Title: Prevalence of Tuberculosis Infection and Its Associated with Intention to Leave in Nursing Career: a Thai Nurse Cohort Study

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ABSTRACT

Background: The spread of tuberculosis (TB) is a major health problem that needs to be monitored. Health care workers (HCWs) who perform the services patients in hospital are high risk of *Mycobacterium tuberculosis* infection especially among nurses who spend a majority of time with patients.
Objective: To determine TB infection rate and relationship between TB and intention to leave (ITL) in nursing career.
Methods: This study utilized data from the baseline survey of the Thai Nurse Cohort Study (TNCS) database. It was a mailed survey conducted in September 2009 involving a total of 18,756 respondents who were then become members of the Cohort. The primary outcomes of this study were tuberculosis (TB) infection in nurses during operation that reported by registered nurses (RNs) and reporting intention to leave (ITL) a nursing career within 1-2 years. Effects of tuberculosis were quantified by prevalence rate, odds ratio (ORs) and its 95%CI using multiple logistic regression.
Results: Among a total of 18,756, there were 16,797 had work in nursing career, 96.8% were female, with a mean age of 43.2 ± 9.4 years old. The rate of TB infection during the operation that reported by RNs and its 95% confidence interval (CI) was 3.5% (3.3% to 3.8%). TB rates were highest in group whose relatives have been infected with TB 6.5% (95%CI: 5.2% to 7.8%). Factors that associated with ITL, presented as odds ratio (ORs) and 95%CI, included TB (OR = 1.2; 95%CI: 0.8 to 1.8; p-value = 0.420), age between 52 to 65 years old (OR = 3.6; 95%. CI: 2.4 to 5.4; p-value < 0.001), male nurses (OR = 1.9; 95% CI: 1.3 to 2.9; p-value = 0.001), and single nurses (OR = 1.7; 95% CI: 1.3 to 2.5; p-value < 0.001).
Conclusions: TB infection rate was high in nurses whose relatives have been TB infected, but TB was not associated with ITL in nursing career. However, this study shows that TB infection rates remain high and remains a health problem that needs to be burned. Especially, in medical personals who closes to patients.

Key words: tuberculosis, intention to leave, rate, prevalence, factors, associated, nurse

INTRODUCTION

Tuberculosis (TB) is caused by *Mycobacterium tuberculosis* infection remains a major global health problem that needs to be monitored.[1] The World Health Organization (WHO) reported about 9 million people in 2011 fell ill with TB and more than 1 million died from TB. TB is highest in Asia and Africa. Almost 40% of the world's TB cases were in India and China. Thailand is one of the 22 countries in the world with the highest TB infection. Prevalence of TB in Thailand nearly 130,000 cases with populations 64 million.[2-3] There are many risk factors for TB infection. One of many factors is the factor of occupation, especially among health care workers who spend a majority of time with TB patients.[4]

Health care workers (HCWs) who perform the services patients in hospital are high risk of *M. tuberculosis* infection particular in many low and middle-income countries.[5-6] Several studies have reported on the TB infection among nurses, for example, the study of TB risk among nursing professionals from Central Brazil (2008) found that 69.5% of 128 nursing professionals infected TB.[7] The prevalence rate of TB infection in the 91 nursing home in Puerto Rico was 42.9%.[8] The Study of TB among HCWs at King Chulalongkorn memorial hospital (2005) from 3,959 HCWs found that TB incidence rate was 188 per 100,000 person-years. The occupation of highest risk was nurse, RR=2.4 (95%CI: 0.9 to 9.1).[9] Such studies made aware of the issue of the spread of disease among nurses and become to health problems which may affect the work. Both lead to intention to leave or even stop working.

Intention to leave (ITL) in nursing career may lead to a shortage of medical personnel. Earlier studies found that there were several causes of such problems. Whether it's the violence, environment in workplace or even health problems that result could not continue to operate.[10] A study on Sweden (2005) showed that 55% of nurses who said they intended to leave their profession. Main reasons were dissatisfaction with the salary (65%), psychologically strenuous and stressful work (32%).[11] The study on 1,793 nurses employed in Lebanon (2009) showed that 67.5% reported intent to leave within the next 1 to 3 years. The two factors most closely associated with male nurses and nurses were unmarried (OR = 2.5; 95%CI: 1.7 to 3.6 and OR = 1.7 95%CI: 1.2 to 2.4, respectively).[12] The study among Japanese nurses in small and medium-sized private hospitals (2006) showed that work as specialists and young age associated with intention to stay on the job.[13] The study on 426 nurses in Macao (2009) showed that age, work experience, workplace, and pay and benefits were associated with intention to leave current employment.[14] The study on nurses working at a Taiwan hospital (2006) found perception of severe acute respiratory syndrome in nurses who caring for these patients associated with intention to leave the job.[15] These reasons cause a shortage of nurses. Even with producing many nursing staff in each year, but it was still not possible to reduce the problem. However, have no studies considered TB as a factor associated with ITL in nursing career.

