Original Article

Knowledge about tuberculosis among pulmonary tuberculosis patients: A cross-sectional study from Uttarakhand

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Abstract

Background: Tuberculosis (TB) is a major health problem in India. The Revised National TB Control Programme (RNTCP) is working towards elimination of TB in the country by 2025. As the RNTCP relies on passive case finding, it is crucial for the success of the RNTCP that TB patients have knowledge about their disease. The present study aimed to assess the knowledge of TB among pulmonary TB (PTB) patients. **Materials and Methods:** A cross-sectional questionnaire based study using a pretested semi-structured questionnaire among new and previously treated PTB patients at Haldwani Block of Nainital District of Uttarakhand State of North India. Data was analyzed using the software Epi Info version 7.2.0.1. **Results:** A total of 111 PTB patients with mean age of 36.3 years were included for final analysis. Only 43.2% PTB patients were aware that TB is caused by germs, 48.6% knew that it is not a hereditary disease. Only 13.5% PTB patients knew that vaccine is available and majority (68.5%) were aware of covering mouth and nose while coughing and sneezing for prevention of the disease. Overall, only two-third (65%) patients had good knowledge about TB. **Conclusions:** About one-third of PTB patients had poor knowledge about TB. This highlights that to achieve elimination of TB, RNTCP needs to change the present information, education, and communication (IEC) system which is based on a bio-medical framework, and to design a culturally sensitive health education system. Alternatively, the Programme needs to shift from passive case finding to active case finding strategy.

Keywords: India, pulmonary TB, tuberculosis

Introduction

India contributes to one fourth of total tuberculosis (TB) burden in the world. In year 2016, out of the estimated annual global incidence of 10.4 million cases, approximately 2.8 million new cases were estimated to have occurred in India.[1] For the same year, new TB case estimates in Uttarakhand State of North India had been reported to be higher than the national estimates, that is, 257 versus. 211 cases per lakh per year.[2]

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According to National Strategic Plan (NSP) 2017–2025, the current focus of Government of India is to achieve rapid decline in TB cases, and morbidity and mortality due to TB, while working towards elimination of TB in the country by 2025.[1] As the Revised National TB Control Programme (RNTCP) of India relies on passive case finding, to realize these goals of NSP 2017–2025, it is necessary that the chest symptomatic and the community at large should be aware of the disease etiology, symptomatology, management, mode of spread of TB, and preventive measures against the disease, and its duration of treatment. Lack of such knowledge among TB patients and community may lead to potential delay in health seeking, persistence of social stigma and

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misconceptions about TB, and the resultant poor adherence to TB treatment.[3,4]

So far, various investigators from different parts of India[5–13] and outside India[14–18] had measured the level of awareness and knowledge of TB patients about TB. However, no such information is available from Uttarakhand State where the estimates of incidence of TB cases are higher than the national estimates. This lack of information in the present study region prompted us to undertake this study to assess the knowledge of TB among PTB patients registered under RNTCP at Haldwani Block of District Nainital in Uttarakhand State of North India.

Results of this study would help the RNTCP and the family physicians in formulating and implementing an effective information, education, and communication (IEC) strategy targeted at TB patients in Indian community.

Materials and Methods

Study design

A descriptive cross-sectional questionnaire based hospital study between July 2018 and October 2018.

Study settings

The study was conducted in two designated microscopy centers (DMC) in Haldwani Block of District Nainital in Uttarakhand State of North India. Nainital is one of six districts in Kumaon region of Uttarakhand State and has eight Blocks, of which, Haldwani block caters to the largest population of 2.27 lakh people with one of the eight Tuberculosis units (TU) of the district.[19] There are two DMCs under the Haldwani TU – One under Department of Respiratory Medicine of Government Medical College Haldwani, and the other under District TB center Base hospital, Haldwani. Both these DMCs were selected as study settings.

Study population

New and previously treated PTB cases aged ≥18 years who were registered under RNTCP at the study settings.

