



STUDY OF SOCIODEMOGRAPHIC AND CLINICAL PROFILE OF MDR PULMONARY TUBERCULOSIS PATIENTS ON INJECTABLE CONTAINING SHORTER COURSE REGIMEN ATTENDING A TERTIARY CARE CENTRE IN NORTH INDIA.

Pulmonary Medicine

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ABSTRACT

Tuberculosis (TB) is a communicable disease that is a major cause of ill health and one of the leading causes of death worldwide. Until the coronavirus (COVID-19) pandemic, TB was the leading cause of death from a single infectious agent, ranking above HIV/AIDS. Multidrug-resistant TB (MDR-TB) remains a public health crisis and a health security threat. Only about one in three people with drug resistant TB accessed treatment in 2020. **Material And Methods** It was a hospital based, non-randomized and without control group observational and prospective study, in cohort of DRTB patients conducted at Nodal DRTB Centre and Department of Tuberculosis and Respiratory Diseases S. N. Medical College Agra, Uttar Pradesh, India **Result** 53.89% male and 46.11 % females were affected in the study. 65% patients and 35% patients belong to rural and urban populations areas respectively. Cough was present in 100% patients followed by the fever which was present in 95.56% patients. Cough with expectorations was present in 94.44% patients and loss of appetite in 78.89% patients. **CONCLUSION:** Early detection will be helpful in not only modifying the disease course but also delaying and preventing fatal complication hence patient may be treated earliest by various measures.

KEYWORDS

Mdr Tb, Shorter Course Regime, Sociodemographic Profile

INTRODUCTION

"I have no business to live this life if I cannot eradicate this scourge from mankind"- Robert Koch (Delivering a lecture at Berlin University on his discovery of tuberculosis bacilli, 1882) Tuberculosis (TB) is a communicable disease that is a major cause of ill health and one of the leading causes of death worldwide. Until the coronavirus (COVID-19) pandemic, TB was the leading cause of death from a single infectious agent, ranking above HIV/AIDS.

TB is caused by the bacillus *Mycobacterium tuberculosis*, which is spread when people who are sick with TB expel bacteria into the air (e.g., by coughing). The disease typically affects the lungs (pulmonary TB) but can affect other sites. Most people (about 90%) who develop the disease are adults, with more cases among men than women. About a quarter of the world's population is infected with *M. tuberculosis*.

A total of 1.5 million people died from TB in 2020 (including 214 000 people with HIV). Worldwide, TB is the 13th leading cause of death and the second leading infectious killer after COVID-19 (above HIV/AIDS).

In 2020, an estimated 10 million people fell ill with tuberculosis (TB) worldwide. 5.6 million men, 3.3 million women and 1.1 million children. TB is present in all countries and age groups. But TB is curable and preventable. In 2020, the 30 high TB burden countries accounted for 86% of new TB cases. Eight countries account for two thirds of the total, with India leading the count, followed by China, Indonesia, Philippines, Pakistan, Nigeria, Bangladesh and South Africa.

Antimicrobial resistance is still a worrying worldwide public health issue due to the high cost of medical treatment and the potentially severe repercussions it causes. This antimicrobial resistance occurs when the microorganism has an adaptive response when exposed to antimicrobial treatment. Resistance to anti-TB drugs can occur when these drugs are misused or mismanaged. Examples include when patients do not complete their full course of treatment; when health-care providers prescribe the wrong treatment, the wrong dose, or length of time for taking the drugs; when the supply of drugs is not always available; or when the drugs are of poor quality.

Drug resistance is more common in people who:

- Do not take their TB medicine regularly
- Do not take all of their TB medicine as told by their doctor or nurse
- Develop TB disease again, after having taken TB medicine in the past
- Come from areas of the world where drug-resistant TB is common
- Have spent time with someone known to have drug-resistant TB disease

Multidrug-resistant TB (MDR-TB) -

A TB patient, whose biological specimen is resistant to both H and R with or without resistance to other first-line anti-TB drugs. MDR-TB patients may have additional resistance to any/all FQ or any other anti-TB drug.

