



THE TREATMENT ADHERENCE AND EFFECTIVENESS OF PLANNED-TEACHING PROGRAM ON KNOWLEDGE, ATTITUDE AND KNOWLEDGE ON PRACTICE REGARDING PULMONARY TUBERCULOSIS AMONG THE PATIENTS WITH PULMONARY TUBERCULOSIS AT CUDDALORE DISTRICT

S. Maheswari ¹, Dr. K. Latha ², Dr. T. Chandra³

¹ Staff Nurse, GHQH, Tenkasi.

² HOD, Government College of Nursing, Cuddalore.

³ Lecture in Nursing, Government College of Nursing, Cuddalore.

Abstract:

Background: Tuberculosis caused by *Mycobacterium tuberculosis*, primarily affects the lungs and other organs. India has a high TB burden, with Uttar Pradesh leading in cases, especially among the 15-45 age group. **Aim:** The study aimed to assess treatment adherence and the effectiveness of a planned teaching program on knowledge, attitude, and knowledge on practice regarding pulmonary tuberculosis among patients attending the ICTC center in Cuddalore district. **Methodology:** The study employed a one-group pre-test and post-test quasi-experimental design. The participants included 50 patients with pulmonary tuberculosis who were attending the ICTC center at Orathur Primary Health Center (PHC). These patients were selected using a convenience sampling technique. Statistical analysis was performed using descriptive and inferential methods. **Results:** The study showed significant improvements in treatment adherence, knowledge, attitude, and practice regarding pulmonary tuberculosis after the planned teaching program. Post-test results revealed 100% treatment adherence, 100% adequate knowledge, and 100% favorable attitudes, with 98% showing good practice. Significant associations were found between knowledge, attitude, and practice ($p < 0.014$, $p < 0.008$, and $p < 0.0001$, respectively). These findings highlight the program's effectiveness in improving outcomes for TB patients. **Conclusion:** The study concluded that all patients had high treatment adherence knowledge, attitude and knowledge on practice after intervention.

Keywords: Tuberculosis, Knowledge, attitude, practice.

INTRODUCTION

Tuberculosis caused by *Mycobacterium tuberculosis*, primarily affects the lungs and other organs. India has a high TB burden, with Uttar Pradesh leading in cases, especially among the 15-45 age group. Poor treatment adherence increases the risk of death, relapse, and drug resistance (Beena E. Thomas et al., 2020). Health behavior counseling improves adherence and outcomes (Raval.D., P.R.K., 2023). MDR-TB and XDR-TB are major challenges, necessitating better physician knowledge (Jain.M et al., 2023). Despite a decrease in global TB cases in 2020, India saw a rise in 2021 (Almalki, M.E., et al., 2022). Adherence to treatment, essential for curing TB, remains challenging due to the long regimen (Geremariam, R.B., 2021). Non-adherence leads to complications and increased mortality (Palangan, 2021; Nezenega, Z.S., 2020).

NEED FOR THE STUDY

India, with the highest TB burden globally, recorded 2,404,815 cases in 2019, dropping by 24.9% in 2020 to 1,805,670 cases. However, in 2021, the cases rose to 2,135,830, though still 11.2% lower than 2019. TB is widespread in India, with over 40% of the population carrying the infection, but only 10% developing the disease (WHO).

In Tamil Nadu, a study by Anilkumar, I.J (2020) found TB prevalence of 196/100,000 among tribes, with a period prevalence of 1605/100,000. Approximately 46% were illiterate, 31.5% consumed alcohol, and 85% had heard of TB, though many lacked knowledge of its causation. In Cuddalore, TB cases increased from 1,147 in 2013 to 1,192 in 2014 (Jeyanthi.M et al., 2017).

According to Sandhu.G.K. (2011), India's DOTS program, the largest globally, faces challenges like poor healthcare infrastructure in rural areas. Strengthening surveillance is essential for controlling TB. A study by Almalki, M.E (2022) in Saudi Arabia found 64.7% of participants had poor TB knowledge, despite 65.6% being aware of its causes.

In Ethiopia, Gebremariam, R.B (2021) highlighted that TB treatment adherence was influenced by family support and operational problems. Similarly, Gashu, K.D (2021) found that factors such as education, family wealth, and provider-patient relationships positively influenced adherence, while forgetfulness and travel were major barriers. (Nezenega, Z.S, 2020). Olawunmi, O.B (2020) in Nigeria noted a 24.8% TB prevalence, with high recurrence due to non-adherence.

