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Assessment of Non-Adherence to Anti-Tuberculosis Treatment and Determinant Factors among Tuberculosis Patients in Balodabazar District North Eastern Chhattisgarh: A Cross-Sectional Study

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A B S T R A C T

Background: One of the main challenges to improving tuberculosis (TB) treatment outcomes is non-adherence to anti-TB treatment. The poor adherence to anti-TB treatment among patients with TB is a major problem in Balodabazar. This study aimed to assess the level of non-adherence to anti-TB treatment and associated factors among TB patients in Balodabazar District North Eastern Chhattisgarh.

Methods: A cross-sectional study was conducted in Balodabazar District North Eastern Chhattisgarh from 1st September 2024 to 31st October 2024. A non-probability convenience sampling method was used. A total of 164 TB participants were interviewed and data was collected using a self-structured questionnaire. Data was entered and analysed by using an Excel worksheet 2021.

Results: The majority of the TB participants were literate (88.4%) those with primary school levels of education 40.9%. The majority of the participants were farmers (40.9%) and belonged to the rural areas (86%). The mean age of the total participants was 39.36 years. 82.3% of TB participants heard about tuberculosis before diagnosis. The main source of information about TB was health workers (39.6%). The most important reasons for non-adherence to ATT were adverse effects of drugs 36% followed by general weakness 51.2%, feel better 29.9%. 34.1% contributed a history of chewing tobacco, 33.5% had a smoking habit and 21.3% had a history of alcohol consumption. The study further revealed that age, levels of education, occupation, and area of residence were significantly associated with level of knowledge.

Conclusions: The present study also reveals that the most common reasons for stopping ATT were adverse effects of anti-tubercular drugs, chewing tobacco, cigarette smoking, alcohol consumption, and feeling better after a few months of treatment.

Keywords: *Tuberculosis, Non-Adherence, Balodabazar, Chhattisgarh*

Introduction

Globally, tuberculosis (TB) is a serious public health concern (1). TB is a disease that may be prevented and is typically cured. There were 1.25 million TB-related deaths in 2023, including 161,000 HIV-positive deaths. After three years when coronavirus disease (COVID-19) overtook tuberculosis (TB) as the world's greatest infectious agent-related cause of death, TB has most likely reverted to its previous position. An estimated 10.8 million individuals worldwide contracted tuberculosis in 2023, comprising 1.3 million children, 3.6 million women, and 6.0 million men. TB impacts people of all ages and in all countries. Tuberculosis (TB), is an infectious bacterial disease brought on by Mycobacterium tuberculosis, most often affecting the lungs. It is spread by droplets from the lungs and throat of individuals who have active respiratory disease (WHO). India has the largest TB burden, with two TB-related fatalities every three minutes (2). According to the highest DALY rates for tuberculosis, Chhattisgarh ranks sixth among the states. Chhattisgarh's TB incidence was 69 per lakh population, and the disease burden, or DALY rate, was 3.5 times greater than the global average (3) Sometimes, it's common to forget to take prescribed medication (4).

The lack of knowledge about tuberculosis, especially treatment, may influence treatment compliance (5). It has been determined that one of the main sources of tuberculosis's being a public health crisis is that patients find it challenging to follow its lengthy treatment plan (6). This leads to non-adherence to treatment. It has been recognized as a significant obstacle to the treatment of tuberculosis and drug resistance. However, it is quite difficult to have regular supervision and support for TB patients. Hence, this study assessed the level of non-adherence to anti-TB treatment and associated factors among TB patients in Balodabazar District North Eastern Chhattisgarh.

Materials and Methods

The study used a cross-sectional study based on an observational questionnaire and a non-probability purposive sampling technique. That self-structured questionnaire technique included identification details and social demographic information such as age, gender, occupation, place of residence, education status, family members, and marital status. In addition, including reasons for the interruption of anti-TB treatment, knowledge, medication, and behavioral-related characteristics. The study was conducted from November 2024 to December 2024 to assess the level of interruption to anti-TB treatment and related factors among TB patients. The data was analyzed using descriptive and inferential statistics with frequency, percentage, chi-square test, and p-value test.

