



Knowledge and attitude on tuberculosis among college students in Cambodia

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ABSTRACT

Background: Tuberculosis (TB) is one of the most common infectious diseases in the world, and it remains a significant public health concern. Cambodia is one of the 30 countries with the highest tuberculosis burden.

Objective: to explore the knowledge and attitudes about TB and obtain sources of TB information among college students in Cambodia.

Methods: The study design was descriptive and cross-sectional. The participants were 240 students from the Royal University of Phnom Penh who were chosen at random. The questionnaire was self-administered. The information was gathered in May 2019 and analyzed using descriptive and t-test statistics and the Chi-square test. To determine statistical significance, a p-value of 0.05 was used.

Results: This study revealed that students moderately understood tuberculosis (M = 27.76, range = 21 - 35). Male students had higher levels of TB knowledge than female students (X² = 5.909, p = 0.052). Many students lacked knowledge regarding tuberculosis transmission and had a negative attitude toward tuberculosis, particularly "if they found out that they had TB" and "if they thought they had symptoms of TB." TB data was gathered from various sources. TB knowledge was significantly related to TB information obtained by health workers (r = 0.234, p = 0.01).

Conclusions: The findings emphasize increasing knowledge about tuberculosis prevention and treatment. They will be able to practice appropriate health behavior through health education effectively, and education will lead to the formation of proper attitudes about tuberculosis.

Keywords: tuberculosis; knowledge; attitudes; college students

INTRODUCTION

Tuberculosis (TB) is one of the most common infectious diseases in the world, and it remains a major health issue in low and middle-income countries (Meghji et al., 2021). The bacteria primarily affect the lungs but can harm other organs (Ou et al., 2018). TB is spread through airborne contamination, such as coughing, sneezing, and spitting, and affects millions of people

Nursing and Healthcare Practices

- *Knowledge about TB in student groups is needed.*
- *Our research shows that good knowledge among student can participate in prevention and seek for treatment.*
- *Community nurses and health workers can involve youth groups especially student in TB prevention.*

each year, ranking as the second leading cause of death among transmission diseases. Any healthy person can become infected by breathing in airborne bacteria and develop tuberculosis (Hayward et al., 2020). This can happen within a year or years of being infected. When an infected person's immune system is compromised due to malnutrition, other diseases such as human immunodeficiency virus (HIV) infection, diabetes, ageing, and the TB risk are increased (Organization, 2013).

According to Global Tuberculosis Report, TB is one of the world's top ten causes of death and the leading cause of a single infection agent, ranking above HIV/AIDS (Clarke et al., 2019). In 2017, there were an estimated 10 million incident cases worldwide, of which 5.8 million were among men, 3.2 million were women, and 1.0 million were children. There were 1.6 million TB death and an additional 0.3 million death resulting from TB disease among HIV positive. Moreover, there were 558 000 new cases with drug resistance TB (Houben & Dodd, 2016). The Global Burden of latent tuberculosis also estimated that approximately 1.7 billion individuals were latently infected with M. TB globally in 2014, just under a quarter of the global population (Bello, 2010). The global targets for TB control have been developed to halt and reverse TB incidence by 2015 and to eliminate TB as a public health problem with one case per one million population by the year 2050 (Organization, 2015).

In South-East Asia, TB continues to remain one of the major health and developmental problems. With 26% of the world's population, this region carries over 41% of the global TB burden. An estimated 4 million new TB cases and 460 000 TB deaths occurred in 2014, and

about 5.4 million people suffered from active TB (Chhim, 2021).

In 2015, WHO estimated there were approximately 36,000 cases out of the population of 16 million, which was more than 2 cases for every 1000 people. Between 2000 and 2015, the estimated incidence of all forms of TB fell from 575 to 380 per 100 000 population (34% reduction) (Hossain et al., 2017). However, it revealed that many people lacked knowledge and attitude related to tuberculosis infection. Moreover, beyond the health care provider and educators, college students are a potential influence on the family and their contribution to the future society in Cambodia. Thus, special attention and education should be paid to university students (Organization, 2013). Therefore, it is worthy to assess the level of knowledge and attitudes about TB, as well as to examine the socio-demographic factors associated with knowledge and attitudes toward TB among college students in Cambodia.

METHODS

Design

A quantitative, descriptive, and cross-sectional study was used to assess TB knowledge and attitudes among Cambodian college students.

