A cross-sectional study to assess the non-adherence to anti tubercular treatment & detrimental factors among patients with pulmonary tuberculosis in selected DOT's clinics, West Bengal.

Ms. Tamashree Roy [1] , Ms. Sutapa Das [2] , Ms. Purabi Modak [3]
[1]( )
[2]*(Associate Professor, Apollo Gleneagles Nursing College, Kolkata, West Bengal, India)*
[3] *(Associate Professor, Apollo Gleneagles Nursing College, Kolkata, West Bengal, India)*

Abstract:
Background: *India is the second most populous country in the world and one fourth of the global incident Tuberculosis (TB) cases occur annually. TB treatment needs multidrug combination to eradicate bacteria. Inability to complete the prescribed regimen is an important cause of treatment failure, relapse, drug resistance and continuous transmission of infection. The aim of the study was to assess the prevalence & detrimental factors of non-adherence to anti tubercular treatment, & to determine the association between detrimental factors with non-adherence to anti-tubercular treatment.*
Materials and Methods: *With this background a study was conducted with quantitative descriptive survey approach. Fishbone model served as the conceptual framework for the study. Data were collected from 200 pulmonary TB patients selected by non probability purposive sampling technique, taking ATT from DOT's Clinic. Background information of the patients and the detrimental factors were collected by using a self prepared and validated questionnaire and prevalence rate was calculated from record analysis.*
Results: *Findings revealed that the prevalence of non adherent pulmonary tuberculosis patients with ATT was 12.59 during the month of January 2021. The detrimental factors that were found to be significant were mode of transportation, waiting time at health facility, history of alcohol consumption during ATT, disclosure of the diagnosis, family support, and knowledge regarding ATT. Findings could be implicated for nursing services, nursing education, nursing administration and nursing research.*
Conclusion: *After detailed statistical analysis, the generalization is drawn, that there are few health related, socio- cultural, treatment related & knowledge factors present which affect the treatment adherence to anti-tubercular treatment.*
Key Word: *Tuberculosis, Tuberculosis patient, Anti tuberculosis treatment (ATT), Non-Adherence, Detrimental factors*

I.   Introduction

Tuberculosis (TB) remains a public health issue globally over, with an excellent part of its morbidity and mortality concentrated in developing countries. It is also an age old disease but its cause remained unknown until 24 March 1882, when Dr Robert Koch announced his discovery of the bacillus subsequently named Mycobacterium tuberculosis. It is one of the top ten causes of death worldwide and the leading cause of death from a single infectious agent. However, if TB is detected early and fully treated, people with disease quickly become non-infectious and eventually cured. For the same reason, in a country like India, where TB is a major public health problem, the focus of public health machinery is on the pulmonary tuberculosis. [1] In this study, the investigator emphasizes the detrimental factors which are affecting the anti tuberculosis(ATT) treatment.

II.   Objectives of the Study

- To assess the prevalence of non-adherence to anti tubercular treatment.
- To assess the detrimental factors for non-adherence to anti-tubercular treatment.
- To determine the association between selected demographic variables like age, sex, family type, marital history, education, occupation, monthly family income with non-adherence to anti-tubercular treatment.

- To determine the association between selected detrimental factors with non-adherence to anti-tubercular treatment.

III.   Material And Methods
Study design: Non-experimental Descriptive Cross-Sectional Survey Study design
Study setting: DOT's Clinic of Bongaon Sub-divisional Hospital & Barasat District Hospital.
Study duration: 11th January,2021 to 6th February, 2021
Sample size: 200 TB patient (150 adherent to ATT, 50 non-adherent to ATT)
Sample selection method: Non probability purposive sampling technique
Inclusion criteria:
- Pulmonary tuberculosis patients aged between 18 to 70 years.
- Pulmonary tuberculosis patients having a diagnosis of Cat I, Cat II, MDR, MR tuberculosis.
- Pulmonary tuberculosis patients who could cooperate and were present at the time of data collection.

