

Original Research Article

Evaluation of awareness and factors determining satisfaction among tuberculosis patients regarding RNTCP services in a western district of Uttar Pradesh: a cross sectional study

Deepak Kumar¹, Divyata Sachan^{2*}, Manoj K. Verma³, Abhinav Gangwar⁴, Pankaj K. Jain⁴,
Dhiraj K. Srivastava⁴, Prashant K. Bajpai⁵

¹Department of Health and Family Welfare, Senior Medical Officer, Agra, Uttar Pradesh, India

²Department of Community Medicine, S. M. M. H. Medical College, Saharanpur, Uttar Pradesh, India

³Department of Health and Family Welfare, Senior Medical Officer, BaraBanki, Uttar Pradesh, India

⁴Department of Community Medicine, U. P. U. M. S., Etawah, Uttar Pradesh, India

⁵Department of Community Medicine, K. G. M. C., Lucknow, Uttar Pradesh, India

Received: 16 May 2023

Revised: 05 August 2023

Accepted: 07 August 2023

*Correspondence:

Dr. Divyata Sachan,

E-mail: divyatasachan92@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: With the help of 'Revised National Tuberculosis Control Program' (RNTCP), India has envisioned to end Tuberculosis (TB) five years ahead of the targets set by SDG which was by 2030. Regular evaluation is necessary for every programme to keep the programme in track and to identify the existing lacunae. Therefore, this study was planned to assess the awareness of TB patients regarding RNTCP along with identifying the factors which determine satisfaction of TB patients.

Methods: A community-based cross sectional study was conducted on patients seeking treatment at district tuberculosis centre and DOTs centres of district. The data were collected using a close-ended, pretested and pre-validated questionnaire.

Results: The mean score for awareness regarding TB among 205 study participants was 5.76 ± 1.88 with level of awareness being poor, average and good in 41%, 31% and 28% of the study participants respectively. The mean satisfaction score was 9.47 ± 1.02 and the services were perceived as good, average and poor by 56%, 39% and 5% of the study population respectively. Majority of the participants were unsatisfied due to the untimely distribution of the money provided under Nikshay Poshan Yojna (31.7%). The reasons for satisfaction among majority of the participants was the availability of staff at DOTs Centre (87.3%). A significant correlation was observed between satisfaction score and awareness score ($r^2=0.033$, $p=0.01$).

Conclusions: The overall awareness and satisfaction about RNTCP services was good among TB patients with a greater satisfaction among people with high awareness.

Keywords: DOT, RNTCP, Satisfaction, TB, Tuberculosis

INTRODUCTION

Despite the fact that the organism that causes tuberculosis (TB) was discovered around a 100 years ago and that it is

a preventable disease, yet it remains the most common infectious disease worldwide.¹ Tuberculosis is a leading cause of mortality worldwide, affecting 10 million people globally and killing 1.3 million in 2018.² Tuberculosis is

one of the major public health problems in India with an estimated TB incidence of 25,90,000 and deaths of 4,93,000 in years 2020.³ Adding to the problems, World health organization (WHO) reported strains of mycobacterium tuberculosis which are resistant to standard anti-TB therapy are emerging rapidly due to non-adherence and inappropriate therapy for treatment.⁴

With the help of 'Revised National Tuberculosis Control Program' (RNTCP) which is a state-run TB control initiative of the Government of India, India has envisioned to end TB five years ahead of the targets set by SDG which was by 2030.⁵ There has been a considerable control with the help of new policy formulated like that of directly observed treatment (DOT) therapy, fixed dose combination (FDC) drugs and Nikshay Poshan Yojna. However, regular evaluation is necessary for every programme to keep the programme in track and to identify the existing lacunae. Therefore this study was planned with the objective to assess the awareness of TB patients regarding RNTCP along with identifying the factors which determine satisfaction of TB patients as patient satisfaction is considered to be a highly desirable outcome measure of clinical care, influencing both treatment adherence and continuity of care. This study not only highlights the factors responsible for satisfaction of TB patients in TB treatment but also their awareness regarding the same.