Sample and Setting

To avoid bias, a random sampling method ensures that all students are given the same chance. A multistage sampling method was employed. First, choose two faculties randomly: Science and Social Science and Humanity (out of six). Second, six programs from & Social Science and Humanity (out of 16 undergraduate programs) were randomly chosen. Third, choose second and third-year students from six programs: Khmer, Psychology, Philosophy, Tourism, International Technology, and Physics. The sample size was 240 students. The study was conducted at the Royal University of Phnom Penh (RUPP), Cambodia's most prominent university. It offers degrees in sciences, social sciences and humanities, and engineering. Vocational courses in information technology, electronics, psychology, and tourism also provide Cambodia's foremost degree-level language programs through the Institute of Foreign Languages. RUPP has full membership in the ASEAN University Network. The inclusion criteria in this study consist of 1)

Table 1. Respondents Characteristics

Variable	Category	n	%
Sex	Male	150	62.5
	Female	90	37.5
Ethnicity	Khmer	233	97.1
	Khmer Loue	6	2.5
	Vietnamese	1	0.4
Religion	Christianity	4	1.7
	Buddhism	232	96.7
	Islam	4	1.7
Hometown	Urban	70	29.2
	Rural	170	70.8
Academic year	Second year	120	50
	Third year	120	50
Age (year)		Mean ± SD	Range
		20.43 ± 1.35	17 - 25

the respondents who present at school during the data collection; 2) the participants who are willing to participate; and 3) the participants who are studying in departments and universities as the above. In addition, respondents who were absent during data collection and not studying in the department and university above were excluded.

Instruments

Data was gathered using a self-administered questionnaire. The survey was divided into four sections. Section 1 included items to assess TB knowledge. Section 2 had questions about TB attitudes. Section 3 included items relating to TB information sources. Finally, Section 4 included questions about the respondents' socio-demographic characteristics. Aung developed an instrument in 2013 to assess TB knowledge (39 items). Attitudes toward tuberculosis (5 items) and information about tuberculosis (2 items) were measured using WHO tools developed in 2018 (Organization, 2018). The TB knowledge instrument is made up of the following components: the cause of TB, transmission, signs and symptoms, prevention, diagnosis, treatments, misconceptions, sources, and contents of TB information (39 items). The answers are classified as 'true,' 'false,' or 'don't know.' Participants who said they didn't know the answer were thought to have answered the question incorrectly. A correct answer receives a score of '1', while false or unknown answers receive a score of

'0'. The score ranged from 0 to 39, with answers added together for a total score. The total score in this study was divided into three levels: low (0 – 23 scores), moderate (24-31 scores), and high (32-39 scores). Multiple-choice questions were used to assess participants' attitudes toward tuberculosis (5 items). To assess the TB information (2 items), the participant was asked to indicate whether they had received TB information ('yes' or 'no'). The survey questionnaire was translated into Khmer by the research team.

Data Collection

The data collectors on the research team first explained the purpose of the study and how to fill out the questionnaires to participants. Students were informed that their participation was entirely voluntary and that they could withdraw at any time. Participants had the option of refusing to answer any questions that made them uncomfortable. Answering the questions took about 15 to 20 minutes. Data was collected between the 5th and 25th of May 2019.

Data Analysis

Data in each question was coded by number and analyzed with the Statistical Package for the Social Sciences® (SPSS), version 25.0. (SPSS Inc., Illinois, USA). Participants' characteristics were examined using descriptive statistics, frequency counts, and percentages. Variables are summarized using the mean and standard

