

Self-Perception of CNS Tuberculosis Prevention among Healthcare Workers in Malaysia

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Abstract: Tuberculosis of the central nervous system (CNS) which is mainly caused by *Mycobacterium tuberculosis* constitutes approximately 5–15% of the extra pulmonary tuberculosis cases. The study aimed to determine the association between self-sufficient perception with the level of knowledge, attitude and practice towards CNS tuberculosis prevention among healthcare workers. A cross-sectional study was conducted among 152 healthcare workers (HCWs) who worked as healthcare workers at medical wards, neurology wards and forensic units at two tertiary hospitals: Hospital Universiti Sains Malaysia and Hospital Kuala Lumpur. One hundred thirty-five healthcare workers were responded with the response rate 88.8%. A newly developed self-administered questionnaire with internal consistency of 0.879, 0.754 and 0.812 respectively was used to evaluate the self-sufficient perception of healthcare workers towards knowledge, attitude and practice of CNS tuberculosis. Results revealed that a total of 152 healthcare workers were studied. The mean age and SD was 30.6(12.86) years old, 95(70.4%) were female, 100(74.1%) have diploma and 89(65.9%) were in grade U29. Seventy-seven (57.0%) of them came from neurology wards and have worked at least 8.48(8.44) years in service. The study showed that 60.0%, 51.9% and 60.0% of healthcare workers had good knowledge, attitude and practice respectively towards CNS tuberculosis. There were significant association between self-sufficient perception and level of attitude and practice. Out of 81 of healthcare workers with good knowledge, 64(79.0%) perceived themselves as having insufficient level of knowledge while 49(70.0%) and 60(74.1%) of them with good attitude and practice respectively perceived themselves as having insufficient level of knowledge on CNS tuberculosis prevention. In conclusion, despite of having good knowledge, attitude and practice, the healthcare workers still perceive themselves as having insufficient level of knowledge in preventing from getting CNS tuberculosis.

Key words: Tuberculosis • CNS • Knowledge • Attitude and Practice • Healthcare Workers • Malaysia

INTRODUCTION

Tuberculosis of the central nervous system (CNS) which is mainly caused by *Mycobacterium tuberculosis* constitutes approximately 5-15% of the extra pulmonary tuberculosis cases, beside that from all cases of tuberculosis, CNS tuberculosis accounts only 10% but carries a high mortality and distressing level of neurological morbidity [1]. Harris and Morris [2] reported

that approximately 10% of persons with pulmonary TB will develop CNS tuberculosis, which can manifest as meningitis or lesions of the brain or spine.

CNS tuberculosis is associated with significant morbidity and mortality which predominantly affect very young children in high TB prevalence countries and affect adults in low TB prevalence countries [3, 4]. Aside from affecting children, this disease also affects human immunodeficiency virus (HIV)-infected individuals [5].

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More than half die or are disabled; of those who receive treatment for CNS tuberculosis disease and the others if left untreated [6]. However, in Malaysia, TB is still a public health problem compared to CNS tuberculosis with its incidence rate in the last ten years has been stagnant at around 58.7 to 65.5 per 100,000 populations [7].

According to Harris and Morris [2], although CNS tuberculosis may be a rare complication of TB, it is essential especially for healthcare workers to keep CNS tuberculosis in the differential when evaluating neurological issue since it can be a dreadful omission for the patient. Besides, Christopher *et al.* [8] have found that healthcare workers attributed 5.8% estimation of median annual incidence of TB infection in low and middle income countries. CDC data recorded that 6.3% of extra pulmonary cases (1.3% of total TB cases) had CNS tuberculosis [9], while up to 10% of cases showed CNS involvement reported in a study from an American epidemiological study of extra pulmonary tuberculosis [9]. In general, the incidence of CNS tuberculosis is directly proportional to the prevalence of tuberculosis infection [10].

