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Brief Original Article

Knowledge and perception of treatment among tuberculosis patients attending primary care clinics in Malaysia

Nesamalar Balakrishnan[1], Ezura Madiana Md Monoto[2], Noorlaili Mohd Tohit[2], Asrul Abdul Wahab[3]

[1] Pasir Gudang Health Clinic, Ministry of Health Malaysia, Pasir Gudang, Johor, Malaysia
[2] Department of Family Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Cheras, Kuala Lumpur, Malaysia
[3] Department of Medical Microbiology and Immunology, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Cheras, Kuala Lumpur, Malaysia

Abstract

Introduction: Tuberculosis is a disease of public health concern. It can be treated effectively with good knowledge about the disease and complete adherence to the recommended treatment regime. This study is intended to assess the level of knowledge and perception of treatment among tuberculosis patients attending primary care clinics.

Methodology: We conducted a cross-sectional study using a validated self-administered questionnaire among tuberculosis patients attending primary care clinics in Johor Bahru district. A total of 208 tuberculosis patients were enrolled in this study through convenience sampling. We assessed the general knowledge, transmission, causes, and prevention of tuberculosis, where higher scores indicated better knowledge. For the perception of treatment, a higher mean score indicated a more negative perception.

Results: The mean score for knowledge on tuberculosis was 54.33 ± 12.78, ranging from 25 to 88.9%. The mean score for perception was 2.75±0.52, ranging from 2.15-3.39. We found that although 88.9% of respondents knew a person could be infected with TB through inhalation of tuberculosis bacilli, a majority believed that smoking (68.2%), sharing food (69.2%), and eating from the same plate (66.8%) are causes of tuberculosis. Moreover, there was still a negative perception regarding the treatment of tuberculosis with the highest mean score for the statement 'I am afraid if I am told I am tuberculosis positive'.

Conclusions: We found that there were gaps in knowledge among tuberculosis patients. Intermittent counseling during the treatment re-enforces the knowledge of tuberculosis. An updated standardized counseling sheet of tuberculosis Health Education should be included along with staff training to update their knowledge as part of their important role in health education in tuberculosis prevention.

Key words: knowledge; perception; tuberculosis.

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Introduction

Tuberculosis (TB) caused by the *Mycobacterium tuberculosis* bacteria can affect many systems in the human body with a wide clinical presentation of signs and symptoms. In 2016, the World Health Organization (WHO) reported that 10.4 million people were diagnosed with tuberculosis with an estimated 600,000 cases of multi-drug resistant TB [1]. Ending the TB epidemic by 2030 is one of the targets of the newly adopted Sustainable Developmental Goals by the WHO [1]. TB control is being achieved in countries with high-income economies, however, TB continues to plague people living in countries with low-income and lower-middle-income economies [2]. In 2019, the incidence of TB in Malaysia was 92 cases per 100,000 population [3].

The National TB Control Program in Malaysia was established in 1961, and has been striving to improve TB control and outcomes. This program encompasses prevention strategies, early detection, treatment, and management of TB. Starting in 1973, each state in Malaysia had a dedicated TB team to conduct the above tasks. Progressing forward, in 1994, with the implementation of an integrated primary care concept in Malaysia, this program is placed under the general medical and health system. Every year, the state level must report to the Disease Control Division in the Ministry of Health regarding their progress [4]. This shows that treating TB is one of the priorities in the Malaysian health care system.

Studies regarding knowledge, attitude, and perception have been carried out throughout different

parts of the world. Many of them show that lack of adequate knowledge affects the patient's compliance. In northwest Rajasthan, 100 percent of the respondents in the community did not know the name of the vaccine for TB [5]. In another community study in India, the majority did not know TB symptoms [6]. Misconceptions and wrong beliefs held by patients contribute to poor compliance [7]. In Malaysia, it has been shown that poor knowledge about tuberculosis among TB patients is associated with poorer compliance [8]. TB patients are being treated in primary care clinics throughout Malaysia. However, knowledge regarding TB and perception on treatment in the primary care clinic setting is lacking. The health care providers in the primary care clinic are supposed to provide relevant health education during the initiation of TB medications. Generally, there is a checklist for educating TB patients before commencing their treatment. The objective of this education is to ensure the patients understand their disease, medications during the treatment, and the medication side effects. Thus, the researchers aimed to determine the level of knowledge and perception of treatment among TB patients attending selected primary care clinics in Malaysia.

