ASSOCIATION OF SOCIO-DEMOGRAPHIC PROFILE WITH PREVALENCE OF MULTI DRUG RESISTANT TUBERCULOSIS AMONG RETREATED PULMONARY TUBERCULOSIS PATIENTS IN NORTH INDIA

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ABSTRACT

Methods: An observational cross sectional study, which includes 116 patients of sputum smear positive pulmonary TB of age 18 or above. Further, detailed history taking regarding different demographic profile was done. Also, they were subjected to CB-NAAT and rifampicin resistant cases were considered as MDR-TB.

Results: Proportion of MDR-TB was 31.89% among retreatment TB cases. 56.75 % (n=21) of MDR-TB cases were between the age group of 21-40 years. Proportion of MDR-TB was higher among males (75.67%), married (59.45%) and rural dwellers 59.45%. Proportion was 61.76% among patients with BMI <16; 31.57% with BMI 16-16.99, 28.57% with BMI 17-18.49 and 5.7% with BMI 18.50-24.99. MDR-TB proportion was less 29.72% (n=11) in patients with history of TB contact in family. Pulmonary TB including MDR-TB was more common among illiterates (37.83% among MDR).

Conclusion: Proportion of MDR-TB was high among retreatment cases in north India. Among them low BMI and education status are modifiable factor and this study signifies that MDR-TB burden can be reduced by improving health and education status of patient.

Key words: Pulmonary TB, Retreatment case, Socio-demographic profile, MDR-TB

INTRODUCTION

Tuberculosis (TB) is leading cause of death due to a single infectious agent. Worldwide 4.1% of new TB cases and 19% of retreatment TB cases have multi-drug resistant TB (MDR-TB).[1] Tuberculosis (TB) is as old as mankind.[2-4] Globally TB is leading cause of mortality due to a single infectious agent.[5] India has the highest TB burden in the world and accounts 25% of global burden.[1]

In 2016, 6.3 million new cases of TB were reported worldwide and an estimated 1.3 million TB deaths in HIV negative people.[1] An important cause of TB epidemic is emergence of multi drug resistant (MDR) strains of Mycobacterium tuberculosis. Globally, an estimated 4.1% of new TB cases and 19% of previously treated cases have MDR-TB.[1] In 2016, an estimated 600000 people were eligible for MDR-TB treatment and 47% of these cases were in India, China and Russian Federation.[1] Despite the availability of good quality treatment that can cure most cases of TB, levels of MDR-TB remain worryingly high in India. MDR-TB is consider as a man-made phenomenon and occur as a result of inappropriate treatment of drug sensitive TB.[6] Prevalence of MDR-TB mirrors the functional state and efficacy of TB control program in the country. The present study is aimed to find out association of various socio-demographic profiles with prevalence of MDR-TB to reveal modifiable risk factor so that we can modify them to prevent development of MDR.

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MATERIALS AND METHODS

Study Design- An observational, cross sectional study.

Study Period- From August, 2016 to August, 2017.

Study Settings- All patients aged >18 years of either sex with pulmonary TB were enrolled in this study as per inclusion and exclusion criteria.

Inclusion Criteria:

1. Patients with pulmonary TB confirmed by sputum smear examination
2. Patient who are about to start DOTS retreatment regimen

Exclusion Criteria:

1. Patients not giving consent for participation in the study
2. Pregnant women
3. Patients with co-morbid illness like Diabetes, AIDS, Kidney disease, Liver disease and Psychiatric illness

After obtaining informed consent, patients qualifying inclusion criteria will be assessed as follows:-

- Recording of demographic data
- Investigations: Routine haematological, Bacteriological examination (sputum smear examination for M. TB and CB-NAAT(Cartridge based nucleic acid amplification test). Standard chest X-ray postero-anterior view

Patients of retreatment pulmonary TB cases were selected from Department of pulmonary medicine, M.L.N. Medical College, Allahabad. The sputum was collected as the clinical specimen for further examination and investigation. Sputum sample consists of fresh discharged material from the bronchial tree, with minimum amounts of oral or nasopharyngeal material. Specimens were transported to the laboratory as soon as possible after collection. The sputum samples were sent for sputum-smear microscopy for tubercular bacilli at the time of enrolment, further they were subjected to CB-NAAT examination.