Table 2. Descriptive of The Students' TB Knowledge

Items	Male		Female		Total	
	n	%	n	%	n	%
Basic knowledge						
TB is a communicable disease	143	95.3	85	94	228	95
TB caused by germs produced from a person with active lungs TB	93	62	53	58.9	146	60.8
Transmission of TB						
Through handshakes*	133	88.7	91	90	214	89.2
Through the air when a person with TB coughs or sneezes	138	92	85	94.5	223	92.9
Through sharing dishes*	65	43.3	42	46.7	107	44.6
Through eating from the same plate*	48	32	34	37.8	82	34.2
Through touching items in public place*	133	88.7	76	84.4	209	87.1
Through mosquito bite*	142	94.7	85	94.5	227	94.6
Through blood transfusion*	93	62	57	63.3	150	62.5
Signs and symptoms of TB						
Cough for more than 2-3 weeks	130	86.7	80	88.9	210	87.5
Coughing up blood	72	48	46	51.1	118	49.2
Evening rise in low grade fever	24	16	7	7.8	31	12.9
Sweating at night time	27	18	5	5.6	32	13.3
Gain weights*	145	96.7	87	96.7	232	96.7
Gain appetite*	139	92.7	86	95.6	225	93.8
Prevention of TB						
Avoiding handshakes*	134	89.3	80	88.9	214	89.2
Covering when cough or sneeze	140	93.3	85	94.4	225	93.8
Avoiding the sharing of dishes*	51	34	33	36.7	84	35
Washing hands after touch public items	90	60	51	56.7	141	58.8
Closing windows at home*	141	94	82	91.1	223	92.9
Having nutritious foods	86	57.3	47	52.2	133	54.5
Taking antibiotics*	105	70	71	78.9	176	73.3
Praying*	145	96.7	85	94.4	230	95.8
BCG vaccination children < one year old	129	86	72	80	201	83.8
TB can be diagnosed by sputum test	121	80.7	63	70	184	76.7
TB can be cured	123	82	71	78.9	194	80.8

*Negative

deviation (SD). Differences in male and female TB knowledge scores were assessed using Chi-square tests for categorical variables and t-tests for continuous measures. Correlation tests were performed to determine which obtained information is related to tuberculosis knowledge. All tests were two-tailed, with a p 0.05 threshold considered significant. Positive items were coded as 'yes' (correct answer)

was 1 and negative items were coded as 'no' (incorrect answer) was 0. Negative items were re-recorded in reverse order, with 'yes' (incorrect answer) equal 0 and 'no' (correct answer) equal 1.

Ethical Consideration

Before beginning data collection, the University of Health Sciences ethic committee issued the

Table 2. Descriptive of The Students' TB Knowledge *Continue ...*

Items	Male		Female		Total	
	n	%	n	%	n	%
How can be TB cured						
Taking medicines from drug store*	52	34.7	27	30	79	32.9
Rest in home without taking medicine*	147	98	89	98.9	236	98.3
Self-treatment*	146	97.3	88	95.6	234	96.7
Praying*	149	99.3	87	96.7	236	98.3
Taking treatment with traditional healer*	138	92	87	96.7	225	93.8
Taking anti-TB drugs by health care providers	143	95.3	88	97.8	231	96.3
Skipping the anti-TB drugs*	138	93	87	96.7	225	93.8
Who can be infected with TB?						
Poor people	75	50	29	32.2	104	43.3
Well-nourished people*	135	90	84	93.3	219	91.3
Old people	79	62.5	42	46.7	121	50.4
People living with crowed places	55	36.7	28	31.1	83	34.6
People living close to the TB patients	136	90.7	75	83.3	211	87.9
People living in good ventilated places	16	10.7	6	6.7	22	9.2

*Negative

letter of approval number 0995-UHS. This was sent to the Royal University of Phnom Penh, who granted permission for data collection. The study's purpose was explained to the students. Anonymous questionnaires maintain confidentiality, and all students have the right to decline participation without penalty. If they agree to participate in the study, a consent form is obtained and the questionnaires are completed. All study participants are permitted to read and sign the consent form.

RESULTS

Table 1 describes the characteristics of the participant. The average age of the participants was 20.43 years (SD = 1.35) with a range of 17 to 25 years. Fifty percent were second-year students, and fifty percent were third-year students; 62.5% were male, and 37.5% were female. Participants were mostly Khmer (97.1%), Khmer Loue (2.5%), and Vietnamese (0.4%). The majority of students (70.8%) were from rural areas, while 29.2% were from urban areas.

Table 2 describes the students' TB knowledge. The majority of them (95.0%) were aware that tuberculosis is a communicable disease and that TB caused by germs produced by a person with active lungs TB (60.8%). The majority of students correctly answered