Table 1. Sociodemographic characteristics and clinical characteristics of the respondents.

Variables	Frequency (%)
Age (Mean ± SD (years))	40.7 ± 15.75
Gender	
Male	125 (60.1)
Female	83 (39.9)
Race	
Malay	139 (66.8)
Chinese	40 (19.2)
Indian	18 (8.7)
Others	11 (5.3)
Marital Status	
Single	76 (36.5)
Married	115 (55.3)
Divorced / Widowed	17 (8.2)
Education level	
Not school	10 (4.8)
Primary	46 (22.1)
Secondary	119 (57.2)
Tertiary	33 (15.9)
Employment Status	
Government	14 (6.7)
Private	80 (38.5)
Self	34 (16.3)
Non-employed	80 (38.5)
Risk factors	
Smoker	72 (34.6)
Diabetes mellitus	53 (25.5)
Cancer	3 (1.5)
Human immunodeficiency virus (HIV) infection	0
Types of Tuberculosis	
Pulmonary	181 (87)
Extra-Pulmonary	17 (8.1)
Both	10 (4.8)
Compliance to TB treatment	207 (99.5)
Symptoms experienced by TB patients	
Reduced appetite	109 (52.4)
Cough with phlegm	104 (50.0)
Reduced body weight	90 (43.3)
Fever	73 (35.1)
Cough > 2 weeks	30 (14.4)
Night sweats	27 (13.0)
Haemoptysis	18 (8.6)

Methodology

Study population and sample

The cross-sectional study was conducted among tuberculosis patients taking treatment from all 13 primary care clinics in Johor Bahru district. Johor Bahru is the capital state of Johor, which is a state located in the South of Peninsular Malaysia. There are almost 500,000 people who live in Johor Bahru. The method of sampling was convenience sampling. We included all TB patients aged 18 and above, on treatment or surveillance, and those who understood Malay or English language. Those who were acutely ill and did not consent were excluded from the study. Ethical approval for the study was obtained from the Secretariat of Research and Innovation Universiti Kebangsaan Malaysia (FF-2017-199) and the Medical Research and Ethics Committee (NMRR-17-663-34746). This study was done from June 2018 to November 2018.

Questionnaire and variables

We used a self-administrated validated questionnaire available in both Malay and English language. This questionnaire on Knowledge of Tuberculosis and the Perception of Tuberculosis Treatment Among Tuberculosis Patients in Malaysia was developed and validated with Cronbach's alpha of 0.751 [9].

The questionnaire has three sections. The first section is about the respondent's sociodemographic information. The second section tested on the knowledge of patients about TB which consists of general knowledge, causes, prevention, and mode of transmission of TB whereby the respondents were required to answer 'Yes', 'No', or 'Unsure' for each of the 36 questions. The correct answer was given one mark while incorrect and 'Unsure' answers were scored zero. The score was then converted to a percentage. The higher the score indicated better knowledge. The third

section assessing the perception of TB treatment consists of 10 questions. The perception was scored according to five Likert scale options of 'Strongly disagree', 'Disagree', 'Unsure', 'Agree' and 'Strongly agree'. Scores of 1 to 5 were given respectively with a higher mean score reflecting a more negative perception.

The clinical characteristics of the patients were obtained from their TB folders, particularly from the TBIS 10A-1 form. TBIS 10A-1 form is the standard form used by the Ministry of Health Malaysia to record the details of a TB patient before commencing TB treatment. The data gathered from this form included the underlying medical conditions and symptoms experienced by the patient before commencing TB treatment.

Statistical analysis

Data were analyzed using SPSS version 23. Categorical data were described as frequency and percentage, while continuous data were described as mean and standard deviation. Responses to all questions on knowledge and perception were recorded in numbers and percentages. Pearson Correlation analysis, Independent T-test and One-way ANOVA were the statistical analysis used in the study. The two-tailed *p*-value < 0.05 were taken as statistically significant for all analysis.

Table 2. Patients' knowledge about tuberculosis.

