

Study the Clinical Characteristics, Diagnosis, and Co-Morbidity of Pulmonary and Extrapulmonary Tuberculosis Patients Registered with the Nikshay Portal from the Tertiary Care Hospital Morbi, Gujarat, India

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Received: 25-07-2023 / Revised: 28-08-2023 / Accepted: 30-09-2023

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Conflict of interest: Nil

Abstract:

Introduction: Tuberculosis has high burden in developing countries like India. Our aims of this study are to evaluate the incidence of pulmonary and extra-pulmonary tuberculosis, the clinical characteristics, diagnosis, and co-morbidity of pulmonary and extra-pulmonary cases at tertiary care hospital.

Material and Method: A descriptive retrospective study was done using the data retrieved from the NIKSHAY portal of GMERS Medical college, Morbi. Data obtained from the portal between January 1, 2017, and August 31, 2023, total duration of six-year and eight-month studies. Only registered patients who resided in the Morbi district were included in this study.

Result: In this study, 6673 patients, there were 5067 (75%) with pulmonary tuberculosis and 1606 (25%) with extrapulmonary tuberculosis. Male to female ratio is 2:1. And overall, male pulmonary cases are higher than other cases. This study's age distribution shows that the most common age group affected is 21-30 year 2004 (30%), followed by 31-40 year 1211 (18%) and 11-20 year 944 (14%). In patients with pulmonary and extrapulmonary tuberculosis, 2319 (35%) had been diagnosed by chest x-rays, and 1961 (29%) patients were positive for fluorescence microscopy, CBNAAT 496 (7%), Truenat (MTB) 207 (3.1%), LPA 44 (0.66%), histopathology 26 (0.39%), cytopathology 12 (0.18%), and culture 5 (0.07%), respectively. The seropositive HIV infection in TB patients are 2% and 3% of patients are diabetic.

Conclusion: In this study, pulmonary male tuberculosis has a higher ratio, particularly between 21 and 30 years of age. Chest X-rays have higher sensitivity but a poor diagnostic value. HIV and diabetes testing is also important for TB patients.

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Introduction

Tuberculosis (TB) caused by Mycobacterium tuberculosis (MTB) is a well-known and major public health challenge globally, and is the leading cause of death from a single infectious agent[1]. According to the Global TB Report, an estimated 10.6 million incident cases of TB were reported in 2021. The World Health Organization (WHO) END TB strategy aims to reduce 95 per cent of TB deaths and 90 per cent of new incident cases of TB by 2035[2]. The global TB targets for reductions in disease burden of TB can only be achieved if diagnostic, prevention and treatment services of TB are strengthened [3,4].

Although tuberculosis is primarily the disease of affecting the lungs (Pulmonary Tuberculosis; PTB),

it may have various manifestations and can affect many sites such as lymph nodes, central nervous system, bones, and gastrointestinal tract which is known as Extrapulmonary tuberculosis (EPTB) [5,6].

Tuberculosis commonly presents with cough, fever, hemoptysis, anorexia and unintentional weight loss. Presentation varies depending upon infection site and other patient factors.[7]

Diagnosis is based on Ziehl-Neelsen stain, fluorescence microscopy, chest x-ray and CBNAAT for pulmonary tuberculosis. And CT scan, or one culture-positive specimen from the extrapulmonary site; or histological evidence; or strong clinical evidence consistent with active EPTB disease

followed by a medical officer's decision to treat with a full course of anti-TB therapy. EPTB is a significant health problem in both developing and developed countries and prevalence of disease in India accounts for 8.3% to 13.1% [8,9]. Reports have largely focused on smear positive pulmonary TB that posed greater infective threat and accounted for a higher morbidity and mortality than EPTB. Sparse literature is available regarding the relative contributions of extrapulmonary disease to the total number of tuberculosis cases from India as reliable epidemiological data are lacking [10].

Objective

1. To evaluate the incidence of pulmonary and extra pulmonary tuberculosis cases among all tuberculosis patients from the Morbi District who registered with the Nikshay Portal.
2. To evaluate the clinical characteristics, diagnosis and co morbidity of pulmonary and extra pulmonary cases.