Sample size calculation

The sample size was calculated using statcalc Epi Info version 7.2.0.1. Assuming satisfactory knowledge about PTB among 50% PTB patients, and considering 95% confidence interval and 10% absolute error, the required sample size for this study was calculated to be 100. Adding 20% nonresponse rate, the final sample size came out to be 120.

Sampling technique and study sample

A consecutive sampling technique was used to interview a total of 120 PTB patients registered under RNTCP at the study settings during the study period. The purpose of the study, confidentiality, and anonymity were explained to the patients before taking their due consent. A total of 9 PTB patients were excluded as they did not give consent for participation in the study. Finally, a total of 111 PTB patients formed the study sample for final analysis [Figure 1].

Data collection

A trainee junior resident (SM) well versed in interview skills, interviewed the study participants at the time they visited the study settings for anti-TB drugs using a pretested semi-structured questionnaire to seek information on their knowledge about PTB.

Statistical analysis

The data were entered in MS excel and analysis was done using the software Epi Info version 7.2.0.1. Data were expressed in terms of frequency, percentage, and 95% confidence intervals. We calculated the odds of good knowledge among PTB patients with potential determinant variable versus the reference group using univariate analysis. Variables with $P < 0.25$ in univariate analysis were included in the multivariate model and adjusted odds ratios with 95% CI were calculated using multiple logistic regression analysis. $P < 0.05$ was considered as statistically significant.

Operational definitions

- **Assessment of knowledge about PTB:** Patients' knowledge was assessed by asking them seven questions – two questions on disease etiology, one on mode of transmission, and two

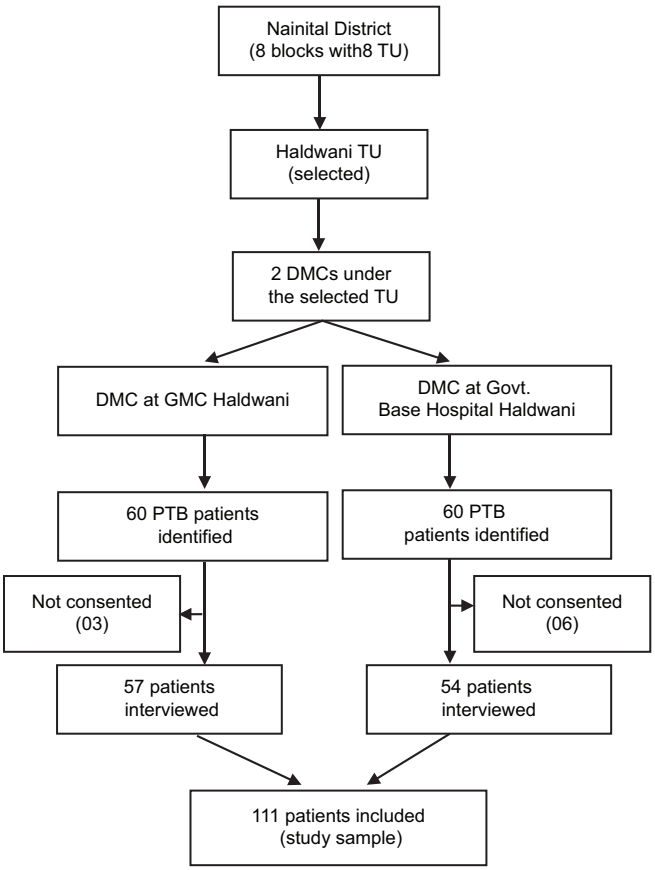

Figure 1: Study sample selection

each on treatment and prevention of PTB. A scoring system was generated to assess the level of knowledge. Each correct answer was awarded one point and each wrong answer was awarded zero. Those who scored 4 and above were considered to have "good knowledge" while those who scored zero to three were considered to have "poor knowledge" about PTB

- **Socioeconomic status:** According to modified BG Prasad classification,[20] per capita income was categorized into socioeconomic class I–V, with class I and II as high income group, class III as middle income group and class IV and V as low income group.