the question about TB transmission. When a person with tuberculosis coughs or sneezes (92.9%), handshakes (89.2%), touching items in public (87.1%), and mosquito bites, TB can be transmitted through the air (94.6%). Students, on the other hand, revealed a lack of understanding that TB can be transmitted through blood transfusion (62.5%), sharing dishes (44.6%), and eating from the same plate (34.9%). The students were aware that 'coughing for more than 2-3 weeks' (87.5%) and 'coughing up blood' (49.2%) were signs and symptoms of tuberculosis. Almost all students (96.7%) correctly answered that weight gain and appetite gain were not signs and symptoms of tuberculosis. The students demonstrated a lack of understanding that 'evening rise in low grade fever' (12.9%) and 'sweating at night time' (11.8%) were signs and symptoms of tuberculosis. TB can be prevented, according to the students, by covering one's cough or sneeze (93.8%), washing one's hands after touching public items (58.8%), and receiving BCG vaccination (83.8%). The majority of students were aware that TB cannot be prevented by avoiding handshakes (89.2%), closing windows at home (92.9%), taking antibiotics (74.3%), or praying (95.8 percent). However, 35% of them believed that TB could be avoided by not sharing dishes. 76.7% of students knew that TB can be

Table 3. TB Knowledge between Male and Female

Level		Male		Female		Total		X ²	p
		n	%	n	%	n	%		
High	32-39	14	5.8	8	3.3	22	9.2	5.909	0.052
Moderate	24-31	132	55.0	73	30.4	205	85.4		
Low	0-23	4	1.7	9	3.8	13	5.4		
Total		150	62.5	90	37.5	240	100		

Table 4. Total Mean Score of TB Knowledge in Male and Female

Variable	n	%	M±SD	t	p
Male	150	62.5	21.99 ± 2.52	1.72	0.087
Female	90	37.5	27.37 ± 2.93		

diagnosed by examining sputum, and 80.8% believed that TB could be cured. Almost all students responded that TB can be cured by taking anti-TB drugs prescribed by health care providers (96.3%). Almost all students were aware that TB cannot be cured with rest at home without taking medicine (98.3%), self-treatment (96.7%), praying (98.3%), traditional healer treatment (93.8%), and skipping anti-TB drugs (93.8%). In contrast, 32.9% of students believed that taking drugs from a drug store could cure tuberculosis. Surprisingly, students demonstrated a lack of knowledge about tuberculosis infection, including the fact that poor people (43.3%), elderly people (50.4%), people living in crowded places (34.6%), and people living in well-ventilated places (9.2%) can be infected. Furthermore, most students (91.3%) understood that well-nourished people cannot be infected with TB and that people living near TB patients can be infected with TB (87.9%).

Table 3 revealed about Level of TB Knowledge between Male and Female. The Chi-square test was used to compare TB knowledge levels between male and female students. In this sample, 85.4% (55% male, 30.4% female) had moderate TB knowledge, 9.2% had high TB knowledge (5.8% male, 3.3% female), and 5.4% had low TB knowledge (1.7% male, 3.8% female). Male students had higher knowledge levels than female students, but the difference was insignificant ($X^2 = 5.909$, $p = 0.052$). Furthermore, the students' total mean TB knowledge score was 27.76 (SD = 2.69, Range = 21-35).

Table 4 was the result to compare the total mean score of TB knowledge between male and female students, an independent t-test was used. Although female students scored

higher than male students ($M = 27.37$, $SD = 2.93$), the difference was insignificant ($t(238) = 1.72$, $p = 0.087$).

Table 5 summarizes the findings of the TB attitude survey. More than half of students said they would be scared if they were diagnosed with tuberculosis (52.9%). Female students (64.4%) were more fearful than male students (46%). 38.3% of students would be surprised if they had tuberculosis, and 27.5% would be sad or hopeless. Only 9.6% of respondents reported feelings of shame, while 6.3% reported feelings of embarrassment. If they have TB, almost all of them want to speak with a doctor or another medical professional (96.3%). If they had TB, 42.5% of them want to talk to their parents, 19.2% want to talk to other family members, and 17.9% want to talk to close friends. If they have TB symptoms, 95.8% of students go to a health facility, and 26.3% go to a pharmacy. They refused to go to the hospital for the following reasons: Cost (42.5%), not knowing where to go (35.45%), transportation or distance to clinic (29.9%), not wanting to find out that something is seriously wrong (20.4%), and distrust of medical workers (15.8%). Students were asked how much they thought TB diagnosis and treatment cost. According to the findings, it is reasonably priced (32.9%), somewhat or moderately expensive (30.8%), and free of charge (26.3%).

