Section: General Medicine

Original Research Article

SOCIO CLINICAL PROFILE OF MULTIDRUG RESISTANT TUBERCULOSIS CASES

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Abstract

Background: India has highest burden of both tuberculosis (TB) and multidrug resistant tuberculosis (MDR TB) based on estimation reported in Global TB Report 2016. The two reasons why multidrug resistance continues to emerge and spread are mismanagement of TB treatment and person-to-person transmission. Most people with TB are cured by a strictly followed, 6-month drug regimen that is provided to patients with support and supervision. Inappropriate or incorrect use of antimicrobial drugs, or use of ineffective formulations of drugs and premature treatment interruption can cause drug resistance, which can then be transmitted, especially in crowded settings such as prisons and hospitals. **Materials and Methods:** A Cross sectional study was conducted in DR-TB Centre under the Department of Pulmonary Medicine, VSS Medical College, Burla. Treatment is decentralized, but requires a clinical expert resource centre for the complicated clinical care needs. This is the DR-TB Centre. This type of Centers is utilized to initiate treatment, follow-up case management and manage complications. One DR-TB Centre is expected per 10 million populations roughly. DR-TB Centre was set up in this tertiary care centre and first patient registered on 20th May 2013. DR-TB Centre is 16 bedded indoor hospital functioning under the Dept. of Pulmonary Medicine under the administrative control of DR -TB Committee/PMDT-management Committee. **Result:** In our study shows that 41(47.7%) of MDR cases were suspected at the end of the 2nd episode of TB treatment. These were mostly the relapse/lost to follow up & failure of CAT I&CAT II. 37(43%) were within the one episode of TB treatment and were mostly newly diagnosed case of MDR-TB, Cat-I Failure, Cat-I Relapse. These 43 % &47.7% cases were mostly due to primary & secondary resistance. In this study shows that 73(84.9%) patients were treated under RNTCP Regimen as per WHO Guideline. Only 08(9.3%) patients were treated privately either initially or in Between and 05(5.8%) were treated both private and RNTCP any one of the sources initiated first then next one. **Conclusion:** These MDR cases are in most economically productive age group & underweight because of TB disease. Mal nutrition & Infection is known to be the parts of a vicious cycle. An improved nutritional status or BMI of infected individuals will have a definite impact on the cure rate of the cases. As under nutrition and drug resistant both are inter related to aggravate each other. So supplementary nutrition for the cases on the drug resistant will not only improve the compliance for the treatment but also prevent the drug resistance of the cases.

INTRODUCTION

India has highest burden of both tuberculosis(TB) and multidrug resistant tuberculosis (MDR TB) based on estimation reported in Global TB Report 2016.[1] According to the World Health Organization, 5000 people die every day which made it world's top infectious disease. It killed about one million children below 14 year in 2015 and ranks among the top 10 global causes of death worldwide 1.7 lacs were diagnosed with TB (10-15%) are under the age of 14 years.[2] In terms of incidence rate India ranks number

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six, appears to be the major source for the Region's TB numbers.

As per the 2016 Global TB report, the WHO South-East Asia Region (SEAR) the estimated incidence of MDR TB and rifampicin resistant (RR-TB) was 2lacs cases in 2015. The MDR/RR-TB cases estimated 35 953 cases were diagnosed using laboratory confirmation out of 1.1lacs notified pulmonary cases in the same year, of which the laboratory confirmed cases, 32 648 were started on treatment. All the MDR/RR-TB cases initiated treatment in 2013 and the treatment success rate were 49% only in SEAR.[3,4]

An estimated 1.3 lakh incident MDR-TB patients emerge annually in India which includes 79000 MDR-TB Patients estimates among notified pulmonary cases.[1] The rate of decline is too slow to meet the 2030 Sustainable Development Goals (SDG) and 2035 End TB targets, although India has managed to scale up basic TB services in the public health system, treating more than 10 million TB patients under RNTCP. To hasten the rate of decline of incidence of TB more than 10-15% annually new comprehensive interventions are required deployed. The requirements for moving towards TB elimination have been integrated into "Detect – Treat –Prevent – Build" (DTPB) are the four strategic pillars of approach of RNTCP, National Strategic Plan 2017 - 2025.[5]

