

Knowledge and Practice among Nurses on Management of Tuberculosis in a Teaching Hospital

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ABSTRAK

Batuk kering (TB) telah menjadi satu kebimbangan awam di seluruh dunia dengan 10.4 juta kes baru dilaporkan dalam tahun 2015 dan 1.4 juta kematian akibatnya. Lebih penting lagi, tren peningkatan kejadian TB di kalangan kakitangan kesihatan telah menjadi perkara yang membimbangkan. Oleh itu kajian ini telah dilakukan untuk mengkaji pengetahuan dan amalan tentang TB dan faktor yang berkaitan dengannya di kalangan jururawat dalam sebuah hospital pengajar. Kajian ini menggunakan reka bentuk keratan rentas dan kaedah persampelan rawak terstrata. Sejumlah 275 orang jururawat dalam sebuah hospital pengajar telah menyertai kajian ini. Pengetahuan dan amalan tentang pengurusan TB diukur secara soal selidik berstruktur. Kebanyakan responden mempunyai pengetahuan dan amalan yang baik terhadap pengurusan TB, iaitu masing-masing diwakili dengan 70.2% dan 63.3%. Namun jurang dalam kaedah pengumpulan kahak telah dikenalpasti dalam bahagian pengetahuan (1.8%) dan amalan (0.4%). Tempat kerja adalah satu-satunya faktor demografi yang signifikan berkait dengan tahap pengetahuan dan amalan ($p=0.028$). Tahap pengetahuan dan amalan terhadap pengurusan TB yang dikenalpasti di kalangan jururawat didapati tidak berkait dengan kebanyakan faktor sosio demografi. Jururawat sebagai kakitangan kesihatan barisan hadapan adalah berisiko tinggi untuk terdedah dengan jangkitan TB kerana mereka berhubung kerap dengan pelbagai pesakit terutamanya pesakit yang tidak didiagnos dan disyaki berpenyakit TB. Oleh yang demikian, pelaksanaan langkah-langkah kawalan jangkitan TB adalah penting untuk mengurangkan risiko penyebaran dan jangkitan dalam hospital.

Kata kunci: amalan, jururawat, pengetahuan, tuberkulosis

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ABSTRACT

Tuberculosis (TB) has become a worldwide public concern with 10.4 million new cases reported in 2015 and 1.4 million deaths. More importantly, an increase in trend in TB incidence among healthcare workers has become a major concern. Therefore, the present study was conducted to explore the knowledge and practice towards TB and the factors associated with it among nurses in a teaching hospital. The present study used cross-sectional design and stratified sampling method. A total of 275 nurses in a teaching hospital participated in this study. The knowledge and practice on management of TB was measured using a structured questionnaire. Majority of the respondents had good knowledge and practice on management of TB represented by 70.2% and 63.3%, respectively. However, knowledge gap (1.8%) and practice gap (0.4%) were identified in method of sputum collection. Work place setting was the only demographic factor found significantly associated with level of knowledge and practice ($p=0.028$). Level of knowledge and practice on management of TB identified among nurses was not associated with many socio-demographic factors. Nurses as frontline healthcare workers are at high risk of being exposed due to frequent contact with various patients especially those who are undiagnosed and TB suspect patients. Hence, implementation of TB Infection Control (TBIC) measures is important to minimize the risk of infection and cross-infection within hospital.

