EPIDEMIOLOGY OF TUBERCULOSIS: CURRENT STATUS IN DISTRICT DIR (LOWER) PAKISTAN

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Abstract- Among infectious diseases the Tuberculosis (TB) is one of the major causes of morbidity and mortality. The present study was carried out in district Dir (Lower) Khyber Pukhtoon Khwa Pakistan. The aim of the study was to find out the prevalence of TB among the local population in district Dir (L). A descriptive study was design. The data were collected from different hospitals located in different area of district Dir (L). The data were analyzed for area wise distribution, area wise comparison, gender wise distribution and comparison and age wise distribution. From January 2011 to December 2011 total 1332 sample populations were analyzed. Out of total samples the 513 (38.51%) were positive and 819 (61.49%) were found negative. The area wise distribution shows that the high number of TB cases was reported in Shamshi Khan (54.62%) where, the lowest cases were recorded in Chakdara (28.04%). The results show that the female (53.22%) are more infected than male (46.78%). The occurrence of high TB patients (24.37%) was recorded in age group 2: (>10-20 years) while the lowest of TB patients (3.7%) were recorded in age group 1: (0-10 years). From this study it was concluded that the TB is still prevalent in district Dir (L) and affect the most productive age group.
Key words: Tuberculosis, Prevalence, Morbidity, Mortality, Descriptive study.

1 INTRODUCTION

Even in the modern era the Tuberculosis (TB) remains a major global health problem especially in poor countries. During the last decade Tuberculosis has re-emerged as a devastating disease with a high morbidity and mortality. One of the most prevalent infections of human beings is TB and contributes high morbidity and mortality around the world. The TB starts in the lungs if untreated it can lead to spread to other parts of the body. TB is caused by the bacterium known as *Mycobacterium tuberculosis (M. tuberculosis)* also known as Bacillus tubercle and was reported by first time by Robert Koch in 1882. General symptoms of TB are Cough (sometimes blood in the sputum), chest pain, breathlessness, night sweats, fatigue, chills and loss of appetite [1, 2, 3].

M. tuberculosis is gram positive, non-motile, non-spore forming, non-capsule forming, thin rods, usually straight or slightly curved. The genome of *Mycobacterium tuberculosis* has a high content (61-71 %) of guanine (G) plus cytosine (C). *M. tuberculosis* is a slow growing obligate aerobe and takes 16-20 hours for its division. The *M. tuberculosis* is an acid-fast bacterium is not stained with regular laboratory stains such as Gram stain, requiring specialized procedures known as Ziehl-Nielson's stain [4]. *M. tuberculosis* has a thick, waxy coat and the envelope of contains typical polypeptide layer. The waxy appearance and impermeability of envelope is due to contain the complex fatty acid such mycolic acid. The waxy coat has several functions such as hydrophobicity, acid fastness, resistance to injury and antibiotics. The Bacillus Calmette Guerin (BCG) vaccine protects against severe childhood forms of the disease but the BCG vaccine fails to protect against adult pulmonary TB in those countries in which the tuberculosis is endemic [4].

There are some major factors which increase the incidence of TB like socioeconomic condition, HIV epidemic, poor living standard , demographic change and inadequate attention to TB in health policies. The transmission of disease from

mother to child is a common phenomena because siblings in a joint family system [5]. *M. tuberculosis* virtually transmitted from person to person, usually by mucous droplets i.e. cough, sneezes, laugh, sings or even breath. The size of particles are an estimated 1–5 mm, for prolonged time periods normal air currents can keep them airborne and spread them throughout a room or building. When a susceptible person inhales droplet nuclei containing *Mycobacterium tuberculosis* Infection occurs and these droplet nuclei traverse the mouth or nasal passages reach to the alveoli of the lungs [6]. Directly Observed Treatment short-course (DOTS) was launched in 1994. The purposes of DOTS are case detection, regular drug supply, standard short-course therapy, and monitoring and evaluating the programmed. In 2003 globally the case detection rate is increased from 45% to 65%. In 2009, the treatment success rate of DOTS is 87% [7, 8].

About one-third of all people in the world are currently carriers of TB. Every second someone in the world is infected with TB. In 1993, the World Health Organization (WHO) declared TB a global public health emergency. Among the infectious diseases the TB as the second leading cause of death after the human immunodeficiency virus (HIV) worldwide. 95%, cases of TB occur in developing countries where few resources are available to ensure proper treatment and where the HIV infection might be common. Between 19-43% of the world population is infected with *M. tuberculosis* [9, 10, 11].