The above situation can be seen that the spread of TB is a major health problem, which affects the performance of work that needs monitoring and managed to prevent. This study aims to determine the prevalence of TB infection in nurses in Thailand and its associated with intention to leave in nursing career. The study used data from Thai Nurse Cohort Study (TNCS). With the large sample size and spread across the country like this can make the population aware of the broad range of contexts, location or work area, and much more that are not in the earlier study. It can reflect a problem and solutions in a large sample survey of nursing across the country to be held in the future.

MATERIALS AND METHODS

Study design

This study is part of the Thai Nurse Cohort Study (TNCs). The TNCs was planned as a 20-year longitudinal cohort study. In 2009 the base-line survey was performed. A random sample of registered nurses (RNs) who held nursing licenses granted by Thailand Nursing and Midwifery Council (TNMC) as of 2008 were surveyed by mailed-questionnaires and the respondents were enrolled as cohort members. The first wave of the study was carried out as a cross-sectional survey. The sampling method was stratified random sampling with probability proportional to size of nurses in each 10-year age intervals. This paper involved a total of 18,756 members of the cohort then excluded those nurses who did not work in nursing career.

Study outcome

Primary outcome was TB infection during the operation that reported by nurse. Values of the variable are 0 means no infection and 1 means infection.

Secondary outcome was reporting intention to leave (ITL) a nursing career within 1-2 years. Values of the variable are 0 means no ITL and 1 means ITL in nursing career within 1-2 years.

Statistical analysis

Demographic characteristics of the respondent, nurses who worked in nursing career were included in the analysis. These characteristics were described using frequency and percentage for categorical data such as gender, age group, marital status, highest education attainment, receive a scholarship, current major work position, working status, working status, workplace, region of workplace, working experienced, average of monthly income, liabilities, sufficiency of monthly income, and TB infection in relative, ITL in nursing career, and TB infection. To describe continuous data such as age and working experienced using mean, standard deviation, median, minimum, and maximum.

Prevalence rate of TB infection was calculated using the number of nurses who reported TB infection during operation as the numerator and total number of nurse who responded to the questionnaire and work in nursing career as the denominator. The 95% confidence interval (CI) of the rate was computed based on normal approximation to binomial distribution.

To investigate factors that associated with ITL, adjusted odds ratios (ORs) and their 95% confidence intervals (95%CIs) were estimated using multiple logistic regression for survey sampling. This analysis was adjusted for baseline variables that were considered biologically and sociologically relevant or which showing a univariate relationship with outcomes such as gender, age, marital status, receive a scholarship, highest education, current major work position, workplace, region of workplace, working experienced, and average monthly income.

All analyses were performed by using STATA version 12.0 (StataCorp, College Station, TX). All test statistics were two-sided and a p-value of less than 0.05 was considered statistical significant. This project was approved by the Human Research and Ethics Committees of the Ministry of Public Health of Thailand.

RESULTS

A total of 142,699 RNs who held nursing licenses and were listed in TNMC database in 2008 were the population of this study. From the 18,756 RNs who randomly selected, responded to the survey, and agreed to participated as members of the TNCS 1,959 were excluded for this paper due to currently not involved in nursing career 1,709 RNs and missing data on current working status 250 RNs, hence 16,797 RNs were included in the analysis for aim 1 and aim 2 (Fig 1).

