Knowledge and Practice on Tuberculosis among Prison Workers from Seremban Prison

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Abstract

Background: Prisons are always overcrowded, and congestion leads to close relationships, and subsequently, increases the likelihood of airborne illnesses including Tuberculosis (TB). The purpose of this study was to identify the level of knowledge of TB transmission, and TB preventive practices of prison workers in a Malaysian prison. Methods: A cross-sectional study was conducted with convenience sampling technique utilizing a validated questionnaire. 280 prison workers employed at the Seremban Prison were invited to participate in the study. The study period was from January 2019 to June 2019. Inclusion criteria included age above 18 years old and English literacy. The questionnaire was divided into 3 parts which were sociodemographic details, knowledge on TB transmission and TB preventive practices. The analysis was done in SPSS version 24.0 using appropriate statistical tests. Descriptive statistics was used to evaluate the knowledge level of TB transmission, and TB preventive practices of prison workers at Seremban prison. Results: Around 190 questionnaires were obtained usable registering a response rate of 68.5%. This study showed that around 66% of prison workers had moderate knowledge while around 26% had good knowledge of TB transmission. In terms of practice, around 93.7% of prison workers applied good TB prevention practice. Conclusion: This study showed that the majority of the respondents had moderate knowledge regarding TB transmission. However, their disease preventive practices were at acceptable levels which implied that existing prison standard operating procedures play an important on instilling these practices. Nonetheless, prison management should take important ac-

tion by providing education and training to increase TB knowledge among prison workers to ensure that this practice is always upheld in both prison and community settings.

Keywords

1. Introduction

Tuberculosis (TB) is one of the most common worldwide infectious diseases and one of the leading causes of death in the world, with an overall 1.7 million TB-related deaths reported in 2016, despite accessibility of TB treatment. In 2016, the World Health Organization (WHO) estimated a total of 10.4 million incident TB cases globally, 10% of whom were living with HIV infection. The burden of TB is the highest in the South-East Asian and African regions, which accounted for 70% of the global TB incidence in 2016 [1]. In fact, since 1993, TB has been declared as a "global emergency" by the World Health Organization until now [2] [3].

In Malaysia, TB is the second most frequently reported communicable disease (after dengue fever) and is the leading cause of death from communicable diseases, with a mortality rate of 5.56 per 100,000 persons [4]. In 2017(5), estimated TB burden by Malaysia per 1,000,000 for mortality (HIV & TB only) was 0.93 and incidence (HIV & TB) was 5.7. By gender estimate, TB incidence in Malaysia has shown male (18 cases per 1,000,000) at higher levels than female (11 case per 100,000). A number of cases registered and notified as TB cases in 2017 account for around 26,168 cases. Malaysia has witnessed an increase in the incidence of TB, from 65 cases per 100,000 in 2000 to 92 per 100,000 in 2016 by the global TB report [5].

Closed settings, including prisons, present special challenges to national TB control programs. Prisons are concentrated populations of individuals at high risk of TB, such as people who use drugs and/or alcohol, the homeless, people with a history of past incarceration, and people with pre-existing comorbidities. Poor environmental conditions, such as overcrowding and inadequate ventilation, and restricted access to health care services can facilitate the transmission of TB in prisons [6], [7]. The prevalence of TB is estimated to be up to 100 times higher in prisons than in the general populations [8], [9]. Recent reports from 2 Malaysian prisons have shown a very high (>80%) prevalence of latent TB infection among prisoners, irrespective of HIV status. A follow-up intensified case-finding survey in one of these prisons reported a high prevalence (7.7%) of previously undiagnosed active TB [10]. This prison is overcrowded and has a daily census of 4200 prisoners, operating at 120% of its maximum capacity of 3500 [11].

The high burden of TB within prison poses a threat to the general population, as the disease can be transmitted to correctional staff who are in daily close contact with prisoners. Furthermore, inmates who are incarcerated for a short period of time and who do not receive adequate treatment may transmit the disease on their return to the community [12]. In a recent systematic review, a large fraction of TB cases in the general population was attributable to acquisition of TB inside prison. This has been estimated at 1 in 11 TB cases in high-income countries and 1 in 16 cases in low-/middle-income countries. Another study estimated that for each 1% increase in the incarceration rate in European and Central Asian countries, there was a 0.34% increase in TB incidence in the general population [13].