In each year an average 9 million people are infected with active TB disease. In 2008, 9.2 million new cases and 1.7 million deaths from TB (of which 0.7 million cases with HIV and 0.2 million deaths were in HIV positive patient) were recorded [7]. In 2009, 9.4 million new cases of TB occurred along with 1.7 million deaths from the TB. In 2010, an estimated 12 million people were living with active TB with 8.8 million new cases and 1.4 million TB-related deaths were recorded [8]. According to WHO, 1.4 million TB deaths (990 000 among HIV negative people and 430 000 HIV-associated TB deaths) reported in 2011. In 2010 the high numbers of cases are recorded in Asia 59% followed by Africa 26%, Eastern Mediterranean Region 7%, Europe 5% and Americas 3% [8].

In the developing countries like Pakistan tuberculosis is one of the major causes of morbidity and mortality. In Pakistan the fourth major cause of all deaths is considered to be Tuberculosis. Pakistan has ranked at 6 among those nations that account for more than 50% of TB cases worldwide. In the developed countries the Tuberculosis recurrence is uncommon. The increase of TB in young adult is due to disinformation of healthcare personnel. The lack of proper diagnostic and therapeutic approaches in nursing homes and/or support houses unavailability of laboratory facilities to diagnose TB [12, 13].

2 OBJECTIVES

The aim of the present investigation were, to aware the people about the causes and consequences of TB and find out the prevalence of TB among the local population of district Dir (L). The ratio of the occurrence of TB is based on parameter like area, sex and age. The result of the present investigation would be very helpful to determine the important of TB among different age group and future prospect of study to control the TB in district Dir (L) with a suitable targeted achievement.

3 MATERIALS AND METHODS

3.1 Study area

The present study was conducted in district Dir (L) Khyber Pukhtoon Khwa Pakistan. In the east of Dir (L) is the district of Swat, in the northwest district Chitral, in the south Malakand Agency while in the west lies Afghanistan. According to 2010 census report the population of Dir (L) 1,074,401 with an area of 1585 kilometer square.

3.2 Study design

A descriptive study was design.

3.3 Data collection and duration

The data has been collected from Hospitals located in different area of district Dir (L). A design standard performa were used for the collection of data include, date of entry, sex, age and address of patients. The data were collected during the period of January 2011 to December 2011.

3.4 Hospitals

The hospitals include District Head Quarter (DHQ) Timergara, Tehsil Head Quarter (THQ) Chakdara, Tehsil Head Quarter (THQ) Samar Bagh, Rural Health Center (RHC) Lal Qilla, Rural Health Center (RHC) Munda, Rural Health Center (RHC) Shamshi Khan and Rural Health Center (RHC) Gul Abad.

3.5 Inclusion and exclusion

All the patients were come with common symptom like coughing, sneezing, chest pain etc. For the confirmation of TB the sputum microscopy was done.

3.6 Analysis of data

The data were analyzed for area wise distribution, area wise comparison, gender wise distribution and comparison and age wise distribution.

4 RESULTS AND DISCUSSION

The current study was approved by the ethical authority of respective hospitals working under the supervision of Government of Pakistan. In the present study total 1332 sample populations were analyzed from January 2011 to December 2011. Out of total samples the 513 (38.51%) were positive and 819 (61.49%) were found negative.