METHODS

A community- based cross sectional study was conducted over a duration of sixteen months from January 2019 to June 2020 in the western district of Uttar Pradesh.

Study population

Patients seeking treatment at district tuberculosis centre and selected DOTs centres.

Inclusion criteria

Patients with age 15 years and above suffering from pulmonary tuberculosis, registered at the selected centres for availing services under RNTCP between 1st January to 31st December of year 2019 and are on continuation phase treatment for tuberculosis during selection process of the study.

Exclusion criteria

Patients who were severely ill/ hospitalized or suffering from extra pulmonary tuberculosis and belonged to MDR, XDR category of tuberculosis excluded from study.

Sample size

Twenty patients from district tuberculosis centre and five patients each from the selected DOTS centre making a total of 205 study participants were included in the study.

Methodology

The study was conducted in the public health facilities of the study district working under Revised National Tuberculosis Control Programme. There are a total of 624 DOT centres working under 11 tuberculosis units (TU) and one District Tuberculosis Centre (DTC) in the study district. The selection of DOT centres and patients was done using purposive sampling method because of the limited resources available. Out of 11 Tuberculosis Units, four Tuberculosis Units were selected randomly by using lottery method.

From these four tuberculosis units, we procured lists of DOT centres working under the respective TU along with the list of patients registered on them. There were 185 DOT centres under the selected TUs out of which 20% DOT centres were selected randomly from each TU making a total of 37 DOT centres. A total of 205 participants were selected, twenty patients were selected from District Tuberculosis Centre while five patients each were selected from the list of patients of 37 DOT centres who were in their continuous phase treatment and registered between 1st January to 31st December of year 2019. List of patients obtained for each DOT centre was arranged chronologically and five patients were selected whose treatment started earlier most. If the number of patients from the selected DOT centre was less than five, then remaining patients were taken from nearby DOT centre which was not selected previously. Patients from the district tuberculosis centre were selected using a similar methodology.

Data collection

The data were collected using a close-ended, pretested and pre-validated questionnaire which was categorized into three broad headings: Sociodemographic profile, level of awareness (eight questions) and level of patient satisfaction (thirteen questions). A pilot study was conducted prior to the study on 33 participants and necessary changes were incorporated in the questionnaire. The questionnaire depicted excellent content validity index, face validity and Cronbach's ranging from 0.6-0.8.

Data analysis

For each correct response on questions on awareness a score of one was awarded and a total for each patient was calculated out of eight which was converted into percentage. The total score percentage of awareness was classified as poor (0%-50%), average (51%-75%) and good (76%-100%). For satisfaction, a score of 1 was awarded for response of "very satisfied", 0.8 for "satisfied", 0.6 for "cannot say", 0.4 for "unsatisfied" and 0 for "very unsatisfied". A total score percentage was calculated using maximum score being 13 and the satisfaction percentage was classified as low (0%-50%), medium (51%-75%) and high (76%-100%).

Statistical analysis

The data were entered in Microsoft Excel and analysed using Statistical Package for Social Sciences (SPSS) version 24.0, IBM Inc. Chicago, USA software after coding it. The knowledge of participants and satisfaction was expressed as proportion while the scores were expressed in form of mean $\pm$ standard deviation and percentages. The scores was also expressed as box plot describing the median, interquartile range and the outliers. Chi square test/ Fischer exact test was conducted to assess the relationship between satisfaction and socio-demographic features and $p < 0.05$ was considered as significant. The correlation between awareness and satisfaction score was depicted as a scatter plot where $p < 0.05$ was considered as significant. While performing the regression analysis, in order to create a two by two

table, independent and dependant parameters were merged. Dependant parameter i.e. the satisfaction which was classified into good, average and poor was reclassified into “unsatisfied” (poor and average) and “satisfied” (good).

RESULTS

The maximum number of participants (64.9%) belonged to the age group of 16-45 years while the mean age of study participants was 39.23 ± 17.13 years. Proportion of male patients (67.8%) was greater than female patients (32.2%). About 90% of the participants were Hindu while around 50% belonged to OBC caste. Around 28% of the participants were illiterate while 37.6% i.e. majority belonged to lower middle class followed by lower class (29.8%) (Table 1).