Despite recent findings of high prevalence rates of both latent and active TB in Malaysian prisons, routine intensified TB screening and treatment are not currently practiced, and diagnosis of active TB remains passive. Environmental conditions, such as overcrowding and poor ventilation, further facilitate the transmission and spread of TB in these settings. To counter these precipitating factors for TB transmission, it is important that prison workers have good knowledge on TB transmission and apply excellent preventive practices associated with TB diseases to ensure low risk of TB incidence among prison workers. However, there has been minimal studies evaluating TB knowledge and practice on prison workers in Malaysia. So this study undertook the objective of determine the level of TB transmission knowledge and TB preventive practices among prison workers in a selected prison in Malaysia.

2. Materials and Methods

This cross-sectional study was conducted in Seremban Prison in Malaysia from January 2019 to June 2019. Seremban Prison was selected because it was one of the oldest prisons in Malaysia and it functions also as a prison for drug abuse offenders. The study population was full-time Seremban prison workers such as correctional officers which included all the ranks from the Prison Wardens up to Assistant Commissioner of Prisons (KA 48), healthcare personnel and administrative staff. The sample size was calculated and the required sample size was 162 respondents with a 95% confidence level. Convenience sampling was used due to the restriction in time, place, and logistics. The inclusion Criteriawere: 1) The respondent was required to be above 18 years old. 2) The respondent could read, write and speak English. iii. The respondent was willing to participate. The questionnaires were distributed using convenience sampling to all the prison employees who met the inclusion criteria. The participants were given a brief explanation of the study and required to fill up the consent form before answering the questionnaires.

The questionnaire attached in Appendix 1, consists of 4 main sections and a total of 32 items. This structure of the items involved closed ended questions such as dichotomous (yes/no) and a Likert scale-based agree/disagree component. The study questionnaire was adapted from a similar study done in Ethiopia

which evaluated TB knowledge on prison workers and prisoners [14]. The Ethiopian study developed the questionnaire based on the general guidelines of WHO KAP questionnaires design and adapted to suit TB KAP exploration with evaluation on factor analysis and reliability [15]. For the purpose of our study, we undertook the responsibility to additionally re-evaluate content validity and face validity. The validity findings of our study were consistent with the earlier study and a pilot test by 30 respondents gave a similar average Cronbach alpha value of 0.887, confirming adequate reliability. This finalized version was used for data collection in the general sample population.

Data analysis was done using 'Statistical Package for Social Sciences' (SPSS) Version 22.0. The descriptive tests were computed using this software. The research proposal was reviewed and cleared by the Ethics Committee of Perdana University. Informed consent was obtained from each study subject.

3. Results

This chapter describes the characteristics of the study sample's knowledge, attitude and practice among prisoner workers on TB disease. Between January, 2019 to Jun 2019 at Seremban Prison, Seremban Negeri Sembilan, 280 questionnaires were given out to all prison workers which include all gender and position (uniform and administrative department) and around 190 questionnaires were returned usable for the study. This gave a response rate of 68.5%.

3.1. Socio-Demographic Variables among Respondents

The sociodemographic profile of the current study respondents has been depicted in Table 1. The respondents' age distribution was 21 - 30 [19.5% (n = 37)], 31 - 40 [49.5% (n = 94)], 41 - 50 [21% (n = 40)], and ≥50 [10% (n = 19)] years old. The distribution of sexes among the respondents was 86.3% (n = 164) and 13.7% (n = 26) for males and females respectively. The distribution of the respondents' ethnicity was Malay [94.2% (n = 179)], Indian [2.6% (n = 5)] and others [3.2% (n = 6)]. The pattern of the respondents' martial was single [9.5% (n = 18)], married [88.4% (168)] and discover/window [2.1% (n = 4)]. Considering the respondents' educational level, [61.1% (n = 116)] had primary/secondary education, and [38.9% (n = 74)] had university/college education. The respondents' period of services was 11 - 20 years [37.9% (n = 72)], 2 - 10 years [35.3% (n = 67)], 21 - 30 years [15.3% (n = 29)], more than 30 years [5.2% (n = 10)], and less than 1 years [6.3% (n = 12)]. [82.1% (n = 156)] of the respondents lived 0 - 10 km, [15.3% (n = 29)] lived in 11 - 20 km, [1.6% (n = 3)] lived in 21 - 30 km and [1% (n = 2)] other respondents more than 30km. The distribution of the respondents' previous history of TB, [83% (n = 83)] were not been diagnosis, and [93.2% (n = 177)] were been diagnosis.