4.1 Area wise distribution of positive cases

For the current study, seven different areas (Timergara, Chakdara, Samar Bagh, Shamshi Khan, Lal Qilla, Munda and Gul Abad) of district Dir (L) were included. The analysis of the data showed that Shamshi Khan was the major area affected by TB as maximum numbers of cases were recorded there. Out of total of the 119 registered cases of the area, 65 (54.62%) were found to be positive. This was followed by Lal Qilla with 85 positive out of 175 of the total registered cases (48.58%), Munda with 66 positive out of 143 of the total registered cases (46.15%), Gul Abad with 21 positive out of 56 of the total registered cases (37.5%), Timergara with 136 positive out of 373 of the total registered cases (36.46%), Samar Bagh with 80 positive out of 252 of the total registered cases (31.75%) and Chakdara with 60 positive out of 214 of the total registered cases (28.04%) as shown in figure 1.
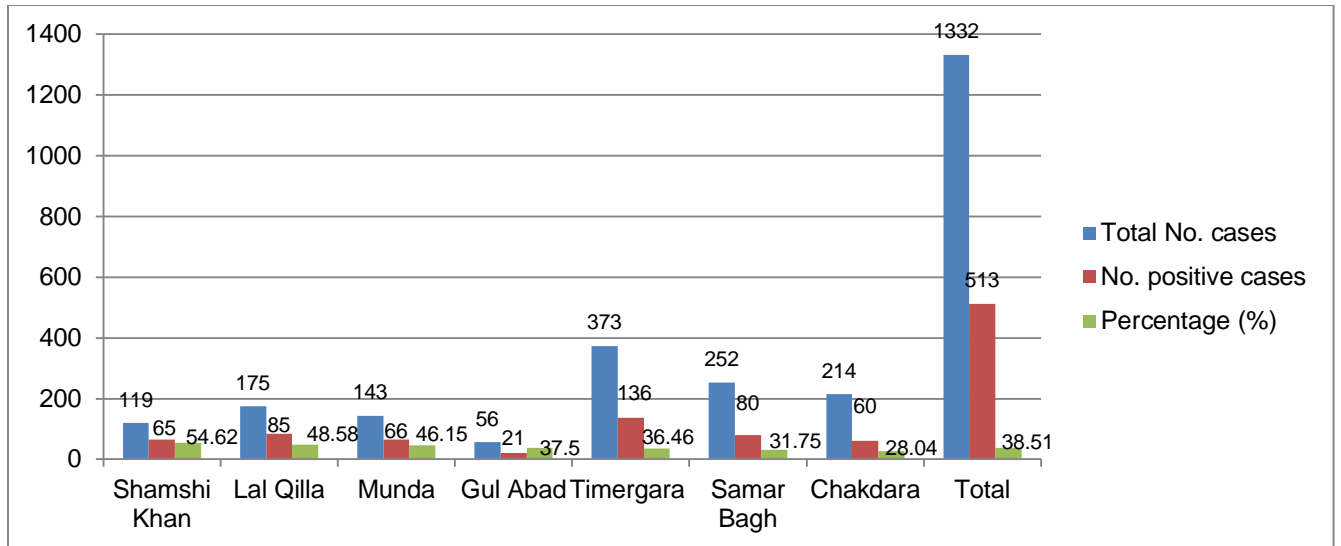
Figure 1: Area wise distribution of positive cases of TB in different area of Dir (L)

4.2 Area wise comparisons

When the obtained data were analyzed for the area wise comparison and contribution of total TB positive cases in district Dir (L), it was found that out of the total of 513 positive cases, 136 (26.51%) were from Timergara, followed by Lal Qilla 85 cases (16.57%), Samar Bagh 80 (15.6%), Munda 66 cases (12.86%), Shamshi Khan 65 cases (12.67%), Chakdara 60 cases (11.7%) and Gul Abad 21 cases (4.1%) as shown in figure 2.
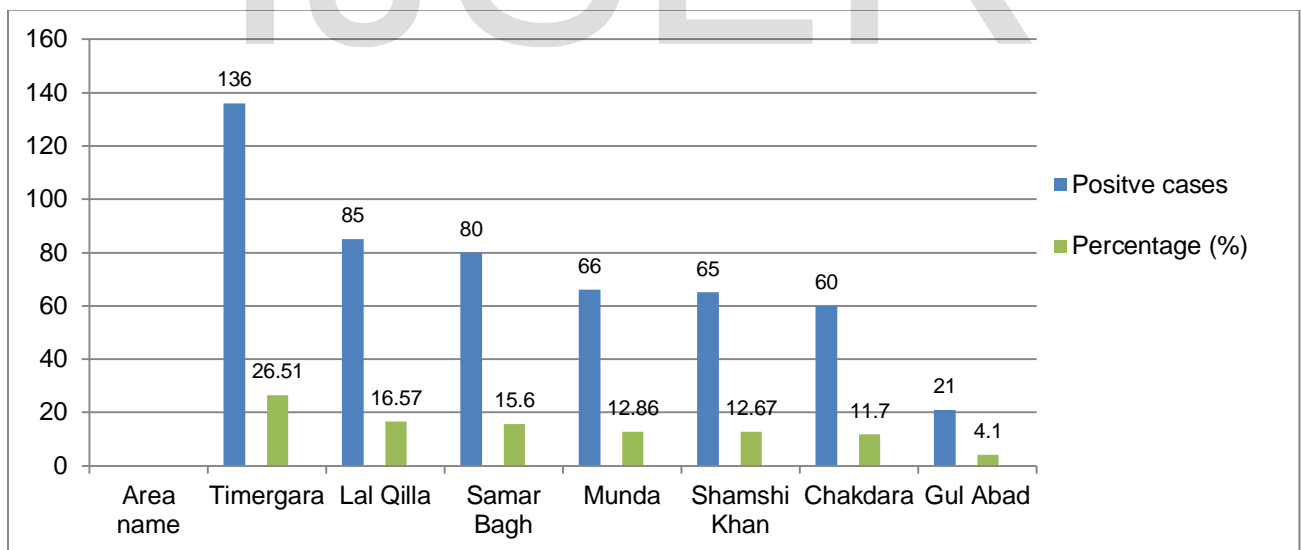