Table 1: Socio-demographic distribution of the beneficiaries.

Socio- demographic variables		Frequency (n=205)	Percentage (%)
Age (years)	Mean $\pm$ SD	39.23 $\pm$ 17.13 years	
	16-45	133	64.9
	>46	72	35.1
Sex	Male	139	67.8
	Female	66	32.2
Religion	Hindu	188	91.7
	Muslim	17	8.3
Caste	General	38	18.5
	OBC	109	53.2
	SC/ST	58	28.3
Education	Illiterate	57	27.8
	Primary school	23	11.2
	Middle school	44	21.5
	High school	24	11.7
	Intermediate	29	14.1
	Graduate	25	12.2
	Post graduate	3	1.5
Occupation	Unemployed	44	21.5
	House wife	49	23.9
	Unskilled worker	26	12.7
	Semiskilled worker	8	3.9
	Skilled worker	12	5.9
	Clerk/shopkeeper/ farmer	58	28.3
	Professional	8	3.9
Family type	Nuclear family	87	42.4
	Joint family	100	48.8
	Three generation family	18	8.8
Socio-economic scale as per B.G. Prasad classification	Upper class	0	0.0
	Upper middle class	24	11.7
	Middle class	43	21.0
	Lower middle class	77	37.6
	Lower class	61	29.8

Almost 100% of the participants were aware that the government is providing free of cost treatment of TB

while only 51.2% of them knew that cough of more than 2 weeks could be TB (Figure 1). More than half of the

patients were satisfied with the DOTs services except for the amount of money spent for management of side

effects associated with DOTs treatment and the amount of money spent to reach DOTs centre (Table 2).

Table 2: Satisfaction of beneficiaries regarding DOTs services (n=205).

Satisfaction variables	Very satisfied	Satisfied	Cannot say	Un-satisfied	Very unsatisfied
Timing of DOTs Center	26 (12.7)	179 (87.3)	0 (0.0)	0 (0.0)	0 (0.0)
Availability of staff at DOTs Centre	26 (12.7)	179 (87.3)	0 (0.0)	0 (0.0)	0 (0.0)
Behaviour of staff at DOTs Center	49 (23.9)	148 (72.2)	1 (0.5)	7 (3.4)	0 (0.0)
Facilities available at DOTs Centre	13 (6.3)	174 (84.9)	7 (3.4)	11 (5.4)	0 (0.0)
Duration of treatment under RNTCP	4 (2.0)	133 (64.9)	9 (4.4)	50 (24.4)	9 (4.4)
Waiting time for medical care	7 (3.4)	177 (86.3)	6 (2.9)	15 (7.3)	0 (0.0)
Accessibility of DOTs Center	24 (11.7)	161 (78.5)	6 (2.9)	12 (5.9)	2 (1.0)
Frequency of visit to DOTs Center for getting medicine	2 (1.0)	149 (72.7)	6 (2.9)	45 (22.0)	3 (1.5)
Regularity of drug supply at DOTs Center	14 (6.8)	173 (84.4)	1 (0.5)	15 (7.3)	0 (0.0)
Amount of money spent for management of side effects associated with DOTs treatment	1 (0.5)	90 (43.9)	74 (36.1)	39 (19.0)	1 (0.5)
Amount of money spent to reach DOTs Center	2 (1.0)	100 (48.8)	72 (35.1)	30 (14.6)	1 (0.5)
Amount of money provided by the government under Nikshay poshan yojana	4 (2.0)	118 (57.6)	6 (2.9)	63 (30.7)	14 (6.8)
Monetary benefits received at time	0 (0.0)	112 (54.6)	5 (2.4)	65 (31.7)	23 (11.2)

Table 3: Relationship between socio-demographic features and satisfaction of the beneficiaries in terms of RNTCP services.

