

## A STUDY OF CLINIC-RADIOLOGICAL PROFILE AND ADVERSE DRUG REACTIONS IN PATIENTS OF DRUG RESISTANCE TUBERCULOSIS ON ALL ORAL LONGER REGIMEN IN AHMEDABAD, INDIA.

Gojiya Rita<sup>1</sup>, Jindal Savita<sup>2</sup>, Mehta Ayushi<sup>1</sup>, Sanjai K<sup>3</sup>, Nikhil Pankaj<sup>1</sup>, Pithadia Pradeep<sup>4</sup>

<sup>1</sup>Senior Resident, Department of Respiratory Medicine, M P Shah Govt. Medical College, Jamnagar, Gujarat, India

<sup>2</sup>Associate Professor, Department of Respiratory Medicine, Narendra Modi Medical College, Ahmedabad, Gujarat, India

<sup>3</sup>Junior Resident, Department of Respiratory Medicine, M P Shah Govt. Medical College, Jamnagar, Gujarat, India.

<sup>4</sup>Assistant Professor, Department of PSM, Govt. Medical College, Bhavnagar, Gujarat, India.

Received : 30/07/2024  
Received in revised form : 20/09/2024  
Accepted : 04/10/2024

### Keywords:

Adverse drug reactions, DR-TB, drug regime, NTEP, treatment outcome

Corresponding Author:

**Dr. Pithadia Pradeep,**

Email: pradeep280683@gmail.com

DOI: 10.47009/jamp.2024.6.5.99

Source of Support: Nil,  
Conflict of Interest: None declared

*Int J Acad Med Pharm*  
2024; 6 (5); 524-528



### Abstract

**Background:** India is one of the high TB burden country with rising cases of drug resistant cases, with multi-drug resistant TB posing an important public health concern. Long treatment with high incidence of adverse drug reactions among MDR TB cases warrants strict and close supervision for better outcome among MDR cases. Present study aims to evaluate the socio-demographic, clinical and radiological profile, treatment outcome and frequency and severity of adverse drug reactions due to antituberculous treatment among drug resistant TB cases who are treated with all oral longer regime. **Materials and Methods:** It was a cross-sectional study in which we included 70 drug resistant TB cases, diagnosed as MDR or XDR cases and registered between July 2020 to November 2022 and put on all oral longer regimen under National TB Elimination Program at department of Respiratory Medicine, Narendra Modi Medical college attached with LG hospital, Ahmedabad, Gujarat. All patients were assessed for baseline symptoms with close monitoring on monthly basis for development of any adverse drug reaction during treatment. Treatment outcome was obtained after completion of treatment. **Result:** In our study, mean age among DR-TB cases was 36.6 years, with male predominance (62.9%). Half of patients had MDR TB, whereas half had XDR TB. About 75% patients were in the productive age group (18 to 45 years), with about 30% patients having past history of TB. About 85.70% patients were reported as underweight. About half of DR TB patients reported severe adverse drug reactions in our study, with peripheral neuropathy and skin discoloration as most common adverse drug reactions. We observed 81.40% cure rate among DR-TB cases. Cavity and consolidation in lungs were observed in about half of DR TB patients. **Conclusion:** Our study revealed that adverse drug reactions were higher in productive age groups. More than three fourth of DR TB patients were underweight. Cavity and consolidation of lungs were most common X-ray findings among patients. About half of DR TB patients experienced severe adverse drug reactions, with peripheral neuropathy and skin discoloration among most commonly reported adverse drug reactions. Cure rate (81.40%) was pretty good among studied DR TB Patients.

