

TREATMENT OUTCOME OF TUBERCULOSIS CASES AMONG PAEDIATRIC PATIENTS IN WESTERN RAJASTHAN

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ABSTRACT

Objective: This study aimed to identify drug-resistant tuberculosis cases and treatment results. Because it is one of the few studies that have looked at the results of TB treatment among children in the nation, this one was noteworthy.

Methods: Drug-resistant cases of paediatric TB were recruited from various districts of Western Rajasthan. Drug resistance in Mycobacterium tuberculosis was detected by line Probe Assay. The cases were followed up for treatment.

Results: A total of 41 drug-resistant TB cases were evaluated. Out of 41, 21 were rifampicin mono-resistant, 8 were isoniazid mono-resistant, MDR and pre-XDR were 5 each, and XDR cases were 2. 19 cases were successfully cured and there was one death reported during treatment.

Conclusion: Cure rate of paediatric TB is less than 50% in our region. Adherence to treatment and contact isolation are crucial to increase cure rate and decrease the incidence of drug-resistant TB.

Keywords: Drug-resistant tuberculosis, Paediatric patients, Treatment outcome, Western Rajasthan

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INTRODUCTION

There were 10.6 million cases of tuberculosis (TB) worldwide in 2021, or 134 cases for every 100,000 people. An estimated 443,742 cases of paediatric tuberculosis were reported in 2021, according to the WHO tuberculosis report 2022. An estimated 1.9 million children received tuberculosis treatment between 2018 and 2021, with 17700 of those cases being MDR/RR-TB [1].

Children's tuberculosis is a direct result of adult tuberculosis and serves as an excellent indicator of the disease's current community transmission. The subtle and frequently quick transition from Mycobacterium tuberculosis infection to illness is another distinctive feature of tuberculosis in children. Numerous factors, such as age at exposure, immunological and nutritional health, genetics, virulence of the organism, and the severity of the initial infection, influence the likelihood of developing disease following infection. While improvements in adult TB diagnosis and treatment have been accomplished, paediatric TB progress has lagged behind [2].

Several studies have shown that childhood TB treatment outcomes varied with sex, age, nutritional status and HIV status [3, 4]. In a retrospective cohort study conducted by Vukugah *et al.*, the unsuccessful TB treatment rate was 20%, with 12% of deaths [4].

In the present study, we tried to evaluate the treatment outcome of drug-resistant tuberculosis in paediatric population of Western Rajasthan.

MATERIALS AND METHODS

This cross-sectional study was conducted in the TB C and DST laboratory, Department of Microbiology, IDI block, Kamla Nehru Chest Hospital, Dr. S. N. Medical College, Jodhpur, Rajasthan, India. The samples were collected from Western Rajasthan districts. The duration of the study was three years. The drug resistance was detected by line Probe Assay.

Inclusion criteria

All the samples from TB-suspected patients (under age of 15 y, irrespective of gender) received from 9 districts (Barmer, Bikaner,

Hanumangarh, Jaisalmer, Jalore, Jodhpur, Pali, Sirohi, and Sri Ganganagar) were included in the study.

Exclusion criteria

- Close contacts or household contacts were excluded from the study.
- Patients with a history of infection by another aetiology agent (fungus) within one month were excluded from the study.
- Re-infection or relapse cases were not included in the study.

Statistical analysis

SPSS Version 26 was used to analyse the data. Chi-square test was used to compare the groups. P value < 0.05 was considered statistically significant.

Ethical consideration

Ethical approval for this study is obtained from DTO and STO of NHM, Rajasthan via letter No. TB/2021/1638. Dated 27/09/2021.

RESULTS

In this study, a total of 41 cases were evaluated, out of which 21(51.2%) were rifampicin mono-resistant, 8(19.5%) were isoniazid mono-resistant, MDR and pre-XDR were 5(12.2%) each, and XDR cases were 2(4.9%).

The success and failure rates of patients with mono-resistance to isoniazid and rifampicin during their treatments. The category with the greatest number of cured patients (n = 13) was rifampicin mono-resistance, followed by isoniazid mono-resistance (n = 1). Regarding negative outcomes, there was only one instance of isoniazid and isoniazid mono-resistance in this group, but no treatment failure was noted in cases of rifampicin mono-resistance. In each of the two mono-resistance cases, treatment regimen adjustments occurred at the same frequency (four times). Regarding the isoniazid mono-resistance cases, one death was noted [table 1].