Described the Sources of TB Information among participants. More than half of the students (69.2%) had received tuberculosis information (68.0% male and 71.1% female). When asked where they learned about tuberculosis, the top five ranked resources were as follows: TV (54.6%), family, friends, neighbors, colleagues (40.8%), health worker (36.30%), teacher (35.8%), radio (28.7%)

Table 5. Attitude on TB in Male and Female Students

Items	Male		Female		Total	
	n	%	n	%	n	%
What would be your reaction if you were found out that you have TB?						
Fear	69	46	58	64.4	127	52.9
Surprise	62	41.3	30	33.3	92	38.3
Shame	16	10.7	7	7.8	23	9.6
Embarrassment	8	5.3	7	7.8	15	6.3
Sadness or hopelessness	43	28.7	23	25.6	66	27.5
Other	28	18.7	12	13.3	40	16.7
Who would you talk to about your illness if you had TB?						
Doctor or other medical worker	146	97.3	85	94.4	231	96.3
Spouse	35	23.3	11	12.2	46	19.2
Parent	61	40.7	41	45.6	102	42.5
Child(ren)	17	11.3	3	3.3	20	8.3
Other family member	31	20.1	15	16.7	46	19.2
Close friend	27	18	16	17.8	43	17.9
No one	2	1.3	1	1.1	3	1.3
Other	3	2	2	2.2	5	2.1
What would you do if you thought you had symptoms of TB?						
Go to health facility	143	95.3	87	96.7	230	95.8
Go to pharmacy	35	23.3	28	31.1	63	26.3
Go to traditional healer	3	2	2	2.2	5	2.1
Pursue other self-treatment options (herbs, etc.)	0	0	1	1.1	1	0.4
Other	8	5.3	4	4.4	12	5
If you would not go to the health facility, what is the reason?						
Not sure where to go	53	35.3	32	35.6	85	35.45
Cost	64	42.7	38	42.2	102	42.5
Difficulties with transportation/distance to clinic	37	24.7	18	20	55	29.9
Do not trust medical workers	21	14	17	18.9	38	15.8
Do not like attitude of medical workers	19	12.7	6	6.7	25	10.4
Cannot leave work or school (overlapping work hours with medical facility working hours)	20	13.3	9	10	29	12.1
Do not want to find out that something is really wrong	29	19.3	20	22.2	49	20.4
Other (please explain)	14	9.3	3	3.3	17	7.1
How expensive do you think TB diagnosis and treatment is in your country?						
It is free of charge	34	22.7	29	32.2	63	26.3
It is reasonably priced	50	33.3	29	32.2	79	32.9
It is somewhat / moderately expensive	49	32.7	25	27.8	74	30.8
It is very expensive	17	11.3	7	7.8	24	10

*Attitude questions were multiple answer format except question 5. Respondents selected more than one answer that apply to them.

(Table 6).

Table 7 displays the results of Spearman correlation statistics. Students who received TB information through a health worker ($r = 0.243$, $p 0.01$) and radio ($r = 0.127$, $p 0.05$) were significantly related to their TB knowledge score.

DISCUSSION

The goal of this study was to look at college students' knowledge, attitudes, and sources of information about tuberculosis. The current study's findings revealed that participants had limited knowledge and misconceptions about tuberculosis. In the TB knowledge levels, which were classified as high, moderate, and low, most of student demonstrated moderate knowledge. When compared to the Thailand study results, the total mean score of knowledge in this study was higher. On the other hand, a study in Thailand were immigrants from Myanmar with a low level of education (Hibstu & Bago, 2016).

Knowledge on TB

Almost of students were aware that tuberculosis is a communicable disease. This finding was higher than the study's finding among Nepalese at higher secondary school (high school) students in 2016 (Hibstu & Bago, 2016). The students were well-versed in the transmission of tuberculosis. Higher percentages of the participants were correctly identified that TB can be transmitted through the air when a person with TB coughs or sneezes and less than half of students revealed that they were lacked knowledge about TB transmitted through 'sharing dishes and eating from the same plate. According to the North Carolina Tuberculosis Control Program, people who are infected with TB have usually had close contact with someone who is sick with TB diseases. Someone with TB disease is more likely to infect family members, roommates, friends, or close co-workers. However, TB cannot be transmitted through shaking hands, kissing, sex, sharing glasses, plates, utensils, clothing, sheets, or furniture, or through the air outside (Organization, 2018).