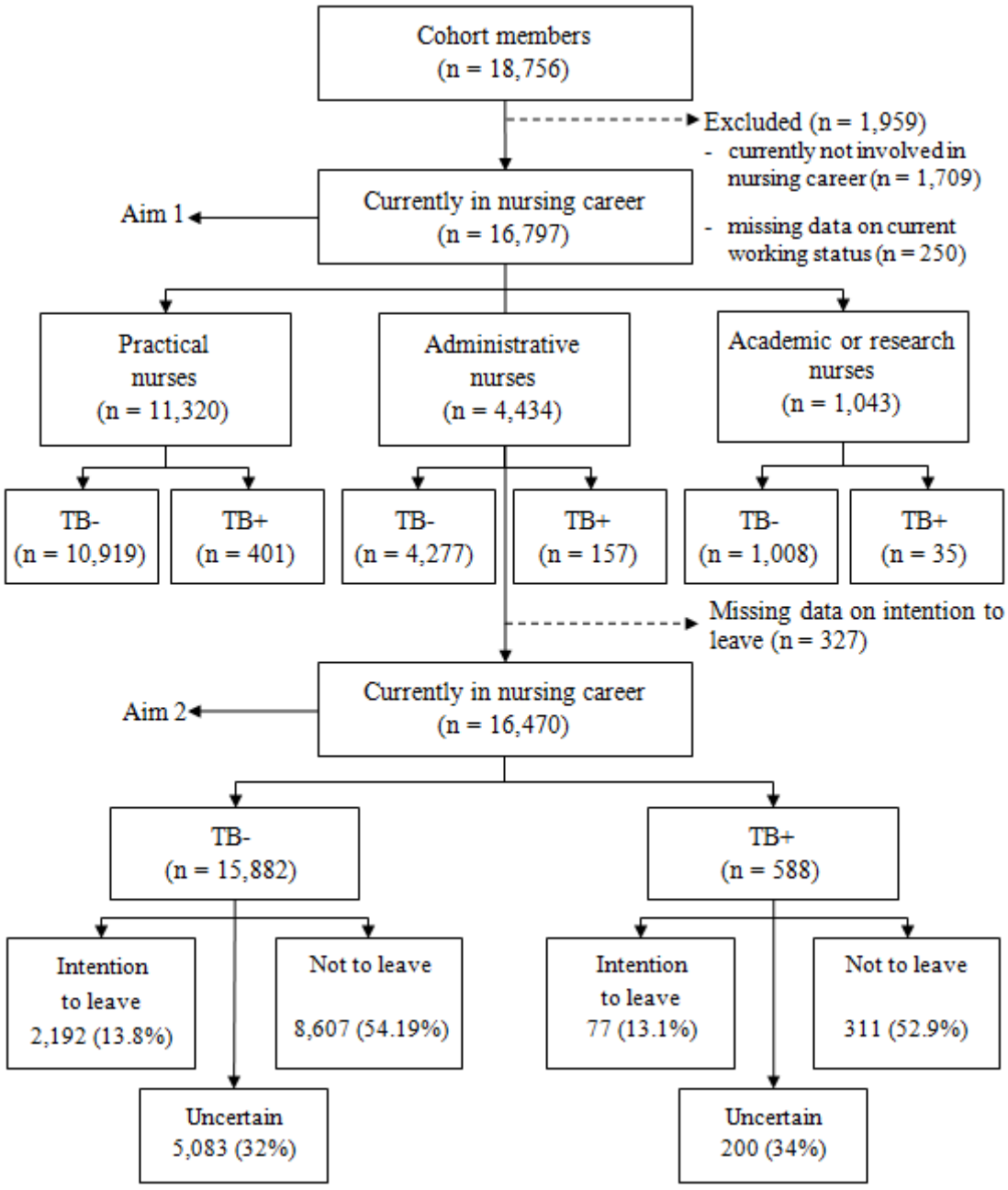

Figure 1 TB infection and ITL in nursing career among registered nurses in Thailand

Demographic Characteristics

From the 16,797 RNs, almost all of them 96.8% were female with a mean age of 43.2 ± 9.4 years old (ranged: 19 to 65) (Table 1). They were mainly married (60.7%), currently employed in nursing care services (67.4%), and workplace was in Central (38.1%).

Table 1. Demographic characteristics of the registered nurses presented as number and percentage (n = 16,797)