Figure 2: Area wise comparison of TB patients in different area of Dir (L)

4.3 Gender wise distribution and comparison

In the present investigation it has been found that the overall tendency to get TB was higher in female population (of the area included in our study) as compared to male population and the recorded ratio of occurrence was 53.22% (273/513) and 46.78% (240/513) respectively (Table: 2). In Gul Abad the ratio of female TB patient was very high (81%) as compared to male (19%) followed by Chakdara female with (61.67%) and male with (38.33%), Munda female with (59%) and male with (41%), Timergara female with (54.41%) and male with (45.59%), Lal Qilla female with (51.76%) and male with (48.24%), Samar Bagh female with (42.5%) and male with (57.5%) and Shamshi Khan female with (40%) and male with (60%) (Figure: 3).
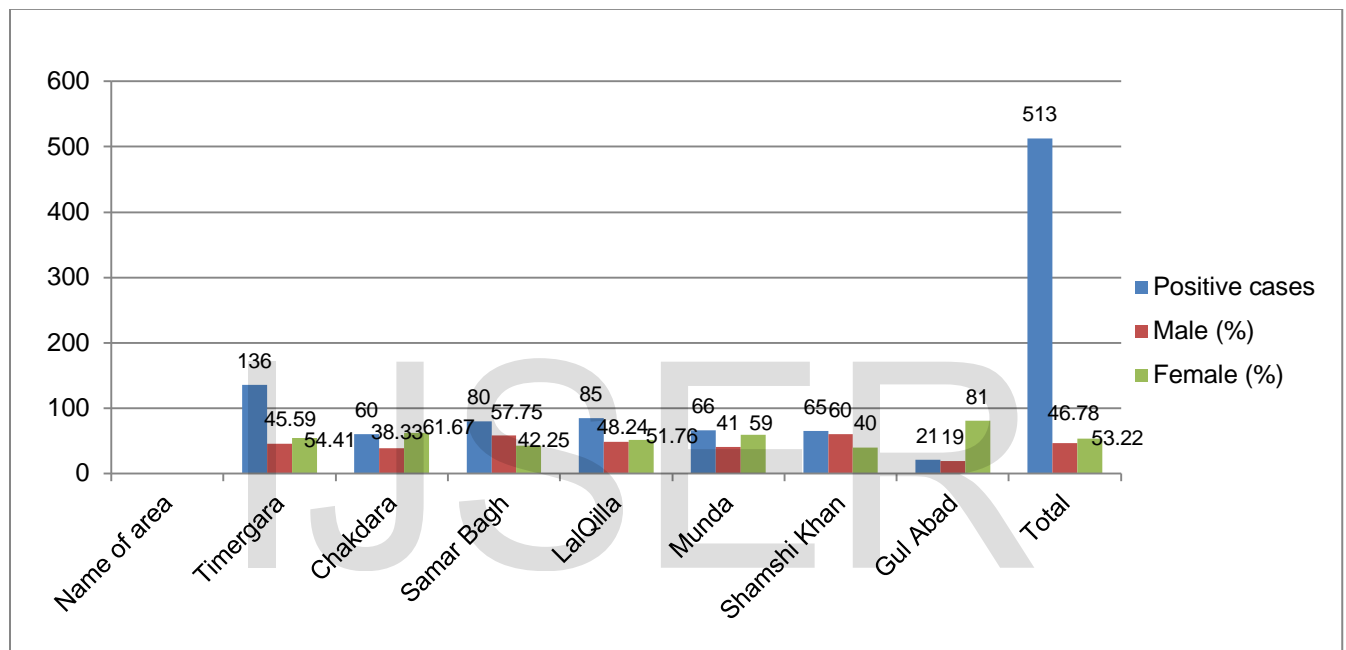