Multidrug-resistant TB (MDR-TB) remains a public health crisis and a health security threat. Only about one in three people with drug resistant TB accessed treatment in 2020.

Recent global estimates indicate that about a half million new cases of rifampicin resistant TB (RR-TB) occurred in 2019 with 78% of them having confirmed MDR-TB. Estimated number of MDR/RR-TB cases in India are 124 000 (9.1/lakh population). The first national anti-tuberculosis drug resistance survey (NDRS) revealed that 28% of TB patients were resistant to any drugs (22% among new and 36.82% among previously treated) and 6.19% had MDR-TB (2.84% among new and 11.62% among previously treated [PT]). Further, any Isoniazid (H) resistance (16% in all with 11.6% in new and 25% in PT) being driver for RR-TB.

In this situation, an attempt of using the shorter course Regimen to face the MDR-TB crisis as an alternate method proves to be promising. The Shorter course Regimen is a treatment for MDR-TB that could effectively reduce the duration of drug administration. Short course regimen is summarized into three drug classes, including FQ (ofloxacin, gatifloxacin, moxifloxacin, etc.), core drugs (kanamycin, prothionamide, etc.), and active companion drugs (clofazimine and first-line drugs such as isoniazid, Pyrazinamide and Ethambutol.)

The therapy of MDR-TB using shorter course regimen is crucial and

essential to explore, as it has the potential to increase the success rate of MDR-TB treatment. Since the invention of the Bangladesh regimen in 2010, which only required nine months of treatment, several studies have also carried out to implement a similar regimen in MDR-TB management. Several new regimens have also been reported to possess comparative effectiveness with long-term regimens.

Decision to start shorter MDR TB regimen will be based on non-DST and DST based exclusion criteria. patients who are Rifampicin-resistant pulmonary and extra pulmonary TB are registered under Shorter MDR TB regimen

Nodal DRTB Centre S.N Medical College Agra is successfully running Shorter Course MDR regimen under PMDT.

The present study was undertaken to evaluate the efficacy, safety and outcomes of shorter course MDR Regimen as per drug susceptibility testing (DST) in DR-TB patients.

AIM:

Sociodemographic and clinical profile of MDR Pulmonary Tuberculosis patients on injectable containing Shorter Course Regimen attending a tertiary care Centre in North India.

OBJECTIVES

1. To assess the prevalence of MDR Pulmonary tuberculosis patients among different sexes in this region
2. To assess various risk factors responsible for MDR Pulmonary tuberculosis in this region.
3. To study various clinical feature of MDR Pulmonary tuberculosis patients and their distribution according to sociodemographic parameters.

MATERIAL AND METHODS

It was a hospital based, non-randomized and without control group observational and prospective study, in cohort of DRTB patients conducted at Nodal DRTB Centre and Department of Tuberculosis and Respiratory Diseases S. N. Medical College Agra, Uttar Pradesh, India.

Study Population

Self-reporting and /or referred MDR-TB patients registered under the short course CAT-IV at the nodal DRTB Centre, S. N. Medical College Agra were encouraged to participate in the study.

Inclusion Criteria

1. A patient will be eligible for treatment with a novel shorter MDR-TB
2. treatment regimen if he/she:
3. Is willing and able to give informed consent to be enrolled in the research project and for follow up.
4. Has bacteriologically confirmed TB with initial laboratory result of resistance to at least rifampicin.
5. Has strong clinical and radiological evidence of active TB and is a close household contact of a patient with laboratory-confirmed MDR-TB.
6. Is willing to use effective contraception if the patient is a premenopausal woman.
7. Is willing to adhere to the follow-up schedule and to study procedures.