Over 2lakhs people got DR-TB in 2015 due incomplete treatment.[3] Incomplete treatment may be due to many factors or underlying factors. The TB epidemic is much larger than earlier, particularly in the WHO South-East Asia Region (SEAR). This was largely because the private sector in India was outside the ambit of the National TB Programme (NTP). When the correction was made it led to a 34% rise in notifications in India between 2013 and 2015. This is because in 2015 there were 4.3 million "missing cases". Ten countries accounted for 77% of this estimated gap globally. In SEAR, besides India, Bangladesh, Indonesia and Myanmar also contributed substantially to the "missing cases".[6]

A well-ventilated room that allows sunlight reduces risk of TB transmission whereas Malnutrition, smoking, alcohol and diabetes aggravate TB.[7]

The two reasons why multidrug resistance continues to emerge and spread are mismanagement of TB treatment and person-to-person transmission. Most people with TB are cured by a strictly followed, 6-month drug regimen that is provided to patients with support and supervision. Inappropriate or incorrect use of antimicrobial drugs, or use of ineffective formulations of drugs (such as use of single drugs, poor quality medicines or bad storage conditions), and premature treatment interruption can cause drug resistance, which can then be transmitted, especially in crowded settings such as prisons and hospitals.[8]

MATERIALS AND METHODS

A Cross sectional study was conducted in DR-TB Centre under the Department of Pulmonary Medicine, VSS Medical College, Burla during 1st December 2015 to 30th November 2017.

Treatment is decentralized, but requires a clinical expert resource centre for the complicated clinical care needs. This is the DR-TB Centre. This type of Centers is utilized to initiate treatment, follow-up case management and manage complications. One DR-TB Centre is expected per 10 million populations roughly. DR-TB Centre was set up in this tertiary care centre and first patient registered on 20th May 2013. DR-TB Centre is 16 bedded indoor hospital functioning under the Dept. of Pulmonary Medicine under the administrative control of DR -TB Committee/PMDT-management Committee.

Inclusion Criteria

All newly diagnosed MDR-TB cases registered were identified from line lists available at VSS MCH Burla.

Exclusion Criteria

Extensive Drug Resistant TB (XDR) and those who not consenting to participate in the study population were excluded from the study.

Sample Size

The entire patient registered in the DR-TB centre were included in my study population till the end of my study period and the sample size was 86 (n-86).

Methods

The DR-TB centre was visited thrice in a week and all the newly diagnosed. Drug resistant TB cases admitted during the period for Pre-treatment Evaluation & Initiation of MDR- TB Treatment in DR-TB Centre VSS Medical College, Burla were interviewed after taking prior consent (Annexure-I) over a pre-tested structured scientifically designed interviewer administered questionnaire (Annexure-II) was used for data collection. The same questionnaire was used to extract and abstract data from patients' records. Secondary data regarding the social profile, clinical profile, Laboratory findings etc also collected over the schedule.

All patients were hospitalized (at the DR-TB Centre) for pre-treatment evaluation and treatment initiation. Pre-treatment evaluation included a thorough clinical evaluation by a physician, chest radiograph, and relevant haematological and bio-chemical tests. Since the drugs used for the treatment of MDR-TB known to produce adverse effects, a proper pre-treatment evaluation is essential to identify patients at increased risk of developing such adverse effects.

Statistical Analysis

Data was coded during collection and Epi info version 7statistical software (free software by WHO/CDC) was used for both data entry and analysis. Double data entry was done on daily basis to minimize errors by identifying inconsistently entered files. Data cleaning was done prior to analysis. Each questionnaire was assigned a unique

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identifier to allow validation. To ensure confidentiality, access to data was restricted by use of passwords only available to the principal investigator. Questionnaires were kept under lock and key by the principal investigator.

RESULTS

[Table 1] shows that total 86 subjects 58(67.4%) were males as compared to 28(32.6%) females. With the minimum age 12 years and maximum with the age 81years with the mean years 35.83, SD 14.42 for all. For male minimum age in years is 17 and maximum age in years is 81 with the mean age in years is 37.73 and SD 14.42. For female minimum age 12 years and maximum 76 years with the mean 31.78 and SD 15.28. The age group mostly affected were 45(52.3%) belongs to age group 21 to 40 and least affected were below 20years 11(12.8%) and above 61 years 4(04.7%). Males affected by MDR-TB have an adverse impact on the socio-economic status of the family being burden on the other earning members increasing dependency (58-70). This gender distribution in this study shows similar findings to earlier studies.