3.2. Knowledge about Tuberculosis (TB)

The level of knowledge among the respondents regarding TB was determined by generating the score from the descriptive analysis to classify them into "Good

Table 1. Respondents demographic data (N = 190).

No.	Main category	Sub-category	Sample (n)	Percentage %
1.	Age	21 - 30	37	19.5
		31 - 40	94	49.5
		41 - 50	40	21
		≥51	19	10
2.	Gender	Male	164	86.3
		Female	26	13.7
3.	Race	Malay	179	94.2
		Indian	5	2.6
		Chinese	0	0
		Others	6	3.2
4.	Marital status	Single	18	9.5
		Married	168	88.4
		Divorced/window	4	2.1
5.	Education level	No formal education	0	0
		Primary/Secondary School	116	61.1
		College/University	74	38.9
6.	Period of Service in prison	Under 1 year	12	6.3
		2 - 10 years	67	35.3
		11 - 20 years	72	37.9
		21 - 30 years	29	15.3
		≥30 years	10	5.2
7.	Distance of healthcare	0 - 10 km	156	82.1
		11 - 20 km	29	15.3
		21 - 30 km	3	1.6
		≥30 km	2	1
8.	Previous or current TB treatment	Yes	13	6.8
		No	177	93.2

Knowledge", "Moderate Knowledge" and "Poor Knowledge". Hence, a respondent who able to answer 7 questions and above were considered to have good knowledge, whereas those who able to answer around 4 - 6 questions were moderate knowledge. Those respondents who were able to answer less than 4 questions were considered to have poor knowledge. As shown in **Table 2**, many of the respondents had moderate knowledge which accounted for 66.3% (n = 126), good knowledge was 26.3% (n = 50) and only 7.4% (n = 14) had poor knowledge regarding the topic. In terms of specific question analysis as shown in **Table 3**, majority of respondent's response was inaccurate for source of information for correct TB data with wrong answers accumulating to around 86.3%

Table 2. Overall knowledge on TB level among prison workers (n = 190).

No.	Main Category	Sub-category	Sample (n)	Percentage (%)
		Poor	14	7.4
1.	Knowledge	Moderate	126	66.3
		Good	50	26.3

Table 3. Knowledge of TB among the prison workers.

No.	Questionnaire	Scoring	Sample (n)	Percentage (%)
1.	Source of information	Correct	26	13.7
		Wrong	164	86.3
2.	Transmission risk of TB in general population	Correct	161	84.7
		Wrong	29	15.3
3.	Transmission risk of TB in prison	Correct	99	52.1
		Wrong	91	47.9
4.	Symptom of TB	Correct	39	20.5
		Wrong	151	79.5
5.	Mode of Transmission	Correct	114	60
		Wrong	76	40
6.	Who can contract TB	Correct	164	86.3
		Wrong	26	13.7
7.	Curability of TB	Correct	184	96.8
		Wrong	6	3.2
8.	TB treatment options	Correct	162	85.3
		Wrong	28	14.7
9.	Any law presents related to TB disease	Correct	114	60
		Wrong	76	40

(n = 164) compared with only a small number of correct answers 13.7% (n = 26). Most of the respondent were not able to identify all the symptoms of TB [79.5% (n = 151)] compared to the minority with correct answers [20.5% (n = 39)]. However, respondents were able to give correct answer to some important questions in regards to mode of transmission 60% (n = 114), high risk to be contact with TB 86.3% (n = 143), TB curability 96.8% (n = 184) and treatment options for TB around 85.3% (n = 162).

3.3. Prevention Practice on TB

The level of prevention practice among the respondents regarding TB was determined by generating the score from the descriptive analysis to classify them into "Good practice" and "Poor practice". Hence, a respondent who scored 20 marks and above were considered to have good practice, whereas those who

scored less than 20 marks were considered to have poor practice. As shown in Table 4, many of the respondents had good knowledge which accounted for 93.7% (n = 178), and only 6.3% (n = 12) had poor knowledge regarding the topic. In terms of specific question analysis as shown in Table 5, majority respondents did answered questions such as covering mouth when coughing or sneezing with strongly agreement of 60.5. Similarly, most respondents had strong awareness on the importance of hand washing methods with more than 80% in agreement. The pattern showed respondents supported statement for isolating patient if present with TB. Almost all the respondent's response for sufficient ventilation was in strong agreement ranging from 66.8% and agreement at 30%. Majority of respondents also supported regular sputum examination with strong agreement around 70% and agreement 25.8%.