Question	Yes (%)	No (%)	Unsure (%)
General knowledge about TB			
a. Shaking hands with someone with TB	23 (11.1)	137 (65.9)	48 (23.1)
b. Inherited	53 (25.5)	100 (48.1)	55 (26.4)
c. Smoking	108 (51.9)	66 (31.7)	34 (16.3)
d. By inhaling TB germs in the air	185 (88.9)	3 (1.4)	20 (9.6)
e. Sharing foods	113 (54.3)	64 (30.8)	31 (14.9)
f. Eating from the same plate	104 (50.0)	69 (33.2)	35 (16.8)
g. Through touching items in public places (doorknobs, handles in transportation)	35 (16.8)	100 (48.1)	73 (35.1)
Knowledge about TB prevention			
a. Avoid shaking hands with TB patients	50 (24.0)	114 (54.8)	44 (21.2)
b. Covering mouth and nose when TB patients is coughing	191 (91.8)	8 (3.8)	9 (4.3)
c. Covering mouth and nose when TB patients is sneezing	197 (94.7)	5 (2.4)	6 (2.9)
d. Avoid sharing foods with TB patients	141 (67.8)	43 (20.7)	24 (11.5)
e. Wash hand after touching items in public places	154 (74.0)	23 (11.1)	31 (14.9)
f. Closing window at home	31 (14.9)	136 (65.4)	41 (19.7)
g. Taking healthy food	156 (75.0)	22 (10.6)	30 (14.4)
h. By taking BCG vaccination	100 (48.1)	19 (9.1)	89 (42.8)
i. By praying	130 (62.5)	46 (22.1)	32 (15.4)
Knowledge about TB infection			
a. From anyone	195 (93.8)	5 (2.4)	8 (3.8)
b. Poor people	107 (51.4)	56 (26.9)	45 (21.6)
c. Homeless people	112 (53.8)	50 (24.0)	46 (22.1)
d. Alcoholics	120 (57.7)	38 (18.3)	50 (24.0)
e. Drug users	140 (67.3)	26 (12.5)	42 (20.2)
f. People living with HIV/AIDS	128 (61.5)	16 (7.7)	64 (30.8)
g. People who have been in prison	99 (47.6)	32 (15.4)	77 (37.0)
Knowledge about TB transmission			
a. Through contact with TB patients	151 (72.6)	19 (9.1)	38 (18.3)
b. Shaking hands with TB patients	54 (26.0)	111 (53.4)	43 (20.7)
c. By sexual intercourse with TB patients	61 (29.3)	51 (24.5)	96 (46.2)
d. From TB mother	116 (55.8)	26 (12.5)	66 (31.7)
e. Sharing cigarette with TB patients	145 (69.7)	18 (8.7)	45 (21.6)
f. Weather changing	27 (13.0)	94 (45.2)	87 (41.8)
g. Through TB germs in the air	185 (88.9)	3 (1.4)	20 (9.6)
Knowledge about TB treatment			
a. TB can be cured	180 (86.5)	0	28 (13.5)
b. Herbs mixed	33 (15.9)	112 (53.8)	63 (30.3)
c. Rest without medicine	14 (6.7)	173 (83.2)	21 (10.1)
d. Taking medicine prescribed by health clinic	199 (95.7)	3 (1.4)	6 (2.9)
e. Shaman	1 (0.5)	172 (82.7)	35 (16.8)

Results

Test of normality was done using Shapiro-Wilk. The sample was normally distributed with a *p*-value of more than 0.05. Table l showed the sociodemographic and clinical characteristics of our respondents. We recruited 208 TB patients in this study with the majority being males (60.1%). The mean age of patients was 40.7±15.75 years ranging from 18 to 83 years old. Most of the patients were of Malay race (66.8%) and about half were married (55.3%). Almost all had formal education (95.2%) and more than half were working (61.5%). About one-quarter of the respondents were known diabetics and one-third of them were active smokers. The majority had pulmonary TB (81%). There was good compliance among the respondents (99.5%). The top three symptoms experienced by the patients were reduced appetite (52.4%), cough with phlegm (50.0%), and reduced body weight (43.3%).

