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Smear Positive Pulmonary Tuberculosis Patients - An Epidemiological Perspective

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ABSTRACT

India has the highest burden of tuberculosis and multidrug resistant tuberculosis in the world. Epidemiology is the study of disease in population. Epidemiology is the study of the frequency, pattern, and distribution of determinants (causes, risks) of health states and conditions (not just disease) in the general population. The data of sputum for tuberculosis during the period from January 2020 to December 2022 in Palghar, Maharashtra is available with the dept. of Microbiology. The, aim of the present study was to analyse the epidemiological perspective of pulmonary tuberculosis in the tribal population of Palghar district, Maharashtra. Out of the total 925 registered cases, 101 (10.92%) were found to be positive and 824 (89.08%) were negative. TB was higher in male population as compared to female population and the recorded ratio of occurrence was 11.54 % (65/563) and 09.94 % (36/362) respectively. The maximum number of TB patients were in the age group 21-30 year. In this present study where 04/5 (80%) HIV-TB co-infected individuals were included. It was concluded that TB is a prevailing disease in district Palghar. In the present study it has been observed that TB has severely affected the adults and economically productive age group of districts Palghar. Males are more susceptible to TB than females. Smoking and diabetes were found to be important social factor, significant related to the higher prevalence of disease.

Keywords: *Mycobacterium tuberculosis,* prevalent causes, mortality, morbidity, multidrug resistant.

INTRODUCTION

India has the highest burden of tuberculosis and multidrug resistant tuberculosis in the world. Recent evidence suggests that India's TB burden may be declining, but very slowly.[1,2] Tuberculosis epidemic is widespread in India. Analysis of data from seven subnational epidemiological surveys, local and regional epidemiological surveys and multidrug resistant tuberculosis, prevalence between countries high to very low prevalence of TB. There are differences in TB prevalence between urban and rural areas; urban areas have an overall lower prevalence and higher annual risk of TB, and rural areas have a higher risk and lower risk of TB infection each year. TB diversity in the country requires different approaches to solving this problem. [3-5]

World Tuberculosis Day is widely known every year on March 24 to increase efforts to end the global tuberculosis epidemic and to boost public awareness about the health, social and economic consequences of TB. The National TB Elimination Programme of India is geared to fill the ambitious thing pronounced by the Honorable Prime

Minister of ending the TB epidemic by 2025 from the country (India TB Report 2023).[6]
In 2020, TB is world's deadliest contagious conditions killing over 4100 people each day. According to WHO, an estimated 9.9 million people fell ill with TB and 1.5 million people failed of TB encyclopedically in 2020. India accounts for 26% of TB cases worldwide. In India is 192 cases per 100,000 people. India is responsible for 38% of global HIV-negative TB deaths and 34% of HIV-negative and positive TB deaths. In 2020, India accounted for 24% of the estimated global gap in TB incidence. [7-12] According to global TB Report 2021, which was 19 percent higher than 2020 (16,28,161). The total number of new TB patients notified during 2021 was 19,33,381. India has made TB a priority issue, increasing the country's allow budget for TB by 70 % and calling for an end to TB by 2025, a full five years before of the UN goal (India TB Report 2023).[13] Epidemiology is the study of disease in population. Epidemiology is the study of the frequency, pattern, and distribution of determinants (causes, risks) of health states and conditions (not just disease) in the general population (CDC).
The, aim of the present study was to analyse the epidemiological perspective of pulmonary tuberculosis in the tribal population of Palghar district, Maharashtra.

MATERIALS & METHODS

Study Design

Retrospective data analysis

Data collection

The data of sputum for tuberculosis during the period from January 2020 to December 2022 in Palghar, Maharashtra is available with the dept. of Microbiology. The details of the patients available on the requisition form i.e., Name, Age, Gender, Address etc. were collected. No patients were contacted either in person or telephonically for any additional data collection. Sample size was 925 patients. The confidentiality of the patient was strictly maintained.

STATISTICAL ANALYSIS

The data was anonymized and presented in percentages and graphs.

RESULT AND DISCUSSION

Table 1: Distribution of negative and positive TB patients with grading (n = 925)

Grade	No. of TB Patients
Scanty	9
1+	26
2+	33
3+	33
TB Negative	824
Total	925

Out of the total 925 registered cases, 101 (10.92%) were found to be positive and 824 (89.08%) were negative as shown in table 1. The results of our study are similar to Shafqat and Jamail 2012; Sultan et al. 2012

Gender distribution of patients

In the present study were found that the overall tendency to get TB was higher in male population as compared to female population and the recorded ratio of occurrence was 11.54 % (65/563) and 09.94 % (36/362) respectively (Figure 1). The gender wise occurrence of TB is comparable with the findings of Qing-Qing Zhu et al (2020) reported that a total of 211,892 cases of tuberculosis were reported in Anhui Province, China between 2013 and 2018, with an average annual incidence of 57.7 per 100,000 population. A significant decrease ($p<0.001$) in the incidence of pulmonary tuberculosis was observed during the study period. Men had a higher incidence of pulmonary tuberculosis than women ($p<0.001$). The females in this age group have close contact with children because they are involved in household activities, while the male members support the whole of the family.

