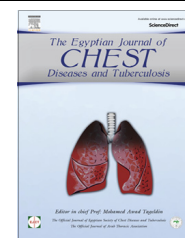




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## ORIGINAL ARTICLE

# Prevalence of sputum smear positive pulmonary tuberculosis at Dargai, District Malakand, Pakistan: A four year retrospective study



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### KEYWORDS

Tuberculosis;  
 Retrospective study;  
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**Abstract** Tuberculosis (TB) is an ancient disease however, poses serious challenge in the modern era in developing as well as developed countries. Every year millions of peoples are infected with TB and millions of peoples lose their lives. This study was undertaken to determine the prevalence of pulmonary tuberculosis sputum smear positive (PTB-SS+ve) among the suspected TB patients at Tehsil Head Quarter (THQ) Hospital Dargai, District Malakand Khyber Pakhtunkhwa, Pakistan. A retrospective study was designed from January 2011 to December 2014. Out of 736 registered and suspected patients of TB, (40.08%) were PTB-SS+ve, (15.63%) were PTB-SS–ve whereas the remaining cases were diagnosed with extra-pulmonary TB, hence excluded from the study. The ratio of PTB-SS+ve cases was higher in females (57.63%) compared to males (42.37%). Furthermore, in the age group <20 years PTB-SS+ve cases were (34.92%), in 21–40 years it was (33.90%), and in 41–60 years it was (21.35%), and in >60 years age group PTB-SS+ve cases were (9.83%). No difference was found in the years 2013 and 2014 regarding PTB-SS+ve cases registration. PTB still presents a serious health issue in the region and rapid prophylactic measures are needed to eradicate the issue.

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### Introduction

Infection of Tuberculosis (TB) occurs when someone inhales the droplet nuclei containing the tubercle bacilli which reach the alveoli of the lungs. Ingestion of these tubercle bacilli is done by the alveolar macrophages and the majority are destroyed or inhibited. However when the macrophages died the remaining

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small number of tubercle bacilli may multiply intracellularly. The transportation of the bacilli to more distant tissue and organ occurred through lymphatic channel or through the blood stream. The body immune cell macrophages ingest the bacilli within 2–8 weeks and form a barrier shell around the bacilli known as granuloma. The granuloma keeps the bacilli under control. If the immune system cannot keep the bacilli under control, as a result the multiplication of the bacilli can take place and spread the infection in the body such as lungs, brain, kidney etc [1–2].

Mostly the MTB caused infection of the lungs is known as PTB. The common symptom of the PTB are prolonged cough lasting more than 2 weeks, night sweat, moderate fever, anorexia, haemoptysis (blood in sputum) and weight loss [3].

In the year 2013, worldwide 9 million peoples were infected with TB. In addition, 1.1 million cases of TB were notified in those patients who are HIV positive. The overall deaths due to TB infection were reported to be 1.5 million in 2013. Hence in the same 360,000 deaths were recorded in HIV positive. Overall 510,000 women died from TB in 2013 with 180,000 women HIV positive. The ratio of occurrence of TB in children was reported to be 555,000 in 2013. Hence HIV negative children who died from TB were 80,000 in the same year [4].

## Materials and methods

### Aim of the study

Aim of the current research was to determine the prevalence and distribution on the basis of gender and age of PTB-SS +ve cases at THQ Hospital Dargai.

### Study design

The current study was conducted in the period from January 2011 to December 2014 at Dargai, District Malakand. A retrospective nature study was designed.

### Patient registration and microscopy

A total of 736 patients were enrolled in the study period comprising 344 (46.74%) males and 392 (53.26%) females. Of the total cases 295 (40.08%) were PTB-SS +ve, 115 (15.63%) were PTB-SS–ve and 326 (44.29%) were EPTB. All the suspected patients had come with common symptoms i.e. prolong cough, night sweat, moderate fever, chest pain etc. For the suspected patients of PTB the sputum smear microscopy was performed.

Those with positive sputum smear were considered PTB-SS +ve case while the rest of the patients were excluded.