OBJECTIVE OF THE STUDY:

1. Assess the treatment adherence and knowledge, attitude and knowledge on practice regarding pulmonary tuberculosis among the subjects, before the implementation of planned teaching program.

2. Assess the effectiveness of planned-teaching program in terms of treatment adherence knowledge, attitude and knowledge on practice regarding pulmonary tuberculosis among the subjects after the intervention.
3. Correlation between adherence knowledge, attitude and knowledge on practice among the patients with pulmonary tuberculosis in post-test.
4. To associate the pre- test level of adherence knowledge, attitude and knowledge on practice with the selected demographic and the clinical variables.

MATERIALS AND METHODS

Study Design and Participants

The study employed a one-group pre-test and post-test quasi-experimental design. The participants included 50 patients with pulmonary tuberculosis who were attending the ICTC center at Orathur Primary Health Center (PHC). These patients were selected using a convenience sampling technique.

Inclusion and Exclusion Criteria

The inclusion criteria consist of patients between the ages of 20 and 60 years, diagnosed with pulmonary tuberculosis, currently undergoing treatment, and willing to participate in the study. Both male and female patients residing around Orathur village were eligible, and those in the early stage of non-adherence to treatment were specifically included.

The exclusion criteria consisted of patients who were severely ill, particularly those with respiratory symptoms, as well as individuals with co-morbid conditions such as congestive heart failure or HIV. Additionally, patients who were defaulters of treatment or had multi-drug-resistant tuberculosis were excluded from the study, as well as those with mental illnesses or communication difficulties that might hinder participation.

Tools

The study utilized several tools to gather data from the participants. The demographic and clinical variables were collected through a structured questionnaire that captured information such as age, gender, and health history. An Adherence Rating Scale, a standardized tool developed by Hogan et al. (1983), was used to measure treatment adherence among the patients. Additionally, the study employed custom-designed knowledge and attitude scales to assess the participants' understanding of treatment adherence related to pulmonary tuberculosis. These tools were designed to evaluate both knowledge on treatment adherence and the attitudes of patients toward their treatment regimens.

Data Collection Procedure

The data collection process was carried out over a period of four weeks, from 03.07.2023 to 30.07.2023, at the ICTC center in Orathur PHC, Chidambaram. The process started with a pre-test, which involved administering the demographic, clinical, and adherence rating tools. The intervention was a planned teaching program on treatment adherence, delivered through flashcards, booklets, and PowerPoint presentations. After the intervention, a post-test was administered to assess any changes in the patients' knowledge, attitudes, and practices related to treatment adherence.

Data Analysis

Data were analyzed using descriptive and inferential statistics. Descriptive statistics assessed demographics and the effectiveness of the teaching program. Paired t-tests compared pre- and post-test scores, chi-square tests analyzed associations between demographics and adherence knowledge, and Pearson's correlation examined relationships between knowledge, attitude, and practice. Results with $p < 0.05$ were considered significant, and data were visualized with bar diagrams, boxplots, and scatter diagrams.

RESULTS:

Demographic and clinical variables

Table 1 shows that most of the patients with pulmonary tuberculosis totalling 17(34%) were aged between 51 – 60 years, 38(76%) were male, 39(78%) were married, 27(54%) belonged to nuclear family, 43(86%) were residing in rural area, 19(38%) had primary education, 34(68%) were staying in concrete house, 19(38%) were daily wagers and 23(46%) had family monthly income of Rs.10001 – 15000. The table 2 shows that majority of the patients with pulmonary tuberculosis totalling 28(56%) had the disease for less than 1 year and 50(100%) no family history of tuberculosis they were under 6 months treatment regimen.

Treatment adherence, Adherence knowledge, Attitude, Adherence knowledge

Table 3 indicates that, in the pre-test, 30 (60%) patients with pulmonary tuberculosis were non-adherent to treatment, while 20 (40%) adhered to the treatment. However, in the post-test, following the intervention, 50 (100%) patients were adherent to the treatment. Despite 60% of patients being non-adherent in the pre-test due to reluctance to continue the regimen, post-intervention data shows that all patients adhered to the treatment regimen regularly.

Table 4 demonstrates that in the pre-test, 20 (40%) patients had inadequate knowledge, 19 (38%) had moderately adequate knowledge, and 11 (22%) had adequate knowledge regarding pulmonary tuberculosis. After the intervention in the post-test, 50 (100%) patients had adequate knowledge.