Keyword: knowledge, nurses, practice, tuberculosis

INTRODUCTION

Tuberculosis (TB) has become a worldwide public-health concern. There are 10.4 million of new cases reported in 2015 by World Health Organization (WHO). In 2015, approximately 1.4 million deaths occurred with an additional 0.4 million deaths among those who were HIV-positive (World Health Organization 2016). As TB is both contagious and airborne, it is the leading cause of mortality from a single infectious agent, only second to human immunodeficiency virus (HIV) and Acquired Immune Deficiency

Syndrome (AIDS). There are lots of preventive measures taken and carried out by Ministry of Health Malaysia (MOH) and World Health Organization (WHO). TB still remains a public concern in Malaysia with around 16,000 to 20,000 cases reported annually (Sha'ari Ngadiman et al. 2014). The trend of TB incidence in Malaysia increased from 2008 until 2013 where the rate was 80.59 and 78.28 per 100,000 population, respectively (Ministry of Health Malaysia 2014). Recent reports from MOH on TB stated that the rate of TB incidence kept increasing with percentage value of 82.10% in 2014

compared to 78.28% per 100,000 population in 2013 (Ministry of Health Malaysia 2015). This indicates that TB still remains a public health challenge in Malaysia despite efforts in terms of infection control and preventive measures which were implemented (Rafiza et al. 2011).

As there is an advance number of patients who require treatment and the risk of getting in contact with TB agent among healthcare providers is also on the rise (Rafiza et al. 2011). According to MOH, data provided by Tuberculosis Information System (TBIS) show that the incidence rate of active TB among healthcare providers was higher compared to the general population between 2007 and 2010. The incidence rate was 65.71 – 97.86 per 100,000 population of healthcare providers (Ministry of Health Malaysia 2012).

Several factors can lead to the emergence of this endemic agent which include the flooding of foreign workers from endemic countries and an increase in HIV/AIDS incidence rate. Since patients with HIV/AIDS are highly vulnerable to TB due to their immune-compromised body system, MOH Malaysia estimated that in 2012, from 23,027 people infected with TB, TB incidence with TB/HIV co-infection would be about 8% (Sha'ari Ngadiman et al. 2014). Other than that, there are several factors which were identified to be linked to the increase in incidence rate of TB among healthcare providers. According to MOH, ventilation and practices of Standard Precaution as well as late diagnose of TB are among the contributing factors. Stigmatization

and poor knowledge on TB services coverage lead to underexploited of these services, poor access to treatment services and eventually cause awareness of TB, remained inadequate (Maher et al. 2006).

This study aimed to determine the level and relationship of knowledge and practice regarding management of TB among nurses.

MATERIALS AND METHODS

This study used a cross-sectional survey design conducted in a 845 bedded teaching hospital in Kuala Lumpur. All nurses in this teaching hospital from all disciplines were selected. The total population of this study was 1522. Stratified random sampling was used since the population of this study was divided into different discipline or strata. Samples were obtained from various discipline. Based on the sampling frame of 1522, sample size of $n = 317$ was calculated using Slovin's formula ($n = N / \{1 + Ne^2\}$), where n denotes the sample size and N population size with $e = 0.05$ as the margin of error (Guilford & Frucher 1973).

However, only a total of 275 out of 317 nurses who met the eligible criteria agreed to participate in the study which contributed to 86.8% response rate.

Study questionnaire was adopted from Bhebhe et al. (2014) on 'Attitudes, knowledge and practices of healthcare workers regarding occupational exposure of pulmonary tuberculosis' after obtaining permission from the original author. This self-administered questionnaire consisted of four parts:

(A) demographic characteristics, (B) knowledge on TB, (C) attitudes towards TB and TB related practice. Some modification was done to fit the instrument with the local setting of this study and subsequently validated by a panel of experts. Ethical approval was obtained from the institution research ethic committee with the project code of FF-2016-064 for the study. Pilot study was carried out on 32 respondents from different strata who were chosen randomly with the modified questionnaire after obtaining the ethical approval. The reliability test was carried out and result revealed good consistency of the instrument with Cronbach's alpha value of 0.752, 0.750 and 0.722 for Knowledge, Attitudes and Practice, respectively.

Data collection was carried out after researchers obtained permission from each stratum head nurse to conduct the study. Following that the researchers met up with the respondents and invite them to participate in the study by giving them a clear explanation. Data collected using a questionnaire after consent obtained. Completed questionnaire was collected in a sealed envelope to maintain confidentiality.

