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Frequency of Sputum Smear Positive Tuberculosis at District Bannu Khyber Pakhtunkhwa, Pakistan

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Abstract

Objective: To measure the frequency of sputum smear positive tuberculosis in District Bannu, Khyber Pakhtunkhwa, Pakistan.
Material and Methods: This is a cross-sectional study on patients referred to DHQ Hospital, District Bannu for the purpose of measuring the prevalence of Khyber Pakhtunkhwa, Pakistan. The study was conducted from October 2018 to October 2019. There were 200 sputum samples subjected to the ZN stain microscopy method for AFB. All the sputum samples were collected in sterile (wide mouth) 10 ml bottles and were homogenized and decontaminated by using 4% Sodium Hydroxide (NaOH) in an equal quantity to that of the sample and mixed for 10 minutes at room temperature. The mixture was centrifuged at 3,000 rpm for 05 minutes and smears were prepared, dried in the air and stained with Ziehl Neelsen stain.
Results: In this study, a total of 200 sputum smear samples were processed for Acid fast Bacilli, Females were 115 (57.5%) and males were 85 (42.5%). Out of 200 samples, 57 samples were positive for tuberculosis. 57/200 (28.5%). In these positive samples, females were 34/57(59.65) and males were 23/57 (40.35%). Out of 57/200 (28.5%) tuberculosis positive patients, 15 (26.3%) were aged 20--40 years, 20 (35.0%) were age 40--60 years, while 22 (38.5%) were age > 60 years. Out of 57/200 (28.5%) tuberculosis patients, 40/57(70%) were in rural area while in urban area patient were 17/57 (30%).
Conclusion: This study shows an important frequency rate of sputum smear positive tuberculosis in district of Bannu. Both groups (sex and age) influenced the frequency of tuberculosis. Females demonstrated high rate of frequency than males. Age group of 40-60 years and up to 60 years demonstrated a higher frequency rate in tuberculosis. High prevalence is noted in rural areas as compared to urban.
Key words: Mycobacterium tuberculosis, Ziehl Neelsen staining, prevalence, pulmonary tuberculosis.

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Introduction

Mycobacterium Tuberculosis causes pulmonary tuberculosis. [1] Symptomized by fever, hacking, night sweat, chest torment and weight reduction.[2] World Health Organization (WHO) revealed that 6.4 million new cases of tuberculosis worldwide in 2017. [3]

An estimated 54 million lives were saved through the effective treatment of patients with TB over the period 2007-2017 overall. [3] WHO pronounced TB a worldwide crisis in 1993,[4] what's more, embraced a directly observed treatment short course strategy (DOTs) to treat patients with TB. The stop TB system was started in 2006.[5] It expands on the DOTs methodology and has the objective to kill TB as general medical condition by 2050 (low to 1 case per million populations). during 2014-2015, all part of WHO and the united nations collectively supported WHO end TB methodology, and took on the united countries reasonable advancement objectives, which indicate endemics of the TB scourge by 2030.[3] The objective of the TB system is to diminish mortality brought about by TB by 35% and rate of the sickness by 20% in 2020 compared with the pervasiveness pace of the disease in 2015.[3] The end TB methodology target 2030 is a 90% decrease in TB passing and an 80% decrease in TB occurrence rate, while the target

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2035 is a 95% decrease in TB passing and a 90% decrease in TB rate, compared to 2015 levels, and thus to end the global TB scourge.[3] The end TB system achievements for 2020 and 2025 must be accomplished through, first, giving widespread wellbeing inclusion and second multisectorial activity to address the social and monetary variables responsible for TB epidemics.[3]

Pakistan has a 5% prevalence on a national level and among the thirty (30) high burden of tuberculosis, Pakistan has on 5th position.[3] which represents 87% of TB cases overall.[3,6]

Materials and Methods

The study was conducted at District Bannu with FR Bannu from July 2020 to July 2021. Non-Probability Random sampling technique was used. The patients referred to DHQ Hospital, District Bannu for the purpose to measure the Frequency of Tuberculosis at District Bannu with FR Areas.

Inclusion criteria: All patients of any age and sex having chronic productive prolong coughing approximately more than 21 days with temperature, appetite loss, weight decreases, evening sweating with chest pain were included in this study.

Exclusion criteria: Patients with other chronic illnesses like malignancy, Asthma etc were excluded from this study.

All the Sputum samples were collected in sterile (wide mouth) 10 ml bottle, 1st morning samples were collected by deep coughing, patients were directed to collect three days consecutive sputum samples, deliver to lab and were immediately processed.

Sputum Samples received are stained by Ziehl Neelsen staining method in DHQ Hospital, Bannu and observe under microscope for Acid fast bacilli. Sputum Smear Microscopy is the efficient method of diagnosis TB, Samples were prepared by homogenization and decontamination. For this purpose, 4% NaOH was added in an equal volume to the sample, and then left in room temperature for 10 minutes. Finally, it was centrifuged (3,000 rpm) for 05 minutes. Smears were prepared from sputum samples and were air dried. Heat-fix the dried smear by passing over the flame 2-3 times. Apply and cover the sputum smear with carbol fuchsin dye and heat the dye on the smear with spirit lamp of burner until the vapors from the stain just now begins to rise, over heating must be prohibited, now allow the heated stain on the smear up to five minutes for better results. Immediately wash the smear with running tap water to remove the heated stain from smear, if tape water is not available then it can be washed with filtered rain water also. Decolorize the smear sufficiently with acid alcohol until the smear have pale pink appearance. Immediately wash the smear with running tap water When added slide methylene blue or malachite green for 1—2 minutes, time may little increase if smear is thick. Immediately wash the smear with running tap water. Wipe the slides back, air dry it. Use 100 X oil immersion lens for microscopy, and report the smear.

