Factors influencing compliance to directly observed treatment, short course therapy and effectiveness of awareness program on knowledge and compliance

Prakash Mahala[1], Suman Choudhary[1], Sanjenbam Emon Chanu[2], Priya J P N[2]

[1]All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India, [2]Himalayan College of Nursing, Dehradun, Uttarakhand, India

Correspondence to: Prakash Mahala, E-mail: prakashjpmmahala@gmail.com

ABSTRACT

Background: Tuberculosis (TB) is one of the most infectious diseases if not treated properly it may lead to mortality. The directly observed treatment, short course (DOTS) therapy is the choice of the treatment of TB. **Objectives:** The objectives of the study were (1) to determine the factors influencing compliance of persons with TB to DOTS, (2) to evaluate the effectiveness of an awareness program on knowledge and compliance to DOTS among persons with TB, (3) to find the association between pre-test level of knowledge with selected sociodemographic variables, and (4) to find the association between pre-test level of compliance to DOTS with selected sociodemographic variables. **Materials and Methods:** An evaluative approach with one group pre-test and post-test design was used as a research design in the study. 50 participants were selected as a sample using purposive sampling technique. The data were collected using structured knowledge questionnaire and compliance checklist through interview schedule **Results:** The study result showed that the mean post-test knowledge score (17.32 + 1.58) was higher than the mean pre-test knowledge score (10.80 + 2.05) and "t" value is 27.22 at $P < 0.05$. Similarly, the mean post-test compliance score (8.92 + 0.72) was higher than the mean pre-test compliance score (6.00 + 1.05) and "t" value is 9.369 at $P < 0.05$. The sociodemographic variable such as age and educational status was significantly associated with pre-test knowledge score ($\chi^2 = 5.993$, $P < 0.05$, and $\chi^2 = 11.49$, $P < 0.05$), respectively, and gender was significantly associated with pre-test compliance score ($\chi^2 = 4.482$, $P < 0.05$). The main reason for noncompliance to DOTS therapy was difficult to take multiple drugs for a long period and data showed that family support (29.55%) was highly influencing to comply with DOTS therapy. **Conclusion:** The awareness program was highly effective in increasing knowledge among TB person and compliance to DOTS therapy. Therefore, the knowledge and compliance of the TB person to DOTS therapy can be further improved by providing on-going awareness programs.

KEY WORDS: Tuberculosis; Directly Observed Treatment, Short Course Therapy; Knowledge; Compliance; Awareness Program

INTRODUCTION

Tuberculosis (TB) is a common and deadly infectious disease caused by *Mycobacterium* TB in humans.[1] It usually attacks the lungs but can also affect other parts of the body. Every year, nearly 9 million people develop TB, usually of the lungs and about 2 million people die from the disease.

TB can be cured by taking several strong antibiotics daily for at least 6 months, but many patients fail to complete this treatment because the drugs have unpleasant side effects. In addition, people often feel better soon after starting treatment so they stop taking their tablets before all the bacteria in their body are dead. Poor treatment compliance (poor adherence) means that people remain infectious for longer and are more likely to relapse and die. It also contributes to the emergence of drug-resistant TB. To help people complete their treatment, the World Health Organization recommends a strategy known as directly observed treatment, short course (DOTS). Although DOTS has contributed to improved TB control, better patient compliance is needed to halt the global TB epidemic.[2] For most bacterial infections, antibiotics are taken for no longer than a week, but TB treatment requires a minimum of 6 months treatment, and so it is not surprising that non-adherence is a problem. Poorly treated patients can develop drug-resistant and potentially incurable forms of TB. So compliance with drug therapy is one of the important factors that affect the outcome of the therapy. Still, treatment compliance may be a problem due to social stigma and or deficient knowledge of the disease and treatment. Apart from these, there are many reasons for poor adherence, including the personal and social characteristics of patients, the health care workers treating them; cultural beliefs on both sides; the infrastructure supporting the health-care system; and the extent of the patient's knowledge and perception of the disease.[3-6]