The data was analysed using IBM SPSS Statistics version 22 and descriptive analysis was performed to obtain mean, standard deviation, frequencies and percentage to determine the level of knowledge and practice regarding management of TB among nurses. Independent Chi-square test and Spearman Rank Order Correlation (ρ) test was used to determine the relationship between demographic characteristic and nurses'

level of knowledge and practices of TB. The significance level for this study was set to 5%.

RESULTS

The demographic characteristic of the respondents are presented in Table 1. Most of the respondents were less than 25 years of age. Most of the respondents comprised of diploma holders and other qualifications in nursing. Majority of them had never been exposed with TB (Table 1).

Most of the respondents were classified as having good knowledge of TB with good score above 75.0% based on the overall score achieved on the TB-related knowledge questions, while only 29.8% ($n=82$) of the respondents obtained a fair score that range between 40.0% - 69.0%. Of all the surveyed respondents, none of them were classified of having poor knowledge (<39.0%) of TB.

Regarding the association between socio-demographic characteristics and the knowledge level, only workplace setting had significant association with the knowledge level of TB ($p=0.028$). There was no significant association between age and level of knowledge ($p=0.693$). The relationship between education level with level of knowledge on TB revealed that respondents with Diploma and Diploma plus Post Basic Education had good knowledge however, there was no relationship between the two levels of education ($p=0.20$) thus indicating that knowledge of TB did not influence by education level. Majority of the respondents who obtained good score

Table 1: Socio-demographic characteristic

Socio- demographic Characteristic	Variable	Frequency (n)	Percentage (%)	Mean (SD)
Age (years)				32.57 (± 5.72)
	≤ 30	119	43.3	
	≥ 30	156	56.7	
Education level	Diploma & Diploma + Post Basic	238	86.5	
	Bachelor Degree and Master	35	12.7	
Services year				9.92 (± 5.38)
	1-4	55	20.0	
	5-9	78	28.4	
	10-15	80	29.1	
	15	62	22.5	
Workplace setting	TB Critical areas	127	46.2	
	TB Non-critical areas	148	53.8	
History of Tuberculosis	YES	8	2.9	
	NO	267	97.1	

were within the year of services from 1-4 years to 5-9 years. However, as the respondent’s years of services increased to 10-14 and more than 15 years, the score for good knowledge decreased. There was also no association found between services year and level of knowledge on TB (p=0.35). Hence, an increase in service year did not denote the increase level of knowledge of TB. Nurses’ work in TB non-critical areas showed good and fair knowledge of TB. Result indicated that nurses’ level of knowledge on TB was dependant on the workplace setting (Table 2).

Out of 275 respondents 63.3% (n=174) were classified as having good practice on TB prevention with score of more than 70.0% on the Tuberculosis-related practice, whereas 36.0% (n=99) was categorised as fair practice with scored of (40.0% - 69.0%). Only 0.7% (n=2) were classified as practicing poor TB prevention in their workplace

setting (<39.0%).

For the association between socio-demographic characteristic and practice of TB prevention among nurses, there was no significant association between age (P=0.736) and the practice of TB prevention. Service year of the nurses also showed no significant association with practice of TB prevention (p=0.729) (Table 3).

Regarding education level and workplace setting, results showed that there was no association between these two demographic characteristics with practice of TB prevention. Results indicated that education level (p=0.69) and workplace setting (p=0.84) did not affect the practice of TB prevention of the respondents. Results also indicated most of the surveyed respondents who were classified of having good practice of TB prevention were from TB non-critical areas compared to the TB critical areas (Table 4).

