European Proceedings of
Social and Behavioural Sciences
EpSBS
www.europeanproceedings.com
e-ISSN: 2357-1330

DOI: 10.15405/epsbs.2020.03.03.96

ICMR 2019
8th International Conference on Multidisciplinary Research

PREVENTING INFECTIOUS DISEASE THROUGH KAP PERSPECTIVES AMONG TUBERCULOSIS PATIENTS IN MALAYSIA

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Abstract

This study aims to assess the level of knowledge of and preventive actions against infectious disease among tuberculosis patients in Malaysia using the Knowledge-Attitude-Practice model. Quantitative method using survey design was employed to collect data from 1,587 tuberculosis patients in Penang, Kuala Lumpur, Selangor, Kelantan, Sabah and Sarawak as sample respondents. Ethical approval was obtained from the Ministry of Health, Malaysia. Data analysis was performed using descriptive statistics and chi-squared tests. The findings showed that the level of knowledge of and preventive actions against infectious diseases is high while the level of prevention in terms of patients' attitudes of how they feel about preventing the disease is moderate. This study also found that gender does not affect tuberculosis preventive actions, and the levels of knowledge, attitude and practice among tuberculosis patients were also not significant. In fact, there were no differences reported based on the age of respondents. Interestingly, the results showed that there were significant differences based on the location of a patient's residence. The study concludes with theoretical and practical contributions as well as avenues for future research.

Keywords: Infectious diseases, knowledge, Malaysia, practices, Tuberculosis, TB.

https://doi.org/10.15405/epsbs.2020.03.03.96
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Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

Tuberculosis (TB), better known as dry cough, is an infectious disease and is one of the leading causes of death in Malaysia (Rahman & Mokhtar, 2015; Yaakob & Yunus, 2017). TB is also the world's oldest contagious disease caused by the Mycobacterium Tuberculosis bacteria, which is transmitted through the air (Zin, Hanafiah, & Masod, 2018). Among the signs and symptoms of TB disease are cough persisting for more than three weeks, fever, bloody haemorrhage, chest pain or shortness of breath when coughing, night sweats, extreme fatigue, loss of appetite and weight loss (McIntosh, 2018). The disease can be cured by adhering to a prescribed TB treatment for at least six months.

In the last three years (2015-2017), the Ministry of Health, Malaysia (MOH) reported that TB cases are increasing throughout Malaysia, with Sabah and Kuala Lumpur recording the highest cases (BERNAMA, 2019; Ministry of Health Malaysia, 2019). The incidence of TB cases was recorded as increasing by 7.4% from 24,220 cases in 2015 to 26,168 cases in 2017 (Ministry of Health Malaysia, 2019). According to the director of the Institute of Respite Medicine, Malaysia, the continued increase in TB cases is due to delays in diagnosis and treatment (The Star, 2017; Zin et al., 2018). Thus, the target of a 25% reduction in TB-related deaths in the MOH's National Strategic Plan (2016-2020) for Tuberculosis Control (2016 – 2020) will be continued with the implementation of more aggressive awareness programmes regarding the risks and fatality threat of TB.

2. Problem Statement

Four groups are at high risk for TB infection, namely, contacts of TB patients, individuals with low immunity, individuals living in crowded environments, and drug addicts or smokers. Contacts of TB patients refer to individuals who have a close relationship or who spend about eight hours daily and regularly or family members who stay at the same house with individuals with TB. In fact, Mokhtar and Rahman (2017) emphasised that the public is at high risk of contracting TB if they share 'airspace' with TB patients who are not receiving treatment. In addition, preventive measures are strongly recommended to prevent TB disease from spreading unrestrained. Therefore, health education and awareness programmes, especially on personal hygiene and health practices during coughing or sneezing, are essential in instilling the importance of maintaining good preventive care to avoid TB disease transmissions (DeLuca et al., 2018).

In light of these issues, the purpose of this study was to examine the current state of TB patients in Malaysia in terms of awareness and preventing the spread of TB disease to others. This study is important as a useful scientific reference material for future studies, especially in the field of medicine and public health. In addition, the findings of this study will make a significant contribution to expanding information and knowledge on the prevention of TB disease in Malaysia and to shedding light on the possible shortcomings of government health campaigns and programmes from the perspective of patients. This study will also provide inspiration to local researchers to conduct more research on TB and highlights the importance of research on the effectiveness of disease awareness campaigns. Finally, suggestions are given for improving the level of prevention (infectious disease) and recommendations are made for addressing the gaps and limitations in implementing health programmes in the country.