Characteristics	Total	TB^+	TB^-
	n (%)	n (%)	n (%)
Gender (n=16,699)			
Male	526 (3.2)	12 (2)	514 (3.2)
Female	16,173 (96.8)	577 (98)	15,596 (96.8)
Age (years) (n=16,797)			
19 to 36	4,288 (25.5)	121 (20.4)	4,167 (25.7)
37 to 44	4,343 (25.9)	182 (30.7)	4,161 (25.7)
45 to 51	4,675 (27.8)	182 (30.7)	4,493 (27.7)
52 to 65	3,491 (20.8)	108 (18.2)	3,383 (20.9)
Mean ± standard deviation	43.2 ± 9.4	43.1 ± 9.5	43.8 ± 8
Median (Min : Max)	44 (19 : 65)	44 (19 : 65)	44 (23 : 63)
Marital status (n=16,737)			
Single	5,234 (31.3)	169 (28.6)	5,065 (31.4)
Married	10,169 (60.7)	363 (61.4)	9,806 (60.7)
Divorced/ Widowed/ Separated	1,334 (8)	59 (1)	1,275 (7.9)
Highest education attainment (n=16,429)			
Bachelor's degree	13,376 (81.4)	452 (77.7)	12,924 (81.6)
Master's degree	2,760 (16.8)	120 (20.6)	2,640 (16.7)
Doctoral degree	139 (0.9)	5 (0.9)	134 (0.8)
Others	154 (0.9)	5 (0.9)	149 (0.9)
Receive a scholarship (n=16,241)			
No	3,276 (20.2)	90 (15.6)	3,186 (20.3)
Yes	12,965 (79.8)	488 (84.4)	12,477 (79.7)
Currently work position (n=16,797)			
Service nurses	11,320 (67.4)	401 (67.6)	10,919 (67.4)
Nurse lecturers/ Researcher	1,043 (6.2)	35 (5.9)	1,008 (6.2)
Administrators	4,434 (26.4)	157 (26.5)	4,277 (26.4)
Working status (n=16,743)			
Government officers (civil servants)	14,098 (84.2)	532 (90)	13,566 (84)
Government employees	642 (3.8)	10 (1.7)	632 (3.9)
State enterprises employees	80 (0.5)	2 (0.3)	78 (0.5)
Private employees	1,188 (7.1)	22 (3.7)	1,166 (7.2)
Business owners	27 (0.2)	3 (0.5)	24 (0.2)
Others	708 (4.2)	22 (3.7)	686 (4.3)
Workplace (n=16,102)			
Hospitals	13,358 (82.9)	484 (86.3)	12,874 (82.8)
Health centers	2,394 (14.9)	63 (11.2)	2,331 (15)
Others	350 (2.2)	14 (2.5)	336 (2.2)

Characteristics	Total	TB^+	TB^-
	n (%)	n (%)	n (%)
Region of workplace (n=16,176)			
North	2,075 (12.8)	89 (15.2)	1,986 (12.7)
Northeast	3,770 (23.3)	163 (27.8)	3,607 (23.1)
Central	6,162 (38.1)	209 (35.6)	5,953 (38.2)
East	1,198 (7.4)	48 (8.2)	1,150 (7.4)
West	896 (5.5)	33 (5.6)	863 (5.5)
South	2,075 (12.8)	45 (7.7)	2,030 (13)
Working experienced (years) (n=16,761)			
Lower than 6	1,436 (8.6)	15 (2.5)	1,421 (8.8)
6 – 10	1,312 (7.8)	46 (7.8)	1,266 (7.8)
More than 10	14,013 (83.6)	532 (89.7)	13,481 (83.4)
Mean ± standard deviation	20.5 ± 9.6	20.5 ± 9.7	21.4 ± 8.4
Median (Min : Max)	22 (0.5 : 52)	22 (0.5 : 52)	22 (1 : 52)
Average income (Baht) (n=16,730)			
10,000 or lower	44 (0.3)	1 (0.2)	43 (0.3)
10,001 to 20,000	2,383 (14.2)	63 (10.6)	2,320 (14.4)
20,000 to 30,000	5,542 (33.1)	214 (36.2)	5,328 (33)
30,001 to 40,000	5,910 (35.3)	220 (37.2)	5,690 (35.3)
40,001 to 50,000	1,704 (10.2)	56 (9.5)	1,648 (10.2)
More than 50,000	1,147 (6.9)	38 (6.4)	1,109 (6.9)
Liabilities (n=16,152)			
No	5,044 (31.2)	162 (28.6)	4,882 (31.3)
Yes	11,108 (68.8)	404 (71.4)	10,704 (68.7)
Sufficiency of monthly income (n=16,660)			
Unstable income	650 (3.9)	30 (5.1)	620 (3.9)
Insufficient	3,226 (19.4)	125 (21.2)	3,101 (19.3)
Sufficient	5,662 (34)	207 (35.1)	5,455 (33.9)
Saving	7,122 (42.7)	228 (38.6)	6,894 (42.9)
TB infection in relative (n= 16,797)			
No	15,371 (91.5)	500 (84.3)	14,871 (91.8)
Yes	1,426 (8.5)	93 (15.7)	1,333 (8.2)
Intention to leave in nursing (n=16,470)			
No	8,918 (54.1)	311 (52.9)	8,607 (54.2)
Yes (Within 1-2 years or after)	2,269 (13.8)	77 (13.1)	2,192 (13.8)
Uncertain	5,283 (32.1)	200 (34)	5,083 (32)
Tuberculosis infection (n=16,797)			
No	16,204 (96.5)	NA NA	NA NA
Yes	593 (3.5)	NA NA	NA NA