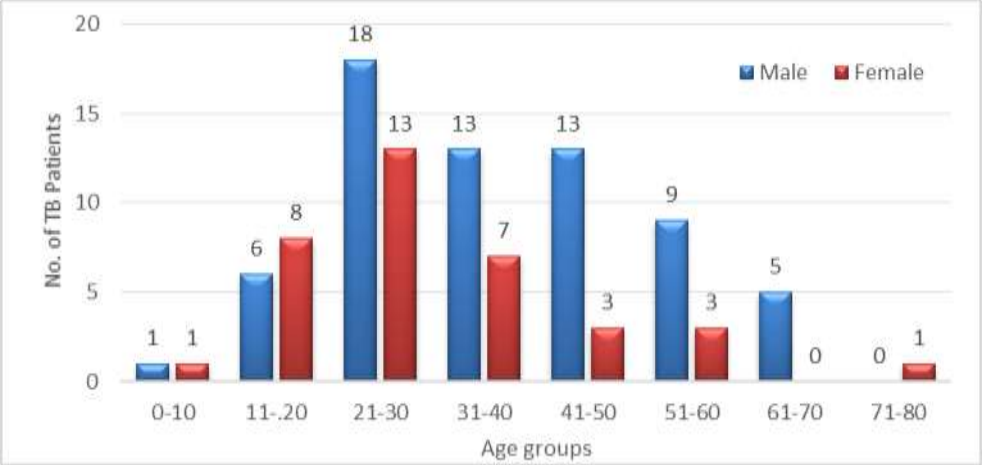

Figure 1: Age and gender wise distribution of TB patients in Palghar district (n = 101)

Age – group wise distribution

The Local population was divided into different groups as follows groups, 0-10 years, 11-20 years, 21-30 year, 31-40 years, 41-50 years, 51-60 years, 61-70 years and above. The maximum number of TB patients were in the age group 21-30 year, followed by group 31-40 years and group 41-50 years as showed in Figure 1. The age wise analysis of TB patients revealed. Alarming results: 82% patients belong to age group 15-64 years, a result which is similar to others (Shafqat and Jamail 2012; Ahmad and Ali 2013; Muhammad et al. 2007; Dey 1995; Ahmad and Ali 2013).

Table 2: Occupational and gender distribution of smear positive pulmonary tuberculosis patients in Palghar district during 2020-2022 (n = 101)

Gender	Male			Female		
	Occupation	**No.**	**TB $^{+ve}$**	**Occupation**	**No.**	**TB $^{+ve}$**
	Agriculture	206	44 (21.35%)	House wives	257	25 (9.72%)
	Non- Agriculture	357	21 (5.88%)	Other	105	11 (10.47%)
	Total	563	65 (11.54%	Total	362	36 (9.94%)

Ignorance, no early medical care, poor hygiene, poorer nutritional status, lack of proper treatment protocol, lack of proper health facility and lack of knowledge regarding the treatment. 21.35 % (44/206) cases amongst males were engaged in agriculture and the rest of them were engaged in non- agriculture activities. The non-agriculture activities included labourer class, service class, business and dependents (students, elders not doing any Job). In the females, all the 36 cases were either house wives or dependents. Majority of women surveyed were found to be housewives with additional job of helping in agriculture and attending the livestock (Table 2). Whereas in a study conducted by Gupta et al., (2002). Most of the studied population had agriculture as then main occupation. No significant association was found between occupation and occurrence of tuberculosis in the study Saiyed et at., (1995).

Table 3: Distribution of tubercular cases according to social variables

Variable	Persons Surveyed (n=925)	Tubercular Cases (n=101)
Smokers	320	34
Non-smokers	605	26
HIV	05	04
Diabetes	97	09

In this study, a total of 320 smokers were found out of which 34/320 (10.62 %) smokers turned out to be tubercular patients. The remaining surveyed population of 605 was of non-smokers which comprised 26/605 (4.29 %) tubercular case (Table 3). The prevalence of tuberculosis was significantly higher in the smoker group and

was low in the non-smoker group. AI Caide and Gupta et al. (2002) in a case control study established cigarette smoking to be a major factor contributing to tuberculosis in young adults. Zhang et al. (2015) studied that smoking is an independent risk factor for tuberculosis infection, especially in elderly smokers, as well as demonstrating a direct correlation between smoking history (pack-years) and the risk of latent tuberculosis. In this present study where 04/5 (80%) HIV-TB co-infected individuals were included, we found that 30-40 years age group were most affected which is of a higher age group when compared to other studies. Where in a study conducted by Tiewsoh *et al.* (2020) they had even reported a HIV-TB co-infected individuals were included. A prevalence of 09 (9.27%) of diabetes was seen in the present study among the tuberculosis sputum positive patients. Balakrishnan et al, a prevalence of 44% was seen in Kerala. But another study by Agarwal et al. in Gwalior saw a prevalence of 15.5%. Similar pattern was found in yet another study by Ahmad and Ali 2013).

CONCLUSION

It was concluded that TB is a prevailing disease in district Palghar. In the present study it has been observed that TB has severely affected the adults and economically productive age group of districts Palghar. Smoking and diabetes were found to be important social factor, significant related to the higher prevalence of disease. Males are more susceptible to TB than females.

Limitation

The study has limitations which need to be considered during interpretation of results. A limited number of screening criteria were included, which underestimated the actual presumptive TB burden in the study area. Many samples are salivary especially from OPD patients decreasing the sensitivity of AFB microscopy & the diagnostic yield.

Future Scope

The data collected from present study on prevalence of pulmonary tuberculosis in tribal patients of Palghar district - will be useful to plan the strategy for focussing highly prevalence areas to achieve the status of TB free.

Secondly, the study also highlighted the most common risk factors like smoking and diabetes in patients, contributing to poor treatment. So, further efforts need to be focused to address these issues by increasing health literacy about smoking and diabetes to bring changes in their lifestyle.

Declaration by Authors

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