

Adherence And Associated Factors Of Treatment Regimen In Drug Susceptible Tuberculosis Patients

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Abstract:

Introduction:

India has the highest burden of tuberculosis in the world and remains a significant public health issue. Nonadherence to anti tuberculosis treatment adversely effect the treatment success rate thereby increasing mortality, drug resistance and spread of the disease. Therefore, it is important to identify the reasons which contribute to nonadherence.

Methods and Materials:

This is a prospective observational study conducted at Government General Hospital, Vijayawada. A total of 1018 sputum smear positive newly diagnosed pulmonary TB patients, who were initiated on anti-tuberculosis treatment under NTEP from January 2022 to December 2022 were enrolled and followed.

Results:

We followed 1018 newly diagnosed pulmonary TB patients. Of these, 104 (10.21%) were non adherent to anti tuberculosis treatment. Of which 82 (76.9%) were male, and 22(21.15%) were female. Independent risk factors for non-adherence were identified as Alcoholism (23.07%), followed by Perception of improved symptoms (19.2%), Pill burden (14.42%), Migration (13.46%), side effects with TB medication (11.53%), other health issues like malnutrition, HIV, dementia, cancer, kidney diseases (11.53%), family issues (with lack of adequate care or money) 6.73%.

Conclusion:

Middle aged men with addictions have been the major risk group for non-adherence in this study followed by perception of improved symptoms as a cure. Focusing on this group and considering other contributors for lost to follow up can reduce the economic burden.

Key Words: Anti-Tuberculosis Treatment, CBNAAT, Non-Adherence, Pulmonary Tuberculosis, loss to follow up, NTEP.

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I. INTRODUCTION:

India carries the unwelcomed burden of more than a quarter of the world's TB cases - a startling 2.6 million annually, leading to the death of 0.44 million Indian individuals each year. The World Health Organization (WHO) further reports that 33% of the world's drug-resistant TB cases are present in India. [[1]] Some of the risk factors for TB include poverty, malnutrition, wars, HIV/AIDS, undergoing immunosuppressive therapy, as well as exposure to pneumoconiosis arising from occupational roles such as mining and construction. [[2],[3]]

Patients diagnosed with pulmonary tuberculosis will typically show physical signs such as a chronic cough, blood-tinged sputum, weight loss, a low-grade fever, and night sweats. [[2],[3],[4]]. It can affect multiple systems as well, usually presenting with pulmonary symptoms [[4]]. The use of chest X-Rays is imperative for all those who have screened positive in order to verify or negate any active tuberculosis. [[4]] Acid Fast Staining-Ziehl-Nelsen, cultures, and molecular-based diagnostic techniques like GeneXpert and DR-MTB are also employed, the latter being more efficient in providing rapid diagnosis results within hours.

Tuberculosis was categorized as the ninth leading cause of death worldwide. [[6],[7]]. To address this issue and to know the other risk factors contributing to tuberculosis, the WHO has launched a 2030 multi-sectoral

strategy to strive for the elimination of tuberculosis. [[6],[8]] Fortunately, TB is treatable and preventable, and it is estimated that 85% of those infected can recover by following drug regimens for six months. Access to these treatments should be assured through Universal Health Coverage (UHC). [[9]]

Consumption of alcohol and cigarette smoking are two individual behavioral factors associated with non-adherence to TB treatment and missed follow-ups that have been reported so far. It has been demonstrated that alcohol use can have a direct impact on the progression of TB disease and poor TB treatment outcomes. Individuals who participate in heavy episodic drinking are proven to have a delayed culture conversion rate and an increased risk of treatment failure, relapse and even mortality as compared to those who do not consume alcohol. Excessive alcohol consumption is known to disrupt retention of care and has been linked to the missing of Directly Observed Therapy (DOT) visits [[10]].