Rate of Tuberculosis infection

Of the 16,797 RNs, who worked in nursing career, the rate of TB infection was 3.5% (95%CI: 3.3 to 3.8) (Table 2). Found that TB infection rate in group whose relatives have been infected with tuberculosis were highest 6.5% (95%CI: 5.2 to 7.8). Followed by those with unstable income and marital status were divorce or widowed or separated 4.6% (95%CI: 3 to 6.2) and 4.4% (95%CI: 3.3 to 5.5), respectively.

Table 2. Rates of Tuberculosis infection in nurses and their 95% confidence intervals (CI)

Variables	Number	Tuberculosis (TB) infection		
		% TB	95% CI	p-value*
Tuberculosis (TB) infection	16,797	3.5	3.3 to 3.8	NA
Gender				0.116
Male	526	2.3	1.0 to 3.6	
Female	16,173	3.6	3.3 to 3.8	
Age (years)				0.001
19 to 36	4,288	2.8	2.3 to 3.3	
37 to 44	4,343	4.2	3.6 to 4.8	
45 to 51	4,675	3.9	3.3 to 4.4	
52 to 65	3,491	3.1	2.5 to 3.7	
Mean ± standard deviation	43.9 ± 8			
Median (Min : Max)	44 (23 : 63)			
Marital status				0.102
Single	5,234	3.2	2.7 to 3.7	
Married	10,169	3.6	3.2 to 3.9	
Divorced/ Widowed/ Separated	1,334	4.4	3.3 to 5.5	
Highest education attainment				0.097
Bachelor's degree	13,376	3.4	3.1 to 3.7	
Master's degree	2,760	4.3	3.6 to 5.1	
Doctoral degree	139	3.6	0.5 to 6.7	
Others	154	3.2	0.4 to 6.1	
Receive a scholarship				0.005
No	3,276	2.7	2.2 to 3.3	
Yes	12,965	3.8	3.4 to 4.1	
Currently major work position				0.951
Service nurses	11,320	3.5	3.2 to 3.9	
Nurse lecturers/ Researcher	1,043	3.4	2.3 to 4.5	
Administrators	4,434	3.5	3.0 to 4.1	
Working status				< 0.001
Government officers	14,098	3.8	3.5 to 4.1	
Government employees	642	1.6	0.6 to 2.5	
State enterprises employees	80	2.5	- 1 to 6.0	
Private employees	1,188	1.9	1.1 to 2.6	
Business owners	27	11.1	- 1.6 to 23.8	
Others	708	3.1	1.8 to 4.4	
Workplace				0.045
Hospitals	13,358	3.6	3.3 to 3.9	
Health centers	2,394	2.6	2.0 to 3.3	
Others	350	4	1.9 to 6.1	
Region of workplace				0.001
North	2,075	4.3	3.4 to 5.2	
Northeast	3,770	4.3	3.7 to 5.0	
Central	6,162	3.4	2.9 to 3.8	
East	1,198	4	2.9 to 5.1	
West	896	3.7	2.4 to 4.9	
South	2,075	2.2	1.5 to 2.8	

Variables	Number	Tuberculosis (TB) infection		
		% TB	95% CI	p-value*
Working experienced (years)				< 0.001
Lower than 6	1,436	1	0.5 to 1.6	
6 to 10	1,312	3.5	2.5 to 4.5	
More than 10	14,013	3.8	3.5 to 4.1	
Mean ± standard deviation	21.4 ± 8.4			
Median (Min : Max)	22 (1 : 46)			
Average income/month (Baht)				0.128
10,000 or lower	44	2.3	-2.3 to 6.9	
10,001 to 20,000	2,383	2.6	2.0 to 3.3	
20,000 to 30,000	5,542	3.9	3.4 to 4.4	
30,001 to 40,000	5,910	3.7	3.2 to 4.2	
40,001 to 50,000	1,704	3.3	2.4 to 4.1	
More than 50,000	1,147	3.3	2.3 to 4.4	
Liabilities				0.173
No	5,044	3.2	2.7 to 3.7	
Yes	11,108	3.6	3.3 to 4.0	
Sufficiency of monthly income				0.118
Unstable income	650	4.6	3.0 to 6.2	
Insufficient	3,226	3.9	3.2 to 4.5	
Sufficient	5,662	3.7	3.2 to 4.1	
Saving	7,122	3.2	2.8 to 3.6	
TB infection in relative				< 0.001
No	15,371	3.3	3.0 to 3.5	
Yes	1,426	6.5	5.2 to 7.8	