## INTRODUCTION

India is a high TB burden country across the globe with second highest number of estimated drug resistant TB cases after China.<sup>[1]</sup> Multidrug-resistant TB has become a significant public health problem in our country and an obstacle to TB control activities. Studies indicates that the prevalence of

MDR TB in our country is as high as 2-3% among new cases and 12-17% among previously treated cases.<sup>[2]</sup>

The duration of all oral longer regimen is longer (18-20 months), expensive and having higher pill burden with higher toxicity profile. Though, majority of adverse drug reactions are of mild to moderate nature and can be treated with adequate monitoring and

supervision, few cases may experience severe adverse drug reactions, especially in patients with comorbidities, having high morbidity and mortality.<sup>[3]</sup> In Indian studies, the frequency of adverse events to second line anti-TB drugs varies from 47% to 58%.<sup>[4,5]</sup>

Spontaneous adverse drug reactions reporting by global studies showed that adverse drug reactions related to the use of second-line anti-TB drugs are common.<sup>[6,7]</sup> Better outcome of treatment is possible via assuring treatment adherence, pre-treatment counseling and proper management of adverse drug reactions. Therefore, it is imperative to monitor and treat adverse drug reactions developed by the patients of MDR TB put on all oral longer regimen. This study aims to evaluate the socio-demographic, clinical and radiological profile, treatment outcome and frequency and severity of adverse drug reactions due to antituberculous treatment among drug resistant TB cases who are treated with all oral longer regime.

## MATERIALS AND METHODS

Our study aims to study clinical and radiological profile and evaluate adverse drug reactions in patients of drug resistant TB treated by all oral longer regimen under National TB Elimination Program.

It is a cross-sectional study with follow-up and close monitoring of every drug resistant TB patient on monthly basis till completion of treatment or outcome declared. We included 70 MDR TB patients diagnosed and put on all oral longer regimen and registered between July 2020 to November 2022 under National TB Elimination Program at department of Respiratory Medicine, Narendra Modi Medical college attached with LG hospital, Ahmedabad, Gujarat. Written consent was obtained from all study participants before enrolment in the study. The study has been approved by Institutional ethical committee of Narendra Modi Medical College and Hospital, Ahmedabad.

Each Patient's detailed clinical history, addiction, past history and comorbidity, baseline investigations was obtained. The patients were first assessed for symptoms at baseline and then reviewed and followed up with close monitoring on a monthly basis for occurrence of any adverse drug reactions. The treatment of all the patients after sputum culture conversion was continued for a minimum of 18 months. If any patient reports any adverse drug reaction, recommended action were taken like Blood investigations, specialist consultation, reduction of dose or termination of drug etc. and outcome of adverse drug reaction was noted for each patient.

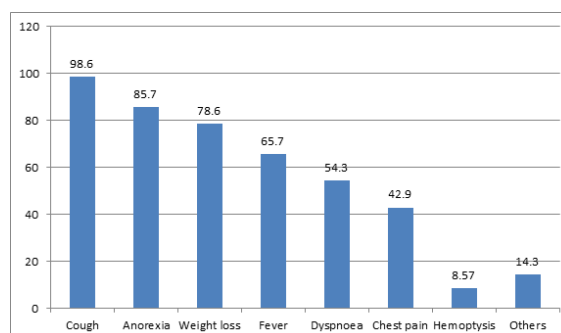
## RESULTS

In our study, Mean age of DR TB patients was 36.6, having 62.9% male patients. About 75% patients were in the productive age group (18 to 45 years). About 30% patients had past history of TB, while one

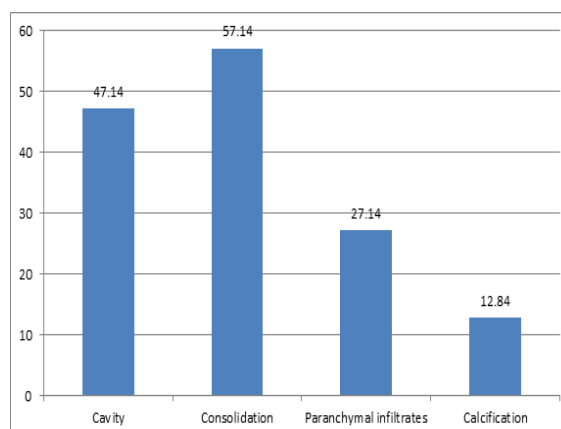
fourth of patients had family history of TB. Regarding nutritional status of DR TB patients, we observed that out of 70 patients, majority of patients (85.7%) were underweight. Almost half of patients were diagnosed as MDR TB and half as XDR TB, though majority of patients (85.70%) had pulmonary TB.