The mean for TB knowledge score in percentage was 54.33±12.78, with the lowest score of 25.0% and the highest score of 88.9%. Table 2 shows the responses of TB knowledge. General knowledge of TB is somewhat poor, with many believed that smoking (68.2%), sharing food (69.2%), and eating from the same plate (66.8%) as reasons why someone gets infected with TB. A good thing to note is that majority of the respondents (88.9%) knew that people could get TB by inhaling TB germs in the air. For the domain on prevention, many still believed that avoiding sharing food (79.3%), washing hands after touching items in public places (88.9%), taking healthy food (89.4%), and praying (77.9%) can prevent TB infection. Surprisingly, more than half (51.9%) of the respondents did not know the role of BCG vaccination. We also noted that our respondents had good knowledge of who can get TB (93.8%). However, they did not know much about the higher risk group population who can be infected with TB and many believed TB is a sexually transmitted disease (75.5%) and could also be transmitted from sharing cigarettes (91.3%). There was good knowledge on the cure of TB (86.5%) and taking treatment from the clinic to cure TB (95.7%). However, many still believed in herbal mixtures to treat TB (46.2%).

The mean for the perception of TB treatment was 2.75 ± 0.52, ranging from 2.15-3.39. There were 10 statements assessing the patient's perception of TB treatment as shown in Table 3. The top 3 most negative perceptions are 'I am afraid that I will be told that I am TB positive' (3.39±1.24), 'I am afraid that I will lose my job/income' (3.03 ± 1.21), and 'I am afraid that TB treatment will be unpleasant and difficult' (2.97 ± 1.20). We looked into the association between knowledge and sociodemographic as well as knowledge and clinical variables of 208 respondents with the mean knowledge

Table 3. Perception of treatment among tuberculosis patients.

No.	Perception towards treatment	Strongly Disagree n (%)	Disagree n (%)	Unsure n (%)	Agree n (%)	Strongly Agree n (%)	Mean ± SD
1.	I am afraid that I will be told I am TB Positive	19 (9.1)	40 (19.2)	27 (13.0)	84 (40.4)	38 (18.3)	3.39 ± 1.24
2.	I am afraid that people will talk about my visit to the clinic	18 (8.7)	81 (38.9)	26 (12.5)	67 (32.2)	16 (7.7)	2.91 ± 1.17
3.	I don't want to cough into the specimen bottle	40 (19.2)	24 (11.5)	20 (9.6)	20 (9.6)	4 (1.9)	2.15 ± 0.91
4.	I don't want to cough into the specimen bottle	19 (9.1)	77 (37.0)	24 (11.5)	74 (35.6)	14 (6.7)	2.93 ± 1.17
5.	I am afraid that TB treatment will interfere my social lives	19 (9.1)	83 (39.9)	20 (9.6)	66 (31.7)	20 (9.6)	2.92 ± 1.21
6.	There are long queues at the clinics	19 (9.1)	71 (34.1)	23 (11.1)	74 (35.6)	21 (10.1)	3.03 ± 1.21
7.	I am afraid that I will lose my job/income	18 (8.7)	80 (38.5)	19 (9.1)	73 (35.1)	18 (8.7)	2.97 ± 1.20
8.	I am afraid that TB treatment will be unpleasant and difficult	35 (16.8)	100 (48.1)	45 (21.6)	19 (9.1)	9 (4.3)	2.36 ± 1.01
9.	I perceive that I can die from TB if I do not take your drugs regularly	40 (19.2)	103 (49.5)	26 (12.5)	23 (11.1)	16 (7.7)	2.38 ± 1.14
10.	I perceive that TB treatment can take at least one year	27 (13.0)	112 (53.8)	34 (16.3)	23 (11.1)	12 (5.8)	2.43 ± 1.04

score as shown in Table 4. All analyses showed no statistical significance (p>0.05).

Discussion

This study showed that the respondents did not score well for domains on transmission and prevention. This has been seen in previous studies where respondents believed that transmission of TB was through contaminated food [10,11]. Similarly, a high proportion of our respondents did not know the role of BCG vaccination as was seen in another study [5]. More focused counseling should be given to TB patients in the identified areas causing misconception.

Our study also found that the respondents were afraid of the stigma associated with TB. The majority was afraid of being told if they have TB, worry that TB will affect their income, and the treatment being unpleasant. In response to this, TB patients might need to adapt their activities of daily living to avoid the social consequences of the disease. This was seen in a community study done in Sabah, where all patients changed their daily activities (e.g. separation of utensils, new sleeping arrangements, reduced social activities), with one patient's income being affected when his community knew he had TB [11]. Hence, it is important to reduce this negative attitude by conducting health promotion among patients and the public.

In this study, there was no significant association between the level of knowledge with education.