Exclusion Criteria

A patient will not be eligible for treatment with a novel shorter MDR-TB treatment regimen if he/she:

1. Those who are not willing to be the part of study or not giving consent in written.
2. Those who are defaulter in short course regime of CAT-IV
3. Extra-pulmonary TB other than cervical lymphadenopathy and pleural effusion
4. If pregnant women in the first trimester are excluded from the shorter MDR-TB. If pregnant women are included, it is advisable to avoid those in the first trimester.
5. Is unable to attend or comply with treatment or follow-up schedule.
6. Is unable to take oral medication.
7. Is taking any medications contraindicated with the medicines in the shorter MDR-TB regimen.

8. Has a known allergy to any of the drugs in the shorter MDR-TB regimen.

Study Period

The study will be carried out from September 2019 to March 2021.

Study Design

The present study was hospital based prospective and observational study carried out on MDR patients.

Sample Size Of Study

This Study was conducted over cohort of 180 patients who were eligible for the study

RESULTS

Table 1: Analysis of patients registered at nodal DRTB centre S.N. Medical College Agra

Time	No of patient registered (n=420)		No of patients on shorter regimen (n=180)	
	n	%	n	%
First quarter	130	30.95	41	22.77
Second quarter	112	26.67	53	29.44
Third quarter	139	33.10	60	33.33
Fourth quarter	39	9.29	26	14.44

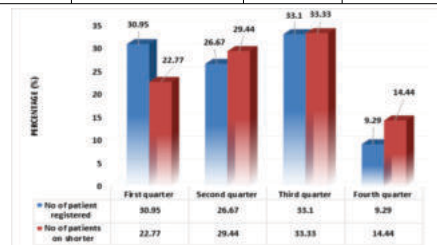
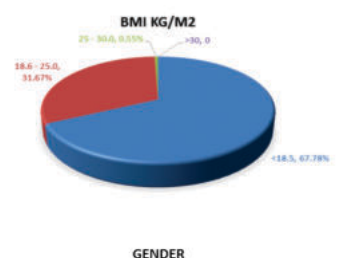


Table 2: Distribution of patients according to gender, Residence and BMI (kg/m2)

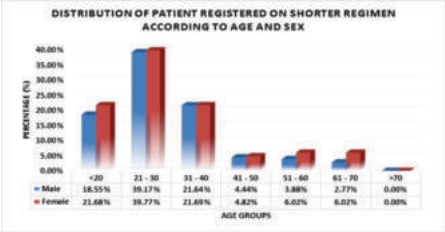
		n	%
Gender	Male	97	53.89
	Female	83	46.11
Residence	Rural	118	65.56
	Urban	62	34.44
BMI kg/m2	≤18.5	122	67.78
	18.6-25.0	57	31.67
	25-30.0	1	0.55
	>30	0	0.00



Among 180 patients registered 53.89% were males & 46.11% were females. Maximum number of patients were in group 21-30 year age group followed by ≤20 year (20%). Maximum number of males were in 21-30 year age group (39.17%) followed by ≤20 year and 31-40 year. Similarly females also were maximum in age group 21-30 followed by ≤20 year.

Table 3: Distribution of patient registered on shorter regimen according to age and sex

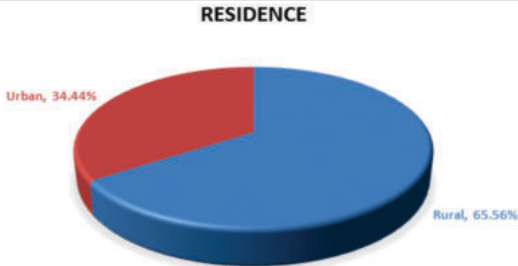
Age groups	Male (n=97)		Female (n=83)		Total (n=180)	
	n	%	n	%	n	%
≤ 20	18	18.55	18	21.68	36	20.00
21-30	38	39.17	33	39.77	71	39.44
31-40	21	21.64	18	21.69	39	21.67
41-50	08	4.44	04	4.82	12	6.67
51-60	07	3.88	05	6.02	12	6.67
61-70	05	2.77	05	6.02	10	5.55
>70	00	0.0	00	0	00	00



Out of total 180 patients ,65.56% were from rural area and 34.44% were from urban area .Proportion of males and females was similar in both the areas.