Table 2: Relationship between demographic characteristic and level of knowledge on TB

Socio-demographic Characteristic	Variable	Level of knowledge on Tuberculosis			χ^2	p-value
		Poor n (%)	Fair n (%)	Good n (%)		
Age (years)	≤ 30	0	34 (12.4)	85 (30.9)	0.156	0.693
	≥ 30	0	48 (17.5)	108 (39.3)		
Education level	Diploma & Diploma + Post Basic	0	68 (24.7)	172 (62.5)	1.66	0.20
	Bachelor Degree and Master	0	14 (5.1)	21 (7.6)		
Services year	1-4	0	19 (6.9)	36 (13.1)	3.28	0.35
	5-9	0	18 (6.5)	60 (21.8)		
	10-15	0	23 (8.4)	57 (20.7)		
	15	0	22 (8.0)	40 (14.5)		
Workplace setting	TB Critical areas	0	39(14.2)	88(32.0)	0.868	0.028
	TB Non-critical areas	0	43(15.6)	105(38.2)		

The significance level is $p \leq 0.05$, and statistically significant result is bold

Table 3 : Relationship between practices on Tuberculosis prevention with age and services year

Socio-demographic characteristic	Practice on TB prevention	
	r-value	p-value
Age (years)	- 0.020	0.736
Services year	- 0.021	0.729

The significance level is $p \leq 0.05$

Finally, results showed that there was no significant association between respondents' knowledge on TB and practice of TB prevention $r=-0.44$, $n=275$, $p<.47$. Hence, the level of knowledge did not determine the practice of TB prevention among population of the study.

DISCUSSION

The level of knowledge and practice among nurses in this study regarding management of Tuberculosis (TB) were relatively good, indicated majority of them had high level of knowledge and practice. The demographic characteristic of age, education level and service year were found to have no significant association with level of knowledge and practice of TB.

Our finding showed hundred

Table 4: Relationship between socio-demographic characteristic and practice of TB prevention

Socio-demographic characteristic	Variable	Practice of Tuberculosis Prevention			χ ²	p-value
		Poor n (%)	Fair n (%)	Good n (%)		
Education level	Diploma & Diploma + Post Basic	2 (0.7)	88 (32.0)	150 (87.3)	0.75	0.69
	Bachelor Degree and Master	0	11 (4.0)	24 (8.7)		
Workplace setting	TB Critical areas	1 (0.4)	48 (17.5)	78(28.4)	0.351	0.839
	TB Non-critical areas	1 (0.4)	51(18.5)	96(34.9)		

The significance level is $p \leq 0.05$

percent of the respondents had satisfactory level of knowledge on general TB information, preventive measures and courses of TB treatment. These findings were consistent with the study by Hashim et al. (2003) who reported good knowledge of TB obtained from almost 100% of his respondents. However, it is contrary to studies from Russia, USA, Peru and Brazil, which found unsatisfactory level of TB knowledge among respondents (Woith et al. 2012; Maciel et al. 2008; Kiefer et al. 2009). The high level of knowledge among respondents from this study may be due to the fact that TB is a common disease in Malaysia and nurses in the hospital setting had been exposed to TB knowledge.

Our study also found that majority of the nurses had good TB prevention practice. However, some of them only demonstrated fair level of practice in accordance to National Tuberculosis Practice (NTP) guidelines. This may be due to lack of self-improvement in TB knowledge besides the non-provisional of specific guidelines by the hospital policy. Similar findings

were reported before by Temesgen & Demissie (2014). However, contrary results were reported by studies in Thailand, Lesotho and Iraq (Lertkanokkun et al. 2013; Bhebhe et al. 2014; Hashim et al. 2003). Our findings indicated remarkable level of knowledge by nurses in this teaching hospital because more than half of the respondents achieved good knowledge level. This finding was similar with Temesgen & Demissie (2014), that showed the majority (>70.0%) of healthcare workers scored good knowledge level in Tuberculosis-related knowledge. According to them, this was due to increase in the awareness regarding TBIC guidelines, as well as trainings and supportive supervisions by the national and regional TBIC programmes beside the support from the non-governmental organizations (NGOs) related to TBIC (Temesgen & Demissie 2014). However, in this study, there was no specific trainings pertaining to TBIC programmes carried out in this hospital unlike training programmes such as Basic Life Support and Diabetic