4. Discussion

The purpose of this study was to examine the knowledge level and prevention practice on TB among prison workers in Seremban Prison. The study indicated that high proportions of respondent had moderate knowledge of TB transmission. However, most of the respondents exhibited good practice level in terms of TB prevention. The findings differ slightly from another local study done in Tapah prison in Malaysia which showed good knowledge and good practice among prison workers [16]. Another study done in Brazil which compared knowledge of prison workers, prisoners and public health workers found that there was very good knowledge, attitude and practice among prison workers and public health workers but low knowledge and practice among prisoners [17].

Table 4. Overall prevention practice level among prison workers (n = 190).

No.	Main category	Sub category	Sample (n)	Percentage (%)
1.	Practice	Good	178	93.7
		Poor	12	6.3

Table 5. Descriptive of prevention practice (n = 190).

No.	Item	Strongly disagree		Disagree		Uncertain		Agree		Strongly agree	
		n	%	n	%	n	%	n	%	n	%
1.	Cover mouth when cough/sneezing	1	0.5	3	1.6	0	0	71	37.4	115	60.5
2.	Washing hand	1	0.5	1	0.5	3	1.6	72	37.9	113	59.5
3.	Isolating TB patients	1	0.5	4	2.1	7	3.7	41	21.6	137	72.1
4.	Sufficient ventilation	1	0.5	0	0	5	2.6	57	30	127	66.8
5.	Regular sputum examination	1	0.5	0	0	7	3.7	49	25.8	133	70

The differences with the above studies could be due to a number of factors in this study. Moderate knowledge among prison workers could be due to inadequate training and health education. Dengue is a major concern in Malaysia as it is the leading cause of death due to communicable diseases. Huge resources and budget have been allocated for dengue management to create awareness and preventive health education [18], [19]. Unfortunately, the same emphasis was not given to tuberculosis prevention, particularly in high risk areas such as prisons. Under National Strategic Plan for Tuberculosis Control (NSPT) (2016-2020), there was a consensus about prisons as a major source of TB transmission to general population and the need to strengthen preventive measures on these institutions. However, the implementation of major initiative was impacted due to the reduced budget capacity caused by volatility in oil prices [20]. Additionally respondents had not received any training in the previous year nor undertaken any TB health education course which would have improved their knowledge levels [21], [22]. The findings of the study identify the pressing need for TB training for all prison workers. The participants did not seem to fully comprehend the real risk of TB exposure, and most were afraid of becoming infected with TB. Concerns and stigma related to TB emerged particularly among prison workers from prison without TB related training. Irrational work practices and fear might lead to a higher risk of exposure [23].

Interestingly although prison workers had moderate level of knowledge on TB transmission but they had good preventive practice at their occupational setting. This could be due to the standard operating procedures (SOP) in place for TB disease prevention as required by law for prison settings under a country [24], [25]. Based on Malaysian law, any government or non-government agencies should obey or comply to Occupational Safety and Health Act 1994 (OSHA 1994) whereby institutions have a duty of care towards their employees safety and health, and to that of others at their workplace [26], [27], [28]. Among the guidelines present that prison workers should follow are Guideline for workplace the control of Tuberculosis and Ministry of Health Malaysia guideline for control of TB and a customized guideline for prisons that was developed as a collaborative effort by Ministry of Health and Department of Prison Malaysia [29], [30]. Major role for this policy or SOP for employees or employers is to protect fundamental rights and ensure them following the rule in order to protect the staff's safety and health. Frequent monitoring and auditing by internal and external management have also ensured the prison workers follow the policy or SOP which subsequently has ensured the practice is maintained at excellent standards [31], [32], [33].

5. Conclusion

Since the study showed that prison workers had moderate knowledge but good preventive practices, we can therefore conclude there were low chances for spread of TB to general population from prison population due to strict adher-

ence to existing SOP's in prison. However, the moderate knowledge implies that the prison workers do not understand the importance of TB transmission and prevention, hence these practices may not be practiced at community levels. So, an important finding of this study is to increase educational intervention and knowledge empowerment of prison workers in prisons in Malaysia.

6. Limitation

One of the main limitations of this study would be its sample population. The study population was small and was limited to a cohort of prison staff in Seremban prison only, therefore the results of the study will not be generalized to all prison staff on knowledge, attitude and practice on tuberculosis in part of Negeri Sembilan or Malaysia prison as the situation in other districts may differ from what prevails in Seremban prison. Additionally, convenience sampling was administered rather than random sampling which would have given a stronger generalizability.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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