Material and Method

Data Collection

A descriptive retrospective study was done using the data retrieved from the NIKSHAY portal of GMERS Medical college, Morbi. To list every variable on the web-based Nikshay site, secondary data from the NTEP project was evaluated. Data obtained from the portal between January 1, 2017, and August 31, 2023, total duration of six-year and eight-month studies. Notification means reporting about information on diagnosis and/or treatment of TB cases to the nodal Public Health Authority or

officials designated by them for this purpose. Every health-care providers meaning clinical establishments run or managed by the government (including local authorities), private, or NGO sectors and/or individual practitioners[11]. The NIKSHAY portal was started in January 2017 in Morbi district. We had taken permission from the DTO (District Tuberculosis Officer) before retrieving the data from the data entry operator.

Since this study was a review of reports pulled from the "Nikshay" database and did not involve patient interaction, individual patient consent was deemed unnecessary. Data analysis was done by using micro-soft Excel. As of now more than 1.3 million TB patients have been registered all over India. A total of 6673 patient having pulmonary and EPTB were undertaken in this study.

Inclusive Criteria

Only registered patients who resided in the Morbi district were included in this study.

Exclusive Criteria

Patients who are diagnosed with tuberculosis in the Morbi district but lived outside Morbi, we did not consider.

Result

In this study, 6673 patients were noted for tuberculosis (pulmonary and extra-pulmonary) from January 2017 to August 2023, a total duration of six years and eight months.

Table 1: The incidence of pulmonary and extra pulmonary tuberculosis was compared from January 2017 to August 2023

Year	Pulmonary%	Extra pulmonary	Total	
2017	762(11%)	217(3%)	979(14%)	P value <0.02
2018	872(13%)	201(3%)	1073(16%)	
2019	1004(15%)	263(4%)	1267(19%)	
2020	528(8%)	211(4%)	739(13%)	
2021	769(11%)	264(4%)	1033(15%)	
2022	749(11%)	308(5%)	1057(16%)	
Up to August 2023	383(6%)	142(2%)	525(8%)	
total	5067(75%)	1606(25%)	6673(100%)	

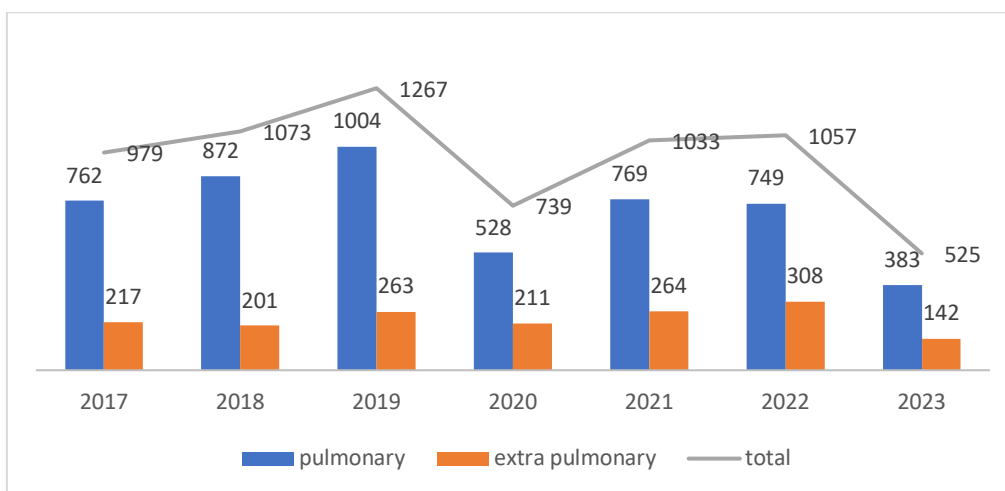


Figure 1: The incidence of pulmonary and extra pulmonary tuberculosis was compared from January 2017 to August 2023

Among the 6673 patients, there were 5067 (75%) with pulmonary tuberculosis and 1606 (25%) with extrapulmonary tuberculosis. The year-wise (January 2017 to August 2023) incidence of pulmonary and extrapulmonary tuberculosis is demonstrated in Table 1. The incidence of Pulmonary tuberculosis was higher than extra pulmonary tuberculosis and this was statistically significant (p=0.02)