More research is needed to determine the root causes of non-adherence to TB medication and to develop methods to improve treatment adherence. Factors that may influence a person's adherence to TB medication include unfamiliarity of the medication, complex dosing regimens, financial difficulties, perceived stigma, and access to healthcare. Studies undertaken indicate a correlation between socioeconomic factors such as homelessness, malnutrition, low education level, inability to afford transportation, social support with non-adherence to treatment and missed follow ups [[11]]. Understanding these barriers can help inform evidence-based strategies to increase adherence and improve TB treatment outcomes. Therefore, further research is required to identify and address the root causes of non-adherence in order to effectively reduce the spread of TB.

Poor adherence to ATT may lead to treatment failure while strict adherence to ATT helps to achieve desired treatment success and helps to minimize emergence of drug resistant strains and the mortality. Tuberculosis non-adherence is the major challenge in TB treatment which leads multidrug as well as extended drug-resistant TB [[12],[13]].

II. Materials and Methods:

This is a prospective observational study conducted at Government General Hospital, Vijayawada in Andhra Pradesh. We followed the guidelines on programmatic management of tuberculosis in India for the diagnosis and classification of TB cases. A total of 1018 sputum smear positive newly diagnosed pulmonary TB patients, who were initiated on anti-tuberculosis treatment from January 2022 to December 2022 were enrolled and followed up as per the national tuberculosis elimination programme.

Men and women more than 15 years of age with newly diagnosed Drug sensitive TB cases were included in the study. Patients with MDR tuberculosis, End stage disease, retreatment cases, breastfeeding and pregnant women, less than 15 years age were excluded.

Sputum for CBNAAT was performed for patients with presumptive TB, both spot and early morning sample, and the newly TB positive patients were enrolled. Six month anti-tuberculosis treatment (two months Intensive phase, four months Continuation phase) was initiated. The patients were followed up on their monthly visits to the DTC, OP, IP, and the missing patients were followed up by phone calls and messages. Follow up of last case recruited ended in March 2023.

All the study subjects who were lost to follow up were interviewed with a detailed questionnaire. Information pertaining to their demographic background, comorbidities, addictions, phase of discontinuation and the reasons for non-adherence to treatment was collected. We used an in-depth interview guide to explore the barriers related to TB control programs. The data was analyzed using Microsoft Excel 10.0.

Loss to follow up in tuberculosis treatment refers to a situation where a patient fails to adhere to the prescribed treatment plan and discontinues their treatment without notifying the healthcare providers.

Nonadherence to ATT is defined as interruption of anti-tuberculosis treatment by recruited patient for more than or equal to one month. [[14]]

III. Result:

Of the 1018 patients, 104 (10.21%) are non-adherent to anti-tuberculosis treatment. Male to Female ratio in the non-adherence group is 3.7:1. 75.96% of the patients are in the BMI group of 16 to 18kg. 76.92% had a rural background. Most of the patients (70.19%) were lost to follow-up in intensive phase of treatment. The median time-to-discontinuation is 80 days.

Table 1: Demographic data, comorbidities, addictions of non-adherent participants.

S. No	Details	Count & Percentage
1	Age Group	
	20-40	42 [40.38]
	40-60	46 [44.23]
	60 above	16 [15.38]
2	Gender	
	MALE	82 [78.85]

	FEMALE	22 [21.15]
3	Locality	
	RURAL	80 [76.92]
	UBRAN	24 [23.08]
4	Addictions	
	ALCOHOLIC	27 [25.96]
	SMOKING	15 [14.42]
	BOTH ALCOHOLIC & SMOKING	6 [5.77]
	NOT ADDICTED	54 [51.92]
5	Comorbidities	
	D M	7 [6.73]
	H T N	8 [7.69]
	D M & H T N	16 [15.38]
	HIV	13 [12.5%]
	NONE	60 [57.69%]
6	BMI	
	< 16	17 [16.35]
	16 TO 18	79 [75.96]
	18-24	8 [7.69]
7	Period of lost to follow up	
	2 months	48. (46.15)
	3 months	36 (34.61)
	4 months	16 (15.38)
	5 months	4 (3.84)
8	PHASE OF TREATMENT	
	intensive phase	73 [70.19]
	continuation phase	31 [29.81]