In Uttarakhand, the estimated number of new smear-positive (NSP) cases is 95/100,000 population per year (based on recent ARTI report). The data from revised TB control program in Uttarakhand revealed that overall cure rate in NSP patient is low (< 80%) in three districts (Dehradun, Haridwar, and Nanital).[7]

The above data show that patients with TB require knowledge and awareness regarding compliance with DOTS. Thus, it is evident that TB is highly infectious and accounts for a high rate of mortality and morbidity in our country. Hence, it is important that the patients should have adequate knowledge regarding the disease to survive and prevent further infection.

Objectives of the Study

The objectives are as follows:
- To determine the factors influencing compliance of persons with TB to DOTS.
- To evaluate the effectiveness of an awareness program on knowledge and compliance to DOTS among persons with TB.
- To find the association between pre-test level of knowledge with selected sociodemographic variables.
- To find the association between pre-test level of compliance to DOTS with selected sociodemographic variables.

MATERIALS AND METHODS

The research approach adopted for the study was experimental with one group pre-test - post-test design. 50 participants those who are diagnosed as TB and taking DOTS therapy were selected using purposive sampling technique from selected DOTS Center of Dehradun Uttarakhand. A structured interview schedule which consists of sociodemographic variables, factors influencing compliance check list, structured knowledge questionnaire, and compliance check list was used to collect the data. The data were analyzed using frequency percentage, paired "*t*"–test, and Chi-square test.

RESULTS

Frequency and Percentage Distribution of Sociodemographic Variables

Data showed that majority of the respondents 62% were within the age group of 18–40 years and 68% were males. Majority of the respondents 72% were literates. More than half of the respondents 58% were unskilled workers. 76% of respondents were having a family income <4000/month. Half of the respondents (54%) were from joint family and 82% of the respondents got information regarding TB from health-care personnel and 18% were from media. Only 2% of the respondents were having the habit of smoking during treatment. Majority of the respondents (94%) had not exposed to smoking during treatment and the remaining 6% of the respondents were exposed to smoking. The duration of DOTS therapy was between one to 3 months for 70% of
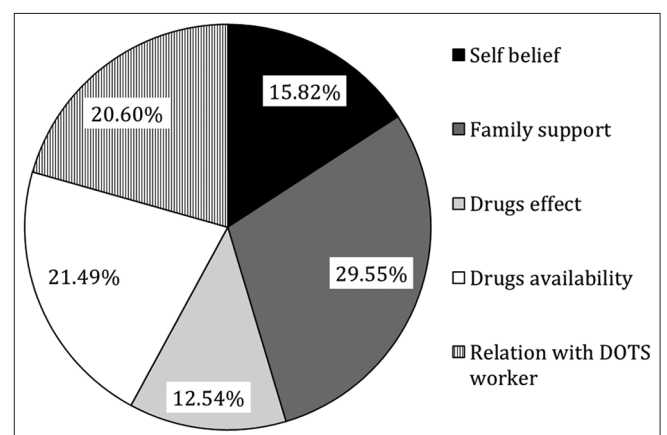

Figure 1: Frequency and percentage distribution of factors influencing compliance, *n*=50

Table 1: Mean, mean difference, SD of pre-test and post-test knowledge scores, *n*=50

Pre-test	Post-test	Mean difference	"*t*" value
Mean±SD	Mean±SD		
10.80±2.050	17.32±1.584	6.52	27.228*

"*t*"$_{49}$=2.09, *P*<0.05, *indicates significant SD= Standard Deviation

Table 2: Area wise distribution of pre-test and post-test mean scores, SD and paired "*t*" test, *n*=50