Educator programmes. If training pertaining to TBIC programmes is implemented in the hospital, the results on TB knowledge among respondents may be even remarkable and the gaps found in certain part of knowledge might be overcome too. In contrast to our study Bhebhe et al. (2014) found that most of the healthcare workers obtained fair score in Tuberculosis-related questions. Study by Ukwaja et al. (2013) also portrayed similar finding that most of healthcare workers were only fairly knowledgeable about Tuberculosis. The reason for the fair score reported was not known because even with establishment of in-service training programmes for TB healthcare workers still resulted the knowledge regarding TB remained inadequate. Therefore, new strategies were needed to improve the gaps in TB knowledge (Ukwaja et al. 2013).

Findings found that age difference was not statistically significant to the respondents' level of knowledge. However, respondent with an increase in age mostly scored better in knowledge level. Respondents within aged group "above 30 years" were classified as having good knowledge of TB compared to younger respondents. This finding contradicted to studies by Temesgen & Demissie (2014) and Adebajo (2011). According to Adebajo (2011), increase in age does not contribute to an increase in knowledge. However, Ukwaja et al. (2013) reported similar findings of mean knowledge having no significant difference across age. Study by Minnery et al. (2013) reported the mean of knowledge to be decreased

as the age increased. Our findings showed that increase in age did not influence the increase in the level of knowledge on TB. Our findings indicated the insufficient exposure to TB-related programmes is a crucial problem and nurses need to upgrade their knowledge from time to time regardless of their age.

Banda et al. (2014) reported clearly that the changes in TB knowledge level was directly linked to the level of formal education. Study by Minnery et al. (2013) also reported that respondents with highest level of education had a greater average of TB knowledge. However, our study found no relationship between education level and level of TB knowledge. Our finding was similar to a study done in South-East Nigeria which reported that there was no significant difference between TB knowledge and education level (Ukwaja et al. 2013). However, a study by Banda et al. (2014) reported higher TB knowledge level was mostly obtained amongst those who had tertiary education.

Regarding the relationship between knowledge score and service years of respondents, findings showed that there was no significant association between service year and nurses level of knowledge. Our finding also showed that as the nurse's service year increased from junior level (1-4 years) to intermediate level (5-9 years), their score for good knowledge on TB also increased from 13.1% to 21.8%. However, as the nurses' service year continuously increased to senior level (10-14 years) and very senior level (>15 years), their score for good TB

knowledge decreased from 20.7% to 14.5%. This interesting finding may be due to nurses' who had years of experience in clinical areas but were not involved in TB high risk workplace eventually lacked of TB-related information exposure. This finding was similar to study done by Charisis et al. (2014), Adebajo (2011) and Temesgen & Demissie (2014) which reported that there was no significant difference between TB knowledge and numbers of working years in hospital. Besides this, respondents with longer duration of working experience may not feel there is a need to update themselves with new information on TB, and it resulted no association with higher level of knowledge as expected from the respondents with longer service years. Our finding could be possibly due to nurses who had less year of working experience, probably who did not encounter many cases of TB if they were not assigned to the TB high risk workplace that required them to equip themselves with TB knowledge. However, according to Temesgen & Demissie (2014), it was due to the lack of training on TBIC before healthcare workers were first assigned to their respective health facilities.

Meanwhile, regarding the workplace setting, the results showed that there was no association between workplace setting and TB knowledge level of nurses. Non-critical area dominates the highest percentage of nurses who scored good level of knowledge compared to other settings. These findings were similar with study by Temesgen & Demissie (2014) which reported that job location was not

associated with TB knowledge. Non-critical area displayed good knowledge instead of critical areas could be due to the higher proportion of respondents from the area. As expected the medical units showed that most of the staff portrayed good knowledge with respect to TB.