Table 2: Sex wise distribution of study subject

Year	Male		Female		Total
	Pulmonary	extra pulmonary	pulmonary	extra pulmonary	
2017	557(8%)	135(2%)	207(3%)	80(2%)	979(15%)
2018	602(9%)	118(2%)	273(4%)	80(1%)	1073(16%)
2019	722(11%)	155(2%)	294(4%)	96(1%)	1267(19%)
2020	369(6%)	121(2%)	177(3%)	72(1%)	739(11%)
2021	549(8%)	134(2%)	241(4%)	109(2%)	1033(15%)
2022	543(8%)	166(2%)	222(3%)	126(2%)	1057(16%)
Up to august 2023	276(4%)	81(1%)	117(2%)	51(1%)	525(8%)
Total	3618(54%)	910(13%)	1531(23%)	614(10%)	6673(100%)

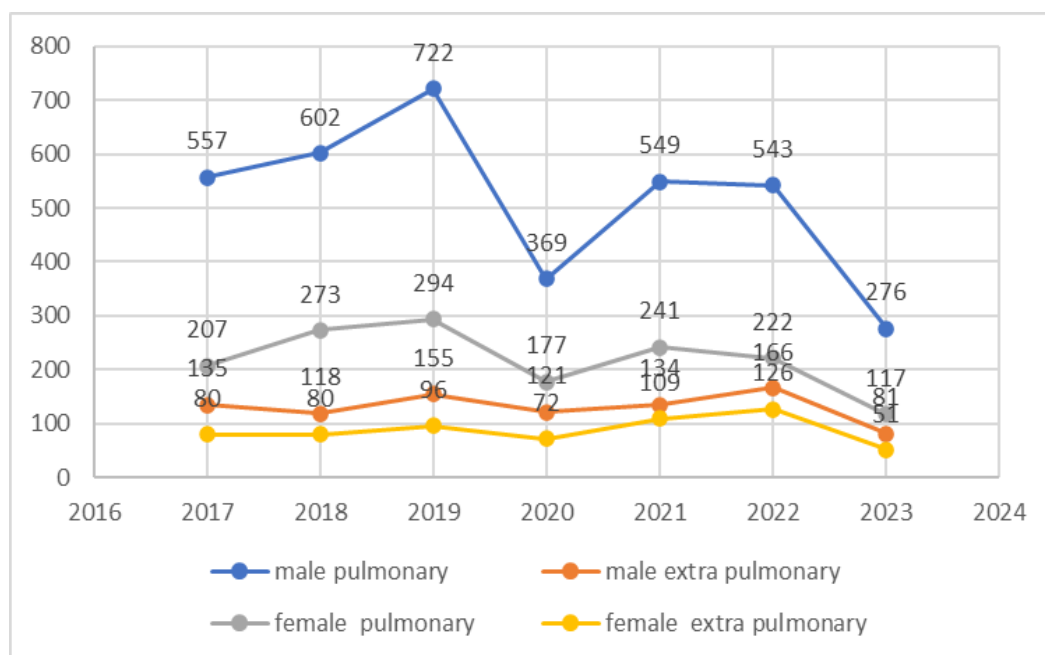


Figure 2: Sex wise distribution of study subject

The gender-wise distribution of pulmonary and extra-pulmonary is demonstrated in Table 2. Graph 2 shows that males are more affected than females in both pulmonary and extrapulmonary cases. And overall, male pulmonary cases are higher than other cases. Male to female ratio is 2:1.

Table 3: Age wise distribution of study

Age	Number	Percentage
0-10	224	3%
11--20	944	14%
21--30	2004	30%
31--40	1211	18%
41--50	870	13%
51--60	738	11%
61--70	465	7%
71--80	174	3%
>81	43	1%
total	6673	100%