Sample and Sampling Technique

The target population for this study consists of individuals who have been identified as non-adherent to prescribed treatment regimens within the last year. A purposive sampling technique was employed to select participants who meet specific criteria related to non-adherence. Participants were recruited from government health facilities. Informed consent was obtained from all participants, ensuring they understood the purpose of the study and their right to withdraw at any time.

Data Analysis

All acquired data was input and analyzed using Microsoft Excel 2021. Data were summarized in percentage and frequency distribution tables, and the association was tested using the chi-square test, p-value, and graphical data display methods.

Results

Demographic Variables

As indicated in Table 1 above, 164 total TB patients participated in the study. The mean age of 39.36 and the majority of the age group was above 45 years (39.6%). About 75.6 % of the respondents were males. The majority of the study participants were married (81.7). Amongst all the participants, the majority of participants were literate (88.4%). Mainly participants who completed primary and secondary school were 40.9% and 22%. Most family members had more than 4 members (53%) with a mean membership of 5. Furthermore, the results show that (40.9%) of the participants were farmers. The maximum number of participants belonged to the rural areas (86%) while the remaining 14% were from the urban areas. (Table 1).

Clinical characteristics of respondents

Of the total 164 participants, about 54.9% of participants stopped their Anti-Tuberculosis Treatment (ATT) during the intensive phase and around 45.1% during the continuation phase. The majority of the participants, 40.2% interrupted the anti-tuberculosis treatment at the end of the 3rd month, followed by 25.6% during the 1st month, 22% during the 2nd month, and 12.2% during the 3rd month. A total of 36% of participants were taking anti-tubercular drugs from Community Health Centres (CHCs), 25.4% from private hospitals, 21.3% from District Tuberculosis Centres (DTC), District Hospital 12.4%, and Primary Health Centres (PHCs) 4.9%.

Personal habits and the main reason for missing doses among respondents

Of the total 164 TB participants, 50.6% of them had a history of addiction, contributing 34.1 % had a history of chewing tobacco habits, 33.5 % had a smoking habit, 21.3% had a history of alcohol consumption, and 11.1% had other habits. Out of the total of 164 TB participants, 76.8 % of them experienced some sort of side effects of anti-tuberculosis drugs including general weakness 51.2%, restlessness 11%, emesis 14.6%, and stomach irritation 17.7%, drowsiness 4.3%, jaundice 0.7% and others 0.5%. About 23.2% of patients did not experience any kind of side effects. (Graph- 2). Most of the participants replied that 36.6% had adverse effects of medication, 29.9% felt better, 14.6% had multiple medications can cause problems, 12.8% replied that I have recovered, 3.7% migrated to another place for living and 1.8% taken medicine from private hospital these reasons also interrupt the ATT (Graph-1).

Knowledge about tuberculosis among respondents

Of the total 164 study participants, a maximum of 82.3% heard about tuberculosis before diagnosis of the disease and 17.7% of participants did not hear about the disease. Most of the participants replied that they got information about tuberculosis from health workers 39.6 %, followed by media 26.2%, family members 17.6%, and friends 16.4%. Most of the participants replied that TB is an infectious disease 96.3%, and 82.3% had information about TB before diagnosis. Most of the participants replied that (95.1%) TB disease can be prevented from spreading by covering their mouth and nose when coughing, and 100% of participants knew that TB is a curable disease. Most of the participants 61.5% replied that the total duration of ATT is less than or equal to 6 months and 28% of participants replied don't know about the total duration of anti-tuberculosis treatment.