Study by Hashim et al. (2003) from Iraq reported that most of healthcare workers demonstrated poor practice regarding TB measures and prevention. However, our findings found that most of the respondent obtained good score in practice towards TB prevention. This result may be due to the appropriate knowledge regarding the NTP guidelines in terms of environmental and personal protection measures. However, in our study, the administrative control was not well practiced by respondents. The poor practice was reflected by certain TB-related practice questions that demonstrated nurses had lack of TB training in terms of administrative control. However, the distribution on the number of questions pertaining to administrative control which in accordance with the setting of this study were less in numbers. Thus, this may affect the actual practice score among the respondents on administrative control. Similar findings reported by Temesgen & Demissie (2014) which showed that overall of the respondent scored good practice towards TB related practice question which opposed the result reported by Bhebhe et al. (2014) that showed 36.4% of their respondent self-reported inappropriate practice and overall practice result obtained by respondent was only fair

score (52.7%). This finding may be due to certain workplace settings which did not provide complete equipment for TB prevention control practice such as N95 mask and cause certain TBIC practice not feasible by respondents of the study compared to those in high risk settings. This was supported by a study done in Ethiopia (Temesgen & Demissie 2014).

Regarding the relationship between practice on TB prevention and age, our finding found there was no association between them. Nevertheless, there were few studies which reported the relationship between practice and age. Lertkanokkun et al. (2013) study found age was related to the provider's practice. Our results also reported no association between practice and duration of services year. However, the number of respondents who obtained good score in practice was higher when working years exceed 15 years and above. The healthcare workers who had worked for more than 10 years had good practice and this may be due to the experience handling and treating TB patients. This study was similar to earlier studies which found that there was a relationship between practice and years of working experience (Charisis et al. 2014; Lertkanokkun et al. 2013).

Our study findings found that there was no association between education level and workplace settings towards practice of TB prevention. Although non-critical areas (Pediatric Unit, Psychiatric Unit, Obstetrics and gynecology Unit, ICU and Staff Health Unit and OT, CSSD and infection control) displayed more positive

practice than critical areas (Medical Unit, Surgical Unit, Orthopedic Unit, Community and Emergency Department), the Medical Units reported the highest respondents with good practice of TB prevention. This could be explained by most of TB cases were placed and treated in medical wards. This is supported by Temesgen & Demissie (2014) that reported healthcare provider who worked in ward demonstrated good practice in TB prevention control compared to outpatient departments. Similar to this study, ward was one of the significant predictor of good practice among the respondents compared to the outpatient department. This was because the ward staff take care of TB suspected patients who were admitted for further investigations. These situations required them to prepare themselves and be aware of the TB infection transmission and also practice the standard precaution as recommended by NTP guidelines (Temesgen & Demissie 2014).

Dhiraj et al. (2014) reported that good practice was found from respondents with modular training which was supported from a study in Thailand by Lertkanokkun et al. (2013). These studies showed the importance of TB training in term of ensuring TB programmes can be implemented effectively as the knowledge on TB was being equipped sufficiently through the training programmes. However, based on the findings of our study, the level of knowledge did not influence the good practice in TB management. This finding may be related to the shortage or unavailability of supplies

like fans, HEPA filters for ventilation and appropriate protective respirators (masks) which can cause nurses lack of opportunities to apply the knowledge pertaining to TB into practice in an effective way (Temesgen & Demissie 2014).

This research is limited to the nurses in a particular teaching hospital only. The results may not be generalized to all nurses.

CONCLUSION

In conclusion, the level of knowledge and practice of TB identified among nurses was not influenced by respondents' socio-demographic data. Critical knowledge and practice gap in TB infection control were identified. As frontline healthcare workers, the risk of getting TB exposure was high due to frequent contact with various patients especially those who were undiagnosed and TB suspect patients. Hence, implementation of TB Infection Control (TBIC) measures is important to minimize the risk of infection and cross-infection within hospital.

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