Figure 3: Gender wise distribution of positive TB patient in different area of Dir (L)

4.4 Age wise distribution

Occurrence of TB among different age groups was also analyzed. Local population was divided in to seven different groups as follows group 1: 0-10 years, group 2: >10-20, group 3:>20-30, group 4: >30-40,group 5: >40-50, group 6: >50-60 and group 7: >60. It was found that the percentage of occurrence of TB is quite uniform (Figure: 4).

Maximum number of TB patient 24.37% were in age group 2: (>10-20 years), followed by 19.5% in age group 3: (>20-30 years), 15.2% in age group 4: (>30-40 years), 14.42% in age group 7: (>60 years), 12.87% in age group 5: (>40-50 years), 9.94% in age group 6: (>50-60 years) and 3.7% were in age group 1: (0-10 years) as shown in figure 4.

In Timergara maximum number of TB patient 30.89% were in age group 2: (>10-20 years), followed by 24.26% in age group 3: (>20-30 years), 15.44% in age group 4: (>30-40 years), 14.7% in age group 7: (>60 years), 8.82% in age group 5: (>40-50 years), 4.41% in age group 6: (>50-60 years) and were 1.48% in age group 1: (0-10 years).

In Chakdara maximum number of TB patient 23.33% were in age group 2: (>10-20 years), followed by 18.34% in age group 6: (>50-60 years), 13.33% in age group 5: (>30-40 years) and in age group 7: (>30-40 years), 11.67% in age group 1: (0-10 years) and age group 3: (>20-30 years) and 8.33% were in age group 4: (30-40 years).

In Samar Bagh maximum number of TB patient 25% were in age group 4: (>30-40 years), followed by 22.5% in age group 2: (>10-20 years), 15% in age group 6: (>50-60 years), 13.75% in age group 5: (>40-50 years), 12.5% in age group 7: (>60 years), 8.5% in age group 3: (>20-30 years) and 2.5% were in age group 1: (0-10 years).

In Lal Qilla maximum number of TB patient 23.53% were in age group 2: (>10-20 years) and age group 7: (>60 years), followed by 17.64% in age group 3: (>20-30 years), 16.48% in age group 5: (>40-50 years), 10.59% in age group 6: (>50-60 years) 7.05% in age group 4: (>30-40 years) and 1.18% were in age group 1: (0-10 years).

In Munda maximum number of TB patient 24.24% were in age group 3: (>20-30 years), followed by 18.18% in age group 2: (>10-20 years), 15.15% in age group 4: (>30-40 years) and age group 5: (>40-50 years) and 13.64% were in age group 6: (>50-60 years) and age group 7: (>60 years).

In Shamshi Khan maximum number of TB patient 24.62% were in age group 3: (>20-30 years), followed by 21.54% in age group 2: (>10-20 years), 16.92% in age group 4: (>30-40 years), 13.85% in age group 5: (>40-50 years), 9.23% in age group 5: (0-10 years) and age group 7: (>60 years) and 4.61% were in age group 6: (>50-60 years).