Table 5 shows that in the pre-test, 40 (80%) patients had a moderately favorable attitude, and 10 (20%) had a favorable attitude toward pulmonary tuberculosis. Post-intervention in the post-test, 50 (100%) patients displayed a favorable attitude.

Table 6 reveals that in the pre-test, 17 (34%) patients had poor practice, 30 (60%) had moderate practice, and 3 (6%) had good practice regarding pulmonary tuberculosis. Following the intervention in the post-test, 49 (98%) patients had good practice, and 1 (2%) had moderate practice.

Correlation:

Table 11 reveals significant associations between knowledge, attitude, and practice in the post-test regarding pulmonary tuberculosis. The mean knowledge score of 12.78 (S.D = 0.76) and the mean attitude score of 57.20 (S.D = 1.64) show a significant association with a p-value of 0.014. Additionally, the mean knowledge score of 12.78 (S.D = 0.76) and the mean practice score of 10.86 (S.D = 0.96) demonstrate a moderately significant association with a p-value of 0.008. Furthermore, the mean attitude score of 57.20 (S.D = 1.64) and the mean practice score of 10.86 (S.D = 0.96) exhibit a highly significant association with a p-value of 0.0001. These results highlight the strong interconnection between knowledge, attitude, and practice regarding TB in the post-test.

Association

Marital status ($\chi^2 = 14.908$, $p = 0.001$) shows a significant association with knowledge about pulmonary tuberculosis. Age ($\chi^2 = 17.993$, $p = 0.006$), education ($\chi^2 = 20.016$, $p = 0.003$), and occupation ($\chi^2 = 17.350$, $p = 0.008$) also show significant associations ($p < 0.05$), while other demographic variables did not.

Regarding attitude, marital status ($\chi^2 = 10.519$, $p = 0.001$) is significantly associated, and age ($\chi^2 = 13.976$, $p = 0.003$), gender ($\chi^2 = 8.882$, $p = 0.003$), education ($\chi^2 = 14.597$, $p = 0.002$), and occupation ($\chi^2 = 11.927$, $p = 0.008$) show significant associations ($p < 0.01$). Other variables did not.

Age ($\chi^2 = 13.735$, $p = 0.033$) shows a significant association with knowledge on practice ($p < 0.05$), while other demographic and clinical variables did not.

Table 1: Demographic variables of patients with pulmonary tuberculosis.

N=50

Demographic Variables	Frequency (n=50)	Percentage (%)
Age		
20 – 30 years	16	32.0
31 – 40 years	8	16.0
41 – 50 years	9	18.0
51 – 60 years	17	34.0
Gender		
Male	38	76.0
Female	12	24.0
Marital status		
Married	39	78.0

Demographic Variables	Frequency (n=50)	Percentage (%)
Unmarried	11	22.0
Single	-	-
Divorced	-	-
Type of family		
Nuclear	27	54.0
Joint	23	46.0
Domiciliary		
Urban	1	2.0
Rural	43	86.0
Semi urban	6	12.0
Education		
Illiterate	14	28.0
Primary education	19	38.0
Secondary education	9	18.0
College & others specify	8	16.0
Type of house		
Concrete house	34	68.0
Terraced house	16	32.0
Occupation		
Farmer	11	22.0
Daily wages	19	38.0
Business	3	6.0
Unemployed	17	34.0
Family monthly income		
Rs.<5000	-	-
Rs.5001 – 10000	6	12.0
Rs.10001 – 15000	23	46.0
Rs.>15001	21	42.0

Table 2: Clinical variables of patients with pulmonary tuberculosis

Clinical Variables	Frequency	Percentage (%)
Duration of disease		
Less than 1 year	28	56.0
1 – 3 years	22	44.0
4 – 5 years	-	-
More than 5 years	-	-
Type of treatment regimen		
2 months	-	-
6 months	50	100
9 months	-	-
More than 9 months	-	-
Family history of tuberculosis		
Yes	-	-
No	50	100.0

Table 3: Treatment adherence on pulmonary tuberculosis among the patients with pulmonary tuberculosis in pre-test and post-test.