During microscopy of smear if there is any pink or red slightly curved or straight, single or in groups rods seen, report the results following WHO Criteria: as AFB positive

>10 AFB per field . . . . . 3+ (+++)

1---10 AFB per field . . . . . 2+ (++)

10---100 AFB per100 fields. . 1+ (+)

1---9 AFB per 100 fields . . . . . Exact number (e.g. 3 AFB seen per 100 field

All the data obtained were entered in Microsoft excel 2007. Data processing was performed manually.

Results

In this study, Total 200 sputum smear samples were processed for Acid fast Bacilli, Females were 115 (57.5%) and males were 85 (42.5%).

Out of 200 samples, 57/200 (28.5%) Samples were Positive for Tuberculosis**. (**Table I). In 57/200 (28.5%) Positive samples, females were 34/57(59.65) and males were 23/57 (40.35%). (Table I) Out of 57/200 (28.5%) Tuberculosis positive patients, 15 (26.3%) were of age from 20--40 years, 20 (35.0%) were age 40--60 years, while 22 (38.5%) were age > 60 years. (Table II)

Table I: Gender Vise Distribution of Positive Tuberculosis Patients

	Total	**Positive**	**Frequency**
S.No	**Gender**	**Number**	**Percentage**
01	Males	23	40.35%
02	Females	34	59.65%
Total		**57**	**100%**

Out of 57/200 (28.5%) Tuberculosis patients, 40/57(70%) were in rural area while in urban area patient were 17/57 (30%). **(Figure I)**

Table II: Age Vise Distribution of Positive Tuberculosis Patients

S.NO	**Age group in years**	**Numbers**	**Percentage**
01	20-40 years	15	26.31%
02	40-60 years	20	35.08%
03	➢ 60 years	22	38.59%
Total		**57**	**100%**

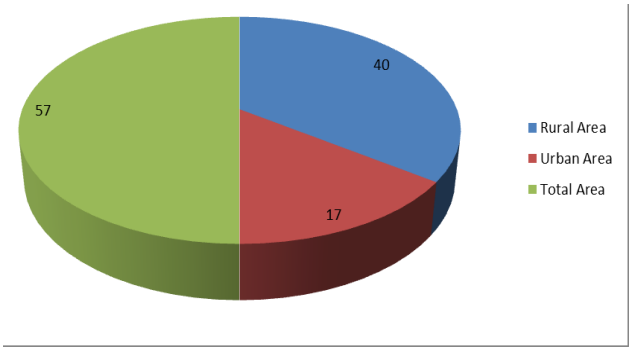

Figure I: Area Vise Distribution Graph (Percentage)

Discussion

World health organization (WHO) estimation indicates that 1/3rd of world population has been encountered with disease of tuberculosis and every fresh infection occurs at a rate of 1 per second, globally each year 8 million new cases arise and nearly 3 million people die annually of tuberculosis.[8] The contribution to global tuberculosis burden is 43% disease burden in Eastern Mediterranean Region WHO countries. [9]

While observing Sputum smears some of the patients are clinically seemed positive but they stand negative when checked through Sputum Smears. Such patients are difficult to diagnose if the facility does not have access to chest x-ray experts. The chest x-ray, concentration method, and Lowenstein culturing are the most efficient and rapid identification tools for such cases. Jenson Media are stills the ''Gold-Standards'' for the diagnosis of active Tuberculosis disease, and especially in low economic profile countries.[10]

Some of the recent studies such as Ahmad T 2017 [11] reported (42.19%) prevalence of tuberculosis in district Bannu while in our study, we recorded (28.5%) frequency in district Bannu, which is slightly higher than the previous one, it may be because of low sample size in our study. Similarly in another study of Ayaz S (2012) at district Peshawar recorded (32.02%).[12]

In our study the Frequency of tuberculosis is higher in female (59.65%) as compared to male. The same has been reported by Ahmad T 2017 which shows highest rate in females (47.5%)[11], which is an agreement to our study. Similarly, in another study of Ahmad et al also showed the highest rate in females (57.63%) as compared to males.[13]

Khattak MI (2010) reported (61.52%) cases in the age of between 20–50 years. [14] An analysis on Tuberculosis Ansari A reported that as compared to a developed country, where TB is common among elderly, it is a disease of young in a developing country. Seventy five percent (75%) of tuberculosis cases occur in age group of 15–59 years.[15] it was true in this study as (35.08%) were in the age group of 40-60 years.

This study showed a significant frequency rate of sputum smear positive tuberculosis in the district of Bannu. It is therefore recommended that since TB AFB Smear Test is a very good technique for early detection of pulmonary tuberculosis, and must be implemented in each and every public & private Medical /clinical laboratory throughout the Khyber Pakhtunkhwa Province as well as in Pakistan. Besides this, further research work is needed to address the issue of Multi drug Resistance Tuberculosis as well.

Conclusion

This study showed a significant frequency rate of sputum smear positive tuberculosis in district of Bannu. Both groups (sex and age) influenced the frequency of tuberculosis. Females demonstrated high rate of frequency than males. Age group of 40-60 years and up to 60 years demonstrated a higher frequency rate in tuberculosis. High frequency is noted in rural areas as compared to urban areas. Strategic planning is needed in both the public and private sectors to address the high rate of tuberculosis infection all over Pakistan.

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