In Gul Abad maximum number of TB patient 28.57% were in age group 3: (>20-30 years), followed by 23.81% in age group 2: (>10-20 years) and age group 4: (>30-40 years), 9.53% in age group 5: (>40-50 years) and 4.76% were in age group 1: (0-10 years), age group 6: (>50-60 years) and age group 7: (>60 years).
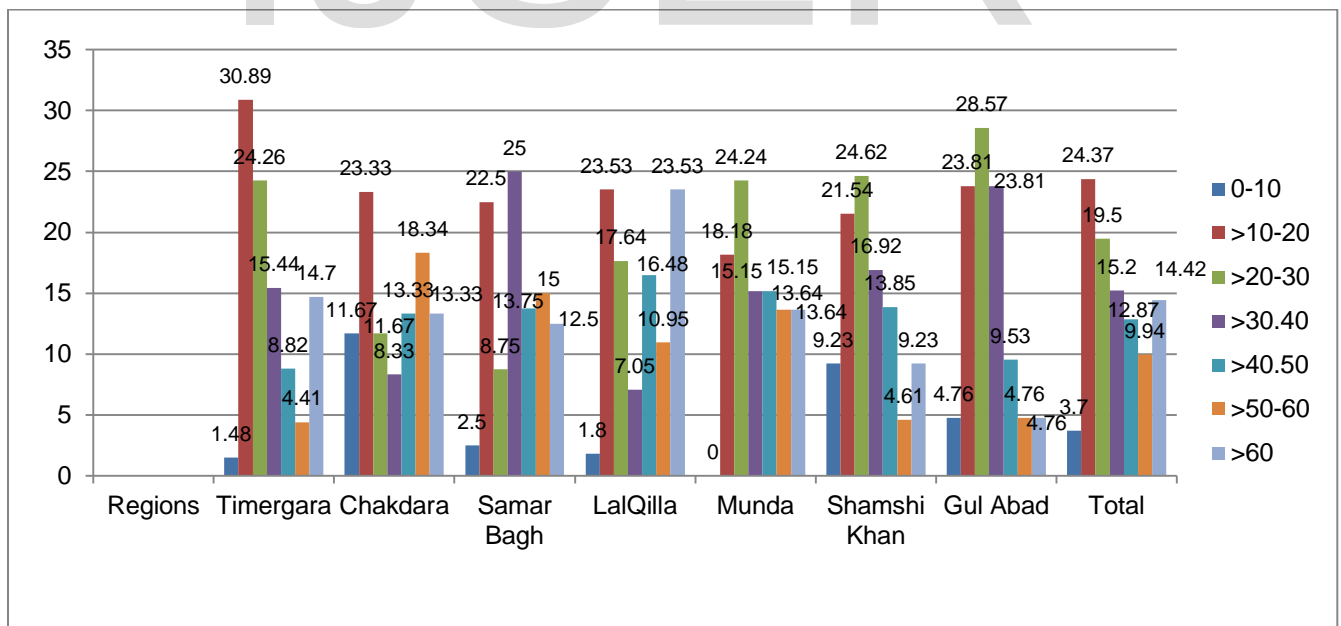

Figure 4: Age wise distribution of positive cases in different area of district Dir (L)

Out of the total 1332 cases the 513 (38.51%) were positive for TB. The finding of our study is comparable with Sultan *et al.,* [14] reported 32.02% positive cases in the local population of Peshawar Pakistan. The present study shows that the overall tendency to get TB is high in female 53.22% as compared to male in district Dir (L). In this study is in line with other study Sultan *et al.,* [14] recorded high number of TB cases in female population as compare to male population. The areas of Dir (L) shows different ratio of occurrence. In Gul Abad the 81% cases were recorded in female while the 19% were recorded in male. The possible reason for high number of cases in this area ignorance of disease, lack of knowledge regarding disease, social exclusion, no proper medical facility and poverty are the major factor contributing the spread of disease.

In Shamshi Khan the high number of cases is recorded in male 60% as compared to female. The result is similar with Tauseef *et al.,* [15] reported 58.82% cases of TB in male population of Chakdara Town Pakistan. According to Cailhol *et al.,* [16] the occurrence of TB is high in male population as compare to female. The finding of our study is also comparable with that of Chadha, [17]. The possible reason for highest ratio for occurrence of TB in male are, ignorance, no early medical care, left the treatment before the completion and poverty.

The maximum number of TB patients were found between the age of >10-20 years (24.37%) while the lowest were recorded in age of 0-10 years (3.7%). The percentage of positive cases between >10-40 years was 59.06% and between >10-60 years is 81.87%. The result is similar with Muhammad & Saba, [18] 84% patients belong to age group 15-64 years. The result of the current study is similar with Muhammad *et al.,* [19] reported 64.1% between 16-45 years and 84.4% between 16-60 years. The finding of our study is also agreement with Tauseef *et al.,* [15] 71.42% in age group 21-40 years while the 75% in age group 41-60 years. Decreasing the prevalence of TB Case finding and accurate treatment are the main steps [20].

5 CONCLUSIONS

From the present study it was concluded that the TB is still prevalent in district Dir (L). In some area of the district Dir (L) the incidence is too much high as compare to overall. The TB affected mostly the significant and productive age group of the local population of district Dir (L). The female are more susceptible to get TB is compare to male. For the control of TB case detection and treatment as well as the proper management should need to those area where the TB incidence is higher.

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