Level of Treatment Adherence	Pre-test		Post-test	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Adherence	20	40	50	100.0
Non-adherence	30	60	-	-

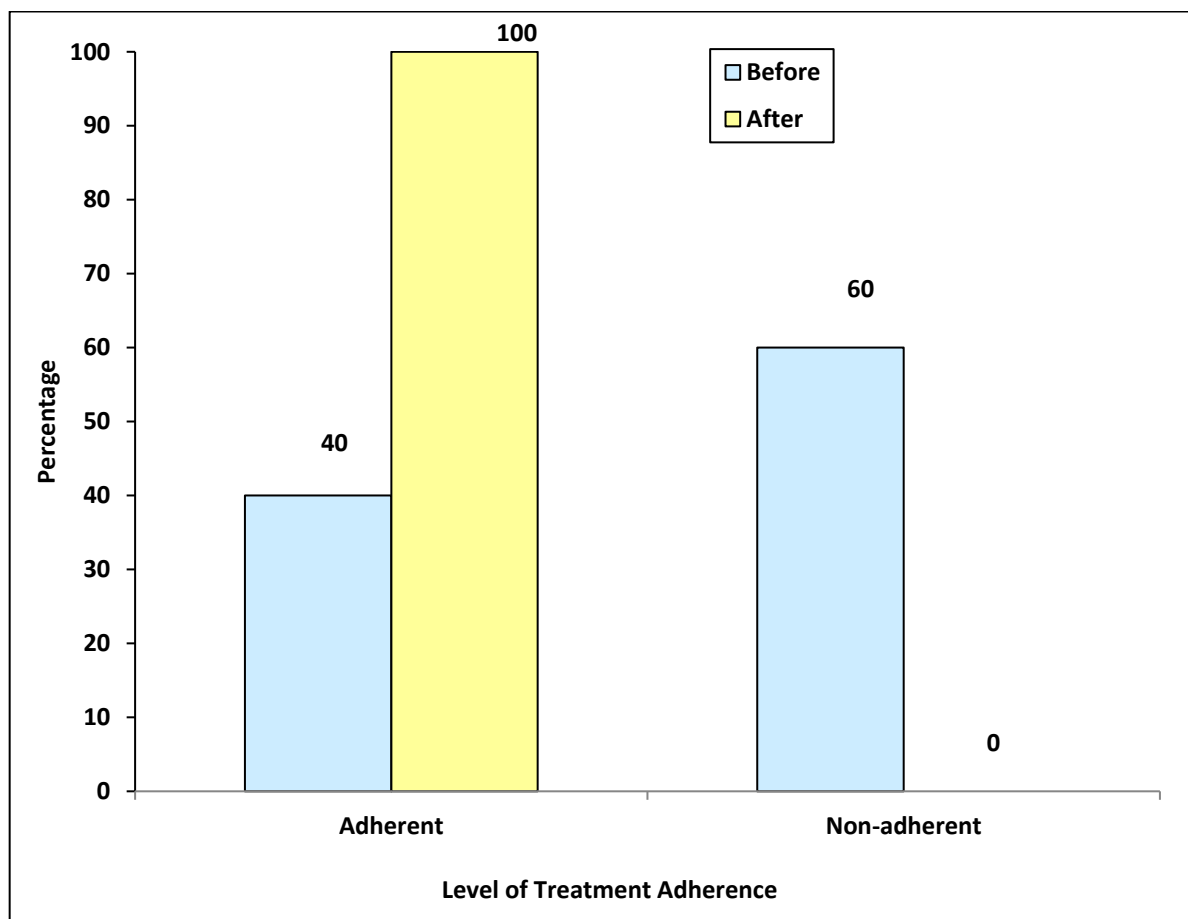


Figure 1: Treatment adherence regarding pulmonary tuberculosis among the patients with pulmonary tuberculosis in pre-test and in post-test

Table 4: Adherence knowledge regarding pulmonary tuberculosis among the patients with pulmonary tuberculosis in pre-test and post-test.

Level of Knowledge	Pre-test		Post-test	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Inadequate knowledge (1 – 4)	20	40.0	-	-
Moderately adequate knowledge (5 – 8)	19	38.0	-	-
Adequate knowledge (9 – 14)	11	22.0	50	100.0

Table 5: Attitude regarding pulmonary tuberculosis among the patients with pulmonary tuberculosis in pre-test and post-test.

Level of Attitude	Pre-test		Post-test	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Unfavorable attitude (≤ 20)	-	-	-	-
Moderately favorable attitude (21 – 40)	40	80.0	-	-
Favorable attitude (41 – 60)	10	20.0	50	100.0

Table 6: Adherence knowledge on practice regarding pulmonary tuberculosis among the patients with pulmonary tuberculosis in pre-test and post-test.