Socio- demographic variables		Satisfaction			X ²	p
		Poor n=2	Average n=108	Good n=95		
Age (years)	16-45	2 (100.0)	67 (62.0)	64 (67.3)	0.830	0.797
	>46	0 (0.0)	41 (38.0)	31 (32.7)		
Sex	Male	0 (0.0)	69 (63.9)	70 (73.7)	4.007	0.040
	Female	2 (100.0)	39 (36.1)	25 (26.3)		
Religion	Hindu	1 (50.0)	92 (85.2)	95 (100.0)	21.94	<0.01
	Muslim	1 (50.0)	16 (14.8)	0 (0.0)		
Caste	General	0 (0.0)	10 (9.2)	28 (29.5)	14.728	<0.01
	OBC	2 (100.0)	64 (59.3)	43 (45.3)		
	SC / ST	0 (0.0)	34 (31.5)	24 (25.3)		
Education	Illiterate	0 (0.0)	37 (34.3)	20 (21.1)	14.986	0.195
	Primary school	0 (0.0)	13 (12.0)	10 (10.5)		
	Middle school	1 (50.0)	20 (18.5)	23 (24.2)		
	High school	0 (0.0)	12 (11.1)	12 (12.6)		
	Intermediate	0 (0.0)	17 (15.7)	12 (12.6)		
	Graduate	1 (50.0)	8 (7.4)	16 (16.8)		
	Post graduate	0 (0.0)	1 (0.9)	2 (2.1)		
Occupation	Unemployed	0 (0.0)	15 (13.9)	29 (30.5)	20.557	0.029
	House wife	1 (50.0)	21 (28.7)	17 (17.9)		
	Unskilled worker	0 (0.0)	17 (15.7)	9 (9.5)		
	Semiskilled worker	0 (0.0)	10 (9.3)	2 (2.1)		
	Skilled worker	0 (0.0)	3 (2.8)	5 (5.3)		
	Shopkeeper/Farmer	1 (50.0)	28 (25.9)	29 (30.5)		
Family type	Professional	0 (0.0)	4 (3.7)	4 (4.2)	9.665	0.027
	Nuclear family	1 (50.0)	39 (36.1)	47 (49.5)		
	Joint family	1 (50.0)	54 (50.0)	45 (47.4)		
	Three generation	0 (0.0)	15 (13.9)	3 (3.2)		
Socio-	Class I	0 (0.0)	0 (0.0)	0 (0.0)	11.538	0.033

Continued.

Socio- demographic variables		Satisfaction			X ²	p
		Poor n=2	Average n=108	Good n=95		
economic scale (B.G. Prasad classification)	Class II	0 (0.0)	7 (6.5)	17 (17.9)		
	Class III	0 (0.0)	22 (20.4)	21 (22.1)		
	Class IV	2 (100.0)	48 (44.4)	27 (28.4)		
	Class V	0 (0.0)	31 (28.7)	30 (31.6)		