Statistical analysis- All patients detail was recorded and analyzed in Microsoft excel sheet.

Ethical approval- The study was started after getting Ethical Clearance Certificate from Institutional Ethics Committee. As per protocol informed consent was taken from the patient/ guardian.

RESULTS

Table 1. Proportion of MDR-TB among patients at start of retreatment ATT regime

	MDR-TB	Non-MDR TB
Patients at start of retreatment regimen (n=116)	37(31.89%)	79(68.11%)

A total 116 sputum positive pulmonary TB patients were included in the study. This study shows that 31.89% (37 out of 116) patients of retreatment pulmonary TB was found to be MDR-TB.

Table 2: Proportion of MDR-TB in different gender among patients at start of retreatment regimen

	MDR-TB	Non-MDR TB
Male	28(75.67%)	55(69.62%)
Female	9(24.32%)	24(30.37%)

The proportion of MDR-TB in retreatment category has been found to be higher in males 75.67% (n=28) than females 24.32% (n=9). Mean age of MDR-TB patients was 34.71±14.72 years in males and 34.22 ± 21.18 years in females. (p value=0.5).

Table 3: Proportion of MDR-TB in different age group among patients at start of retreatment regimen

Age group (in years)	MDR-TB	Non-MDR TB
11-20 (n=13)	6(16.21%)	7(8.86%)
21-30 (n=33)	13(35.13%)	20(25.31%)
31-40 (n=26)	8(21.62%)	18(22.78%)
41-50 (n=20)	4(10.81%)	16(20.25%)
51-60 (n=16)	3(8.10%)	13(16.45%)
>60 (n=8)	3(8.10%)	5(6.32%)

(χ2 yate's corrected=2.57, p value=0.73)

The mean age in patients with MDR-TB was 34.37±15.09 and in Non-MDR TB was 39.29± 15.09 years. About 50.8% (n=59) of retreatment TB patients and 56.75% (n=21) of MDR-TB cases were in the age group of 21 to 40 years, which is known to be the most economically productive period of life. (p value=0.73).

Table 4: Proportion of MDR-TB in population with different BMI groups (according To WHO) among patients at start of retreatment regimen

BMI group (kg/m^2) (acc. To WHO)	<16 (n=34)	16-16.99 (n=19)	17-18.49 (n=28)	18.5-24.99 (n=35)
MDR-TB	21 (61.76%)	6 (31.57%)	8 (28.57%)	2 (5.71%)
Non-MDR TB	13 (38.23%)	13 (68.42%)	20 (71.42)	33 (94.28%)

(**$\chi 2=25.15$, p value=0.000014**)

Among retreatment cases proportion of MDR-TB was 61.76% among patients with BMI <16; 31.57% among patients with BMI 16-16.99; 28.57% among patients with BMI 17-18.49 and 5.7% among patients with BMI 18.50-24.99. As BMI is decreasing below 24.99, proportion of MDR-TB was increasing. (p value=0.000014).

Table 5: Proportion of MDR-TB in population with different Marital Status (among patients at start of retreatment regimen)

	Married	Unmarried
MDR-TB (37)	22(59.45%)	15(40.54%)
Non-MDR TB (79)	64(81.01%)	15(18.98%)

(**$\chi 2=6.10$, p value=0.013**)

Among retreatment TB cases, majority were married 74.13% (n=86), only 25.87% (n=30) were unmarried. Proportion of MDR-TB is higher among married (59.45%) than unmarried (40.54%). (p value=0.013).

Table 6: Distribution of MDR-TB cases in rural and urban dwellers

Residence	Rural	Urban
MDR-TB (37)	22(59.45%)	15(40.54%)
Non-MDR TB (79)	36(45.56%)	43(54.43%)

(**$\chi 2=1.94$, p value=0.16**)

In retreatment cases proportion of MDR-TB was more among rural patients 59.45% (n=22) than urban patients 40.54% (n=15). Among Non-MDR mostly patients belong to urban 54.43% (n=43) area than rural 40.54% (n=15). (p value=0.16).