[Table 2] shows that 41(47.7%) of MDR cases were suspected at the end of the 2nd episode of TB treatment. These were mostly the relapse/lost to follow up & failure of CAT I&CAT II. 37(43%) were within the one episode of TB treatment and were mostly newly diagnosed case of MDR-TB, Cat-I Failure, Cat-I Relapse. These 43 % &47.7% cases were mostly due to primary & secondary resistance.

[Table 3] shows that 73(84.9%) patients were treated under RNTCP Regimen as per WHO Guideline. Only 08(9.3%) patients were treated privately either initially or in Between and 05(5.8%) were treated both private and RNTCP any one of the source initiated first then next one. All privately treated cases were finally treated by CAT-I/ CAT-II RNTCP regimen.

[Table 4] shows the duration of disease in 40(46.5%) patients were below 12 month, in 26(30.2%) patients it was 13 to 48 months, in 5(5.8%) patients above 48 months and in 3 (3.5%) patients, within 37 to 48 month. This was mainly due to negative health seeking behaviour and lack of health facility nearby.

[Table 5] shows 46 (53.5%) patients reported Cat-I failure within 6month, 24(27.9%) patients within 7 to 12 month and lowest 02(2.3%) patients between 19 to 24 months. Mean drug duration before MDR-TB was 7.47 months with upper bound 6.49 and lower bound 8.45 months, Standard deviation 4.57 (CI 95).

[Table 6] shows 61(70.9%) patients belonged to Criteria A being highest and in Criteria C 08(09.3%) patients being the lowest.

[Table 7] shows that among total of 86 MDR-TB cases 83 (96.5%) were pulmonary cases and 03 (3.5%) were extra-pulmonary cases.

Table 1: Socio-demographic characteristics

SL. No.	Demographic characteristics		Frequency	Percentage (%)
1	Sex	Male	58	67.4
		Female	28	32.6
2	Age in years	<20	11	12.8
		21-40	45	52.3
		41-60	26	30.2
		>61	04	04.7
3	Religion	Hindu	78	90.7
		Muslim	05	05.8
		Christian	03	03.5
4	Caste	ST	17	19.8
		SC	28	32.6
		OBC	01	01.2
		General	40	46.5
5	SES	BPL	67	77.9
		APL	19	22.1
6	Marital status	Married	56	65.1
		Unmarried	30	34.9

Table 2: Treatment Episodes (n-86)

Sl No.	Episodes	Frequency	Percentage (%)
1	1st	37	43.0%
2	2nd	41	47.7%
3	3rd	08	09.3%
	Total	86	100%

Table 3: Sources of Treatment (n-86)

Sl No.	Sources	Frequency	Percentage (%)
1	RNTCP	73	84.9%
2	Private	08	09.3%
3	Both RNTCP and Private	05	05.8%
	Total	86	100%

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Table 4: Duration of disease in months (n-86)

Sl No.	Duration of Disease	Frequency	Percentage (%)
1	<12 months	40	46.5%
2	13 to 24	26	30.2%
3	25 to 36	12	14.0%
4	37 to 48	03	03.5%
5	>48	05	05.8%
	Total	86	100%

Table 5: Drug duration before MDR-TB in months (n-86)

Sl No.	Duration in months	Frequency	Percentage (%)
1	<6 months	46	53.5%
2	7 to 12 months	24	27.9%
3	13 to 18 months	14	16.3%
4	19 to 24 months	02	02.3%
	Total	86	100%

Table 6: MDR Criteria (n-86)

Sl No.	Criteria	Frequency	Percentage (%)
1	A	61	70.9%
2	B	17	19.8%
3	C	08	09.3%
	Total	86	100%

Table 7: Types of Tuberculosis among MDR-TB (n-86)

Sl No.	Types of TB	Frequency	Percentage (%)
1	Pulmonary	83	96.5
2	Extra pulmonary	03	3.5
	Total	86	100