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2.1. Knowledge, Attitude, and Practices

Recent studies in the field of medicine and public health suggest that the use of the Knowledge-Attitude-Practice (KAP) model is in line with the study's objective of assessing patients' views on the effectiveness of treatment methods and the ability to change behaviour, especially among patients, and emphasise that it acts as an agent to help reduce the knowledge gap between health service providers and patients (Arif et al., 2017; Balogun et al., 2019).

2.2. Application of KAP

Knowledge influences one's thinking, attitudes and behaviour (Kabir et al., 2019; Mahmud & Siarap, 2013). Exposure to new information through campaigns, programmes and health activities can enhance knowledge. According to Khan, Sarriff, Khan, and Mallhi (2014), the measurement of a person's level of knowledge about illness differs based on the person's own health condition. For example, knowledge of the dangers of TB and the importance of maintaining good health will result in different attitudes and practices among patients compared with the general public. Patients will naturally have a higher level of knowledge as they interact directly with doctors and health institutions. Therefore, their attitudes and practices will be more focussed on better healthcare to prevent further illness and will guide them in the process of recovering from the illness. Meanwhile, the public will tend to be less knowledgeable and will have less information about the illness and its preventive measures.

3. Research Questions

This paper seeks to answer the following Research Question: What are the levels of knowledge, attitude and practices of TB patients in Malaysia in preventing the infectious disease?

4. Purpose of the Study

The purpose of the study is to identify the awareness level among TB patients on prevention of the infectious disease and to what extent they interact with their family members, friends, and neighbours.

5. Research Methods

This study is quantitative in nature to identify and systematically examine the prevention of infectious disease through the knowledge, attitudes and practices of TB patients in Malaysia. It employed a survey research design in which descriptive survey of the samples was conducted in 2015. The questionnaire was adapted from Ul Haq et al. (2012), revised and modified to fit the local context. The final version of the questionnaire consisted of 50 items with four sections, as follows: Part A: Respondent's Profile (14 items); Part B: General Health (11 items); Part C: Knowledge, Attitudes and Practice on TB (16 items); and Part D: Suggestions (9 items). Items in Part A were developed using nominal and ordinal scales while items in Part B and Part C were five-point Likert-type questions and Part D open-ended. Sample respondents were taken based on the number of TB patients in the states with high TB cases, namely, Sabah, Kuala Lumpur, Selangor, Sarawak, Kelantan and Penang.

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5.1. Ethical consideration

The research has obtained NMRR-11-658-9825 ethical approval from MOH for the purpose of transparency and the protection of human subjects. Written consent was collected from each respondent before the data collection process began. Confidentiality was maintained by using codes instead of respondents' names (ID: R001, R002, R003, etc.), and personal details were not disclosed. Participation in the study was voluntary, and tokens of appreciation were given to the respondents upon completion of the questionnaire.

5.2. Data of patients

The data of TB patients were obtained from the Division of Disease Control, MOH as well as respective states. Patients who had been diagnosed and/or confirmed to have TB symptoms and were undergoing TB treatment at a hospital or health clinic under the MOH were the study respondents. In this study, the majority of respondents were undergoing treatment during the data collection period. Subsequently, the collected data were entered into Statistical Package for the Social Sciences (SPSS) software version 24 for further analysis. Categorical variables were tested using descriptive statistics; in cases of abnormal data distribution, tests of independence were performed using the chi-squared test. For example, to test differences between genders (male/female) and levels of knowledge (high/low), a contingency table (2x2) must be used to explain the differences in meaning (Kent State University Libraries, 2018). A p-value of less than 0.05 was considered statistically significant (Moore, Notz, & Flinger, 2013).

6. Findings

A total of 1,600 questionnaires were distributed, and 1,587 completed forms were returned and used which constituted 99.2% response rate. The data were analysed using descriptive analysis namely frequency and percentage to assess respondents' answers.

In general, the study involved 1,587 respondents who are TB patients in Malaysia. The majority of respondents were men (944 patients [59.5%]) while 629 patients (39.6%) were women with the remaining 14 respondents not expressing their gender. The majority of respondents were from Selangor (n = 438; 27.6%), followed by Kelantan (n = 398; 25.1%), Sabah (n = 250; 15.8%), Kuala Lumpur (n = 240; 15.1%), Sarawak (n = 168; 10.6%) and Penang (n = 93; 5.9%). Most respondents were aged 51 and above (n = 477; 30.1%), possess a high school education level - PMR / SPM / STPM (n = 753; 47.4%) and live in urban areas (n = 796; 50.2%). In terms of total income, the majority of respondents had low income of less than RM2,000 (n = 1,137; 71.6%) while only 23 respondents (1.45%) had income above RM4,000.