Table 7: Relation of MDR-TB with Literacy among patients at start of retreatment

Education Status	MDR-TB (n=37)	Non-MDR TB(n=79)
Illiterate	14(37.83%)	36(45.56%)
Primary(1^{st} -5^{th})	11(29.72%)	13(16.45%)
Secondary(6^{th} -12^{th})	9(24.32%)	25(31.64%)
Graduate & above	3(8.10%)	5(6.3%)

(**$\chi 2=3.07$, p value=0.38**)

Out of 116 patients of retreatment cases, 43.10% (n=50) were illiterate. Among literates 20.68% (n=24) studied up to Primary, 29.31% (n=34) up to secondary and 6.8% (n=8) were graduate and above. Pulmonary TB including MDR-TB is more common in illiterates 37.83% (n=14). In this study as the education status is increasing, proportion of MDR-TB is decreasing. But there is no significant relation of literacy with proportion of MDR-TB. (p value=0.38).

Table 8: Family history of TB contact and proportion of MDR among retreatment TB patients

Family history of TB contact	MDR-TB (n=37)	Non-MDR TB (79)
Present (n=37)	11(29.72%)	26(32.91%)
Absent (n=79)	26(70.27%)	53(67.08%)

(**$\chi 2=0.11$, p value=0.7**)

Among retreatment cases, proportion of MDR-TB was less 29.72% (n=11) in patients with history of TB contact in the family than the patients with no history of TB contact 70.27% (n=26). So the family history does not appear to be associated with MDR-TB. (p value=0.7).

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DISCUSSION

This study shows that about one third of retreatment cases having MDR-TB, while Global TB report reported 20% of retreatment cases and 3.5% of new cases having MDR-TB.

This study shows that proportion of MDR-TB is higher among males (75.67%). This finding was in commensuration with Sharma et al[7],Qiao Liu et al[8],in which they reported higher prevalence among males, while N Lomtadzeet al[9] et al reported higher prevalence in females.

According to study 56.7% of total MDR-TB patients were in the age group 21-40 years. This finding was in commensuration with Kai man Kam et al[10], Omar Salad Elmi et al[11], Gneyaa Bahtt et al[12] in which they reported higher proportion of MDR-TB in age group of 15-45 years.

This study shows that there is an inverse relationship between BMI (below 24.99) and occurrence of MDR-TB among retreatment cases. This finding was supported by Kumar A et al[13], Poulomi Mukherjee et al[14], Xin-Xu Li et al[15] reported that most MDR-TB patients were malnourished and low BMI is one of the risk factor significantly associated with MDR-TB.

In this study among MDR-TB patients was 59.45% were married. This finding was in commensuration with Girma Mulisa et al[16], Meghan D. Morris et al[17], Feleke Mekonnen et al[18] reported that in their study 75%, 75%, 50% were married respectively.

Out of total MDR-TB patients among retreatment category 59.45% resides in rural area. Almeida D et al[19], HE Jenkins et al[20] however reported higher percentage of MDR-TB patients were found in urban area.

In this study proportion of MDR-TB was more among illiterates (37.83%), 29.72% were educated up to 5th standard. This finding was in commensuration with Wei-Bin Li et al[21], Mahfuza Rifat et al[22] reported that MDR-TB patients have education status <primary school.

In this study only 29.72 % of MDR-TB patients have history of TB contact. Elizabeth Clara Barroso et al[23], Wahab F et al[24], TN Dhole et al[25] reported that family history of TB contact was not significantly associated with MDR-TB.

CONCLUSION

The present study shows that proportion of MDR-TB was high among-retreatment cases of pulmonary TB, males, married, low education status, rural dwellers. MDR-TB was more common among severe malnourished patients. Low BMI and education status are modifiable factor and this study signifies that MDR-TB burden can be reduced by improving health and education status of patient. So the nature of TB bacilli becoming drug resistance by could be prevented by taking care of simple preventive measures and certain attributes.

CONFLICT OF INTEREST

None

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