Table 2: Adherent and Non-Adherent participants to ATT drugs

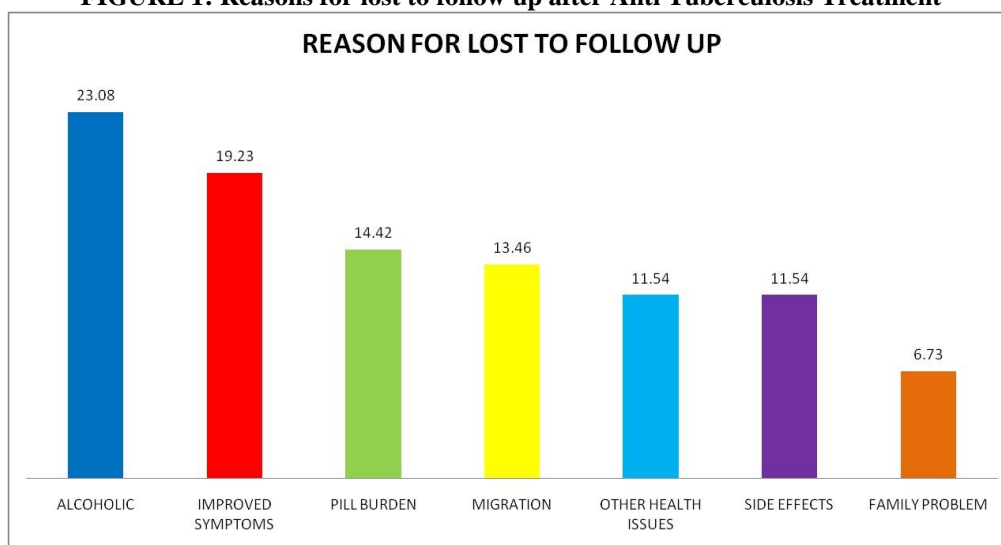
TOTAL	1018
NON ADHERANT	104 (10.21%)
ADHERANT	914 (89.78%)

Alcoholism (23.08%) is the most common reason for lost to follow-up, followed by perception of improved symptoms (19.23%), increased pill burden, migration, associated health issues, side effects of the treatment and family issues.

Table 3: Reasons for non-adherence and lost to follow-up.

Reasons for lost to follow-up	
ALCOHOLIC	24 [23.08]
IMPROVED SYMPTOMS	20 [19.23]
PILL BURDEN	15 [14.42]
MIGRATION	14 [13.46]
OTHER HEALTH ISSUES	12 [11.54]
SIDE EFFECTS	12 [11.54]
FAMILY ISSUES	7 [6.73]

FIGURE 1: Reasons for lost to follow up after Anti Tuberculosis Treatment



IV. DISCUSSION:

Our study identified the most common reasons for loss to follow up in and around our hospital and the effect of addictions on TB adherence and areas to concentrate while supervising the patients on anti-tuberculosis treatment.

In spite of activities under NTEP to improve adherence, the present study found 10.21% patients as non-adherent similar to 10.33% in Pardeshi et al study [[15]]. Out of those 104, male patients were 78.85%. We found females as more treatment adherent as reported by several other studies, Kumareson et al and Sophia et al study [[14],[16]]. Majority of the patients were males in the middle age group. Other studies also showed nonadherence in the middle-aged men due to factors like alcoholism and migration. 79% of the patients had a BMI ranging from 16 to 18, which could be due to tuberculosis and non-adherence to medication. Non-adherence was high in patients from rural background. The possible causes of which could be low education level and decreased proximity and access to healthcare facility which was observed in our patients. Among the non-adherent group combined diabetes and hypertension was the most common comorbidity followed by HIV.

Most of the patients were lost to follow-up during the second and third month, 46.15% and 34.61% respectively which is due to side effects experienced during the Intensive phase of treatment, and perception of improved symptoms after the initial phase of treatment. This was similar to Pardeshi et al study [[15]]. After four months of course, the default rate was low.