Table 4: Distribution of patient according to place of residence (rural or urban)

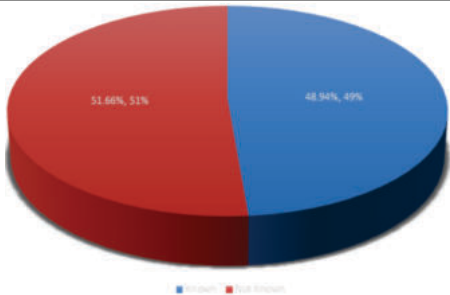
	Rural (n=118)		Urban (n=62)	
	n	%	n	%
Males	65	55.08	36	58.06
Females	53	44.92	26	41.94



Only 48.34% patients were aware of their suspected contacts

Table 5: Analysis of patients according to contact history of tuberculosis

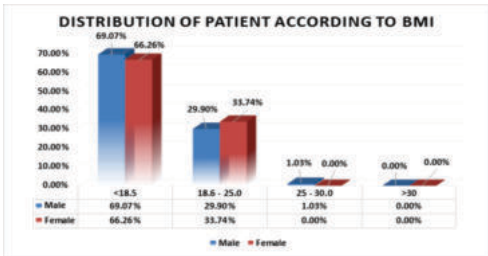
Contact history	n	%
Known	87	48.34
Not known	93	51.66
Total	180	100



Most of the patient 67.78% had low BMI ≤18.5% and 31.67% patients have BMI within normal limit. There was only 01 patient who had BMI between 25-30. Proportion of male and female was nearly similar in low and normal BMI group.

Table 6: Distribution of patient according to BMI

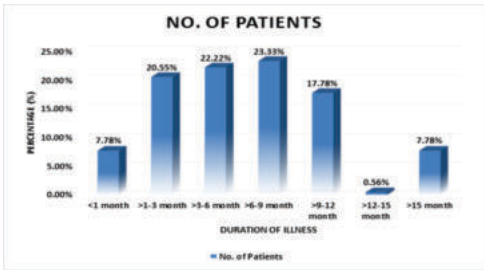
BMI	Male (n=97)		Female (n=83)	
	n	%	n	%
≤18.5	67	69.07	55	66.26
18.6-25.0	29	29.90	28	33.74
25-30.0	1	1.03	0	0.00
>30	0	0.00	0	0.00



Majority of patients had duration of illness between 1 month to 12 months.

Table 7: Distribution of patients according to duration of illness

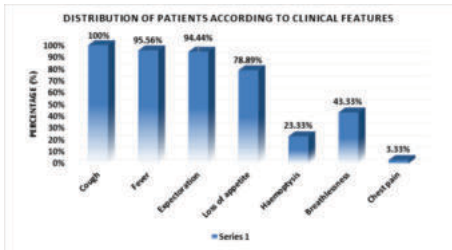
Duration of illness	No of Patients	%
≤1 month	14	07.78
>1-3 month	37	20.55
>3-6 month	40	22.22
>6-9 month	42	23.33
>9-12 month	32	17.78
>12-15 month	1	00.56
>15 month	14	07.78
Total	180	100.00



20% of our patients were new cases ,15.00% were relapse, 53.89% were failure of first previous regimen , 11.11% were reinfection.(If patients was diagnosed as MDR within one year of last treatment we considered it to be relapse)

Table 15: Distribution of Patients According to Clinical Features

	n	%
Cough	180	100%
Fever	172	95.56%
Expectoration	170	94.44%
Loss of appetite	142	78.89%
Haemoptysis	42	23.33%
Breathlessness	78	43.33%
Chest pain	6	3.33%



DISCUSSION

This study was conducted at the Nodal DR-TB centre in the Department of Tuberculosis and Respiratory Diseases, S N Medical College, Agra for a period of 18 months. A cohort of 180 eligible DR-TB patients were enrolled into the study.