We tried to find out association between body mass index and severity of adverse drug reactions, and observed that there were no association between both variables.

We observed that almost all patients had cough, followed by anorexia (85.7%) and weight loss (78.6%) and fever (65.7%) as most common clinical features among DR TB patients.

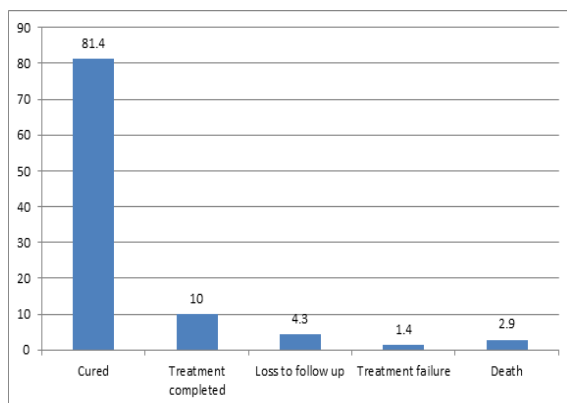


**Figure 1: Clinical Profile of DR TB patients treated on all oral longer regimen (in %)**



**Figure 2: Radiological findings of patients in percentages (multiple responses)(in %)**

X-ray findings in our study revealed that about half of patients had consolidation, while equal proportion had cavity in lungs. About one fourth of study participants had parenchymal infiltrates.



**Figure 3: Treatment Outcome among DR TB patients put on all oral longer regimen.(in %)**

We observed that about 81.4% patients were declared cured, while 1.4% patients were labeled as treatment failure and were evaluated for further DR TB management. About 2.9% patients died during the course of treatment.

**Table 1: Sociodemographic and general profile of DR TB patients.**

Variables	No. (%)
Mean Age (SD)	36.6 (14.20)
Gender	
Male	44(62.9%)
Female	26 (37.1)
Age distribution	
18-30 years	27(38%)
31-45 years	25(35.70%)
45-60 years	16(22.90%)
>60 years	2 (2.90%)
Past history of TB	
Yes	21(30%)
No	49(70%)
Family History of TB	
Yes	17(24.30%)
No	53 (75.70%)
Nutritional Status (BMI)	
Underweight (<18.5)	60(85.70%)
Normal (18.5-25)	5(7.10%)
Overweight or obese (>25)	5
Type of DR TB patients	No. (%)
MDR	36
XDR	34
Site of involvement	
Pulmonary	60 (85.70)
Extra-pulmonary	25 (14.30)

**Table 2: Distribution of DR TB patients according to onset, severity and types of Adverse drug reactions (N=70)**

Onset of ADR	No. (%)
Less than 7 days	12 (17.1)
7 days-15 days	16 (22.9)
15 days-1month	12 (17.1)
1 month to 2 months	8 (11.4)
More than 2 months	22 (31.4)
Severity of ADR	
Mild	17 (24.3)
Moderate	18 (25.7)
Severe	35 (50.00)
Types of ADR	
Peripheral Neuropathy	30 (42.9)
Skin discoloration	28 (40)
Gastritis	12 (17.1)
Hepatotoxicity	5 (7.1)
Arthralgia	5 (7.1)
Nephrotoxicity	3 (4.3)
Optic Neuritis	2 (2.9)
Others	
Outcome of ADR	
Improved	69 (98.6)
Not improved	1 (1.4)

**Table 3: Association of Body Mass Index (BMI) with severity of ADR among DR TB patients.**

BMI	Severity of ADR			Chi square value=0.47 P=0.79
	Mild	Moderate	Severe	
Undeweight	14 (82.4)	15 (83.3)	31 (88.6)	60 (85.7)
Normal or overweight	3 (17.6)	3 (16.7)	4 (11.4)	10 (14.3)
Total	17 (100)	18(100)	35(100)	70 (100)