Table 1: Treatment outcome of rifampicin mono-resistance and isoniazid mono-resistance patients

Treatment outcomes		Rifampicin mono-resistance N(21), %	Isoniazid mono-resistance N(8), %	P-value
Treatment Success	Cured	13(61.9)	1(0.5)	0.421
	Treatment Complete	4(19.05)	1(0.5)	
Unfavourable Outcomes	Treatment failed	0(0)	1(0.5)	0.434
	Lost to follow-up	0(0)	0(0)	
	Migrated	0(0)	0(0)	
	Treatment regimen changed	4(19.05)	4(2)	
	Death	0(0)	1(0.5)	

Table 2 places special emphasis on how treatment outcomes are evaluated in terms of successful and ineffective treatments. Patients are monitored till the end of their course of treatment. As the research comes to an end, both XDR cases are receiving treatment. MDR category 4 has the most cured patients, with 1, pre-XDR cases coming in second. Following therapy, the result is the same as in cases prior to XDR. One unfavourable result is treatment failure in

MDR instances involving a single patient, but pre-XDR or XDR patients do not exhibit treatment failure. In all drug-resistant categories, not a single case was lost to follow-up, migrated, or classified as classified under death. Compared to XDR 2 instances, treatment regimen adjustments occur more frequently in the pre-XDR case 3. Statistics-wise, the treatment's outcome is not significant [table 2].

Table 2: Treatment outcome of MDR, Pre-XDR and XDR tuberculosis patients

Treatment outcomes		MDR N(5) (%)	Pre-XDR N(5) (%)	XDR N(2) (%)	P-value
Treatment success	Cured	4(80)	1(20)	0	<0.05
	Treatment Complete	0	1(20)	0	
Unfavourable outcomes	Treatment failed	1(20)	0	0	<0.05
	Lost to follow-up	0	0	0	
	Migrated	0	0	0	
	Treatment regimen changed	0	3(1.5)	2(0.5)	
	Death	0	0	0	

DISCUSSION

In our investigation, treatment success rates for isoniazid-resistant cases were 25%, whereas treatment success rates for rifampicin-resistant cases were 81%. Because the treatment regime change group occurs in 50% of instances, unsuccessful treatment rates are substantial (75%) among isoniazid mono-resistant patients, but this category only applies to 19.04% of rifampicin mono-resistance patients.

Compared to our data, rifampicin mono-resistant isolates shown high treatment success rates (78% and 70.8%, respectively) in studies by Gopie *et al.* [5] and Villegas *et al.* [6].

It is a really welcome and positive conclusion that in our investigation, we did not come across any cases of lost to follow-up or migration. This demonstrates the ground-level strengthening and follow-up of TB cases.

Our results contrast with a study by Chien *et al.*, which found that 83% of isoniazid mono-resistant patients had successful treatment outcomes [7]. In that study, the treatment success rates for isoniazid mono-resistant patients were 19.6%. An isoniazid mono-resistant treatment success rate of 77.2% was reported by Garcia *et al.* [8], while a 74.1% success rate was recorded by Villegas *et al.* [6].

Second-line drug-resistant cases were evaluated based on treatment categories, good outcomes, and successful outcomes. Unfavorable results were found in 6 cases (1 MDR, 3 Pre-XDR, and 2 XDR). In 1 MDR case, therapy failed during therapy, and in 5 cases, there was no observable medication response; hence, the treatment regimen had to be adjusted.

Our study indicated that the treatment-favorable outcome rates in MDR cases were 19.6%, which is much lower than the 53.5% and 70.6% reported by Aaina *et al.* [9] and Hamdouni *et al.* [10] from India. In our study, the success rate for Pre-XDR patients was 40%, but Aaina *et al.* reported 51% of cases [9].

CONCLUSION

In our area, the cure rate for paediatric tuberculosis is less than 50%. To improve the cure rate and lower the prevalence of drug-

resistant tuberculosis, treatment adherence and contact isolation are essential. According to our research, there were fewer treatment-positive outcome rates in MDR cases.

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Nil

AUTHORS CONTRIBUTIONS

All the authors have contributed equally

CONFLICTS OF INTERESTS

Declared none

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