Ethics approval

Ethical clearance for the study was obtained from the Institute Ethics Committee of Government Medical College Haldwani.

Results

Socio-demographic characteristics of PTB patients

A total of 111 PTB patients were included in the study for final analysis. The mean age of study participants was 36.3 years (standard deviation of 16.7 years) with almost half (52.25%) less than 30 years of age. Majority (52.25%) were male, 68.47% belong to low socio economic status. Majority were literate (77.48%), Hindu by religion (72.07%), and 57.27% were unemployed. Almost two-third (62.16%) were non-smokers, 69.37% were married and 15.32% had history of TB in the family [Table 1].

Patients' knowledge about Tuberculosis

Regarding knowledge of PTB, 43.2% were aware that it is caused by germs, 48.7% knew that TB is not a hereditary disease, 78.4% responded that it is a communicable disease and 83.8% knew that it is a curable disease. More than three-fourth (82.9%) knew correctly that duration of treatment is between six and nine months. Less than one-fourth (13.5%) were aware that for prevention, a vaccine is available for TB. Majority (68.5%) were aware of covering mouth and nose while coughing and sneezing for prevention of the disease [Table 2].

Figure 2 shows that overall 65.0% of the PTB patients had good knowledge about the disease.

Determinants of patients' knowledge about PTB

Good knowledge of PTB was significantly higher among those who were literate, while it was low in patients with low socioeconomic status. Age, gender, religion, employment status, smoking habit, marital status and family history of TB did not show any significant association with patients' knowledge about PTB [Table 3].

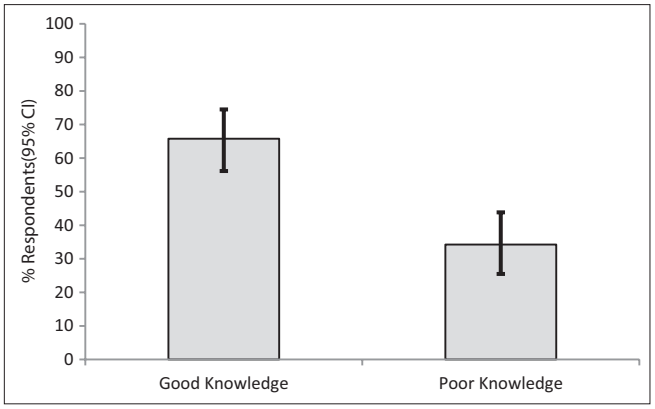

Figure 2: Level of knowledge among PTB patients

Table 1: Socio-demographic profile of study participants

Variable	Categories	Number (%)
Age	≤30	58 (52.25)
	>30	53 (47.75)
Gender	Male	58 (52.25)
	Female	53 (47.75)
Religion	Hindu	80 (72.07)
	Muslim	31 (27.93)
Education	Illiterate	25 (22.52)
	Literate	86 (77.48)
Occupation	Unemployed	63 (57.27)
	Employed	47 (42.73)
Socio-economic status	High	17 (15.32)
	Medium	18 (16.22)
	Low	76 (68.47)
Smoking	Non-smokers	69 (62.16)
	Smokers	42 (37.84)
Marital Status	Married	77 (69.37)
	Others*	34 (30.63)
TB in family	Yes	17 (15.32)
	No	94 (84.68)

*Either unmarried, widow, or divorced.