According to World Health Organization [11], knowledge, attitude and practice survey is expected to be good as a 'moderator' in disseminating guidelines of TB to patients and community. One of the important tools in measuring the level of knowledge, attitude and practice of healthcare workers (HCWs) towards TB cases is by using questionnaire [12]. Since 1920s, TB has been reported to be an occupational hazard for nurses and physicians [13]. Moreover, Joshi *et al.* [14] have reported that a higher risk of acquiring TB disease was associated with certain work locations (inpatient TB facility, laboratory, internal medicine and emergency facilities) and occupational categories (radiology technicians, patient attendants, nurses, ward attendants, paramedics and clinical officers).

A study of knowledge, attitudes and practices survey among healthcare workers and TB patients in Iraq by Hashim *et al.* [15] found that 492 out of 500 health care workers (98.4%) had 'good' scores for knowledge about TB. A study on knowledge and attitudes of healthcare workers towards TB patients and the experiences of TB patients regarding healthcare workers conducted in Vellore District, Tamil Nadu, South India by Wu [16] found that 14% of HCW did not well informed about TB. Investigation in numerous clinical trials, the pathogenesis, diagnosis and treatment of CNS tuberculosis has received little attention unlike pulmonary TB [17].

As healthcare workers, it is an obligation for them in knowing the knowledge on central nervous

system (CNS) tuberculosis, having good attitude and practices towards prevention of CNS tuberculosis to provide better services. This study therefore, aimed to determine the association between self-sufficient perception and the level of knowledge, attitude and practice towards CNS tuberculosis prevention among healthcare workers.

MATERIALS AND METHODS

Study Design and Study Subjects: This study was a cross-sectional study, carried out at medical wards, neurology wards and forensic units at the two hospitals in Malaysia; Hospital Universiti Sains Malaysia (USM) and Kuala Lumpur (HKL). Study subjects were healthcare workers included consultants, medical officers, sisters, staff nurses and attendants who fulfilled the inclusion and exclusion criteria during the data collection. The inclusion criteria were physicians, medical officers, staff nurses, medical assistants and attendants who have possible contact with CNS tuberculosis patients and have worked in the current setting for more than six months. Meanwhile, the exclusion criteria were those who have been infected with tuberculosis. Ethical clearance for this study has been applied to The Human Research Ethics Committee of Universiti Sains Malaysia (JEPeM)(reference no.: USMKK/PPP/JEPeM [243.3.(8)]) and National Medical Research Register (NMRR)(reference no.: NMRR-12-455-10939).

The Instrument: The survey was conducted through the collection of primary data from healthcare workers at neurology wards and forensic units of both hospitals. The respondents answered a self-administered newly developed questionnaire which contains four parts. The questionnaire was designed in English language as it was suitable with the level of education of the healthcare workers. The parts comprised of socio-demographic, knowledge, attitude and practice (KAP). The questionnaire consisted of general tuberculosis and CNS tuberculosis division of the KAP. The knowledge part included general knowledge, symptoms, spreading form, risk factors, diagnostic test, treatment and prevention of the disease. The attitude part consisted of questions based on the way of thinking as a healthcare worker towards a proper situation regarding the disease in public and workplace environment, while the practice part included personal prevention control towards the disease. Besides, item of self-sufficient level of knowledge was added at the end part of the questionnaire.

Development of Kap Questionnaire: The knowledge, attitude and practice questionnaire was adopted from a study by Abdullah *et al.* [18] for knowledge, attitude and practice of tuberculosis among nurses in Hospital USM. Later, the questionnaire has been modified which consisted of general tuberculosis and CNS tuberculosis division in the knowledge, attitude and practice part. The modification process was done by the researchers with help of an expert panel that consisted of health professionals with experience in managing patients with CNS tuberculosis. Sources of knowledge, attitude and practice survey were referred from past studies by Wu [16] towards knowledge and attitudes of healthcare workers towards tuberculosis patients and the experiences of tuberculosis patients regarding healthcare workers in Vellore District, Tamil Nadu, South India and by Hashim *et al.* [15] towards knowledge, attitudes and practices survey among healthcare workers and tuberculosis patients in Iraq. Besides that, the newly developed questionnaire was also referred from Thwaites *et al.* [3] regarding British infection society guidelines for the diagnosis and treatment of tuberculosis of the central nervous system in adults and children and from Hernandez Pando [1] towards modelling of cerebral tuberculosis: hope for continuous research in solving the enigma of the bottom billion's disease.