Students had a general understanding of the signs and symptoms of tuberculosis, but some statements were misunderstood. Coughing up blood was regarded as a sign and symptom of tuberculosis by less than half of the students. Only a small percentage of students knew that 'night-time sweating and

evening rise in low graded fever were signs and symptoms of tuberculosis. Consistent findings from a Belgrade study of college students revealed that night-time sweating and evening rise in low graded fever were signs and symptoms of tuberculosis (Vanaja et al., 2016). The students were well-versed in tuberculosis prevention. Concerning TB prevention, most of participants were aware that TB can be prevented by covering mouth and nose when a person with TB coughs or sneezes' and 'by BCG vaccination. However, the discovery that less than half of students believe that TB can be prevented by avoiding sharing of dishes. It revealed that students had insufficient knowledge. Tuberculosis could have been eradicated with proper treatment, vaccination, and prevention measures.

The majority of students were knowledgeable about tuberculosis diagnosis and treatment. Almost of students were aware that tuberculosis can be cured by taking anti-TB drug, this result was higher than the Thailand study. In contrast, a small percentage of students believed that taking medicine from a drug store could cure tuberculosis, it was consistent with a previous study at Thailand in 2014. In addition, more than one quarter of them would visit a pharmacy if they had TB symptoms. These findings suggested that there is a possibility of developing multidrug-resistant tuberculosis (MDR-TB). MDR-TB is a dangerous form of tuberculosis that does not respond to isoniazid or revamping, the two most powerful anti-TB drugs used to treat pulmonary tuberculosis. Because anti-TB drugs do not kill Mycobacterium tuberculosis, MDR-TB is much more difficult to treat. MDR-TB was diagnosed in an estimated 490,000 people worldwide in 2016. The causes of multidrug resistance are incorrect or inappropriate treatment due to the use of incorrect medications, the use of only one medication (standard treatment includes at least two drugs), and the failure to take medication consistently or for the entire treatment period (treatment is required at least 6 months). Drug-resistant tuberculosis treatment is much more expensive and can take up to two years, putting a strain on both patients and the health-care system (Chandra Gurung et al., 2019).

MDR-TB and the Use of Non-Prescription Antibiotics in Cambodia

Antibiotics without a prescription are widely used in the Cambodian community. MDR-TB accounted for more than ten percentage of all

Table 6. The Source of TB Information among Male and Female

Items	Male		Female		Total	
	n	%	n	%	n	%
Have you ever received information about TB?						
Yes	102	68	64	71.1	166	69.20
No	48	32	26	28.9	74	30.80
*Where do you first heard about TB? (Check all that apply)						
Newspapers and magazine	28	18.7	14	15.6	42	17.15
Radio	44	29.3	25	27.8	69	28.70
TV	90	60.0	41	45.6	131	54.60
Billboard	41	27.3	17	18.9	58	24.20
Brochures, posters and other printed materials	31	20.7	12	13.3	43	17.90
Health worker	53	35.3	34	37.8	87	36.30
Family, friends, neighbors and colleagues	54	36.0	44	48.9	98	40.80
Religious leader	11	7.3	4	4.4	15	6.30
Teacher	59	39.3	27	30	86	35.80
Other	10	6.7	5	5.6	15	6.30

*Respondents selected more than one answer.

Table 7. Relationship between Sources of TB Information and TB Knowledge Score

Variables	Radio	Health worker	TB knowledge
Radio	1		
Health worker	0.191**	1	
TB knowledge	0.127*	0.243**	1

** $p < 0.01$ (2-tailed); * $p < 0.05$ (2-tailed)

TB cases in Cambodia in 2011, up from a small percentage in 2001. In 2014, Cambodia was one of the first countries in the region to develop an antimicrobial resistance policy. The WHO-guided policy was comprehensive and included a three-year implementation plan. However, this has yet to be translated into action. A key policy was a 2016 directive that prohibited pharmacists from dispensing antibiotics without a doctor's prescription. On the other hand, A Health Ministry had no idea whether any pharmacy had ever been disciplined for doing so. Pharmacists were completely ignoring the ministry's ban because no one was monitoring their antibiotic dispensing (Faiz & Basher, 2011; Khan et al., 2022).