***Association between level of knowledge and selected sociodemographic variables*.**

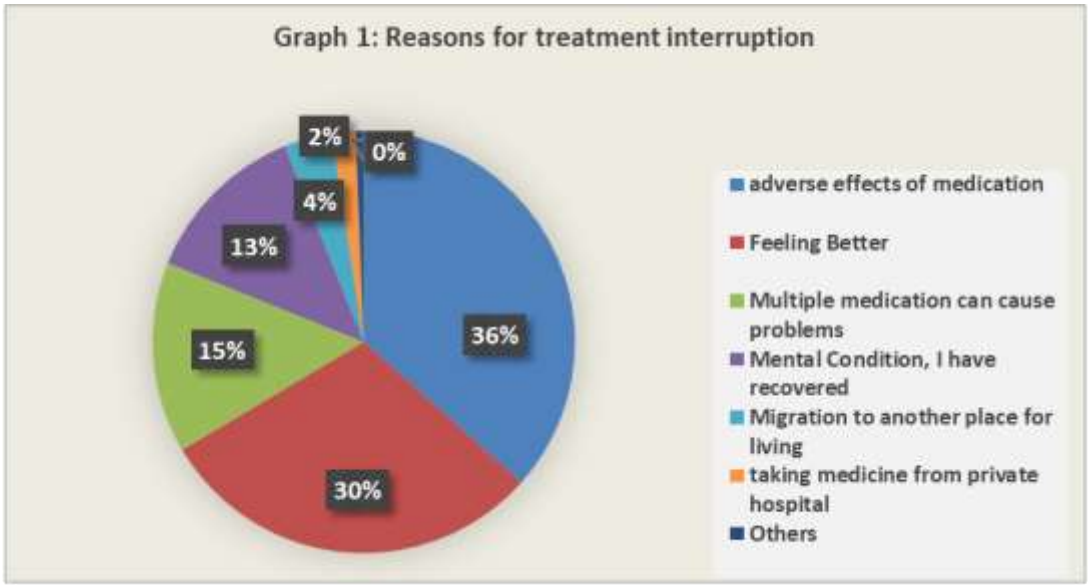
The relationship between the level of knowledge about good and bad touch and selected socio-demographic variables of children was examined, and it was found that there was a significant relationship between the level of knowledge and gender, class, and family type at $p<0.05$ level (Table 2).

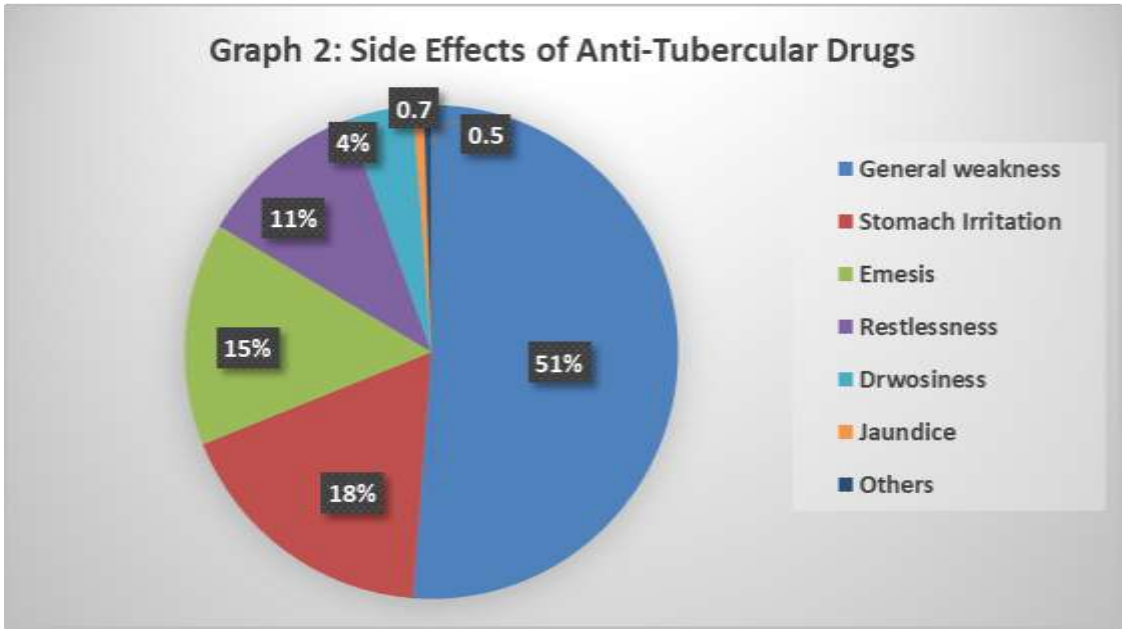
Table 1: Frequency and percentage distribution of demographic variables (N=164)