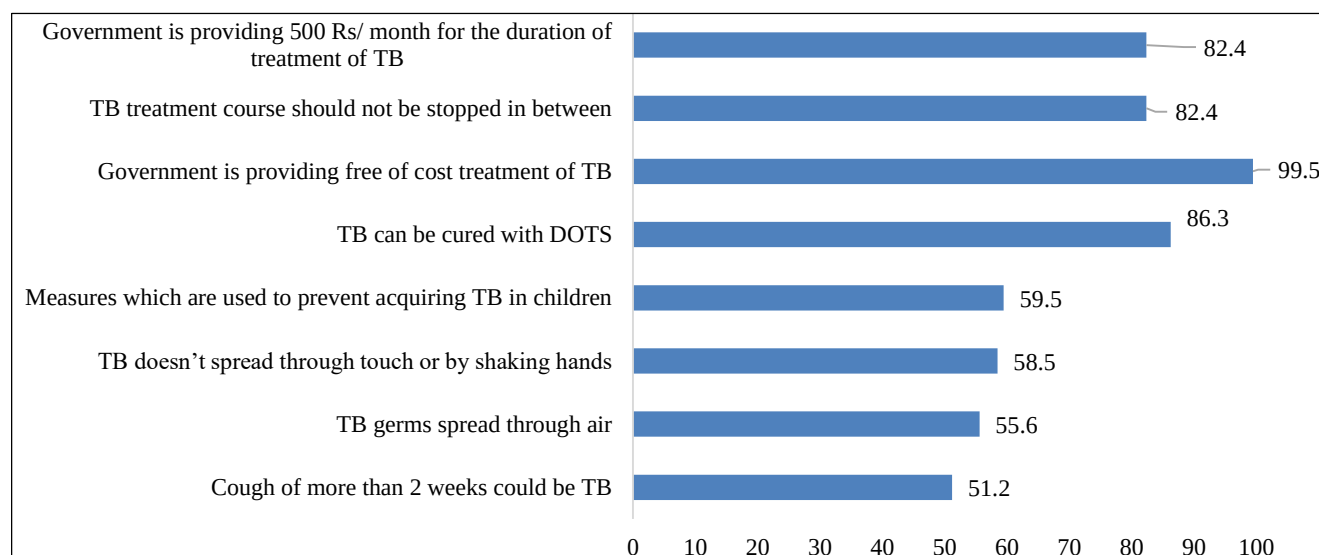


Figure 1: Awareness of beneficiaries regarding DOTs services (n=205).

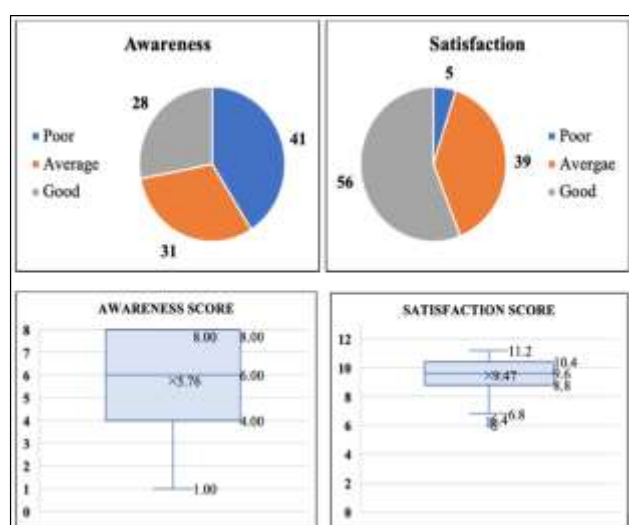


Figure 2: Descriptive and percentage data of awareness and satisfaction of TB patients regarding RNTCP services (n=205).

The mean score for awareness was 5.76 ± 1.88 (maximum value: 8) although the awareness regarding DOTs service was poor among 41%, average for 31% and good among 28% of the participants (Figure 2). Similarly the mean satisfaction score was 9.47 ± 1.02 (maximum value: 13) and the overall satisfaction regarding DOTs services was good as perceived by 56% of the participants, average by 39% and poor by 5% of the participants (Figure 2). The

study revealed statistically significant relationship between satisfaction and all socio-demographic characteristics except for education and age (Table 3).

A statistically significant correlation was observed between satisfaction score and awareness score ($r^2=0.033$, $p=0.01$) (Figure 3).

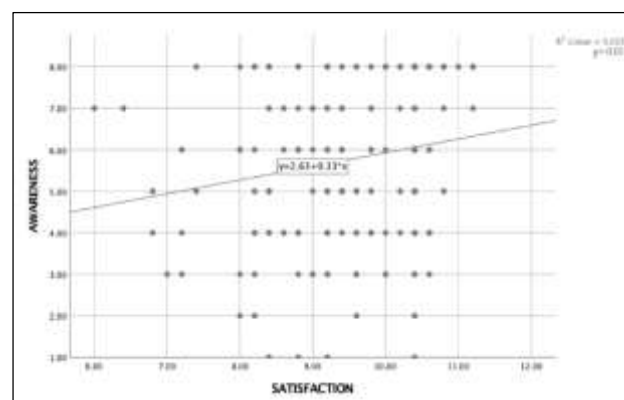


Figure 3: Correlation between awareness and satisfaction score.