Piloting the Kap Questionnaire: Reliability analysis showed that the overall internal reliability for knowledge, attitude and practice (KAP) of CNS tuberculosis among healthcare workers (n=36) at Hospital Kuala Lumpur from January 31st until March 14th, 2013 was 0.789. The individual Cronbach's alpha values of knowledge, attitude and practice domain were 0.879, 0.754 and 0.812 respectively. All the sub-domains in the KAP showed high level of internal consistency. The findings also showed most of items had corrected-item total correlation (CITC) of more than 0.3 which reflected high level of reliability. The final version of questionnaire with 34 items was valid and reliable to evaluate the self-sufficient perception of healthcare workers towards knowledge, attitude and practice of CNS tuberculosis prevention.

Data Collection: A total of 152 questionnaires were distributed to healthcare workers at Hospital USM and HKL from January 31st until July 18th, 2013. These self-administered questionnaires were distributed to eligible healthcare workers to evaluate their self-sufficient perception. An informed consent form was written in

Malay and English language and the copy was approved for use in this study by The Human Research Ethics Committee of Universiti Sains Malaysia (JEPeM)(reference no.: USMKK/PPP/JEPeM [243.3.(8)]) and National Medical Research Register (NMRR)(reference no.: NMRR-12-455-10939).

Data Analysis: Data entry and data analysis were conducted by using the Statistical Package for the Social Science (SPSS) version 20.0. Pearson Chi-square test was used to determine the association between self-sufficient perception and the level of knowledge, attitude and practice towards CNS tuberculosis among healthcare workers. The cut-off point for categorization for good/poor of knowledge, attitude and practice was based on the mean score of each variable.

RESULTS

Demographic Characteristics of Healthcare Workers:

Table 1 shows the summarization of demographic profile of respondents in this study. A total of 152 questionnaires were distributed to healthcare workers and with response rate 88.8%, one hundred thirty-five healthcare workers participated, where 95(70.4%) were female and 39(28.9%) were male. Majority of the healthcare workers average age was 30 years old. Out of 135 healthcare workers, 100(74.1%) were having a diploma, 74(54.8%) were from Hospital USM while the balance, 61(45.2%) were from HKL. Majority of the respondents, 89(65.9%) healthcare workers were in grade U29. Besides, most of them have already worked at least eight years, the majority were working in neurology wards, 77(57.0%). However, out of 135 healthcare workers, there were some missing values for certain variables during the data collection process as tabulated in Table 1.

Association Analysis: According to Table 2, majority of the healthcare workers have good knowledge (60.0%), attitude (51.9%) and practice (60.0%) towards CNS tuberculosis. Table 2 also showed a significant association between self-sufficient perception and level of attitude and practice with $p=0.003$ and $p=0.035$ respectively. Out of 81 of healthcare workers with good knowledge, 64(79.0%) perceived themselves as having insufficient level of knowledge while 49(70.0%) and 60(74.1%) of them with good attitude and good practice respectively perceived themselves as having insufficient level of knowledge on CNS tuberculosis prevention.

Table 1: Socio-demographic characteristics of the respondents (n=135)

Variable		n (%)
Gender	Male	39 (28.9)
	Female	95 (70.4)
Level of Education	SPM	13 (9.6)
	STPM	1 (0.7)
	Diploma	100 (74.1)
	Degree	11 (8.1)
	Master	7 (5.2)
Hospital	Hospital USM	74 (54.8)
	HKL	61 (45.2)
Job Grade	U3	3 (2.2)
	U12	1 (0.7)
	U14	1 (0.7)
	U29	89 (65.9)
	U32	16 (11.9)
	U51	1 (0.7)
	UD44	3 (2.2)
	UD48	5 (3.7)
	UD52	2 (1.5)
	UD54	1 (0.7)
	VK6	2 (1.5)
Workplace	Medical Wards	47 (34.8)
	Neurology Wards	77 (57.0)
	Forensic Units	11 (8.1)
Age (year)		30.61 (12.86) *
Duration of Job (year)		8.48 (8.44) *