### Collection of data and descriptive analysis

The data were collected from the TB center of THQ Hospital Dargai. Demographic information of the patients was also recorded. The obtained data of PTB-SS +ve were further analyzed to check the disease for the gender wise, age wise and year wise analysis.

### Limitation of the study

In the current study only the sputum smear microscopy was performed. Hence no culture or other test was performed. Therefore we cannot assume the degree of latent/asymptomatic TB infection. Hence further studies are recommended.

### Ethical consideration

The study was approved by the ethical research committee Advanced Studies and Research Board of Hazara University Mansehra and prior permission was taken from THQ Hospital Dargai during accessing of data.

## Results

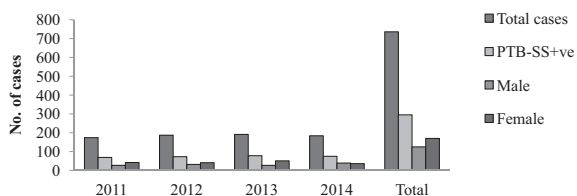
In the current study a total of 736 patients of TB were registered at THQ Hospital Dargai and the male to female ratio was 46.74% and 53.26% respectively. The high No. of patients were registered during 2013 while the lowest in 2011. On the basis of percentage high prevalence of PTB-SS +ve was recorded in 2013 while almost similar ratio was also reported in 2014. Overall prevalence of PTB-SS +ve was notified to be 40.08%. Of the total 55.71% suspected cases of PTB 40.08% were found smear positive while 15.63% were negative. High cases of smear positive was reported in female 57.63% while in case of smear negative the male individuals was high as compare to female (Table 1 and Fig. 1).

### Age wise distribution of PTB-SS +ve cases

Age wise analysis of the data shows that the high No. of cases 34.92% was recorded in age groups 0–20 years. Furthermore almost same No. of cases 33.90% was also notified in the most productive and economically age group 21–40 years. While in age group 41–60 years 21.35% and above 60 years 9.83% cases were reported (Table 2 and Fig. 2).

**Table 1** Gender wise distribution of registered suspected PTB patients at Dargai, n (%).

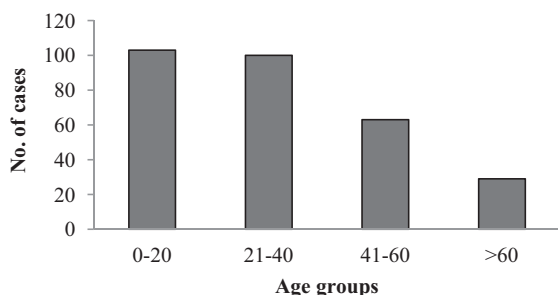
Year	Frequency distribution of PTB-SS +ve cases				PTB-SS–ve cases		
	Total cases	PTB SS +ve	Male	Female	PTB SS–ve	Male	Female
2011	174	69 (37.5)	27 (39.13)	42 (60.87)	29 (16.67)	18 (62.07)	11 (37.93)
2012	187	73 (39.04)	32 (43.84)	41 (56.16)	33 (17.65)	15 (45.45)	18 (54.55)
2013	191	78 (40.84)	27 (34.62)	51 (65.38)	28 (14.66)	15 (53.57)	13 (46.43)
2014	184	75 (40.76)	39 (52)	36 (48)	25 (13.59)	13 (52)	12 (48)
Total	736	295 (40.08)	125 (42.37)	170 (57.63)	115 (15.63)	61 (53.04)	54 (46.96)



**Figure 1** Gender wise distribution of PTB-SS+ve patients at Dargai.

**Table 2** Age wise distribution of PTB-SS+ve patients, n (%).

Year	Age groups (years)				Total
	0–20	21–40	41–60	> 60	
2011	24	19	19	7	69
2012	26	29	14	4	73
2013	29	30	14	5	78
2014	24	22	16	13	75
Total	103 (34.92)	100 (33.90)	63 (21.35)	29 (9.83)	295 (40.08)



**Figure 2** Age wise frequency of PTB-SS+ve cases at Dargai.

## Discussions

In Pakistan, the estimated incidence of all types of TB in 2011 was 231 per 100,000 populations with 64% cases detection rate for all types of TB [5]. In 2014, the estimated TB prevalence was notified 342 per 100,000 populations in Pakistan, an incidence of 275 per 100,000 populations. The case detection rate for all types of TB are 58% while in 2014, 298446 cases were reported in the country [6].