In this study, follow up of the patients was markedly hampered because of Covid-19 pandemic because whole country was locked down and there was restriction of movement.

In the study period, out of 420 registered patients at our Nodal DR-TB Centre S.N. Medical College Agra, 180 Patients were registered in shorter course regimen. Analysis of 180 Pulmonary tuberculosis MDR patients were done.

Among 180 patients, Male patients were 97(53.89%) and Female patients were 83(46.11%). In a study by N Lomtadze et al Among the 1314 patients included in the final analysis, 240 (18%) were female and 1072 (82%) were male. This difference could be due to geographical variation and high survival age in the country.

Among male 18.55% patients were below 20 years of age. 39.17 % in 21-30 years of age group. Maximum number 39.17% in 21-30 years of age group followed by 21.64% which were lied in 31-40 years of age group. Similarly for the female maximum number of females 39.77% were from the age group 21-30 years of age group followed by 21.69% in 31-40 years of age group. Maximum number of patients 39.44% were from age group 21-30 years followed by 21.67% in age group 31-40 years and 20% in the age group of less than 20 years. The high prevalence of DR-TB in young population is alarming as this would result in considerable health and financial burden on individual family and country.

Majority of our patients were from rural background. 55.68% males and 44.92% females were from rural background. 58.06% males and 41.94% females were from urban background. These observations suggest that rural and urban areas were not different in awareness about the facility of diagnosis and management at various tuberculosis centre in the Agra region. In a study Deepak Almeida et al, incidence of multidrug resistance in 150 consecutive *Mycobacterium tuberculosis* isolates obtained from a rural centre (in Sakawar, India) and an urban tertiary care centre (in Mumbai, India). The study highlights an alarmingly high percentage of multidrug-resistant *M. tuberculosis* isolates in Mumbai (51%) as compared with that at the rural centre (2%). This difference could be due to the fact that majority of patients visited in Nodal DR-TB centre Agra belong to rural areas Majority of the study patients had low BMI less than or equal to 18.5. Among male 69.07% and 66.26% female had BMI less than or equal to BMI 18.5. Only 29.90% male and 33.74% female belong to normal BMI 18.6-25.0. there were only 1.03% patients who were presented in BMI range of 25-50. It was really surprising to us that there was no patient in BMI range of more than 30. According to a study Jun Ho Yang, et al done in South Korea mean BMI in MDR Tuberculosis patient was 19.7 km/m2. It was similar to our study.

In our study we distributed the patients according to duration of illness. Out of 180 patients 23.33% patients had duration of illness from 6-9 months, followed by 22.22% from 3-6 months and 20.55% from 1-3 months respectively. This prolonged duration of illness is due to the patients came from rural background and due to Covid-19 pandemic lockdown as there was hampered transport facility in the state which is why patients could not reach to hospital on time. In this study the most common clinical feature was cough. Cough was present in 100% patients followed by the fever which was present in 95.56% patients. Cough with expectorations was present in 94.44% patients and loss of appetite in 78.89% patients.

CONCLUSION:

1. Out of 420 patients registered in NTEP, 180(42.85%) were registered in shorter course regimen for Drug resistant Pulmonary Tuberculosis.
2. Adult population with poor BMI less than 18.5 were found to be most affected by the disease. The fact that Tuberculosis affects the most productive years of life.
3. 53.89% male and 46.11 % females were affected in the study.
4. 65% patients and 35% patients belong to rural and urban populations areas respectively concluding urban population is not much aware about the program.
5. Total duration of illness was between 1-9 months in majority of cases.
6. In this study the most common clinical feature was cough. Cough was present in 100% patients followed by the fever which was present in 95.56% patients. Cough with expectorations was present in 94.44% patients and loss of appetite in 78.89% patients.

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