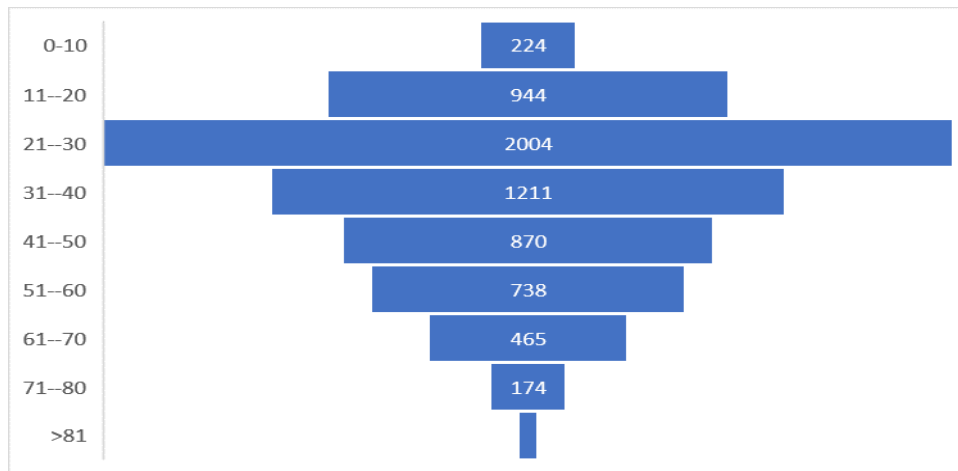


Figure 3: Age wise distribution of study

In this study indicating most common age group affected 21-30 year 2004(30%) follows 31-40 year 1211(18%) and 11-20 year 944 (14%).

Table 4: Positive diagnostic test result

Test name	Number	%
Culture	5	0.07%
S Line LPA	6	0.09%
Cytopathology	12	0.18%
Histopathology	26	0.39%
F Line LPA	44	0.66%
Truenat (MTB)	207	3.1%
Other	496	7.4%
Fluorescent Microscopy	1597	23.9%
CBNAAT	1961	29.4%
Chest X Ray	2319	34.8%
Total	6673	100%

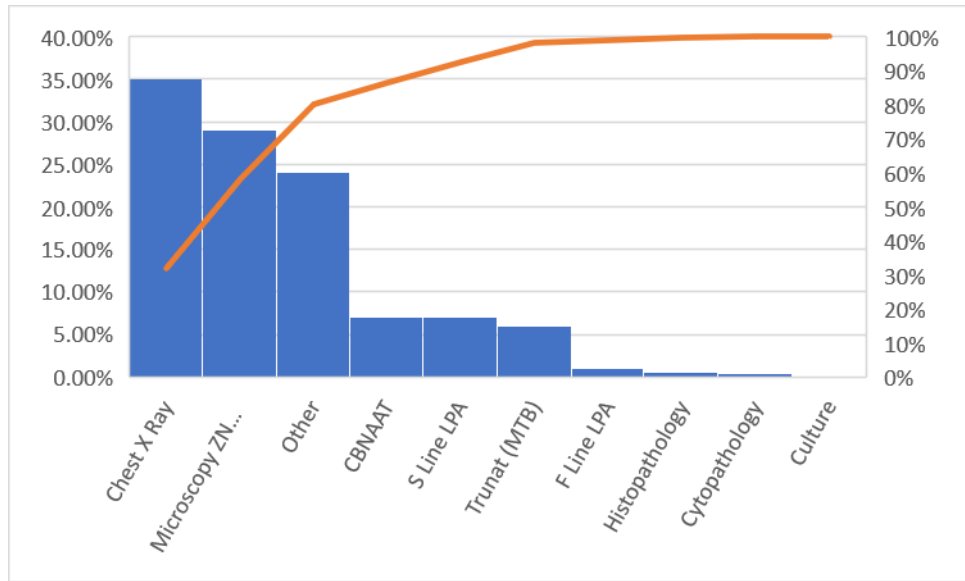


Figure 4: Positive diagnostic test result

Among 6673 patients with pulmonary and extrapulmonary tuberculosis, 2319 (35%) had been diagnosed by chest x-rays, and 1961 (29%) patients were positive for CBNAAT, Fluorescent Microscopy 1597(24%), Truenat (MTB) 207 (3.1%), LPA 44 (0.66%), histopathology 26 (0.39%), cytopathology 12 (0.18%), and culture 5 (0.07%), respectively. (deleted)

Table 5: Distribution of type of co-infection among tuberculosis patients

Disease	Reactive/diabetic	Non Reactive/non diabetic	Unknown
Hiv	117(2%)	5348(80%)	1208(18%)
Diabetics	191(3%)	4688(71%)	1794(26%)

