuberculosis Patients at Yirga Cheffe Health Center from 2008-2013, Ethiopia

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**Abstract:** *Mycobacterium tuberculosis*, the causative agent of tuberculosis (TB), is one of the world's most devastating human pathogens that cause more than 2 million deaths annually. In addition, an estimated 2 billion people are latently infected with *M. tuberculosis*. Ethiopia is ranked 7<sup>th</sup> among TB burden shouldering countries in the world. The data collection was carried out typically by secondary data source from already recorded document. The data was obtained from the data clack of pulmonary tuberculosis patients (PTB) individuals at Yirga Cheffe Health Center. From a total of 1190 subjects who are registered to assessed for tuberculosis diseases at the Yirga Cheffe Health Center study sites, 676 (56.81 %) male were diagnosed followed by female 514 (43.19 %) were diseased by *Mycobacterium tuberculosis*. The PTB disease were highly predominant among male with increase slightly across the year from 2008-2013 and the highest were 58.75 % at 2013. The TB disease were increased among children from 2008-2013 in both sex (male and female). The highest percentage of pulmonary tuberculosis patients were observed at 2012 on male at age >49 with 10.18 % while on female pulmonary tuberculosis patients were observed at 2011 with 7.32 %. To conclude that the prevalence of PTB disease among both sex at study area were high in early. The pulmonary tuberculosis patients were decreased across the 2008-2013.

**Keywords:** Ethiopia, *Mycobacterium tuberculosis*, Pulmonary Tuberculosis Patients, TB, Yirga Cheffe Health Center

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## 1. Introduction

Tuberculosis (TB) is one of the leading infectious disease and health burden in the world (Dye et al., 1999). TB is a bacterial disease caused by *Mycobacterium tuberculosis* (and occasionally by *Mycobacterium bovis* and *Mycobacterium africanum*). The causative organism of tuberculosis, the tubercle bacillus, was isolated and described by Robert Koch in 1882. It is a fastidious, slow growing, lipid-rich, hydrophobic and acid fast bacterial rod shape which resists decolorization with acid alcohol. Tuberculosis is a mycobacterial infection that affects a wide range of mammals. Transmission occurs by airborne spread of infectious droplets. The source of infection is a person with TB of the lung who is coughing. Coughing produces tiny infectious droplets (droplet nuclei). One cough can produce 3,000 droplet nuclei. *M. tuberculosis* infects a third of the world's population. Human and bovine tuberculosis (TB and BTB respectively) share key aspects such as developing similar lesions and immune responses, which often result in colonization and

spread to the same organs, namely lungs and lymphatic tissues (Buddle et al., 2005; Cassidy, 2006; O'Reilly and Daborn, 1995; Van Rhijn et al., 2008). Bovine tuberculosis (BTB) is a chronic, granulomatous mycobacterial infectious disease caused mainly by *Mycobacterium bovis*, which is a member of *Mycobacterium tuberculosis* complex (MTC) Ayele et al., 2004; OIE, 2010).

Every year approximately 9 million people contract tuberculosis (TB) and close to 2 million die from the disease (World Health Organization, 2005). The most TB cases are in Asia, the highest incidence rates are in Africa where high rates of HIV and malnutrition weaken immune systems and accelerate the spread of the disease (World Health Organization, 2009). Consequently, the number of new TB cases in most African countries has more than quadrupled since 1990, with 2.8 million new TB cases and roughly 735 thousand deaths annually (World Health Organization, 2005). Worldwide in 1995 there were about 9 million new cases of TB with 3 million deaths. These deaths comprise 25% of all avoidable deaths in developing countries. 95% of TB cases

and 98% of TB deaths are in developing countries. 75% of TB cases in developing countries are in the economically productive age group (15-50 years).

Pulmonary TB features (Cough, fever, sweats, weight loss and haemoptysis) and extra-pulmonary lymphnode swelling (lymphadenitis) are leads that used in identifying diseases symptomatically. Apart from lung and lymphnode the disease can occur in any part of the body, including the meninges, bone and kidneys that land marks disseminated/miliary TB (Fitzgerald and Haas, 2005). In developing countries, animal TB is widely distributed where control measures are not applied or are applied sporadically (Cosivi et al., 1998). *Mycobacterium bovis* was isolated in numerous African countries from abattoir lesions and clinically suspected bovines and there seem to be an endemic state of bovine tuberculosis in some of these nations (Rigouts et al., 1996; Sulieman and Hamid, 2002; Oloya et al., 2007).