Area of knowledge	Pre-test	Post-test	Paired "*t*" test
	Mean±SD	Mean±SD	
TB, its causes, incidence, Sign, and symptoms	2.90±1.073	4.68±0.471	10.74*
TB and the importance of DOTS therapy	1.22±0.738	3.2±0.699	13.76*
DOTS therapy, availability, effectiveness and side effects	6.68±0.867	9.44±1.072	14.15*

"*t*"$_{49}$=2.09, *P*<0.05, *indicates significant. DOTS: Directly observed treatment, short course, TB: Tuberculosis SD= Standard Deviation

Table 3: Mean, mean difference, SD of pretest and post-test compliance scores, *n*=50

Pre-test	Post-test	Mean difference	"*t*" value
Mean±SD	Mean±SD		
6.00±1.050	8.92±0.724	2.92	19.369*

"*t*"$_{49}$=2.09, *P*<0.05,*indicates significant SD= Standard Deviation

the respondents whereas the remaining 30% were having duration between 4 and 6 months of DOTS therapy.

The data presented in Figure 1 show the most influencing compliance factor to DOTS was family support (29.55%) whereas, the least influencing factor was drugs (12.54%).

The data presented in Table 1 indicated that the mean difference between pre-test and post-test knowledge score was 6.52. To find out the significant difference between means of pre-test and post-test knowledge scores "*t*" value was computed. "*t*" value was significant "*t*"$_{(49)}$ = 27.228, at *P* < 0.05. Hence, the researcher accepted the research hypothesis and rejected the null hypothesis. Therefore, it is evident that the awareness program was effective in increasing knowledge of person with TB.

The data presented in Table 2 shows that the mean post-test knowledge scores in all the above area of TB were higher than the mean pre-test knowledge scores. This indicates that knowledge of the persons with TB was improved after the awareness program.

The data presented in Table 3 indicated that the mean difference between pre-test and post-test compliance score was 2.92. "*t*" value was significant "*t*"$_{(49)}$ = 19.369, at *P* < 0.05. Hence, the research hypothesis was accepted and rejected the null hypothesis. Therefore, the awareness program was significantly effective in increasing compliance too.

Data presented in the Table 4 shows that there was no significant association between the pre-test knowledge level and gender, occupation, family income, type of family, sources of health information, and duration of DOTS therapy. However, the significant association was found with age and educational status. Hence, the researcher accepted the null hypothesis (H$_{03}$) and rejected the research hypothesis.

Data presented in Table 5 show that there was no significant association between the pre-test compliance and age, occupation, educational status family income, type of family, sources of health information, and duration of DOTS therapy. However, the significant association was found with gender. Hence, the researcher accepted the null hypothesis (H$_{04}$) and rejected the research hypothesis.

DISCUSSION

Findings of the study revealed that the most influencing factor of non-compliance for TB person to DOTS therapy was drug effect and its longer duration whereas the family support is the major factor which makes to comply with the therapy.

Findings further showed that there was a significant increase in the knowledge level and compliance of the persons with TB after awareness program. These findings are supported by a study conducted by Gopi and Vasantha on risk factor for non- adherence to DOTS in South India. The risk factors associated with non-adherence were illiteracy (39%), difficulty in accessing health facility (57%), and non-government DOTS center (43%). The study findings highlighted that most of the person with TB had less knowledge and compliance with DOTS therapy.[8] Another study which was conducted by Hoa *et al.* to describe the patient's knowledge of TB and to evaluate the impact of the national TB programs health education.

The study recommends reducing stigma and the impact of social consequences of TB by an ongoing health education program designed to increase the knowledge level in the whole population.[9] Therefore, it is evident that the awareness program was effective in knowledge and compliance on TB and DOTS.

The present study also has few of the limitations, the result might be influenced by an extraneous variable such as treatment by doctor, and home remedies for cough relief might be played a role in the study outcome.