Exclusion criteria:
- Extensively drug-resistant tuberculosis (XDR-TB) which is a form of tuberculosis caused by bacteria that are resistant to some of the most effective anti-TB drugs (fluoroquinolone and a second-line injectable drug (amikacin, capreomycin, or kanamycin)
- Mentally retarded pulmonary tuberculosis patient

Description of data collection tools:
Data were collected by a proforma of background information & interview questionnaire on detrimental factors. In the background information proforma data regarding demographic profile like age, sex, marital status, education, occupation, monthly family income & clinical profile like occurrence of missing of dose, duration of treatment, category of treatment, history of taking another drug & reason for it were collected. In the interview questionnaire data of detrimental factors were collected which was divided in 4 areas & 30 questions. The areas included were health facility & service related factors, socio cultural factors, Knowledge regarding tuberculosis & anti tuberculosis treatment, disease related factors.

Ethical Consideration:
Ethical clearance was taken from the institutional ethics committee of Apollo Gleneagles Hospitals. Written informed consent was taken from the participants and anonymity of the subjects were maintained.

Data collection Procedure:
Study subjects were chosen by non randomized purposive sampling technique & informed consent was taken from the participants. The data collection was done by interviewing the participants. The data regarding background information including demographic profile & clinical profile was collected by interviewing the participants. The assessment of the detrimental factors for non-adherence to anti tubercular treatment was done by interviewing the participants. Coding system was done to maintain confidentiality. The data collected was tabulated and analyzed with the help of descriptive & inferential statistics. Time taken for collecting data was 20 minutes. The data was collected smoothly and systematically.

Statistical analysis: The collected data were analyzed by using descriptive and inferential statistics according to the stated objectives.
Frequency and percentage were used for the analysis of demographic profile, clinical profile & detrimental factors between the adherent & non-adherent group. Chi square test was done to find out the association between selected demographic variables & non-adherence to ATT; & also to find out the association between selected detrimental factors & non-adherence to ATT.

IV.   Result
In the present study the obtained data was organized, tabulated, analyzed and interpreted under four sections.
Section- I Assessment of the prevalence of non-adherence to ATT.
- **Prevalence Rate**

No. of non adherent pulmonary TB patients with ATT attending selected setting during data collection period $\times$ 100

Total no of Patients diagnosed with pulmonary tuberculosis attending selected DOT's clinic during that period
= 85/675 × 100
= 12.59

So, the calculation indicated that the prevalence rate of non adherent pulmonary TB patients with ATT was 12.59 during the month of January.

Section II: Frequency and percentage distribution of background information of samples

Table 1: Frequency and percentage distribution of demographic characteristics of samples

n=200

Sl. No.	Characteristics		Frequency	Percentage (%)
1.	**Age**	18-33	32	16
		34-49	110	55
		50-66	58	29
2.	**Education**	Illiterate	61	30.5
		No formal schooling	70	35
		Primary	38	19
		Secondary	31	15.5
3.	**Occupation**	Service	40	20.0
		Homemaker	37	18.5
		Unemployed	39	19.5
		Daily labor	54	27.0
		Self employed	30	15.0
4.	**Family Income**	<Rs.10001	97	48.5
		Rs.10002 – 15000	72	36
		Rs.15001 – 20000	31	15.5

The above table 1 shows that 55% patients were from age group of 34-49 years, 35% patients did not have any formal schooling, 27% patients worked as daily labour, 48.5% patients had monthly family income <Rs.10000.

Section III: Assessment of the detrimental factors for non-adherence to anti-tubercular treatment

Table 2a: Comparison between frequency and percentage distribution of detrimental factors for non-adherence to anti-tubercular treatment among non-adherent & adherent pulmonary tuberculosis patient

n1=50, n2=150, n (n1+n2) =200

Detrimental factors	Categories	Non-adherent(n1)		Adherent(n2)	
		Frequency	Percentage	Frequency	Percentage
1. **Availability of health services in structure**					
1.1 Suitability of health facility time	a)Yes	36	72.0	106	70.7
	b)No	14	28.0	44	29.3
1.2 Distance between residence & health facility	a)≤ 10 km	37	74	112	74.7
	b)≥ 10 km	13	26	38	25.3
1.3 Money spent on the vehicle per month(Rs.)	a)≤ 100	27	54.0	82	54.7
	b) >100	23	46.0	68	45.3
1.4 Mode of transportation	a)Walking	14	28	77	51.3
	b)Own vehicle	10	20	31	20.7
	c)Public transport	26	52	42	28

Table 2a reveals that the time of health facility was suitable for 72% of non adherent patients & 70.7% adherent patients; 74% non adherent patients & also 74.7% adherent patients had their residence within 10km from health facility where as 52% non adherent patients used the public transport & spent < Rs.100 but 51.3% adherent patients came by walking.