Drug resistance tuberculosis threatens the National Tuberculosis Control Programme in several countries, and the major problem is multidrug resistance TB (MDR-TB) (WHO/IUATLD, 2000). MDR-TB is defined as *M. tuberculosis* strains that are resistant to at least isoniazid and rifampicin, the two key first line drugs in short course TB-chemotherapy. Resistance to any single TB drug is close to 10% in all African countries surveyed (Aziz et al., 2006). The problem of drug resistant TB exists in different parts of Ethiopia, and data on patterns of resistance among Ethiopian isolates is ranging from 2%-21% for isoniazid, 2%-20% for streptomycin and 14%-15% for any of the drugs tested (Demissie et al., 1997; Abate, 2002; Bruchfeld et al., 2002). MDR-TB was also reported in about 1.2% of new cases and 12% of re-treatment cases (Abate, 2002). Little information is available in Ethiopia related to drug susceptibility assay on *M. tuberculosis* isolates from smear negative and culture positive sputum samples (Ejigu et al., 2008).

In Ethiopia, the incidence of TB is estimated at 359 new cases per 100,000 populations and the country is rated 7<sup>th</sup> among the 22 high burden countries (WHO, 2011). The situation is exacerbated by HIV co-infection, with approximately 20% of cases presenting with TB also co-infected with HIV (WHO, 2011). In Ethiopia, based on the detection of tuberculous lesions, condemnation of carcasses totally or partially is a standard practice for the control of zoonotic tuberculosis infections at abattoirs. Detection of tuberculous lesions in slaughterhouses takes place by

observation of the visible tuberculous lesions in infected cattle; however, the level of the quality of such practices may vary from place to place and/or abattoir to abattoir in the country. Among the undertaken abattoir studies, prevalence rate ranges from 3.5 to 5.8% (Ameni and Wudie, 2003; Teklul et al., 2004; Shitaye et al., 2006; Romha et al., 2013) have been reported in different abattoirs in the country.

The eastern part of Ethiopia is known for its high TB case load and anti-TB drugs have been in use for long time in the area before the implementation of directly observed treatment short course (Mitike et al., 1997). However, there is a paucity of data on prevalence in this part of the country. Therefore, this study was conducted to assess the prevalence of tuberculosis disease among pulmonary tuberculosis patients (PTB) at Yirga Cheffe Health Center in SNNPR, Ethiopia.

## 2. Materials and Methods

### 2.1. Study Area

The study was conducted at Yirga Cheffe Health Center in Dilla town surrounding, south of Addis Ababa and far from Addis Ababa was 395 km, in Gedeo zone, SNNPR. Study was conducted from March 2013 to June 2014 at Yirga Cheffe Health Center, South of Addis Ababa, Ethiopia.

### 2.2. Data Collection Technique

The data collection was carried out typically by secondary data source from already recorded document. The data was obtained from the data clack of pulmonary tuberculosis patients (PTB) individuals at Yirga Cheffe Health Center.

### 2.3. Data Analysis

Data were checked for completeness, cleaned manually and entered and analyzed using SPSS version 16 statistical package. Data were summarized using frequency tabular and graphical expression form through percentage.

### 2.4. Ethical Consideration

Ethical clearance was obtained from Dilla University, College of Natural and Computational Sciences, Department of Biology.

**Table 1.** The prevalence of PTB patients at Yirga Cheffe Health Center from 2008-2014, Ethiopia

Year	Sex	Age			Number of patients registered
		Children (0-14)	Young (15-49)	Old (>49)	
2008	Male	7 (3.14 %)	106 (47.53 %)	16 (7.17 %)	129 (57.85 %)
	Female	3 (1.35 %)	82 (36.77 %)	9 (4.04 %)	94 (42.15 %)
	Total	10 (4.49 %)	188 (84.30 %)	25 (11.21 %)	223 (100.00 %)
2009	Male	4 (1.83 %)	105 (47.95 %)	15 (6.85 %)	124 (56.63 %)
	Female	3 (1.36 %)	84 (38.36 %)	8 (3.65 %)	95 (43.37 %)
	Total	7 (3.19 %)	189 (86.31 %)	23 (10.50 %)	219 (100.00 %)
2010	Male	5 (2.31 %)	99 (45.84 %)	17 (7.87 %)	121 (56.01 %)
	Female	3 (1.39 %)	82 (37.96 %)	10 (4.63 %)	95 (43.98 %)
	Total	8 (3.70 %)	181 (83.80 %)	27 (12.50 %)	216 (100.00 %)