*The p-value of comparison difference rate of TB infection between groups in each variable.

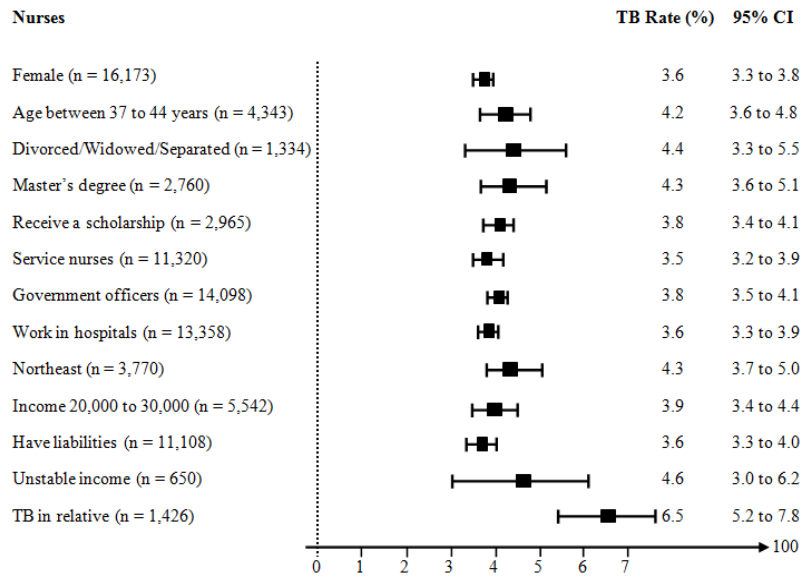

Figure 2 TB infection rate among nurses

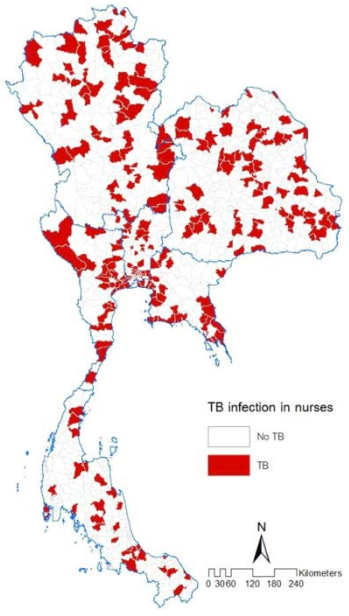

Figure 3 Distribution of TB infection in nurses devided by postal code

Factors that associated with ITL

Among a total of 16,797 had work in nursing career. The factors that associated with ITL, presented as adjusted odds ratio (OR) and 95%CI (Table 3) showed that age between 52 to 65 years old (OR = 3.6; 95%. CI: 2.4 to 5.4; p-value < 0.001), male nurses (OR = 1.9; 95%CI: 1.3 to 2.9; p-value = 0.001), and single nurses (OR = 1.7; 95%CI: 1.3 to 2.5; p-value < 0.001), and workplace was in East (OR = 1.6; 95%CI: 1.1 to 1.2; p-value < 0.001). For TB infection among nurses, found no relationship with intention to leave (OR = 1.2; 95%CI: 0.8 to 1.8; p-value = 0.420).