S. No.	Socio-Demographic Variables		Frequency (n=164)	Percentage
1	Age	0-14 Years	4	2.4
		15-24 Years	32	19.5
		25-34 Years	40	24.4
		35-44 Years	23	14.0
		>45 Years	65	39.6
2	Gender	Male	124	75.6
		Female	40	24.4
3	Marital status	Married	134	81.7
		Unmarried	30	18.3
4	Family Members	1-4	77	47.0
		>4	87	53.0
5	Literacy	Illiterate	19	11.6
		Literate	145	88.4
6	Education Level	Primary	67	40.9
		Middle	36	22.0
		High Education	27	16.5
		Graduation	14	8.5
		Post Graduation	1	0.6
7	Occupation	Farmer	67	40.9
		Housewife	16	9.8
		Unemployed	38	23.2
		Teacher	1	0.6
		Business	17	10.4
		Workers	25	15.2
8	Residence Area	Rural	141	86.0
		Urban	23	14.0

Table 2: Association between demographic variables and level of Knowledge (N=164)

Socio-Demographic Variables		**Adequate (n=151)**	**Inadequate (n=13)**	**X^2**	**p Value**
Age	0-14 Years	4	1	1.74	**0* (S)**
	15-24 Years	29	3		
	25-34 Years	40	2		
	35-44 Years	19	2		
	>=45 Years	59	5		
Gender	Male	116	7	3.36	0.06
	Female	35	6		
Marital status	Married	124	9	1.29	0.25
	Unmarried	27	4		
Family Members	1--4	73	6	0.02	0.8
	>4	78	7		
Literacy	Illiterate	14	7	21.3	3.9
	Literate	137	6		
Education Level	Primary	64	6	2.6	**0* (S)**
	Middle	32	3		
	High Education	23	3		
	Graduation	12	1		
	Post Graduation	1	0		
Occupation	Farmer	61	3	2.15	**0* (S)**
	Housewife	15	2		
	Unemployed	35	3		
	Teacher	1	0		
	Business	18	2		
	Workers	21	3		
Residence Area	Rural	134	8	7.62	**0.005* (S)**
	Urban	17	5		





Discussion

In the present study, we found that the majority of TB participants were male between the age group of 25-50 years. Similar findings have been documented by Thamineni R et al, the majority were between the ages of 30 and 50 (42.4%), and male (53.6%). Another study conducted by Kulkarni P et al also found that the majority of non-adherent patients were males between 15-49 years (7)(8). Meanwhile, the marital status was mostly 81.7%, a similar study conducted by Nasrullah D et al, also found that the marital status was mostly 106 people (40.6%) (9). The findings of the study showed that participants who had low education status often showed discontinuation of TB treatment. A similar Gohel H. et al study showed non-adherence amongst illiterate subjects (10). The current study showed that 86% of TB participants live in rural areas than in urban areas and (40.9%) of the respondents were farmers. A similar study conducted by Ajema D et al also found that the majority of study respondents were rural residents and most of the respondents were farmers 30.9% (11).

We found a significant number of non-adherent patients 54.9% interrupted ATT during the intensive phase because we found that the main factors responsible for discontinuation of TB treatment are adverse effects of medication with 36.6%, (29.9%) feeling better after a few weeks of treatment and 14.6% of them were multiple medications can cause problems, which is close to the findings of another study done by Kulkarni P et al revealed that 51.3% of non-adherent patients were interrupted ATT during the intensive phase and Jaiswal S et al, also revealed that the factor responsible for discontinuation to TB treatment is drug side effects with 36% patient affirming it. Due to this reason difficult for the participants to adhere to the regimen, often resulting in skipping or stopping treatment (8) (12).