Level of Practice	Pre-test		Post-test	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Poor practice (1 – 4)	17	34.0	-	-
Moderate practice (5 – 8)	30	60.0	1	2.0
Good practice (9 – 12)	3	6.0	49	98.0

Table 7: Effectiveness of the Planned Teaching Programme on treatment adherence, knowledge, attitude, and knowledge on practice regarding pulmonary tuberculosis

Parameter	Pre-test Mean	Pre-test S.D	Post-test Mean	Post-test S.D	Mean Difference Score	Paired t-test Value	p-value
Treatment Adherence	-0.60	4.88	24.4	2.72	24.84	34.144	0.0001*
Adherence Knowledge	5.84	3.10	12.78	0.76	6.94	15.764	0.0001*

Attitude	36.10	4.41	57.20	1.64	21.10	32.598	0.0001*
Knowledge on Practice	5.58	2.11	10.86	0.96	5.28	17.230	0.0001*

Table 8: Correlation between adherence knowledge, attitude and knowledge on practice regarding pulmonary tuberculosis among the patients with pulmonary tuberculosis in post-test

Variables	Mean	S.D	Karl Pearson's Correlation	
			'r' value	p-value
Knowledge	12.78	0.76	r=0.345	p=0.014 S*
Attitude	57.20	1.64		
Knowledge	12.78	0.76	r=0.371	p=0.008 S**
Practice	10.86	0.96		
Attitude	57.20	1.64	r=0.557	p=0.0001 S***
Practice	10.86	0.96		

DISCUSSION:

The demographic analysis showed that 34% of patients with pulmonary tuberculosis were aged 51-60 years, and 76% were male. A majority, 78%, were married, and 54% belonged to nuclear families. Clinically, 56% of patients had the disease for less than a year, and all patients had no family history of tuberculosis. These findings align with a study by Adisa.R (2021) in Southwest Nigeria, where 55% of the participants were male, and the majority were aged 18-34 years, with secondary education being the most common level of education.

In terms of treatment adherence, 60% of patients were non-adherent in the pre-test, while in the post-test, 100% were adherent. Knowledge levels improved significantly, with 40% of patients showing inadequate knowledge in the pre-test, and by the post-test, 100% had adequate knowledge. Attitude towards tuberculosis also improved, with 80% having a moderately favorable attitude in the pre-test and 100% showing a favorable attitude post-test. Regarding knowledge on practice, 34% had poor knowledge in the pre-test, but 98% had good practice in the post-test. These findings are supported by Adisa.R (2021), who reported that 97.9% of patients knew TB was curable, and 91.4% understood how it was transmitted.

The effectiveness of the Planned Teaching Programme was evident across all areas. Treatment adherence increased significantly from a pre-test mean of -0.60 (S.D = 4.88) to 24.2 (S.D = 2.72) in the post-test, with a highly significant p-value of <0.001. Knowledge about TB also improved from a pre-test mean of 5.84 (S.D =

3.10) to 12.7 (S.D = 0.76), with a highly significant p-value of <0.001. Attitude improved significantly as well, from a pre-test mean of 36.10 (S.D = 4.41) to 57.20 (S.D = 1.64), with a p-value of <0.001. Knowledge on practice improved from a pre-test mean of 5.58 (S.D = 2.11) to 10.86 (S.D = 0.96), also showing a significant improvement ($p < 0.001$). These results are consistent with Khalili, S.A.L (2022), who found a positive relationship between knowledge, attitude, and practice in Oman, with higher knowledge in females and better practice in non-Omani patients.

Finally, the association between knowledge, attitude, and practice was significant. Knowledge and attitude had a significant association ($p < 0.014$), while knowledge and practice had a moderately significant association ($p < 0.008$). The relationship between attitude and practice was highly significant ($p < 0.0001$). These findings align with Fang, X.H (2019), who identified marital status and income as significant factors influencing TB treatment adherence, with lower income linked to higher non-adherence rates.

CONCLUSION:

The present study assessed the treatment adherence knowledge, attitude and knowledge on practice among the patients with pulmonary tuberculosis. The treatment adherence was assessed by structured interview schedule before and after the study. The study concluded that all patients had high treatment adherence knowledge, attitude and knowledge on practice after intervention.

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