Overall, the respondents represented global data on TB patients with the majority being men, aged 51 or older, living in urban areas, and having low household income (Perriot, Underner, & Peiffer, 2018; Yen et al., 2014).

6.1. General Health Analysis

Since smoking habits are one of the contributing factors to TB disease, respondents were asked if they were smokers, how long they had smoked and whether they knew that smokers had a higher chance

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of contracting TB. The findings indicate that most of the respondents do not smoke (n = 1,050; 66.2%) but, among smokers, most of them admit that they have been smoking for more than 5 years, more than 10 years (n = 476; 30%), between 11 and 20 years (n = 412; 26%), or more than 20 years (n = 428; 27%). About half of the respondents (n = 825; 52%) agreed that smoking increases the risk of TB infection. Respondents were also found to have a high knowledge of smoking and its association with TB disease. As noted in previous studies, smoking increases the risk of infection and transmission of TB (Mokhtar & Rahman, 2017; Perriot et al., 2018). In fact, past researchers have stated that smokers have almost twice the risk of TB infection compared with non-smokers (Bai, Lee, Chien, Suk, & Chiang, 2016; Yen et al., 2014). A study conducted by van Zyl Smit et al. (2010) reported that one in five deaths from TB cases could be avoided if the patient did not smoke. In addition, Hutahaean (2013) confirmed that smokers among TB patients had a very high mortality rate of nine times higher. On the other hand, nearly one-third of deaths due to TB disease could be avoided if patients quit smoking.

Based on the descriptive analysis, the findings show that the prevention level of infectious diseases, especially for TB disease, is high. In other words, the majority of respondents (n = 1,125; 70.9%) managed to achieve a mean score above 4.25. The determination of the level of prevention of the disease depends on the mean score and standard deviation from Part B of the questionnaire. The study interpreted the level of prevention based on the Min Score Interpretation Table, which employs the 5-point Likert scale. Mean scores of 1.00 to 2.33 are considered low; 2.34 to 3.66 are considered average; and mean scores of 3.67 to 5.00 are considered high (Rahman, Ahmad, Awang, & Malek, 2016).

6.2. TB Disease-Knowledge Analysis

Knowledge of TB disease is assessed through general knowledge of TB, TB symptoms, TB infection, and treatment for TB disease. The findings indicate that the majority of respondents (n = 1,179; 74.3%) admitted that they had moderate general knowledge of TB before they became infected (see Table 1). When asked about how TB spreads, many respondents answered correctly: coughing (95.3%), sneezing (76.9%), talking (54.6%) and spitting (52.6%). For the cause of TB, respondents answered germs/bacteria (81.9%), virus (56.5%) and contaminated food/beverages/water (23.2%).

Table 01. Prevention Awareness Level

Knowledge of TB	**Yes** **n (%)**	**No** **n (%)**
Knowledge of TB before infection?		
High	96 (6.1)	-
Moderate	1,179 (74.3)	-
Low	312 (19.7)	-
How TB spread?		
Coughing	1,512 (95.3)	75 (4.73)
Contaminated food/drinks/water	475 (29.9)	1,112 (70.1)
Sneezing	1,221 (76.9)	366 (23.1)
Talking	867 (54.6)	720 (45.4)
Sexual relationships with TB patients	292 (18.4)	1,295 (81.6)
Hereditary	485 (30.6)	1,102 (69.4)
Spitting	834 (52.6)	753 (47.4)

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What is the cause of TB?		
Virus	896 (56.5)	691 (43.5)
Contaminated food/beverages/water	368 (23.2)	1,219 (76.8)
Germs / bacteria	1,300 (81.9)	287 (18.1)
Hereditary	452 (28.5)	1,135 (71.5)
Sexual relationships with TB patients	238 (15.0)	1,349 (85.0)
What are the symptoms of TB?		
Cough up sputum	1,405 (88.5)	182 (11.5)
Bad cough for 3 weeks or longer	1,484 (93.5)	103 (6.50)
Fever for 3 weeks or longer	1,295 (81.6)	292 (18.4)
Bloody cough	1,388 (87.5)	199 (12.5)
No appetite	1,164 (73.3)	423 (26.7)
Sweating at night	1,037 (65.3)	550 (34.7)
Chest pain	1,199 (75.6)	388 (24.4)
Extreme fatigue	1,132 (71.3)	455 (28.7)
Weight loss	1,182 (74.5)	405 (25.5)