Table 3. Odds ratio (ORs) of TB with ITL and their 95% confidence intervals for each factor adjusted for all other factors presented in the table using logistic regression (n = 16,797)

Factors	Number	% ITL	Crude OR	Adj. OR	95%CI	p-value
TB						0.420
No	15,882	4.3	1	1		
Yes	588	4.8	1.1	1.2	0.8 to 1.8	
Gender						0.001
Female	15,859	4.2	1	1		
Male	517	6.8	1.6	1.9	1.3 to 2.9	
Age (years)						< 0.001
19 to 36	4,243	2.6	1	1		
37 to 44	4,286	2.8	1.1	1.1	0.7 to 1.6	
45 to 51	4,578	4.2	1.7	1.7	1.2 to 2.6	
52 to 65	3,363	8.6	3.6	3.6	2.4 to 5.4	
Marital status						< 0.001
Single	5,159	4.6	1	1		
Married	9,945	4	0.9	0.7	0.6 to 0.9	
Divorced/ Widowed	1,309	5.1	1.1	0.6	0.4 to 0.8	
Receive a scholarship						0.995
No	3,223	4.4	1	1		
Yes	12,715	4.2	0.9	1	0.8 to 1.2	
Highest education						0.858
Bachelor's degree	13,105	4.1	1	1		
MS degree or higher	2,860	5	1.2	1	0.8 to 1.2	
Current work position						0.044
Service nurses	11,134	3.7	1	1		
Lecturers/ Researcher	1,035	7.1	2	1.5	1.0 to 2.2	
Administrators	4,301	5.1	1.4	0.9	0.7 to 1.1	
Workplace						0.369
Hospital	13,102	4.1	1	1		
Health centers	2,357	4.5	1.1	0.9	0.6 to 1.2	
Region of workplace						< 0.001
North	2,050	3.9	1	1		
Northeast	3,680	3.2	0.8	0.9	0.7 to 1.2	
Central	6,032	4.8	1.2	1.1	0.8 to 1.4	
East	1,185	6.2	1.6	1.6	1.1 to 2.2	
West	883	3.6	0.9	0.8	0.5 to 1.3	
South	2,040	4.2	1.1	1	0.7 to 1.4	
Working experienced						0.112
Lower than 6	1,429	2.3	1	1		
6 to 10	1,298	3.1	1.3	1.4	0.8 to 2.3	
More than 10	13,708	4.6	2	1.2	0.7 to 2.1	

Factors	Number	% ITL	Crude OR	Adj. OR	95%CI	p-value
Average income (Baht)						0.006
20,000 or lower	2,395	2.7	1	1		
20,001 to 30,000	5,447	3.2	1.2	1.1	0.7 to 1.5	
More than 30,000	8,566	4.3	2.1	1.1	0.7 to 1.6	

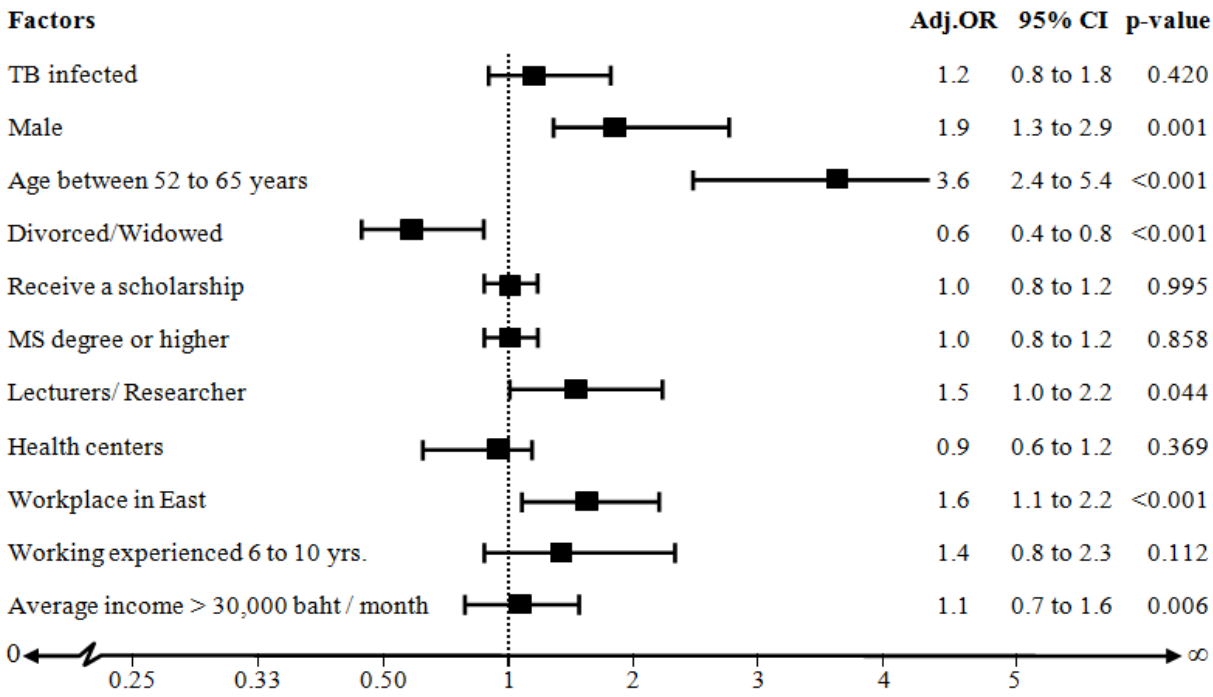

Figure 4 Association between TB and ITL, presented as ORs adjusted for all other factors