Year	Sex	Age			Number of patients registered
		Children (0-14)	Young (15-49)	Old (>49)	
2011	Male	7 (3.41 %)	93 (45.37 %)	15 (7.32 %)	115 (56.10 %)
	Female	4 (1.95 %)	73 (35.61 %)	13 (6.34 %)	90 (43.90 %)
	Total	11 (5.36 %)	166 (80.98 %)	28 (13.66 %)	205 (100.00 %)
2012	Male	4 (2.40 %)	72 (43.11 %)	17 (10.18 %)	93 (55.69 %)
	Female	4 (2.40 %)	65 (38.92 %)	5 (2.99 %)	74 (44.31 %)
	Total	8 (4.80 %)	137 (82.03 %)	22 (13.17 %)	167 (100.00 %)
2013	Male	9 (5.63 %)	74 (46.25 %)	11 (6.87 %)	94 (58.75 %)
	Female	7 (4.37 %)	54 (33.75 %)	5 (3.13 %)	66 (41.25 %)
	Total	16 (10.00 %)	128 (80.00 %)	16 (10.00 %)	160 (100.00 %)

### 3. Results and Discussion

From a total of 1190 subjects who are registered to assessed for tuberculosis diseases at the Yirga Cheffe Health Center study sites, 676 (56.81 %) males were diagnosed followed by females 514 (43.19 %) were diseased by *Mycobacterium tuberculosis*. Of the 223 PTB patients were 57.85 % males followed by females 42.15 %. In addition to this the young age classes were highly affected by PTB (84.30 %) from other age class in 2008 as indicted in the Table 1. The PTB were highly prevalent among Young age (15-49) than other age class like children and old in all study year 2008-2013 and also higher on males than females. Beside of this, in all study year the males were highly infected by *Mycobacterium tuberculosis* than the female age classes as shown in Table 1. As reported by Assam-Assam et al. (2011) that from a total of 756 subjects who presented clinical symptoms of tuberculosis at the hospital study sites, 154 (20.37%) were diagnosed positive by smear microscopy. They were 100 men (64.93%) and 54 women (35.07%). Patients' age distribution showed a steady decline in age-specific prevalence from 30.58% in age group 15-29 years to 15.51% in the age group above 60 years. Of the 154 patients, 32 (20.77%) were HIV positive; while 135 (87.66%) were new cases and 19 (12.33%) were old cases.

#### 3.1. Prevalence of PTB Disease Among both Sex Male and Female from 2008-2013 at Yirga Cheffe Health Center, Ethiopia

The PTB diseases were highly predominant among males with increase slightly across the year from 2008-2013 and the highest were 58.75 % at 2013. The highest PTB diseases 44.31 % were observed at 2012. The percentage of PTB patients among females were slightly decreased from 2008-2013 as indicated in figure 1. The majority of the patients were men (63.93%) and this was found to be in agreement with previous findings (Godfrey-Faussett et al., 2000). Tuberculosis is the most frequent cause of death from a single infectious disease in persons aged 15-49 years. About 8.4 million people develop active tuberculosis every year and 2.3 million die of it. 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 (Miller and Schieffelbein, 1998).

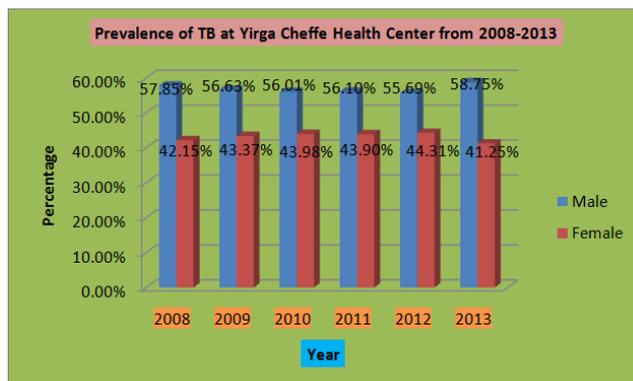


Figure 1. The prevalence of PTB disease among both sex male and female from 2008-2013 at Yirga Cheffe Health Center.

#### 3.2. Prevalence of PTB Disease Among Children Age (0-14) at Yirga Cheffe Health Center from 2008-2013, Ethiopia

The highest number of PTB patients of males diagnosed was observed among children at 2013 with percentage of 5.63 % and followed 3.41 % at 2011. The TB diseases were increased among children from 2008-2013 in both sex (male and female). The highest number of PTB patients of female was observed at 2013 with 4.37 % as shown the figure 2. As report presented at the 10<sup>th</sup> annual review meeting Tuberculosis and Leprosy Control Programmed (TLCP) Ethiopia (18 to 20 September 2002) showed that the incidence of tuberculosis was the increase (TLCP, 2002).