Table 2b: Comparison between frequency and percentage distribution of detrimental factors for non-adherence to anti-tubercular treatment among non-adherent & adherent pulmonary tuberculosis patient

n1=50,n2=150,n(n1+n2)=200

Detrimental factors	Categories	Non-adherent(n1)		Adherent(n2)	
		Frequency	%age	Frequency	%age
1.Socio cultural factors					
1.1 History of alcohol Intake during ATT	a)Yes	28	56	30	20
	b) No	22	44	120	80
1.2 Disclosure of the Diagnosis	a)Family	14	28	45	30
	b)Everyone	6	12	55	36.66
	c)No one	30	60	50	33.33
1.3 Worry about the prognosis of ATT	a)Yes	35	70	105	70
	b)no	15	30	45	30
1.4 Support of family Members about ATT	a)Yes	20	40	100	66.66
	b) No	30	60	50	33.33
1.5 Fear of Isolation	a)Yes	28	56	75	50

from society	b)No	22	44	75	50

Table 2b depicts that 56% non-adherent patients had history of alcoholism where as only 20% adherent patients had alcoholism history, 60% non-adherent patients had not disclosed the diagnosis to anyone & only 33.33% adherent patients had not disclosed the diagnosis to family members. Also in both the group 70% non-adherent & adherent patients are worried about the prognosis of tuberculosis treatment. 66.66% adherent patients & only 40% non-adherent patients were supported by family & 56% non-adherent patients had fear of isolation from society where as 50% adherent patients had fear of isolation from society.

Graphical representation of knowledge scores among adherent & non adherent pulmonary tuberculosis patients
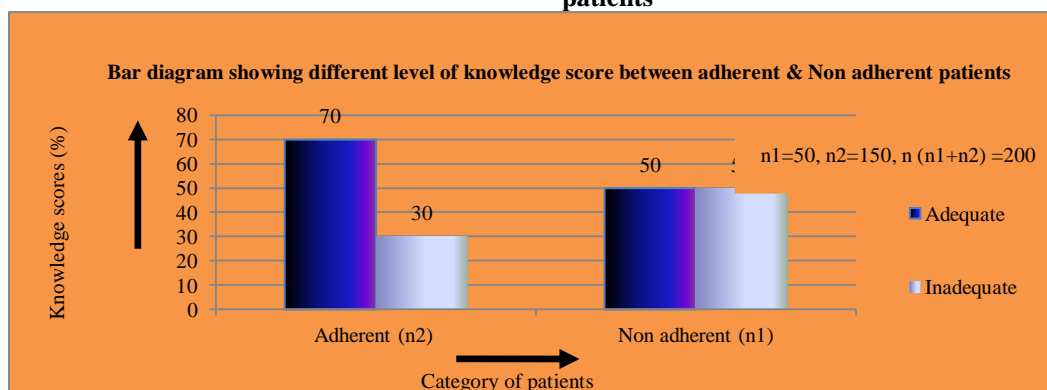

Figure 1: Bar diagram showing percentage distribution of knowledge scores among adherent & non adherent pulmonary tuberculosis patients

Data presented in figure 04 shows that in case of non-adherent patients the percentage was equal for both adequate & inadequate knowledge scores where as 70% adherent patients had adequate knowledge regarding anti tubercular treatment & only 30% patients had inadequate knowledge.

Table 2c: Comparison between frequency and percentage distribution of detrimental factors for non-adherence to anti-tubercular treatment among non-adherent & adherent pulmonary tuberculosis patient

n1=50, n2=150, n (n1+n2) =200

Detrimental factors	Categories	Non-adherent(n1)		Adherent(n2)	
		Frequency	%age	Frequency	%age
1. Treatment related factors					
1.1 Experience of any	a)Yes	50	100	127	84.7
side- effect of drugs during ATT	b)No	0	00	23	15.3
1.2 Type of side effects experienced	a)Diarrhea & vomiting	24	48	90	60
	b)Headache & dizziness	6	12	15	10
	c)Chest pain	20	40	45	30
1.3 Duration to feel better from the day of taking medicine (months)	a)< 2	5	10	30	20
	b)2-4	5	10	30	20
	c) 5-6	10	20	30	20
	d)Never	30	60	60	40
1.4 Reason for missing ATT	a)Forgetfulness	15	30		
	b)Stigma	15	30		
	c)drug side effect	20	40		
1.5 Bear of cost of drug other than ATT	a)Yes	25	50	35	30
	b)No	25	50	105	70