DISCUSSIONS

TB infection rate among nurses was 3.5% (593/16,797). Which is not consistent with the study of TB risk among nurses from Central Brazil (2008) found that 69.5% of 128 nurses infected TB and the study of prevalence rate of TB infection in the 91 nursing home in Puerto Rico was 42.9%, etc.[7-8] This is because the difference in the size of the sample and other studies conducted in only some areas of the country which do not cover as this study. However when considering the population of the other side, such as age, the rate of TB infection increases in the age group between 37 to 44 years and decrease in the age group from 45 years and above as well as the average monthly income found that TB rate increase in average monthly income of 20,000 to 40,000 baht, and slightly lower in the group with high income. For marital status was found to increase TB rate in those who are married and increase in who get divorced or widowed or separated. It was also found that TB rate increase with more working experienced. While TB rate decrease with more savings.

For the association between TB infection and with ITL in nursing career, the study found no relationship and no such relationship was reported by other studies as well. The result of data analysis of association between TB and ITL were not controlled by other factors that there was no association (OR = 1.1; 95%CI: 0.8 to 1.6; p-value = 0.574). When include TB variable into initial model adjusted for another factors, the result found that OR change not much and still not found that TB associated with ITL (OR = 1.2; 95%CI: 0.8 to 1.8; p-value = 0.420). Three first factors that were most associated with ITL include age between 52 to 65 years old,

male nurses, and single nurses (OR = 3.6; 95%CI: 2.4 to 5.4; p-value < 0.001), (OR = 1.9; 95%CI: 1.3 to 2.9; p-value = 0.001), and (OR = 1.7; 95%CI: 1.3 to 2.5; p-value < 0.001), respectively. This were consistent with the study on 1,793 nurses in Lebanon (2009) that reported factors that associated with ITL were male nurses and nurses were unmarried (OR = 2.5; 95%CI: 1.7 to 3.6 and OR = 1.7; 95%CI: 1.2 to 2.4, respectively), and the study on 426 nurses in Macao (2009) showed that age was associated with ITL current employment, but opposition to the study among Japanese nurses (2006) found that young age associated with intention to stay on the job. [12-13-14]

However, the rate of TB infection in this study made it possible to image health problems that cannot be ignored. Infection in nursing career affect the image and belief that the person using the service a lot. The nursing profession is a profession that is highly dependent on patient needs. Most of the time was spent in the nursing care of patients including consulting health and how to prevent diseases. Therefore, surveillance and prevent such incidents as important measures to be implemented to achieve a substantial reduction in the rate of infection among nurses until the end to be eradicated.

Strength of the study

This study was conducted in a large population across the country with a variety of cultural, well-being and environmental which can be a good representation of the population will be able to study and reference.

Limitation of the study

This study has several limitations. Firstly, study result from a large number of samples may be varying in terms of statistics. Second, the study sample, only one group is a group of professional nurses, which are not covered in other professional groups. Third, the data from the study were derived from self-administered questionnaire, which if interpreted the wrong question to answer certain questions that will lead to results that are inaccurate. Fourth, TB infection was reported by nurses who respondents without medical diagnosis confirmed, which could cause under estimate due to the fact some people do not dare to report or not to disclose such results. Finally, because the study was cross-sectional, which cannot identify the causal factors and cannot order that either before or after the data can only be described by the relationship.

Conclusions

TB infection rate is high in nurses whose relatives have been TB infected, unstable income and marital status were divorce or widowed or separated, but TB was not associated with ITL in nursing career. However, this study shows that TB infection rates remain high and remains a health problem that needs to be burned. Especially, in medical personals who closes to patients.

Recommendations

This study was conducted in only one nursing group, which may not be referred to other populations across the country with a wide diversity of professional education, income, etc. For the forward education should focus on specific disease in a population with diverse demographic characteristics to be compared with this study. However, the results from this study can be used as a guideline in conducting the upcoming events in the future.

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