PREVALENCE AND DEMOGRAPHIC PATTERN OF MULTIDRUG RESISTANT TUBERCULOSIS IN A TERTIARY CARE HOSPITAL IN TAMILNADU

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Abstract : ABSTRACT BACKGROUND MDR TB is an emerging threat all over the world. Planning the programmatic management of MDR TB necessitates the need for many studies regarding the prevalence and demographic pattern in various regions. METHODS This was a cross sectional study done in a tertiary care centre in which the diagnosis of MDR TB is done by CBNAAT (GENE XPERT). The sputum samples were sent to a higher centre for analysis. The data from a register in the Dept. Of Thoracic medicine were collected and analysed. RESULTS The prevalence of MDR TB was 18.56 among MDR TB suspected cases. The inference of the study was that the prevalence was more among previously treated cases, male patients, more than 30 yrs of age and among rural population. This pattern may differ in other regions. CONCLUSION MDR TB being an increasing global problem needs more surveillance and monitoring which will help in the proper planning of the diagnostic approach and therapeutic interventions. More studies are needed to accomplish this in various regions.

Keyword : MDR TB, prevalence, demographic pattern

BACKGROUND:

- Multi-drug resistant tuberculosis is the name given to TB when the bacteria causing it are resistant to atleast isoniazid and rifampicin, the most effective TB drugs.

- Multidrug-resistant tuberculosis (MDR-TB) is an increasing global problem, with most cases arising from a mixture of physician error and patient non-compliance during treatment of susceptible TB (1).

- The extent and burden of MDR-TB varies significantly from country to country and region to region. There are 27 'high burden' countries for MDR-TB. These are countries with atleast 4000 cases of MDR-TB each year and/or atleast 10% of the newly registered TB patients are of MDR-TB cases (2).

- The statistics of 'high burden' countries for MDR-TB in 2011 states that India has the maximum TB prevalence of 3,100,000 cases and estimated percentage of new TB cases with MDR-TB of 2.1%, notified cases of MDR-TB of 4,237 and the patients started on treatment for MDR-TB was 3,384(2).

- Treatment for MDR-TB has proven to be feasible and effective in low-resource settings (3), and more-reliable

estimates of the magnitude of MDR-TB, both globally and by country, are now needed for planning and expanding the programmatic management of drug-resistant TB within the context of national TB control programs.

- Not much studies are available regarding the prevalence and demographic pattern of MDR-TB in Tamilnadu.

- This study has been conducted to know the prevalence and demographic pattern of MDR-TB in a tertiary care hospital in Tamilnadu.

AIM:

To assess the prevalence and demographic pattern of MDR TB in a medical college attached to a tertiary care hospital in Tamilnadu.

MATERIALS AND METHODS:

- Institutional Ethical Committee approval was obtained for the study.

- **STUDY CENTRE:** Thoracic Medicine Department of medical college.

- **STUDY DESIGN:** Retrospective, observational study.

- **STUDY PERIOD:** August 2012 – January 2013 (6 months).

- **METHODOLOGY:** The data for this observational study to assess the prevalence and demographic pattern of MDR-TB were collected from the registers in the Department of Thoracic medicine.

From the study centre the sputum samples of patients suspected to have MDR-TB called 'MDRTB suspects' were sent to the higher centre. In the higher centre the diagnosis of MDR-TB was done by the diagnosis of rifampicin resistance using CBNAAT i.e. Cartridge Based Nucleic Acid Amplification Test) or GeneXpert testing (4-6). Genetic probes which detect drug resistance to rifampicin with > 95% accuracy are very suggestive of MDR-TB; <10% of rifampicin resistance is monoresistant, and so rifampicin resistance is a marker for MDR-TB in > 90% of cases (7). This GeneXpert MTB/RIF is a molecular test considered to be impressive by the WHO and it can diagnose rifampicin resistance within 100 mts(2). The sputum samples collected from the patients were sent to the higher centre after proper packing. The results from the higher

centre were obtained 2 hrs after receiving the sputum sample. These data were entered in a register. These data for a period of 6 months from Aug 2012- Jan 2013 were collected and analyzed.

STATISTICAL ANALYSIS: The statistics for calculation of 'p' value was done by one sample t test. The data collected from the register were name of the patient, age, sex, residential area, HIV status, category to which the patient belongs when considered as MDR-TB suspect (as recommended by RNTCP) and the results of the GeneXpert testing done in the higher centre.

RESULTS:

Total number of patients who were considered as 'MDR- suspects' and their sputum samples sent for GeneXpert testing was 167 during the 6 months period from Aug 2012-Jan 2013. All the cases were previously treated and there were no new cases considered as 'MDR TB suspects'. Of these the number of cases detected as rifampicin resistant by CBNAAT were 31cases. So the prevalence of MDR-TB among the previously treated cases was 18.56%.
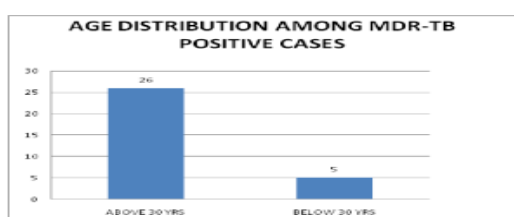
FIG: 1
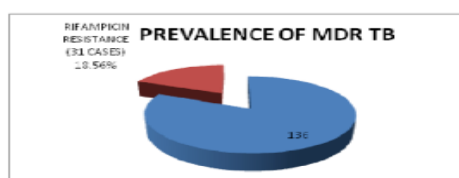
- Among the resistant cases 24 were males and 7 were females.