Table 2c depicts that all the non-adherent patients experienced side effects where as 84.3% of adherent patients suffered from side effects & the common side effects experienced by both non-adherent & adherent patients mostly diarrhea & vomiting i.e. 48% & 60% respectively. 40% non-adherent patients said that they did not feel better with the treatment where as 50% adherent patients feel better within 2-4 months of taking medicine. 50% non-adherent patients claimed that they missed dose due to drug side effects. 50% non-adherent patients & only 30% adherent patients bore the cost of other drugs.

Section IV: Association between detrimental factors with non adherence to anti tubercular treatment

Table 3: Association between the detrimental factors with non adherence to ATT.

n1=50, n2=150, n (n1+n2) =200

Sl no.	Criteria	Category	Non-adherent (n1)	Adherent (n2)	Total (n)	χ^2 value	df
1	**Mode of transportation**	a)Walking	14	77	91	10.24	1
		b)Own vehicle	10	31	41		
2	**Waiting time at health facility**	a)≤ 1 hour	20	103	123	13.01	1
		b)>1 hour	30	47	77		
3	**History of alcohol intake during ATT**	a)Yes	28	40	68	14.37	1
		b)No	22	110	132		
4	**Disclosure of the Diagnosis**	a)Family members	14	45	59	14.19*	1
		b)Everyone	6	55	61		
5	**Support of family members about the ATT**	a)Yes	20	100	120	11.1	1
		b)No	30	50	80		
6	**Knowledge regarding ATT**	Adequate(≥11)	25	105	130	6.59	1
		Inadequate (<11)	25	45	70		

χ^2 (df = 1), 0.05 = 3.841, χ^2 (df=2), 0.05 = 5.99*significant

Table 3 shows that the calculated χ^2 value is greater than tabulated χ^2 value at 0.05 level of significance. So, the null hypothesis is rejected & research hypothesis is accepted i.e. there was association between mode of transportation, waiting time at health facility, history of alcohol intake, disclosure of diagnosis, support of family members, knowledge regarding anti tubercular treatment with non adherence to anti tubercular treatment at 0.05 significance level.

V. Discussion

The major findings of the present study are discussed in relation with the findings of other studies.

In this present study 12.59% pulmonary tuberculosis patients were non adherent to ATT which are almost similar to a cross-sectional study conducted in Mumbai on 2016 by Bagchi S, Ambe G, Sathiakumar N. who find that the prevalence rate was 16%.

In this present study The time of health facility was suitable for 72% of non adherent patients & 70% adherent patients; 74% non adherent patients & also 74% adherent patients had their residence within 10km from health facility. which are almost similar to a study by Chani K et al conducted in China who found that 67% of non complaint patients & 60% complaint patients said that health facility time was suitable, 65% non complaint patients & also 61% complaint patients had their residence within 10km from health facility.

In this present study Variables of background information i.e. age was associated with non adherence to anti-tubercular treatment. which are almost similar to a study by Gohel H. who found that age was associated with non adherence to anti-tubercular treatment.

In this present study Mode of transportation , waiting time at health facility, history of alcohol consumption during treatment, disclosure of the diagnosis, support of family members regarding the treatment, Knowledge regarding anti-tubercular treatment were associated with non adherence to anti-tubercular treatment which are almost similar to a study by Ninan SB who found that Family support, present employment, alcohol use, treatment category, knowledge of TB, family type were associated with non adherence to ATT.

VI. Conclusion

Various reasons given by patients as causes of non adherence mostly reflected the influence of age, marital status, education in background information. Mode of transportation, waiting time at health facility, history of alcohol consumption during treatment, disclosure of the diagnosis, support of family members regarding the treatment, knowledge regarding antitubercular treatment are also important detrimental factors for non adherence. Thus by increasing awareness of patients all this factors can be prevented for a positive outcome of treatment.

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