Univariate regression analysis revealed that caste [OR: 0.239 (0.109-0.525)], education [OR: 1.901 (1.010-3.577)], occupation [OR: 0.359 (0.179-0.722)] and socio-economic status [OR: 0.537 (0.298-0.969)] significantly affected satisfaction of the beneficiaries (Table 4).

However, multivariate regression analysis stated that only caste [OR:0.311 (0.137-0.704)] and occupation [OR:0.439(0.208-0.926)] had a statistically significant impact on the satisfaction.

Table 4: Regression analysis of socio-demographic features and satisfaction of the beneficiaries in terms of RNTCP services.

Socio- demographic variables		Unsatisfied (n=110)	Satisfied (n=95)	UOR 95% CI	P	AOR 95% CI	P
Age groups (years)	16-45	69 (51.9)	64 (48.1)	0.815	0.488	1.017 0.516-2.006	0.960
	>46	41 (56.9)	31 (43.1)	0.458-1.452			
Gender	Male	69 (49.6)	70 (50.4)	0.601	0.094	1.020 0.511-2.039	0.954
	Female	41(62.1)	25 (37.9)	0.330-1.093			
Religion	Hindu	93 (49.5)	95 (50.5)	-		-	-
	Muslim	17 (100.0)	0 (0.0)				
Caste	General	10 (26.2)	28 (73.7)	0.239	<0.01	0.311 0.137-0.704	<0.01
	Reserved (OBC,SC/ST)	100 (59.9)	67 (40.1)	0.109-0.525			
Education	Illiterate	37 (64.9)	20 (35.1)	1.901	<0.05	1.394 0.676-2.877	0.369
	Educated	73 (49.3)	75 (50.7)	1.010-3.577			
Occupation	Unemployed	15 (34.1)	29 (65.9)	0.359	<0.01	0.439 0.208-0.926	<0.05
	Employed	95 (59.0)	66 (41.0)	0.179-0.722			
Family type	Nuclear family	40 (46.0)	47 (54.0)	0.584	0.058	0.554 0.295-1.041	0.066
	Joint & Three generation	70 (59.3)	48 (40.7)	0.334-1.021			
SES	Class I, II, III	29 (43.3)	38 (56.7)	0.537	<0.05	0.709 0.367-1.370	0.306
	Class IV, V	81 (58.7)	57 (41.3)	0.298-0.969			

DISCUSSION

Most of the studies conducted in context of tuberculosis have focused on clinical outcome. Apart from having a clinically sound treatment for any disease, it is important that the treatment policy is well accepted by the patient so that he/she can adhere to the treatment guidelines. This study was conducted to assess the satisfaction of TB patients with respect to TB treatment therapy under RNTCP.

In terms of overall awareness regarding TB, 65% of the participants in the study of Nautiyal et al had good knowledge.⁶ Contradictory results were observed in the study of Das et al who reported that only 29.1% of the patients had satisfactory knowledge which was similar to the results of present study where only 28% of the study participants had good knowledge regarding TB.⁷ The mixed results are not unexpected as in spite of having a fixed guidelines there are huge variations in how TB awareness is generated across different settings in India.

In this study 51% of the participants were aware that cough of more than two weeks could be tuberculosis. Contrary to other studies like that of Dumpeti et al and

Samal et al where 96.3% and 97% of the patients were aware that cough of more than two weeks could be due to TB respectively.^{8,9} Nautiyal et al also reported that 68.47% of the patients had knowledge that TB could be prevented by covering mouth and nose while coughing and sneezing.⁶ Huddart et al and Das et al have also stated a similar percentage of 63.4% and 53.6% respectively.^{7,10} The present study reported that 55.6% of their patients were aware that TB germs spread through air which was similar to findings from other study. The people should be aware of the clinical features and mode of spread so that they are able to identify if they are infected with TB and get treatment at the earliest along with taking preventive measures hence, universal policy implementations are encouraged so that every person has the knowledge to identify the disease and is able to protect himself from the disease.