Almost of students were aware that well-nourished people are less likely to become infected with tuberculosis. In contrast, a surprising number of students lacked knowledge about TB infection. There were minimal percentage of students correctly stated that people living in well-ventilated areas

can be infected with tuberculosis. In addition, the current study found that male students had better knowledge than female students, though the difference was insignificant. The findings revealed that the student knowledge of tuberculosis was insufficient. Health education will improve people's understanding of tuberculosis. The Center for Disease Control and Prevention in the United States has identified colleges and universities as important settings for providing students with health education and services (Control & Prevention, 1997). These findings imply the importance of health education on the causes, transmission, signs and symptoms, prevention, and importance of treatment for tuberculosis. This type of education allows college students to obtain accurate information, improve their knowledge of tuberculosis, and guide positive attitudes. They will be able to effectively practice appropriate TB health behaviors after receiving health care education. An intervention study conducted among students in India to

determine whether educational intervention would affect the level of TB knowledge and awareness discovered that knowledge score improved significantly after education session (Vanaja et al., 2016).

Attitude on Tuberculosis

More than half of participants said they would be scared with TB and minority of participants were surprised and sad or hopeless if they found out they had tuberculosis. There was small percentage of them felt shame or embarrassment. Participants in the Saudi Arabia study (aged 20-60 years old) expressed more fear with a higher percentage and more than one quarter sadness or hopelessness after learning they had tuberculosis (Aung & Panza, 2014). In the current study, the majority of participants would consult a doctor or medical worker if they had TB, and they would visit a health facility if they had TB symptoms. In contrast, an Ethiopian study (aged over 18 years old) found that bigger than half of participants would consult a doctor or medical worker if they had TB and would visit a health facility if they had TB symptoms (Tolossa et al., 2014). The findings revealed that students had a negative or incorrect attitude toward tuberculosis, as well as poor knowledge and attitude toward TB diagnosis and treatment. Less than one-third of students believed that tuberculosis diagnosis and treatment were free of charge. The National Tuberculosis Program in Cambodia provides free TB diagnosis and treatment (Lorent et al., 2015; Yi et al., 2021). International donors and partners include the World Health Organization, Japan International Cooperation Agency, the World Bank, the United Nations World Food Program, the United States Agency for International Development, the Centre for Disease Control and Prevention, and the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Brown et al., 2006; Ruger, 2005).

Tuberculosis Information

In this study, majority of students had heard of tuberculosis. In Bangladesh, most of university students were informed about tuberculosis (Rana et al., 2015). The majority of students in this study learned about tuberculosis from a variety of sources, including television, family, friends, neighbors, and colleagues, a health worker, a teacher, and the radio. As a result, because TV has been identified as the primary source of TB-related information, it will be an

effective way to advertise TB information. Malaysian and Ethiopian studies found similar results (Chinyama, 2021). In this study, one-third of students learned about tuberculosis from a health professional. According to a study conducted in Serbia, the majority of students regard doctors as a source of health-related information (Vanaja et al., 2016). This study found that there were positive relationships existed between TB knowledge and the source of TB information. The source of TB information by health workers and radio were both significantly related to TB knowledge. According to the findings, health workers, particularly community health workers, can play an important role in disseminating TB information. To improve TB knowledge and attitudes, health care workers must educate students and the general public.

CONCLUSION

Tuberculosis is one of the most lethal contagious diseases and a leading cause of death worldwide. This study sought to identify TB knowledge and attitudes, as well as sources of TB information, among Cambodian college students. The findings revealed that students lacked adequate knowledge of tuberculosis. Even though the majority of students were aware that tuberculosis is a curable disease, there are still misconceptions and limited knowledge about tuberculosis, particularly regarding TB treatment. Less than half of participants would go to pharmacy during they had any symptoms and many respondents believed that TB could be cured by taking medication from the drug store. In addition, less than one-third of students were aware that TB-control programs in Cambodia provide free TB medicine. These findings emphasized the importance of increasing knowledge about tuberculosis prevention and treatment. Education will lead to the formation of proper attitudes toward tuberculosis because people's attitudes toward a given disease usually reflect their level of understanding of the disease. Furthermore, the findings suggested that there is a need for the development of relevant information, education, and communication materials to increase knowledge about tuberculosis and its implications for teaching students in schools. On the other hand, the finding suggested that there is a need for the development of relevant information about tuberculosis such as sign, symptom, TB transmission and

how to prevent this disease that it should be encouraged by nursing and other health care providers due to they are an important role in disseminating TB information. Education and communication materials also as the essential parts to increase knowledge about tuberculosis and its implications for teaching students in schools. Proper tuberculosis knowledge aids in tuberculosis prevention and treatment. TB burden can be reduced in any community by providing education and dispelling misconceptions.

Declaration of Interest

None

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Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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