The main cause of TB is germs or bacteria, *Mycobacterium Tuberculosis* (Rahman & Mokhtar, 2015; Zin et al., 2018), and the respondents indicated that they are aware of the mechanism of transmission and causes of TB disease. In terms of TB symptoms, the majority of respondents answered correctly: coughing up sputum (88.5%), bad cough for 3 weeks or longer (93.5%), fever persisting for 3 weeks or longer (81.6%), and bloody cough (87.5%). These results demonstrate that the respondents showed good knowledge of TB and were aware of the symptoms, infections and treatment related to TB disease. Therefore, the patients displayed a high level of knowledge relating to the prevention of TB.

Table 02. Knowledge of TB infection and treatment

Knowledge of TB infection and treatment	**n**	**%**
Is TB infectious?		
Yes	1,419	89.4
No	162	10.2
Not sure / Do not know	6	0.38
Is TB disease preventable?		
Yes	1,262	79.5
No	321	20.2
Not sure / Do not know	4	0.25
Is TB treatable?		
Yes	1,394	87.8
No	184	11.6
Not sure / Do not know	9	0.57
How long does TB treatment take?		
A month	11	0.70
2 months	13	0.80
3 months	85	5.40
6 months	1,017	64.1
9 months	230	14.5
Not sure / Do not know	231	14.6

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Table 2 summarises the knowledge about TB infection and treatment. The majority of patients answered that TB was an infectious disease (n = 1,419; 89.4%), and 1,262 of them believed that TB disease is preventable. About 87.8% agreed that TB can be cured (n = 1,394). Interestingly, with regard to the duration of TB treatment, most respondents answered that 6 months (n = 1,017; 64.1%) was the usual duration of treatment. However, some medical practitioners believe that TB treatment should be carried out for 9 months (n = 230; 14.5%) because during the 9 months, the bacterial recurrence rate was significantly lower than during the 6 months. Therefore, patients who responded that TB treatment takes 9 months were also considered to have answered correctly.

The Kolmogorov-Smirnov normality test revealed that the data for this study did not follow the normal distribution ($p > 0.05$). Therefore, non-parametric tests such as the chi-squared test were used for inferential statistics. The chi-squared test was used to investigate the relationship between two (nominal) variables, and each variable had two or more categories (Pallant, 2013). Given that p-values are higher than significance levels ($p > 0.05$), it can be concluded that there is insufficient evidence to suggest a link between gender and knowledge level [$\chi2$ (1) = 2.057, p = 0.174]. Similarly, in terms of the age of the respondents, no significant difference could be attributed to the level of knowledge about TB [$\chi2$ (4) = 6.151, p = 0.188] (see Table 3). In line with the findings of this study, Abebe et al. (2010) reported that patients' knowledge of a disease is not related to their gender as both genders exhibit similar responses to prevention of disease and maintaining personal healthcare.

Table 03. Chi-Square test analysis by gender and age

Variables		**Knowledge level%**		n	***p-value***	**$\chi2$**
		Low	High			
Gender	Male	12.7	87.3	944	0.174	2.057
	Female	10.3	89.7	629		
Age	Below 20	9.40	90.6	128	0.188	6.151
	21-30	10.7	89.3	393		
	31-40	11.3	88.7	301		
	41-50	9.30	90.7	259		
	51 and older	14.5	85.5	477		
	*No answer on age	10.4	82.8	29		

*Note: $p > 0.05$ showed insignificant results

6.3. TB Disease-Attitude Analysis

To assess patients' attitudes towards the prevention of TB disease, four categories were analysed, namely, those related to the patient, family members, friends and neighbours. Patients' attitudes towards TB prevention were measured with a question about how they react if they experience symptoms of TB disease. Most respondents prefer to consult a doctor and get treatment immediately. Attitudes towards family members, friends and neighbours were assessed with questions about a patient's level of comfort in sharing food/drinks, willingness to communicate, and their openness about their illness. The majority of patients stated that they would not stay away from family members if they were infected (n = 1,237; 77.9%) and would not conceal their illness from family members (n = 1,323; 83.4%). However, in terms of patients' attitudes towards their friends and neighbours, they showed lower rates of openness than their openness with family members. In another measure, only 1,016 patients (64%) did not mind eating with

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friends compared with 1,176 patients (74.1%) who did not mind eating with family members. This pattern can also be seen in attitudes towards neighbours, with only 980 patients (61.8%) reporting that they agreed to share food with neighbours. Comparing these three categories, the data indicate that respondents are more comfortable around their family members than around their friends and neighbours. Therefore, the level of prevention in terms of patient attitude was moderate (mean score = 2.55).