The accurate information as well as the data required on the incidence and prevalence of TB is necessary for the effective TB control program. In this study the prevalence of PTB-SS+ve cases was determined to provide the baseline epidemiological information for population living in Dargai District Malakand, Khyber Pakhtunkhwa as well as for the National Tuberculosis Control Programme (NTP). The results of the current study will be very helpful to control and eradicate the disease. The epidemiological study/research is very important for the preventive planning of TB [7].

In our study among the total registered TB patients 40.08% were PTB-SS+ve and 15.63% were PTB-SS-ve. In our study

the overall prevalence of PTB-SS+ve was notified high which corroborate with other studies who also reported high prevalence of PTB-SS+ve [8–9]. Ahmad et al. [8] notified 44.41% prevalence of PTB in District Lower Dir.

In our study the sputum smear positivity rate was slightly high from the reported cases in 2011 in Pakistan. A report published by WHO shows that in Pakistan a total of 270,394 TB cases were notified, among the total notified cases 105,733 (39.10%) were sputum smear positive and 103,824 (38.40%) were sputum smear negative [10].

In term of incidence and prevalence of PTB both gender and age are traditionally known as variables. The gender disparity is such an indicator which brings the attention to both male and female. On gender basis the disease was recorded high in female than in male patients. In female the disease burden was 57.63% while on the other hand 42.37% male were diagnosed smear positive for PTB. The finding of our study is similar with others studies that reported high prevalence of TB in female population [8,11–23]. A slight increase was observed in the year wise prevalence of PTB-SS+ve.

Why are the females more prone to progression of the disease? Because the females are more immune deficient [24]. A study conducted by Long and his team in Vietnam reported that women waited nearly twice as long to visit the hospital or health care center from the onset of cough when compare to men [25]. In some cases the women also neglected their illness as a result they became too sick and disease progressed rapidly [26]. Delay in the diagnosis and treatment of TB increases the death rate and easily spreads the disease to healthy individuals. Despite the presence of TB diagnoses badly damaging women because socially the stigma of having TB more fall heavily on women as compare to men. Even in some communities the presence of TB infection in women may force them to divorce, if unmarried create difficulties to find a life partner [27].

In many communities the women engage in work outside the home working in the domestic or agriculture sector providing necessary household income. The presence of TB in women leads to a loss of work and income [28].

Age is an important aspect in epidemiology of TB. On age basis the high prevalence of 34.92% was recorded in age 0–20 years. A study conducted by Ayaz et al. [22] in Peshawar Khyber Pakhtunkhwa recorded a high prevalence of 68.96% in age 10–20 years. In the current study the disease burden was also notified high in age 21–40 years. Our results is in line with the finding of others who reported high No. of cases in the productive and most economically important age groups [29–31]. Ahmad et al. [8] reported 39.69% cases smear positive PTB in age 15–34 years in District Lower Dir. Another study conducted by Chattu et al. [21] at Regional TB center in Buraidah Central Hospital Qassim reported high No. of cases 43.3% in age between 16 and 30 years. In Nigeria a study carried out by Ibn et al. (2012), also reported a high No. of TB cases 49.5% in the productive and economically important age 16–35 years. WHO set a Millennium Development Goal (MDG) to stop the progression of the disease and reduce the incidence of TB epidemic by 2015 and eliminate the disease from the surface of the globe by 2050. Since 1990, the prevalence and mortality of the disease is decreased more than 50% [10].

## Conclusions and recommendations

Of the total cases the prevalence of PTB-SS +ve was reported high at Dargai. Maximum cases of PTB-SS +ve were noticed in female's patients of Dargai where majority of the cases were collectively recorded in age 0–40 years. Further research is recommended to explore the epidemiology, barrier to access health care center and provide the health care facility at door step.

## Financial support and conflict of interest

No financial support was received for the current study and conflict of interest about this paper was declared none.

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