We found out that alcoholism is the most common cause for loss to follow up in our setting, alcohol consumption is a well-known risk factor for adherence as mentioned by WHO [[17]]. As smoking is most of the time associated with alcoholism, it can also predict poor treatment adherence. We have a total of 48% of patients with addictions among the non-adherent group. Myers et al study [[10]] demonstrating that Multi-Drug Resistant (MDR) TB patients who consumed alcohol during treatment, on average, missed 18 doses in the intensive phase of treatment. Therefore, training of all the NTEP staff in interpersonal communication skills should be enhanced to deal with TB patients. A special attention should be paid to young and middle-aged male patients with addictions. Daily alcohol consumption noted at the start of treatment stood as a strong predictor of defaulting (with frequency of alcohol consumption showing a dose-dependent relationship). Santha T et al and Hasker E et al [[18],[19]] studies also found that alcohol consumption was associated with defaulting. This analysis suggests that those who drink alcohol wander around and are difficult to locate for follow up. This may lead these patients to discontinue treatment, although we cannot exclude this as it also leads to increased mortality and MDR TB.

NTEP in India places great importance on the patient education, key component of tuberculosis control, it focuses on creating awareness about TB, its causes, transmission, and symptoms [[16]]. Despite this there is an immense need for continuous effective and reinforcing health education to the patient and their family. Our study showed 19.23% of non-adherent patients discontinued treatment due to lack of knowledge, thinking that they got cured after two or three months of treatment after symptomatic improvement. As TB patient feels better after few weeks of treatment initiation patient may tend to leave the treatment as he assumes that TB is cured. Kulkarni P et al study [[20]] showed 47% of non-adherence even before the start of continuation phase.

As migration effects the stability of residence it can also adversely affect adherence [[17],[21]]. Approximately 13.46% of the non-adherent patients were migrants who migrated in search of work or to their native places and were lost to follow up of treatment. Kulkarni P et al study [[20]] showed more than half, 70.51%

of non-adherent patients were migrants with majority of males. In such cases treatment providers should be trained to collect total information regarding their native place, names and contact details of family members of nearest relatives, name of DOTS center for that area and its in-charge officer to ensure adherence among patients.

In this developing world, as there are many other associated diseases, patients taking medicines on a regular basis for other diseases neglected taking tuberculosis medication. Our study shows 14.42% of people who were non adherent because of pill burden. Other health issues like malnutrition, chronic kidney disease, HIV, Diabetes, Hypertension, dementia, cancer, but also the causes of non-adherence which were reported to be about 11.54%

The common side effects include nausea, vomiting, rash, itching, tingling and numbness. Our study showed a non-adherence of 11.54% among patients who are suffering from side effects of the TB medication. The most important of which is to educate the patients taking anti tuberculosis treatment about all the potential side effects, and when to approach for help. Other problems like lack of money for transportation, death of a close family member, lack of care especially among the elderly all constituted to about 6.7% for non-adherence in our study.

V. Conclusion:

All the reasons for loss to follow up should be considered and appropriate measures are to be taken by the health workers to improve the treatment success rate, as non-adherence is a major obstacle to the elimination of tuberculosis. Adherence to TB can be particularly challenging as the duration of treatment is long, unpleasant side effects of the drugs, multiple tablets. Effective mechanisms should be evolved to ensure treatment adherence especially among alcoholic men in the middle age, and patients should be properly educated of improved symptomatology vs cure, reducing the spread of disease to the family and to society. Strategies such as direct or video observed therapy, incentives, digital reminders, patient education improve adherence among the tuberculosis patients. This also helps to reduce drug resistant TB burden and helps to lower the economic burden on the country.

Disclosures:

IRB Approval Number: ECR/633/INST/AP/2014/2022/07/01

Consent of Patient: Consent is taken from all the patients in this study .

Conflict of Interest: None

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