The majority of the participants (40.2%) stopped their treatment at the end of 3rd month, followed by 25.6% during the 1st month because one of the most common reasons was, they had adverse effects experienced and felt better after a few months of treatment and considered as they cured. The second most common reason was they did not know about the duration of treatment. A similar pattern of treatment interruption has been also reported by other studies. Sarpal SS et al found that 31.3% of patients stopped taking medicine at the end of the 3rd month (13).

The study shows that the majority of the TB participants, 82.3% had heard about tuberculosis before diagnosing and the major sources of information were health workers (39.6%) followed by mass media (26.2%). A study done by Das R et al revealed a similar fact where 92.3% heard about tuberculosis before diagnosis and got

Information from the community (35.9%) followed by health workers (32.3%) (9). another study conducted by Pramanik D et al also found that most of the patients, 52% had heard about tuberculosis and the major source of information was health workers (26%) (14) (15).

We found that about majority (96.3%) of the participants knew that tuberculosis was an infectious disease. Similar findings were also reported in the study conducted by Bäckdahl T, Sharma M where 93% of participants were aware TB that is a communicable disease (16).

The study shows that nearly the majority of the studied participants had Knowledge regarding the prevention of transmission of disease, the maximum 95.1% of TB participants replied that covered their mouths and noses while coughing. Similar findings were also observed by Das R et al reported that the majority of the TB patients (53.60%) replied as avoiding uncovered coughing (14).

The current study shows that the majority of TB patients (61.5%) correctly knew about the total duration of anti-tuberculosis treatment and some of the patients were still unaware of the total duration of course. Pramanik D reported a similar fact that most of the patients knew the duration of the course (15).

While assessing the main reasons for the Interruption of ATT, we observed that the common reason for discontinuation of tuberculosis treatment among tuberculosis patients was the adverse effects of the drugs, reported by 36.6% of participants. Similar facts were also found in Chhaya Mittal et al demonstrated that side of drugs (43.2%) was the main reason for interrupting ATT among TB patients (17).

In our study chewing tobacco and smoking habit was the second most common reason for discontinuation of tuberculosis treatment, as reported by 34.1% and 33.5% of participants. Yadav GS et al reported that the various reasons for stopping ATT were 62.7% of patients were smokers and 26.7% of patients were alcoholics (18). Another reason for interrupting the anti-tubercular drug TB patients is because they did not believe in the government hospital and wanted to complete their medication from other private hospitals reported by 21.3% of TB patients. K. Jaggarajamma et al also revealed the same facts (19). We found that up to 12.8% of TB patients stopped taking ATT due to the reason of they did not consider themselves sick. Similar findings were also found by W. M. Jakubowiak et al in their study as the third most common reason for interrupting ATT. Reported by 25.3% of patients (20).

Conclusion

The current research suggests that most patients heard about TB but there is a significant knowledge gap among the TB patients about the duration of the treatment. Some of the tuberculosis patients had stopped their treatment during the intensive phase or after completing the first phase of treatment because some of them were not aware of the total duration of treatment. The present study also reveals that the common reasons for discontinuation of tuberculosis treatment were adverse effects of anti-tubercular drugs, chewing tobacco, cigarette smoking, alcohol consumption, and feeling better after a few months of treatment. Some of the patients did not believe in the Government facilities and wanted to complete their treatment at other private hospitals. Treatment interruptions were maximum at the end of the 3rd month of ATT. Poor education is the further explanation for the discontinuation of TB treatment.

Recommendations

The study recommends the following research:

- A similar study can be conducted with a large sample in a variety of contexts.
- Healthcare workers should inform TB participants about the adverse effects of TB treatment and what they can do when participants experience adverse consequences. They should also explain to their patients how to relate the effect of chewing tobacco and smoking on the treatment outcome.

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