CONCLUSION

The study was undertaken to evaluate the effectiveness of an awareness program on TB and DOTS therapy among persons with TB. Hence, this can be concluded that there was

Table 4: Yates and Chi-square value computed between the pre-test knowledge level and selected sociodemographic variables *n*=50

Selected variable	At and above median	Below-median	Chi and Yates values
Age in years			
18–40 years	25	06	5.993*
41–60 years	09	10	
Gender			
Male	24	10	0.3271
Female	10	06	
Educational status			
Illiterates	04	10	11.49*
Literates	30	06	
Occupation			
Skilled	15	06	0.1956
Unskilled	19	10	
Family income per month			
<2000–4000 Rs.	25	13	0.05825
4001–6000 Rs. and above	09	03	
Type of family			
Nuclear	15	08	0.1516
Joint	19	08	
Sources of health information			
Media	04	05	1.63423
Health personnel	30	11	
Duration of DOTS therapy			
1–3 months	24	11	0.03939
4–6 months	10	05	

P<0.05, χ^2=3.84, df=1, *indicates significant. DOTS: Directly observed treatment, short course

Table 5: Yates and Chi-square value computed between the pre-test compliance level of persons with TB and their selected sociodemographic variables *n*=50

Selected variable	At and above median	Below-median	Chi and Yates values
Age in years			
18–40 years	21	10	0.016
41–60 years	14	05	
Gender			
Male	27	07	4.482*
Female	08	08	
Educational status			
Illiterates	07	07	3.704
Literates	28	08	
Occupation			
Skilled	16	05	0.250
Unskilled	19	10	
Family income per month			
<2000–4000 Rs.	25	13	0.63
4001–6000 Rs. and above	10	02	
Type of family			
Nuclear	17	06	0.310
Joint	18	09	

(Contd...)

Table 5: *(Continued)*

Selected variable	At and above median	Below-median	Chi and Yates values
Sources of health information			
Media	07	02	0.025
Health personnel	28	13	
Duration of DOTS therapy			
1–3 months	22	13	1.81
4–6 months	13	02	

$P<0.05$, $\chi^2=3.84$, df=1, *indicates significant (Yates corrected), DOTS: Directly observed treatment, short course, TB: Tuberculosis

a significant increase in the knowledge level and compliance of the persons with TB. Hence, it may be concluded that not only attainment of knowledge and compliance but also continuous reinforcement and time is necessary to change one's health practices and lifestyle and will help to prevent the progression of TB.

REFERENCES

1. Mitchell N, Richard N. Robbins Basic Pathology. Philadelphia, PA: Saunders Elsevier. p. 516-22.
2. Dye C. Global epidemiology of tuberculosis. Lancet 2006;367:938-9.
3. Center for Disease Control and Prevention-Module-9; Patient Adherence to TB. Available from: http://www.cdc.gov/tb/education/ssmodule/module9.htm. [Last accessed on 2016 Feb 23].
4. World Health Organization. Global TB Control; 2009. Available from: http://www.who.int/tb/publications/global report. [Last accessed on 2016 Feb 23].
5. World Health Organization. Report; 2004 Global TB. Control-Surveillance-Planning-Financing, Internet Document. Available from: http://www.redetb.org/publicacoes/38-relatorios/202-who-report-2004-global-tuberculosis-control-surveillance-planning-financing. [Last accessed on 2016 Feb 23].
6. TB Statistics of India, (Internet Document). Available from: http://www.rkmtbs.com/TBStatistics.htm. [Last accessed on 2011 Jun 08].
7. Uttarakhand State Report, (Internet Document). Available from: http://www.mohfw.nic.in/NRHM/Documents/High_Focus_Reports/Uttarakhand%20Report.pdf. [Last accessed on 2011 Jun 08].
8. Gopi PG, Vasantha M. A study on risk factor for non adherence to DOTS in South India. Tub J India 2007;54:66-70.
9. Hoa NP, Thorson AE, Long NH, Diwan VK. Knowledge of tuberculosis and associated health-seeking behaviour among rural Vietnamese adults with a cough for at least three weeks. Scand J Public Health Suppl 2003;62:59-65.