## DISCUSSION

In our study, we observed that mean age of DR TB patients was 36.6 years, with male preponderance (62.90%). Male predominance may be due to multiple factors like addictions, cultural factors or higher incidence than females. Several studies across different regions also had also male predominance, a finding similar to our study.<sup>[8,9]</sup>

In present study, about three fourth of DR TB patients were in economically productive age groups, which may be due to more outdoor activities. It leads to economic burden among family as well as community. Similar age distribution of patients was also observed by OP Giri and Jagaty S et al in their studies.<sup>[8,10]</sup>

DR TB patients often are undernourished due to anorexia weight loss, that may affect treatment outcome and development of adverse drug reactions. Our study findings revealed that about 85.7% patients were underweight. Swanpnil Jain,<sup>[9]</sup> in his study also observed 88.6% undernourished patients, whereas Sumantkumar Jagaty et al,<sup>[10]</sup> and Omer AA,<sup>[11]</sup> observed about 74.80% and 74.70% patients having undernourishment.

In present study, Cough (98.6%) was present in almost all patients followed by anorexia (85.7%), weight loss (78.6%) and fever (65.70%) In study by Swapnil Jain et al,<sup>[9]</sup> most common symptom was cough (96%) followed by fever (67.5%). This finding is comparable with our study. In study by Sumankumar Jagaty et al. also majority of patients (85.21%) presented with cough.<sup>[10]</sup>

X-ray findings in our study revealed that about half of patients had consolidation, while equal proportion had cavity in lungs. About one fourth of study participants had parenchymal infiltrates. Studies by Omer AA et al,<sup>[11]</sup> and Giovanni Sotgiu et al,<sup>[12]</sup> in their studies observed about 39.70% and 36.80% patients had cavitary lesions in lungs, which is comparable with our study. Joohae Kim et al,<sup>[13]</sup> in his study observed 34.40% patients having cavitary lesions, that is slightly lower than our study.

Our study found that most common adverse drug reaction observed was peripheral neuropathy (42.9%) followed by skin discoloration (40%), Gastritis (17.1%), Hepatotoxicity and Arthralgia(7.1%), Nephrotoxicity (4.3%). In study by Giovanni Sotgiu et al,<sup>[12]</sup> severe ADRs were present in 68.4 % of patients and most common adverse drug reaction was peripheral neuropathy (47.1%). In study by Kalpesh Jain et al,<sup>[14]</sup> 6% had hepatotoxicity and 15% had gastritis that is comparable with our study.

We observed in our study that about one-fourth of DR TB patients observed mild and moderate category of

adverse drug reactions respectively, while about half of DR TB patients had severe adverse drug reactions requiring interventions from health care workers. Giovanni Sotgiu et al,<sup>[12]</sup> in his study reported about 68.4% patients having severe ADRs while Bhusan et al,<sup>[15]</sup> reported 63.6% severe, 18.5% moderate and 17.9% mild adverse drug reaction.

In present study 81.4% patients were cured after treatment, in 1.4% patient treatment failed and 2.9% had died. Omer AA,<sup>[11]</sup> and Giovanni Sotgiu et al,<sup>[12]</sup> reported 72.60% and 81% respectively, both findings are comparable with our study. Joohae Kim et al,<sup>[13]</sup> in his study also reported 77.10% cure rate, which is comparable with our study.

## CONCLUSION

Our study revealed that adverse drug reactions were higher in productive age groups. More than three fourth of DR TB patients were underweight. Cavity and consolidation of lungs were most common X-ray findings among patients. About half of DR TB patients experienced severe adverse drug reactions, with peripheral neuropathy and skin discoloration among most commonly reported adverse drug reactions. Cure rate (81.40%) was pretty good among studied DR TB Patients.

