



## Original Research Article

## Clinical profile of multi-drug resistance tuberculosis in adults

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## ABSTRACT

**Background:** on 24<sup>th</sup> march 1884 etiological agent of tuberculosis was discovered by German doctor Dr. Robert Koch, this discovery led to variety of medical applications in diagnosis and management of pulmonary TB. Among many infectious disease prevalent in India, drug resistant TB is one among the important public health problem. There are many factor which influence occurrences of the drug resistant TB, our study conducted mainly to understand those factors which influences the drug resistant TB i.e clinical profile of drug resistant TB in tertiary hospital VIMS, Ballari.

**Material and Methods:** The prospective study was conducted in patients admitted in medical college hospitals affiliated to Vijayanagar Institute of Medical Sciences, Ballari over a period of 2 years from November 2016 to October 2018. All patients with sputum AFB and X-ray suggestive of tuberculosis were sent to CBNAAT (Cartridge-based nucleic acid amplification test) for detection of drug resistance. Clinical and radiological characteristics, and risk factors were recorded and further analysis was made.

**Results:** Out of 150 patients with pulmonary tuberculosis 28 of them were detected with drug resistance tuberculosis. Out of 28 drug resistance tuberculosis patients all 28 patients had resistance to isoniazid and rifampicin (MDR-TB). During the study period, among the drug resistant tuberculosis patients the maximum patients belonged to age group 35 to 48yrs of age and males (n=24, 85.7%) outnumbered females (n=4, 14.3%). Fever (n=26, 92.9%) was common symptom. And next common symptom was cough (n=25, 89.2%), loss of appetite, shortness of breath, hemoptysis, loss of weight, chest pain and wheezing. HIV (39.2%) was the common comorbidities among the study patients, followed by diabetes mellitus (35.7%), HTN (35.7%) and COPD (28.5%). About 71.5% of the cases were smokers and 64.3% had history of alcohol consumption and 14.2% were tobacco chewers in this study. About 57.1 % (n=16) were taken ATT previously and not completed treatment and 4 of them were relapse case.

**Conclusions:** This study had shown that, drug resistance tuberculosis is more common than a rare entity and also shows that drug resistance is associated with HIV and drug defaulter. Appropriate adherence with ATT and early diagnosis is main determinant in drug resistance TB.

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## 1. Introduction

Tuberculosis is age old disease which is known to cause suffering and death. Among the many disease known to mankind, tuberculosis is thought to be one of the oldest human diseases of all. Mankind has known TB as far the

literature goes back. As per ancient sources it was called as “rajayakshma” (meaning “wasting disease”). In 460-377 B C in the era of Hippocrates a greek doctor, the tuberculosis disease is mentioned as “pthisis”, which means “to consume”.<sup>1</sup> The “tuberculosis” is derived from latin word “tubercula” meaning “a small lump”.<sup>1-3</sup> The discovery of tubercular bacillus was by Dr. Robert Koch in 1884.<sup>4-6</sup>

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The introduction of streptomycin in year 1994 made a bench mark of start of antibiotic era in TB treatment. The joyous dream of curing tb became a reality in mid 1940s with the availability of isoniazide, paraaminosalicylic acid (PAS).

Perhaps the lengthy drug duration course treatment of TB became a short course treatment with rifampicin, pyrazinamide and ethambutol came to existence in subsequent years. However the mere availability of anti-tubercular drugs became a tedious cause in the emergence of drug resistance TB due to the indiscriminate use of antituberculosis drugs and laxity in monitoring of tedious drug regimens, which broke the euphoria which we had initially, the ability to cure TB, which led to emergence of multidrug resistance strain of Mycobacterium tuberculosis. And this worrisome disease MDR-TB is prevalent worldwide.<sup>7-9</sup>

Drug resistance tuberculosis affected 8000 patients in 2017 in a worldwide record. Of these 82% had multidrug resistance TB. Drug resistance tuberculosis occurred more common in 3 main countries worldwide, i.e. India (24%), China (13%) and Russian Federation (10%). Globally 3.5% of new TB cases and 18% of previously treated cases had MDR/RR-TB.<sup>10,11</sup>

Definition of multi drug resistance- a TB patient, whose biological specimen is resistance to both rifampicin and isoniazide with or without resistance to other first line drugs.<sup>12</sup> Definition of XDR- extensive drug resistance – a MDR TB patient, whose biological specimen is additionally resistant to a fluoroquinolone and second line injectable anti-drug.<sup>12</sup> The present study aimed to assess distribution of drug resistance and assessing their clinical profile.

## 2. Materials and Methods

The prospective study was conducted in patients admitted in medical college hospitals affiliated to Vijayanagar Institute of Medical Sciences, Ballari, period of two years from November 2016 to October 2018. All patients admitted during the study period with history of fever with cough for more than 2 weeks, loss of appetite, weight loss, hemoptysis, breathlessness were taken for study. All patients' demographic data, age, sex, occupation, place of stay, comorbidities like diabetes, hypertension, COPD, smoking and alcohol consumption history, history of diagnosed with HIV and on ART, previous history of tuberculosis and ATT collected. All patients were subjected to routine investigation and sputum AFB, drug resistance tuberculosis was diagnosed by CBNAAT.

### 2.1. Statistical analysis

Information gathered for this study encrypted and recorded in a spreadsheet. Statistical analysis was performed using MS excel. Variables were calculated by mean,

standard deviation for quantitative variables, frequency and proportions for qualitative variables.