DISCUSSION

Mahmoudi and Iseman observed that among the 35 patients with MDR-TB patients, errors in management decisions occurred in 28 patients, at an average of 3.93 errors per patient.[9,10] The most common errors were the addition of a single drug to a failing regimen, failure to identify pre existing or acquired drug resistance, initiation of an inadequate primary regimen, failure to identify and address noncompliance and inappropriate isoniazid preventive therapy. Use of single drug to treat TB is another common predisposing cause in the Indian setting. This could have occurred because of ignorance, use of penicillin/ streptomycin combinations; use of Rifampicin for other diseases, and economic constraints. There is also a risk of use of unreliable drugs with poor bioavailability (e.g., Rifampicin, isoniazid, pyrazinamide combinations). Use of anti-tuberculosis drugs by unqualified persons or alternative medicine. A practitioner in bizarre regimens for inadequate periods is an important problem in our country. Availability of anti-tuberculosis drugs over the counter may also contribute to this.[11]

The review indicated that previous exposure to TB treatment was found to be the most significant risk factor for MDR-TB Similar findings were reported from studies conducted in Europe, India, China, Portugal, Iran, Spain and east Africa.[12,13] In contrast to this report Biadglegne et al. in 2013 reported that newly treated TB cases harbour MDR-TB in Ethiopia. Yimer et al,[14] in 2011 and Abebe et al,[15] in 2012 reported HIV to be a risk factor for MDR-TB. However, a positive association between HIV and MDR-TB has not been reported from study results in east Africa and Ethiopia According to the Federal Ministry of Health in Ethiopia exposure to a known MDR-TB case,[16,17] history of using poor quality TB drugs, treatment in a poorly-performing control program and mal absorption were found to have a positive association with MDR-TB. A case control study in Addis Ababa, USA by Hirpa et al,[18] in 2013 reported drug side effects during treatment, treatment not directly observed by a health worker, interruption of treatment of at least a day, duration of treatment between 2 and 7 months, and treatment with a category II regimen as risk factors for MDR-TB.

Being male has been reported to be a risk factor for MDR-TB.[19] The design of the studies, factors such as sample size, education, place, study subjects and other factors might be reasons for the discrepancies in determining the risk factors associated to MDR-TB.

Review of published literature strongly suggests that the most powerful predictor of the presence of MDR-TB is a history of treatment of tuberculosis.[20] TB patients in India get treated with DOTS regimens not only through the Revised National Tuberculosis Control Programme (RNTCP), but also receive treatment from private medical practitioners. Irregular, incomplete, inadequate treatment is the commonest mean of acquiring drug resistant organisms.

Treatment practices in the private sector are largely unregulated and had been an issue for years Inappropriate TB regimens have been documented

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among majority of indigenous medical practitioners private practitioners in a slum area and also among chest physicians.[21-24]

The perceptions of health and illness in many minority groups are altered resulting in a negative impact on health-seeking behaviour and access to services. Important factors include disrupted social networks, social exclusion, reduced accessibility to health care, lack of egalitarian participation in society and lack of trust, understanding or respect for the system. Women, unemployed and homeless people experience longer delays in seeking care resulting in increased suffering and expenses and higher risk of community transmission.[25]

Displaced populations can affect TB control in host countries by significantly increasing disease burden and workload. Poor living conditions and overcrowding increase the risk of TB infection. Special health needs and experience obstacles for accessing health care such as language, stigmatization, poor cultural awareness, psychological distress, disruption of families and social networks, and economic difficulties.[26]

Similar study conducted by Kuitéria Ribeiro Ferreira et al. on 2010 in the State of São Paulo Reference Centre for Tuberculosis (TB) found that 98.4% were pulmonary and 01.6% was extra pulmonary.[27]

CONCLUSION

These MDR cases are in most economically productive age group & underweight because of TB disease. Mal nutrition & Infection is known to be the parts of a vicious cycle. An improved nutritional status or BMI of infected individuals will have a definite impact on the cure rate of the cases. As under nutrition and drug resistant both are inter related to aggravate each other. So supplementary nutrition for the cases on the drug resistant will not only improve the compliance for the treatment but also prevent the drug resistance of the cases. Drug provider should be trained about locally available supplementary nutrition and monitored and supervised regularly at district level.

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