Table 2: Distribution of PTB patients according to knowledge about their disease

Knowledge variable	Number (%)	95% CI
Etiology of TB		
Is caused by germs/bacteria (*n*=yes)	48 (43.24)	33.87-52.98
Is a hereditary disease (*n*=yes)	57 (51.35)	41.68-60.95
Transmission of disease		
Is a communicable disease (*n*=yes)	87 (78.38)	69.56-85.63
Treatment of disease		
Is a curable disease (*n*=yes)	93 (83.78)	75.59-90.10
Duration of treatment (*n*=correct response)	92 (82.88)	74.57-89.37
Prevention of disease		
Vaccine is available (*n*=yes)	15 (13.51)	7.77-21.31
Other preventive measures		
Cover mouth and nose while coughing and sneezing	76 (68.47)	58.96-76.96
Isolation of the patient	17 (15.32)	09.18-23.39
Avoid sharing of food and utensils	12 (10.81)	05.71-18.12
Avoid public places	03 (02.70)	00.56-07.70
Avoid spitting	02 (01.80)	00.22-06.36

Table 3: Multiple logistic regression analysis showing determinants of knowledge of Pulmonary TB

Variable	Categories	Good knowledge *n* (%)	Poor knowledge *n* (%)	COR (95% CI)	AOR (95% CI)
Age	≤30	40 (68.97)	18 (31.03)	1	-
	>30	33 (62.26)	20 (37.74)	0.74 (0.33-1.63)	
Gender	Male	41 (70.69)	17 (29.31)	1	1
	Female	32 (60.38)	21 (39.62)	0.63 (0.28-1.39)	0.52 (0.21-1.30)
Religion	Hindu	55 (68.75)	25 (31.25)	1	-
	Muslim	18 (58.06)	13 (41.94)	0.62 (0.26-1.48)	
Education	Illiterate	09 (36.00)	16 (64.00)	1	1
	Literate	64 (74.42)	22 (25.58)	5.16 (1.99-13.34)	4.73 (1.63-13.68)
Occupation	Unemployed	41 (65.08)	22 (34.92)	1	-
	Employed	31 (65.96)	16 (34.04)	1.04 (0.46-2.30)	
Socio-economic status	High	15 (88.24)	02 (11.76)	1	1
	Medium	15 (83.33)	03 (16.67)	0.66 (0.09-4.58)	1.05 (0.14-7.97)
	Low	43 (56.58)	33 (43.42)	0.17 (0.03-0.81)	0.25 (0.05-1.28)
Smoking	Non-smokers	45 (65.22)	24 (34.78)	1	-
	Smokers	28 (66.67)	14 (33.33)	1.06 (0.47-2.39)	
Marital Status	Married	47 (61.04)	30 (38.96)	1	1
	Others*	26 (76.47)	08 (23.53)	2.07 (0.83-5.17)	2.29 (0.83-6.26)
TB in family	Yes	12 (70.59)	05 (29.41)	1	-
	No	61 (64.89)	33 (35.11)	0.77 (0.24-2.37)	

*Either unmarried, widow, or divorced.

Discussion

Tuberculosis is a major public health problem in India. The responsibility of TB control in India lies with RNTCP which is in operation since 1997. Currently the RNTCP has been working on the line to end TB by year 2025. However as the RNTCP identifies TB patients by its passive case finding methodology, patients' knowledge about the etiology, symptomatology, transmission of the disease, and its prevention is crucial for the success of RNTCP. This study highlights the level of knowledge of PTB patients about their disease.

We found that 43.2% of PTB patients knew that TB is caused by germs and 48.6% knew that it is not a hereditary disease. Das *et al.*[5] from Tripura, Konda *et al.*[11] from Mumbai and Samal *et al.*[12] from Chattisgarh had reported that 14.1%, 35.2%, and 95.0% of their patients respectively were aware that TB is caused by germs/bacteria. Kigozi *et al.*[17] from South Africa had reported their 60.2% patients knew that TB is spread by bacteria. Study by Vidhani *et al.*[6] from Gujarat and Khalil *et al.*[7] from Aligarh had reported that almost 96% of their patients were aware that TB is not a hereditary disease. This difference of knowledge observed may be due to different study areas where literacy status also differs.