Adequate knowledge was present among TB patients regarding free treatment services offered by Government (99.5%). Similar results were observed in the study conducted by Samal et al, Jangid et al and Dumpeti et al as 75%, 73.5% and 89% of the patients were aware of the free treatment services offered by the government respectively.^{8,9,11} Unlike the study of Dumpeti et al where only 12.6% of the study subjects were aware that during

treatment period, Rs.500 will be given every month for TB patients regarding nutrition support, in the present study 82.4% of the patients were aware regarding the same.¹¹ The patients are well aware of the financial support provided to TB patients which is a positive indicator as it promotes TB patients to consult health services and start TB treatment.

The overall satisfaction of TB patients in terms of RNTCP services was good for 56% of the total patients with an overall mean score of 9.47 based on rating score of 1 to 13. Similar results were observed by Samanta et al in the study observing client satisfaction regarding DOTs observed that 54% of the participants were satisfied with the services provided.¹² Peresu et al stated that the overall mean of general satisfaction was fairly favourable i.e. 4.4 out of a maximum of 5 for DOT among multidrug resistant TB patients.¹³ Among the unsatisfied/very unsatisfied individuals in the present study, majority of the individuals were unsatisfied due to the untimely distribution of the money provided under Nikshay Poshan Yojna (31.7%), amount of money provided to TB patients Nikshay Poshan Yojna (30.7%), long duration of treatment (24.4%), frequent visits to DOTs centres to receive the medication (22.0%) along with the amount of money required to reach the DOTs centres (14.6%) and amount of money spent for the treatment of side effects of TB medication (19.0%). Similar results of dissatisfaction were observed in the study of Srivastava et al and Rai et al where 43.6% and 37.1% of the participants were having difficulty to come on alternate days for treatment; 12.8% and 5.93% were dissatisfied with the long distance to travel for DOTs centres while 10.3% were facing financial losses.^{14,15} Majority of the participants in this study were satisfied with the availability (87.3%) and behaviour (72.2%) of staff at DOTS Centre, timing of DOTS Centre (87.3%), prompt treatment availability (86.3%) and the services offered at DOTS centres (84.9%). Other studies like that of Rai et al, Haque et al, Nezenega et al and Mohamad et al reported similar levels of satisfaction regarding same parameters.¹⁵⁻¹⁷

This study has few limitations. The satisfaction of beneficiaries regarding any health services consists of a variety of domains of which only few were covered. A longitudinal study should have been conducted in order to study the satisfaction of patients over the course of treatment. Association between socio demographic factors and satisfaction levels could not be assessed as it required a larger sample size.

CONCLUSION

The overall awareness and satisfaction about RNTCP services was good among TB patients with a greater satisfaction among people with high awareness. The socio-demographic characteristics were significantly related to patient's satisfaction which suggests that in spite of the greatest efforts, people are still facing many social barriers in accessing treatment services against TB.

However, on a positive note, RNTCP services proved a boon to the unemployed beneficiaries as they were satisfied with the services provided under RNTCP which could be due to the economic support provided by this programme.

Recommendations

Research and development should be encouraged in order to create a treatment plan which is of shorter duration as adherence to the complete treatment course is a problem faced by majority due to direct or indirect causes. Counselling sessions can be held in order to improve the adherence and satisfaction. Timely distribution of intended monetary benefit under Nikshay Poshan Yojna which will lead to a better offtake of services.