## 3. Results

This study included 150 patients diagnosed with pulmonary tuberculosis, 28(18.7%) of them found to have drug resistance tuberculosis. All 28 patients had rifampicin and isoniazid resistance. Out of 28 patients with multi-drug resistance TB, majority are males (n=24, 85.7%) than females (n=4, 14.2%). In our study, drug resistance tuberculosis, showed that maximum MDR-TB patients were in the age group of 30-40 years. (mean age = 36.28 years, standard deviation (SD) 13.97 years; range 18 – 70 years). Majority of them were in rural areas (n=20, 71.5%) and were of upper lower and lower socio class (64.2%). 64.2% had history of alcohol consumption and 71.4% had history of smoking and 16.7% were tobacco chewers. HIV (39.3%) was the commonest co-morbidity among the study group followed by diabetes (35.7%), hypertension (35.7%) and COPD (28.6%).

All patients included were of Pulmonary TB, out of which 10(35.7%) patients had bilateral lung involvement on chest X-ray and cavity was seen in all 28 patients.

Fever was the most common symptom occurring in 92.9% patients followed by cough with expectoration (89.2%), loss of appetite and weight (89.8%) and shortness of breath (39.2%).

Majority (78.6%) of patients had previously taken treatment for TB and 35.7% did not complete their treatment.

Outcome-wise 78.6% patients were under treatment and 21.4% patients had been expired.

## 4. Discussion

In this study, the mean age group of our study population was 30-39yrs, in study conducted by Sharma et al (2011)<sup>13</sup> 35.5yrs was mean age, which indicates that in MDR-TB group of individual that are affected are relatively younger age, who belongs to productive age group both socially and economically.

The M:F ratio (male to Female) was 6:1 i.e more in favor of males (M= 85.7% [n=24] F=14.3% [n=4] which when compared to study by Joseph et al conducted in 2011 shows 66% of males had MDR-TB.

In our study the resident of 71.5% of the patients was rural areas when compared to study by Joseph et al (2011)<sup>14</sup> 69% patients had residence to urban areas.

Primary resistance was found in 10.7% whereas 89.3% had secondary resistance, however 10.7% of patients and 63.4% patients had Primary resistance and secondary resistance respectively in study by Datta et al (2009).<sup>15</sup>

In our study, 64.2% of cases had bilateral fibrocavitary changes on Chest X-ray as compared to study of Singla

**Table 1:** Demographic parameters

		Number(n)	Percentage (%)
Sex	Male	24	85.7%
	Female	4	14.3%
Age	18-29	6	21.4%
	30-39	11	39.3%
	40-49	5	17.9%
	50-59	3	10.7%
	>60	3	10.7%
Residence	Urban	8	28.5%
	Rural	20	71.5%
Previous history of ATT and not completed treatment	Yes	16	57.1%
	No	12	42.9%
Relapse	yes	4	14.3%
	no	24	85.7%
H/o Smoking	Yes	20	71.5%
	no	8	28.5%
H/o Alcohol consumption	Yes	18	64.3%
	No	10	35.7%
HIV positive status	Yes	11	39.2%
	No	17	60.8%
Diabetes	Yes	10	35.7%
	No	18	64.3%
Hypertension	Yes	10	35.7%
	No	18	64.3%
COPD	Yes	8	28.5%
	No	20	71.5%

**Table 2:** Symptomatology

Symptoms	No. of patients	Percentage (%)
Fever	26	92.9%
Cough with / without expectoration	25	89.2%
Loss of apatite	25	89.2%
Hemoptysis	10	35.7%
Breathlessness	11	39.2%
Loss of weight	25	89.2%
Chest pain(pleuritic type)	6	21.4%

et al(2009)<sup>16</sup> 84% had bilateral involvement. Whereas cavity in lung tissue was seen in 82.1% of cases, in study conducted by Singla et al the prevalence of cavity was 43%. 89.2% patients had cough as predominant symptom

When comes to associated co-morbidities diabetes mellitus and HIV were commonest. In a study, Kim et al had 18.7% and 17.1% had diabetes mellitus as most common co-morbidity in extensively drug resistant tuberculosis and multi drug resistant tuberculosis patients respectively.<sup>17</sup>

About n=20 (71.5%) patients had history of smoking and 64.3% (n=18) gave history of consumption of alcohol. history of tobacco chewing was elicited in 16.7% of patients.

In study by Marahatta had observed that smoking is associated with the Isoniazid resistance.<sup>18</sup>

In a study in Delhi, smoking was associated factor with 40.8%, 37.7% & 50% of the multi-drug resistant tuberculosis, pre extensively drug resistant tuberculosis & extensively drug resistant tuberculosis respectively.<sup>19</sup>

As part of all prospective study, our study had few drawbacks i.e study duration was short.

The one more drawback is there is no follow up regards to drug side effect.

## 5. Conclusion

Our study shows prevalence of drug resistant is more common than we thought before, which is particularly affecting middle age men.

Associated co-morbidity HIV, type 2 diabetes mellitus, hypertension also common among drug resistance TB.

Among those with drug resistant TB, previous history of treatment with ATT was more common and hence early detection of drug resistance especially among relapse and failure patients, ensuring Quality DOTS Services and patient counseling and rational use of ATT and vigilance of national tuberculosis program will help to prevent the emergence of MDR TB as a major health problem.

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

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