6.4. TB Disease-Practice Analysis

Nineteen questions were asked to evaluate TB prevention practices among respondents. The overall assessment showed that more than half of the respondents agreed with all the statements. In other words, most respondents recorded positive reactions by answering 'Yes' to almost all questions. For example, the total number of respondents who claimed that they maintained cleanliness in their homes was 1,482 (93.4%), while 1,196 respondents (75.4%) reported that they cover their nose when coughing or sneezing and 1,345 respondents (84.8%) reported that they avoid crowded places. Thus a high level of prevention of TB disease was shown in terms of patients' preventive practices with a mean score of 4.48.

The findings of this study are strengthened by previous studies (Kigozi, Heunis, Engelbrecht, van Rensburg, & van Rensburg; 2017; Salleh, Rahman, Rahman, & Haque, 2018). For example, a study by Salleh et al. (2018) also measured the prevention of TB disease among TB patients and found that wearing a mask in public and covering mouths when coughing/sneezing are indicators of good prevention practices. The study emphasised that these actions are considered appropriate, ethical and very important for preventing the spread and transmission of the TB virus to others. Another study on the prevention of TB was conducted in South Africa to reinforce the national health education programmes. Kigozi et al. (2017) outlined three practices as good TB disease prevention practices: covering the mouth/nose with a tissue when coughing/sneezing, discarding used tissues in a trash bin, and washing hands after coughing/sneezing. Interestingly, the study by Kigozi et al. (2017) also emphasised that socio-demographic factors, such as gender, education level, occupational status and place of residence, played an important role in fostering awareness of TB prevention. In particular, highly educated women, working-class patients and those living in urban areas are reported to simply have better practices and improved disease prevention practices as well as to have successfully completed treatment until they are fully recovered.

7. Conclusion

Overall, this study revealed that TB patients have positive knowledge, attitudes and practices in the prevention of TB disease. However, some gaps have been identified including awareness programme on the dangers of TB and information gaps on the importance of personal healthcare. Therefore, there is room for improvement. Among the findings of this study is the discovery that a number of patients are still lacking in terms of health ethics and personal healthcare. Therefore, more health programmes need to be conducted to raise awareness among patients as well as the general public. In fact, given today's interconnected borderless world, social media can be a part of strategies for disseminating information on preventing TB. For example, platforms such as Facebook, Twitter and Instagram are seen as effective media for reaching a broader audience for distribution of TB-related knowledge. Second, in order to

reduce the rate of transmission of TB disease, the government should establish special counselling sessions for TB patients who are compulsory for patients and their contacts so that TB patients do not feel isolated. Friends and neighbours should also be made aware of TB infection and should educate themselves to support patients as they play an important role in the healing process of TB patients. Family members, friends and neighbours should also provide TB patients with more than basic moral support to avoid self-isolation, depression or other forms of negative consequences.

To sum up, this study shows that knowledge of TB is essential to educate TB patients on how TB is transmitted to others, what treatment they need, and how to equip themselves to protect their loved ones with proper personal healthcare. Accurate knowledge on TB disease can lead to positive attitudes and can ultimately influence a patient's behaviour in a positive way. Future studies are recommended to conduct research on TB disease on a larger scale while also considering different socio-economic backgrounds to compare the levels of knowledge, attitudes and behaviours of patients before and after they are diagnosed with TB. References to the KAP model in the study of TB disease are limited primarily to case studies in Malaysia. Therefore, this study contributes to the existing literature on public health and will serve as a current source of reference for future researchers, the public and the Malaysian government in providing a holistic and effective TB control programme at the national level.

Acknowledgments

The authors would like to extend their gratitude to the Long-Term Research Grant Scheme (LRGS) entitled *Enhancement of Relevant National Policies for Effective TB Management: Lesson Drawing and Control,* account number 203.PJJAUH.67212003, Ministry of Education, Malaysia and Fellowship Scheme, Universiti Sains Malaysia, for making the publication of this article possible.

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