FIG: 2
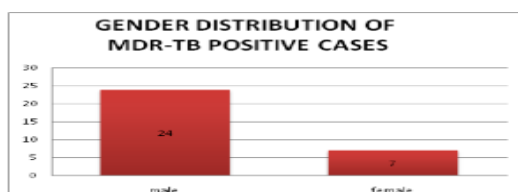
• Most of them (26 out of 31) were more than 30 yrs of age.
FIG: 3

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No of patients hailing from rural population exceeds the urban population. 20 were from rural population and 11 from the urban population. This was statistically insignificant (table 1).
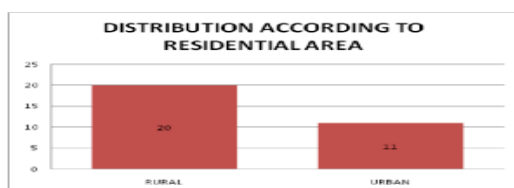**FIG: 4**

TABLE: 1

STATISTICAL 'p' VALUE FOR RURAL & URBAN DISTRIBUTION

NUMBER OF PATIENTS FROM RURAL AREA	NUMBER OF PATIENTS FROM URBAN AREA	T VALUE	DEGREE OF FREEDOM	'p' VALUE
20	11	1.689	30	0.1016

SIGNIFICANT
'p' VALUE <0.05 - CONSIDERED
'p'- NOT SIGNIFICANT

TABLE: 2
CATEGORIES ACCORDING TO RNTCP GUIDELINES (8)

CATEGORY	TYPES OF CASES CONSIDERED AS MDR- SUSPECTS
1	All failures of new TB cases
2	Smear positive previously treated cases who remain sputum positive at 4th month onwards
3	All pulmonary TB cases who are contacts of known MDR-TB cases
4	All smear positive previously treated pulmonary TB cases at diagnosis
5	Any smear positive follow up result in new/previously treated cases
6	All smear negative previously treated pulmonary TB cases at diagnosis, retreatment case
7	HIV-TB co-infected cases at diagnosis

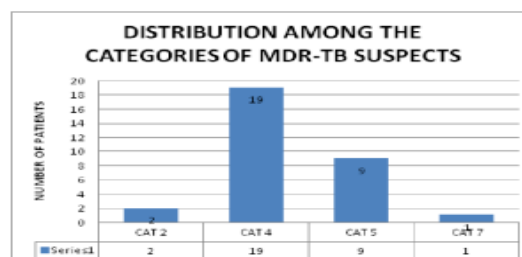• Category wise distribution showed the following data:
Category 4 – 19
Category 5 – 9
Category 2 - 2
Category 7 - 1
FIG: 5

DISCUSSION:

- Anti TB drug resistance is the major public health problem that threatens the progress made in TB care and control worldwide. Drug resistance arises due to the improper use of antibiotics in chemotherapy of drug susceptible TB patients.

- Improper use is a result of a number of actions including administration of improper treatment regimens and failure to ensure that patients complete the whole course of treatment.

- A patient who develops active disease with a drug resistant strain can transmit this form of TB to other individuals (2).

- Innovations in diagnostics are being implemented to enable quicker diagnosis and early start of therapy which is now available in low resource settings.

- In our study the prevalence of MDR TB among previously treated TB cases in the study centre was 18.56% which is higher than the Indian prevalence of 15% according to the Global Tuberculosis Report 2012 by WHO (2). The results of a meta analysis in Europe (9) showed that the MDR TB patients more likely to have received previous treatment in 22 studies, had a pooled estimate 10 times higher than for newer

patients . Our prevalence was not as high as the results of a study conducted in North India (10) where the it was 9.9% among new cases and 27.6% among previously treated cases. Moreover in our study all the cases re ferred for detection of rifampicin resistance were previously treated and none of them were new cases. No cases belonged to the categories 1 & 3 and all those of category 5 were previously treated.

- As far as the age distribution is concerned, prevalence was more in the age group of more than 30 yrs. This is similar to the results of other studies conducted in Europe in 2006(9) where the prevalence is more in older age group. Similarly the prevalence among males is more common than females in our study which is comparable to the study conducted in Europe (9).

- In our study the prevalence of MDR TB among rural population exceeds that of the urban population but is not statistically significant (p value-0.1016). This observation is in contrast to the observations of the study conducted in the Hinduja hospital, Mumbai where the prevalence is greater among the urban population and was statistically significant (11). This could possibly be attributed to more number of cases being referred to our tertiary care centre from the rural areas.

- In category wise distribution the greater number of MDR TB suspects were those with sputum positive, retreatment cases i.e. category 4 with 19 cases. Next come the patients with sputum positivity at any follow up (9 cases). Third in the order is the retreatment case with sputum positivity at 4th month. Only one case belonged to the category 7 (HIV positive). In our study there were no new cases of tuberculosis considered as MDR suspects.

- As far as HIV positivity is concerned among the 31 MDR TB patients only one case is HIV positive. Certain other studies also have found that HIV positivity is not an independent risk factor for MDR TB (12, 13).

The inference of the study was that the prevalence was more among previously treated cases, male patients, more than 30 yrs of age and among rural population. This pattern may differ in other regions. Improved understanding of the epidemiology of TB will be important for designing public health intervention at the national and regional level. More studies are needed to assess the burden of disease at various regions thereby facilitating the planning of interventions.

CONCLUSION:
MDR TB being an increasing global problem needs more surveillance and monitoring which will help in the proper planning of the diagnostic approach and therapeutic interventions. More studies are needed to accomplish this in various regions.

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