*Mean (SD)

Table 2: Association analysis between level of self-sufficiency of healthcare workers and knowledge, attitude and practice variables

		Level of Self-sufficiency of HCWs, n (%)			
Variables	n	Yes (n=27)	No (n=108)	(χ^2)(df) ^b	<i>p</i> value ^c
Knowledge					
Good	81	17 (21.0)	64 (79.0)	0.123 (1)	0.725 ^a
Poor	54	10 (18.5)	44 (81.5)		
Attitude					
Good	70	21 (30.0)	49 (70.0)	9.087 (1)	0.003 ^a
Poor	65	6 (9.2)	59 (90.8)		
Practice					
Good	81	21 (25.9)	60 (74.1)	4.444 (1)	0.035 ^a
Poor	54	6(11.1)	48 (88.9)		

a: Pearson Chi Square test

b: Degree of freedom

c: Significant at $\alpha = 0.05$

DISCUSSION

The demographic profile of the respondents (healthcare workers) was almost parallel with the Malaysian population in terms of gender which 70.4% of them were female [19, 20]. This could be attributed to the local culture where men are less likely to work as nurse [21]. Overall, 60.0% healthcare workers had good knowledge about CNS tuberculosis. However, the levels of knowledge recorded in this study were lower than those reported from Iraq by Hashim *et al.* [15] which could be attributed to the different methodologies used.

Besides that, 51.9% of the healthcare workers had good attitude on CNS tuberculosis prevention. There is only a slightly difference between the percentage of healthcare workers with good and poor attitude results. In contrary, a result from a study conducted in Vellore District, Tamil Nadu, South India by Wu [16] reported about 80% of the healthcare workers feel compassion and desire to help while 8% of them feel compassion, but try to stay away.

Duration of employment, direct contact with patient, or having a contact with active tuberculosis patient have been identified as factors that could affect tuberculosis infection which were also reported in other similar studies conducted in Thailand, Brazil and Ivory Coast [22, 23]. For practice, 60.0% healthcare workers had good practice towards CNS tuberculosis prevention. As for daily basis, wearing any respiratory protection, isolating CNS tuberculosis patient in the isolation room, wearing gloves, apron, gown or lab coat whenever there exist of occupational exposure could be attributed to the high level of practice of the disease prevention similarly to a study conducted at St. Luke Medical Canter, Philippines [24].

The relatively good knowledge, attitude and practice of the healthcare workers however did not significantly influence their attitude and practice towards the disease prevention. It is because 70.0% of the healthcare workers who had good attitude and 74.1% who had good practice still perceived insufficient level of knowledge towards prevention of CNS tuberculosis. A survey of health staff [25] in rural Vietnam revealed similar concern regarding the self-perception of healthcare workers where it accentuated the need of conducting TB training intensively to maximise the effect of information delivering on their attitude and practice. Investigation on clinical aspects of TB received more attention than the human aspect in most of the TB-control efforts worldwide [26, 17]. Thus, this issue is currently being studied and explored more to drive focus in another phase: qualitative research study.

However, the limitation of this study was it is only confined to the healthcare workers who treat patients with CNS tuberculosis at Hospital Universiti Sains Malaysia and Hospital Kuala Lumpur only which do not cover the whole general hospitals in Malaysia. Therefore, it is recommended that similar study should be extended to represent the whole Malaysian population.

CONCLUSIONS

Despite of having good knowledge, attitude and practice, the healthcare workers still perceive themselves as having insufficient level of knowledge in preventing from getting CNS tuberculosis. Thus, this issue is currently being studied and explored more to drive focus in another phase: qualitative research study.

Competing Interest: All the authors have declared there is competing interest in this paper.

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