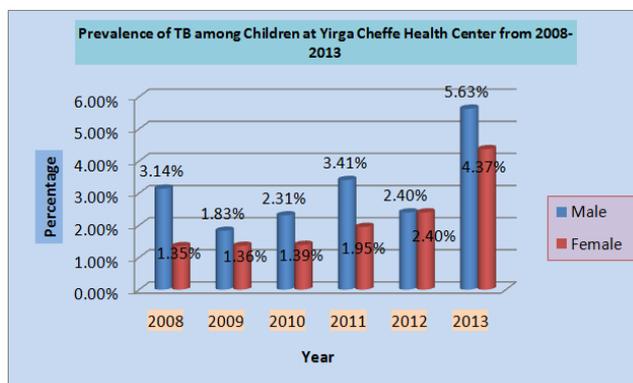


Figure 2. The prevalence of PTB disease among children age (0-14) at Yirga Cheffe Health Center from 2008-2013.

### 3.3. Prevalence of PTB Disease Among Young (15-49) Age at Yirga Cheffe Health Center from 2008-2013, Ethiopia

The highest percentage of PTB patients among males were 47.53 % in addition, the percentage of PTB patients males were relatively high than female across the year from 2008-2013. The percentage of both males and females PTB patients were slightly decreased from 2008-2013. Moreover, the highest percentage of PTB patients of females were observed at 2012 with 38.92 % as indicted in the figure 3. 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 10<sup>th</sup> among the 22 high burden countries (HBC) (WHO, 2003).

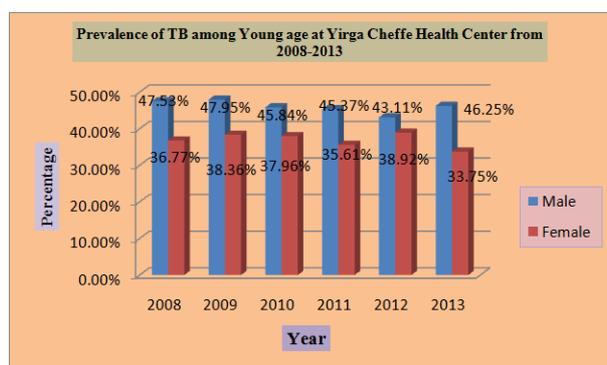


Figure 3. The prevalence of PTB disease among Young (15-49) age at Yirga Cheffe Health Center from 2008-2013.

### 3.4. Prevalence of PTB Disease Among Old Age >49 at Yirga Cheffe Health Center from 2008-2013, Ethiopia

The highest percentage of PTB patients were observed at 2012 on male with 10.18 % while on females PTB patients were observed at 2011 with 7.32 %. The prevalence of PTB disease among females were slightly decreased across the year from 2008-2013 except at 2012. In addition the percentage of PTB disease among the males across the year were decreases from 2008-2013 except at 2012 as indicted in figure 4. In most developing countries two third of the reported TB patients are men (WHO, 1998). Comparable results have been reported from Ghana (Hudelson, 1996).

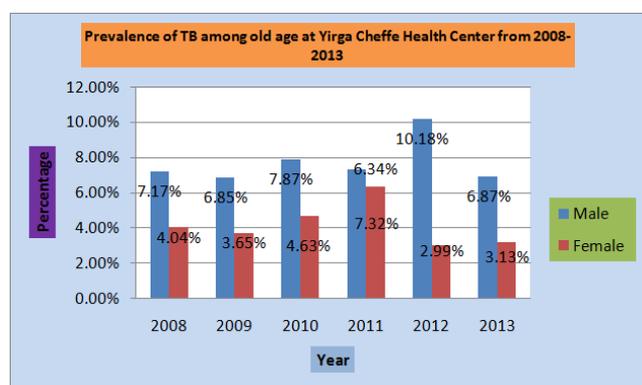


Figure 4. The prevalence of PTB disease among Old age >49 at Yirga Cheffe Health Center from 2008-2013.

## 4. Conclusion

The study revealed that the prevalence of PTB disease among both sex at study area were high in early. However, currently the distribution PTB disease among both males and females were slightly decrease across the year from 2008-2013.

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