## REFERENCES

1. WHO Global TB control. WHO Report 2010. Available on <http://www.who.int/tb/publications/globalreport/2010/en/index.html>. Last seen on July 22, 0224.
2. Rami K, Ghanchi F, Chatterjee I, Khadiya G, Pithadia P. Study on Prevalence of Drug Resistance and Genetic Mutation Pattern Among Suspected Drug Resistant Pulmonary Tuberculosis Cases in Jamnagar District. *Nat J Integr Res Med* 2019;Vol.10(4):6-9.
3. Prasad R, Singh A, Srivastava R, Hosmane GB, Kushwaha R, Jain A. Frequency of adverse events observed with second-line drugs among patients treated for multidrug-resistant tuberculosis. *Ind J Tubercul* Vol.63(2);2016:106-114.
4. Nafis Ahmad et al. Treatment correlates of successful outcomes in pulmonary multidrug-resistant tuberculosis: an individual patient data meta-analysis. *The Lancet*. Vol. 392(10150);2018:821-834. Available on <https://www.sciencedirect.com/science/article/pii/S0140673618316441>. Last seen on 12-Aug, 2024.
5. F. von Groote-Bidlingmaier et al. Efficacy and safety of delamanid in combination with an optimised background regimen for treatment of multidrug-resistant tuberculosis: a multicentre, randomised, double-blind, placebo-controlled, parallel group phase 3 trial. *The Lancet Respiratory medicine*. Vol.7(3);2019:249-259.
6. C.M. Halleux et al. The World Health Organization global aDSM database: generating evidence on the safety of new treatment regimens for drug-resistant tuberculosis. *Eur Respir J*. 2018
7. S. Wu et al. Adverse events associated with the treatment of multidrug-resistant tuberculosis: a systematic review and meta-analysis. *Am J Therapeut* (2016).

8. Giri OP, Giri VP, Nikhil N. Socio-demographic Profile of MDR-TB and XDR-TB Patients Admitted in DR-TB Centre, North India. *J Assoc Physicians India*. 2019 Oct;67(10):61–4.
9. Jain S, Varudkar HG, Julka A, Singapurwala M, Khosla S, Shah B. Socio-economical and Clinico-Radiological Profile of 474 MDR TB Cases of a Rural Medical College. *J Assoc Physicians India*. 2018 Dec;66(12):14–8.
10. Sumankumar Jagaty, Pravati Dutta, Rekha Manjhi, Sudarshan Pathal SM. Clinico-radiological profile and treatment outcome of mdr tb patients in western odisha. *Paripex - Indian J Res*. 2019;8(6).
11. Omer AA, Meshesha MD, Ajema AT, Yoo SD. Treatment Outcome of MDR/RR TB in a Resource-Constrained Setup: A Four-Year Retrospective Analysis. *Infect Drug Resist*. 2022;15:4707–19.
12. Sotgiu G, Centis R, D'Ambrosio L, Alffenaar J-WC, Anger HA, Caminero JA, et al. Efficacy, safety and tolerability of linezolid containing regimens in treating MDR-TB and XDR-TB: systematic review and meta-analysis. *Eur Respir J*. 2012 Dec;40(6):1430–42.
13. Kim J, Kwak N, Lee HY, Kim TS, Kim C-K, Han SK, et al. Effect of drug resistance on negative conversion of sputum culture in patients with pulmonary tuberculosis. *Int J Infect Dis IJID Off Publ Int Soc Infect Dis*. 2016 Jan;42:64–8.
14. Jain K, Desai M, Solanki R, Dikshit RK. Treatment outcome of andardized regimen in patients with multidrug resistant tuberculosis. *Journal of Pharmacology and Pharmacotherapeutics*. 2014 Jun;5(2):145-9.
15. Bhushan B, Chander R, Kajal NC, Ranga V, Gupta A, Bharti H. Profile of adverse drug reactions in drug resistant tuberculosis from Punjab. *Indian J Tuberc*. 2014 Oct;61(4):318–24.