Table 4. Association between tuberculosis knowledge with sociodemographic and clinical characteristics.

Variables	Knowledge (Mean ± SD)	*p*-value	95% Confidence Interval
Age			
	40.69 ± 15.75	0.80*	(-0.12 - 0.15)
Gender			
Male	55.17 ± 12.73	0.24†	(-1.45 - 0.71)
Female	53.05 ± 12.90		
Race			
Malay	55.26 ± 12.16		
Chinese	51.81 ± 13.34	0.21‡	(1.39 - 1.63)
Indian	50.93 ± 13.47		
Others	56.11 ± 16.76		
Marital status			
Single	54.39 ± 13.58		
Married	54.08 ± 12.28	0.90‡	(1.70 - 1.94)
Divorced	53.97 ± 10.74		
Widowed	55.75 ± 17.17		
Education level			
No school	56.11 ± 16.76		
Primary	53.44 ± 13.42	0.92‡	(2.74 - 2.94)
Secondary	54.62 ± 12.79		
Tertiary	53.96 ± 10.67		
Employment status			
Government	45.24 ± 11.86		
Private	55.14 ± 12.74	0.48‡	(2.91 - 3.27)
Self-employed	52.94 ± 11.44		
Non-employed	55.44 ± 13.05		
Smoking status			
Smoker	54.40 ± 12.93	0.95†	(-3.79 - 3.57)
Non-smoker	54.29 ± 12.75		
Diabetes Mellitus			
Yes	53.98 ± 13.61	0.82†	(-3.56 - 4.48)
No	54.44 ± 12.53		
Tuberculosis Type			
Pulmonary	54.21 ± 13.19		
Extra-pulmonary	54.58 ± 9.96	0.70‡	(1.41 - 1.64)
Both	56.11 ± 9.87		

All data was normally distributed. In all analysis, *p*-value < 0.05 was considered significant. * Person's correlation analysis; † Independent t-test; ‡ One-way ANOVA.

However, in a previous study, patients with a higher level of education scored significantly higher than the rest [8,12-14]. This can be because basic knowledge of TB has reached most TB patients in our population through health education; hence, the effect of the educational level was not seen.

There was no association seen between knowledge and clinical characteristics in this study. Despite the medical co-morbidities our respondents had, it did not affect their knowledge level on TB. Previous studies have shown that knowledge on TB symptoms improves health-seeking behavior [12]. In this study, despite some knowledge gaps, there was very good compliance. This can be due to our Directly Observed Treatment (DOTs) program and good defaulter tracing system in our primary care. The DOTs is the most effective treatment strategy for controlling TB [15]. The dedicated team in charge of the TB patients in our primary care clinics would trace and contact the defaulters to make sure they completed the treatment.

The prevalence of diabetes among patients with tuberculosis in this study was 25.5%, similar to another study done on TB patients in Malaysia in 2011, 29.9% [16]. This rate is however higher than another recent study in Bhopal that reported a prevalence of 12.39% [17]. In 2011, a 'Collaborative Framework for care and control of Diabetes and TB' was launched by the WHO and the International Union Against Tuberculosis and Lung Disease (The Union) with one of the important aspects being screening for diabetes in a TB patient and vice-versa. Having diabetes is associated with poorer outcomes for TB patients including delayed sputum conversion rates, a higher rate of relapse after treatment, and a higher risk of death [18]. There is a need for increased attention when managing diabetic patients with TB. Diabetes patients should be informed of their risk and the symptoms of tuberculosis.

Conclusions

Counseling should be given to all TB patients. Intermittent counseling throughout the course of treatment helps to reinforce knowledge of TB. It also gives patients a chance to ask and clarify any misconceptions. A standardized counseling sheet on TB Health Education should include the mode of transmission and prevention. This counseling sheet should be used in all patients before commencing treatment. Thus, a revision of the current checklist is indicated along with staff training so that their knowledge on TB can be updated. Doctors and health care staff should be encouraged to attend short training courses held on TB education aids and guidelines as they play an important role in health education in disease prevention.

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Corresponding author

Ezura Madiana Md Monoto, MBBS, Doctor of Family Medicine
Department of Family Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia, 56000, Cheras, Kuala Lumpur, Malaysia
Phone: +603-91456117
Fax: +603-91459479
Email: ezura@ppukm.ukm.edu.my

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