On the question of communicability of TB, 78.4% of our patients knew that it was a communicable disease. Das *et al.*,[5] Vidhani *et al.*[6] from Gujarat, Jangid *et al.*[8] from Rajasthan, Konda *et al.*,[11] Samal *et al.*[12] and Huddart *et al.*[13] from nine cities of four North Indian states (Madhya Pradesh, Delhi, Chhattisgarh, and Odisha) observed that 14.1%, 47.7%, 77.4%, 87.0%, 82.0%, and 67.2% of their study participants, respectively were aware of communicability of the disease. Kigozi *et al.*[17] had reported that 73.0% of his South African patients had similar knowledge on infectiousness of the disease.

This study revealed that 83.8% of our patients were aware that TB is a curable disease. Das *et al.*,[5] Vidhani *et al.*,[6] Khalil *et al.*,[7] Jangid *et al.*,[8] Konda *et al.*[11], and Samal *et al.*[12] had reported that 76.0–95.0% of their TB patients knew about the curable nature of TB. Tasnim *et al.*[16] and Kigozi *et al.*[17] from outside India had reported 97.6% and 96.3% of their patients, respectively were aware of curability of TB.

We found that a considerably high proportion (82.9%) of our patients had the correct knowledge of six to nine months duration of TB treatment which can have positive impact on treatment adherence. In contrast, the observations by Das *et al.*[5] and Khalil *et al.*[7] showed that only 52.7% and 32.9% of their TB patients, respectively had correct knowledge about the treatment duration. Bhatt *et al.*[15] and Kigozi *et al.*[17] from outside India had reported that 82.0% and 93.7% of their patients, respectively had correct knowledge in this respect.

An important finding in our study was that despite existence of universal immunization programme, where BCG has been an important and an integral component for the last many decades, only 13.5% of our patients were aware that a vaccine is available for prevention of TB. More or less similar results were reported by Vidhani *et al.*,[6] Khalil *et al.*[7], and Jangid *et al.*[8]

With regards to preventive measures other than the vaccine against TB, 68.5% of our patients were aware of covering mouth and nose while coughing and sneezing. Das *et al.*,[5] Khalil *et al.*[7], and Huddart *et al.*[13] have reported that 53.6%, 25%, and 63.4% of their patients respectively were aware of cough hygiene.

The present study also revealed certain misconceptions about prevention of TB such as avoiding sharing of food and utensils by 10.8% patients. Das *et al.*[5] and Khalil *et al.*[7] had also reported that 15.5% and 22.7% of their patients, respectively had the same misconceptions.

In terms of overall good and poor knowledge about PTB, we found that 65.0% of our patients had good knowledge of TB. However, Das *et al.*[5] had reported that only 29.1% of their patients had satisfactory knowledge.

An important finding of the present study was that proportion of good knowledge among PTB patients was significantly higher among literates, and lower among low socioeconomic status patients which is in agreement with the findings of Konda *et al.*[11] and Huddart *et al.*[13] Literacy status as a key factor in determining knowledge of TB was confirmed by a number of other studies too.[5,8–10,14,18]

Wide variability of certain observations on knowledge about TB among patients by different researchers including us in India and abroad might be due to (1) different study settings, and (2) presence of an IEC system which is culturally less sensitive and is largely based on a biomedical framework.

Relevance to family practice and primary care

As family physicians are usually the first point of contact of patients, and they are supposed to be well aware of the cultural beliefs of their TB patients, they may play a vital role in TB control and its eradication in India by providing effective IEC input to their chest symptomatic patients taking account of the lapses of knowledge and beliefs prevalent in the community they serve in.

Conclusions

This study concludes that despite the RNTCP being in vogue for last many decades, overall knowledge about TB was low among PTB patients which may challenge the success of RNTCP in near future. There is a need to develop strategies to uplift the socio-economy and literacy of the country, and to develop and implement an IEC system which is culturally sensitive. Alternatively, the RNTCP might need policy change with respect to case findings, that is, shifting from passive to active case finding strategy.

Limitations

As this is a questionnaire based interview of the patients, and the study was conducted at only one TU, the results of this study may not be generalized.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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