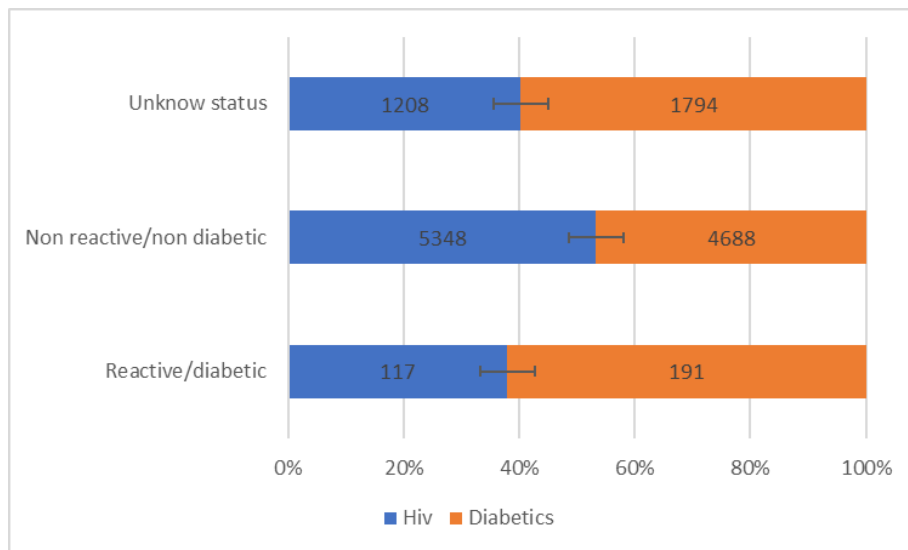


Figure 5: Distribution of type of co-infection among tuberculosis patients

According to Table 5, The seropositive HIV infection in TB patients are 2% and 3% of patients are diabetic. While 18% of patients did not know their HIV status and 26% of patients did not know their diabetes status.

Discussion

Tuberculosis has high burden in India. India's TB incidence for the year 2021 is 210 per 100,000 population. The present study was aimed at knowing the incidence, clinical characteristics,

diagnosis, and risk of comorbidity of pulmonary and extrapulmonary tuberculosis so that we can identify high-risk groups and try to educate them.

Comparison of pulmonary and extra-pulmonary tuberculosis incidence

In our study, 6673 tuberculosis patients were evaluated. Out of them, pulmonary cases (75%) are more than extra pulmonary cases (25%) in all six-year and eight-month studies. A similar study done by Patel S also showed that pulmonary cases were

56% and ETB cases were 44% respectively [12]. The droplet transmission is the reason why there are more pulmonary infections than extrapulmonary cases throughout India.

Gender wise distribution

According to this study male patients are more affected than female. This study is similar to Patel AK 's study where male to female ratio is 2.8:1 [13]. This male predominance may be that in most countries, young men usually have more social and labor activities than women. Thus favoring the transmission of the disease and/or to a higher frequency of underdiagnosis in women primarily resulting from fewer opportunities among women to obtain medical services.

Age distribution

60% of cases are seen between 21 and 50 years of age, and among them, those between 21 and 30 years of age are most affected, which is similar to the study done by Rana U et al. Which shows that 56% of patients were from the age group of 21–40 years. Incidence of pediatric tuberculosis is low but according to S.K Kabra's study, The most children acquire the organism from adults in their surroundings, the epidemiology of childhood tuberculosis follows that in adults. Because of the difficulty of confirming the diagnosis, the global burden of childhood tuberculosis in the world is unclear. [15]

Diagnosis factor

In this study chest x ray was suggestive of TB in 34.8 % of patients. which is more sensitive according to this study.

The Yadav RK study is similar to our study; the sensitivity of X-rays was 47%. Chest radiography is a relatively insensitive tool apart from its known limitations of poor specificity and high inter-observer variability [16].

While 23.9% of cases of tuberculosis are microbiologically proven. The WHO policy on case detection by microscopy was, therefore, revised to recommend a reduction in the number of specimens examined, from three to two in settings with appropriate external quality assurance and documented high quality microscopy. In this study, CBNAAT sensitivity is only 29.4%. while Yadav RK study 14% positive rate in CBNAAT.

Co-infection

The rate of HIV infection was 2%, while the seroprevalence of HIV infection among TB patients in India is estimated to be about 6.7% P Vaidyanathan et al. P. Dave's study found that 6.5% of patients had diabetes, which is twice the rate observed in this study[17]. However, 18% of patients have not been checked for HIV infection,

and 26% of patients have not had a diabetic checkup. So we have to focus more on HIV and diabetic testing.

Conclusion

In this study, We conclude that male pulmonary tuberculosis has a higher ratio, particularly between 21 and 30 years of age. Chest X-rays have higher sensitivity but a poor diagnostic value. GeneXpert (CBNAAT) has higher sensitivity of detection MTB as compare Fluorescent Microscopy as well as it's also detect rifampicin sensitive and resistance. HIV and diabetes have a high chance of getting infected with tuberculosis.

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