ACKNOWLEDGEMENTS

We would like to thank all the staff of the government health facility working under RNTCP who helped us in the course of our study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Ministry of Health and Family Welfare. TB India 2007. RNTCP annual status report 2007. Available at: <https://tbcindia.gov.in/showfile.php?lid=2919>. Accessed 30 October 2019.
2. World Health Organization. Global tuberculosis report 2018. Available at: <https://apps.who.int/iris/handle/10665/274453>. Accessed 30 October 2019.
3. World Health Organization. Global Tuberculosis Report 2021, 2021. Available at: <https://www.who.int/publications/i/item/9789240037021>. Accessed 30 October 2019.
4. Ministry of Health and Family Welfare Government of India. Revised National TB Control Programme-Technical and Operational Guideline for Tuberculosis Control in India 2016. Available at: <https://tbcindia.gov.in/showfile.php?lid=3197>. Accessed 30 October 2019.
5. World Health Organization. States and UTs accelerate action to end TB by 2025, 2021. Available at: <https://www.who.int/india/news/detail/09-11-2021-states-and-uts-accelerate-action-to-end-tb-by-2025>. Accessed 30 April 2022.
6. Nautiyal RG, Mittal S, Awasthi S, Singh RK. Knowledge about tuberculosis among pulmonary tuberculosis patients: a cross-sectional study from Uttarakhand. *J Fam Med Prim Care*. 2019;8(5):1735.
7. Das R, Baidya S. A study on knowledge of pulmonary tuberculosis and DOTS among

- pulmonary tuberculosis patients in west Tripura district, India. *SAARC J Tuberc Lung Dis HIVAIDS*. 2015;12(1):1-7.
8. Dumpeti S, Jothula KY, Naidu NK. Awareness about tuberculosis and RNTCP services among rural people in Nalgonda district, Telangana. *J Fam Med Pri Care*. 2020;9(7):3281.
 9. Samal J. Perception and knowledge of tuberculosis and its services among slum dwellers in Chhattisgarh. *Indian J Respir Care*. 2017;6(2):828–31.
 10. Huddart S, Bossuoy T, Pons V, Baral S, Pai M, Delavallade C. Knowledge about tuberculosis and infection prevention behavior: A nine city longitudinal study from India? *PLoS One*. 2018;13:e0206245.
 11. Jangid VK, Agrawal NK, Yadav GS, Pandey S, Mathur BB. Knowledge and awareness of the tuberculosis in tuberculosis patients at a tertiary care centre in North West Rajasthan, India. *Nat J Commu Med*. 2016;7(04):262-8.
 12. Samanta S, Sarkar AP, Halder D, Saren AB, Sarkar GN, Saha I. Client satisfaction and its correlates of directly observed treatment short course therapy in a tuberculosis unit of Bankura, West Bengal. *Med J Dr. DY Patil Vidya*. 2019;12(2):116.
 13. Heunis CJ, Kigoz GN, De Grave D, Peresu E. Patient satisfaction with directly observed treatment and multidrug-resistant tuberculosis injection administration by lay health workers in rural Eswatini. *Afr J Prim Heal Care Fami Med*. 2020;12(1):1-0.
 14. Srivastava K, Gupta A, Saxena R, Sharma RP, Midha T. Patient's satisfaction regarding directly observed treatment short course under RNTCP in a district of North India. *Int J Commun Med Public Health*. 2017;4(5):1536-41.
 15. Rai N, Singh S, Kushwah S, Dubey D. A cross sectional study on evaluation of satisfaction level of TB patients enrolled for directly observed treatment, short course chemotherapy in a district of Central India. *Int J Community Med Public Heal*. 2017;4(1):5-8.
 16. Haque MA, Kumar D, Vyas S. A study on socio-demographic profile and feasibility of DOTS provider registered under RNTCP in Varanasi district Uttar Pradesh. *Ind J Commu Heal*. 2014;26(1):107-10.
 17. Mohamed E, Ounsa M, Al Mansour M, Alzahrani M, Abdalla S, Medani K, et al. Patients' satisfaction with tuberculosis services of directly observed therapy programs in the Gezira state of Sudan. *Clin Infect Dis*. 2014;9(3):1-5.

Cite this article as: Kumar D, Sachan D, Verma MK, Gangwar A, Jain PK, Srivastava DK, et al. Evaluation of awareness and factors determining satisfaction among tuberculosis patients regarding RNTCP services in a western district of Uttar Pradesh: a cross sectional study. *Int J Community Med Public Health* 2023;10:3150-7.