

## University Students' Knowledge, Awareness, and Perception on Tuberculosis (TB) Disease: A Literature Review

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**Abstract:** Having knowledge of tuberculosis disease (TB) in each individual person is important in terms of understanding the signs and symptoms, spread of disease, and treatment of the disease in order to terminate the TB disease world-wide. The aim of this literature review was to evaluate the knowledge, awareness, and perception of tuberculosis (TB) disease among undergraduate students from various courses. This paper has highlighted for understanding more deeply on the university students' knowledge, awareness, and perception towards TB diseases. However, from this study it can be concluded that the level of knowledge, awareness, and perception towards TB was varied worldwide. It was also found that, many ways to be assessed the level of knowledge, awareness, and perception towards TB disease.

**Keywords:** knowledge, awareness, perception, TB disease, university Students.

### **INTRODUCTION**

Tuberculosis (TB) disease is one of top ten leading causes of death worldwide, around 10.4 million incidence cases were reported globally in 2015 and 61% of the cases were from Asia country [1]. The mortality rate for TB disease globally were estimated around 1.4 million and 84% of the death reported were from WHO African Region and South-East Asia Region [1]. In Malaysia, 19,251 cases were reported in 2011 with and increase to 24,220 cases in 2015 [2]. Incidence rate for TB on 2011 in Malaysia was 71.35 per 100,000 populations and its mortality rate was 5.68 per 100,000 populations [3]. TB disease remain a concern for Malaysia and also worldwide.

### **METHODS**

#### **Search strategy**

To identify the relevant literatures, the authors have used electronic databases and certain keyword. The keyword for this literature review are "knowledge", "awareness", "perception", and "TB disease". On the other hand, the authors did use various databases such as CINAHL Plus with Fulltext, Ovid LWW total access collection & Medline, BMJ Online Journal, ProQuest Health & Medical Complete, Scopus, up to date, and Wiley Online Library to gather the related literatures. There were 8,036 articles found regarding tuberculosis disease. However, 136 articles were found as related to the aim of this review and finally the authors analysed only 17 articles for this literature review. The flow of literature search was as shown below.

In order to end TB disease globally, WHO's Global TB Programme create the End TB Strategy with a goal by 2035 there is 95% reduction in TB mortality rate and 90% reduction in TB incidence rate compared to 2015 statistics. One of the reason for late diagnose of TB disease among community is lack of knowledge in sign and symptom of TB [1-2]. Therefore, in this literature review, the author aimed to review articles that have been conducted on the level of knowledge, awareness, and perception towards TB disease.

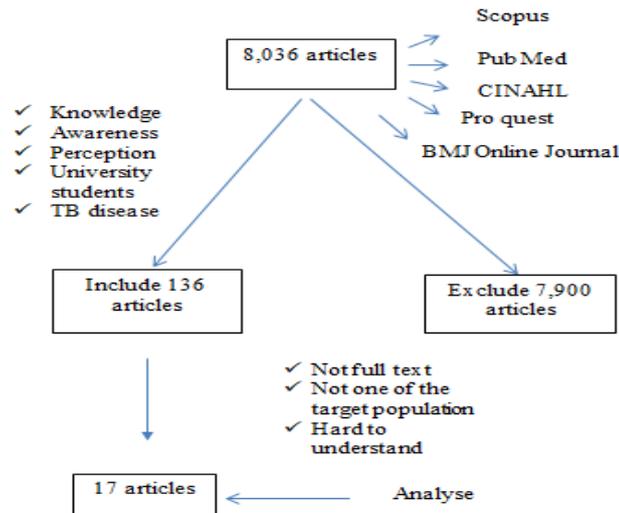


Fig-1: Literature search flow

**Inclusion and exclusion criteria**

Inclusion criteria for this review were; studies that has been done regarding knowledge, awareness, and perception of TB among undergraduate students, studies that been published from 2010 onwards, studies which was written in English language and studies that use human participants. Exclusion criteria for this review were; studies that been published before 2010 and studies that been published in a language other than English.

**Objective of literature review**

The objective of this review is to survey the level of knowledge, awareness and perception on TB among undergraduate students.

**FINDINGS**

Out of 17 articles, only 4 articles were talking about knowledge of TB among undergraduate students, two articles are about TB awareness among community, one article about awareness of TB among undergraduate and postgraduate students, one article mention about awareness of TB among undergraduate students, one article about knowledge and awareness of TB, one article about awareness and perception towards TB, and 6 articles were discussing on perception towards TB disease. Those 17 articles included in this review and their data extractions are presented in Table 1.

**Knowledge of Tuberculosis disease**

Many researches have been done in assessing knowledge of TB among students and community over the decades. In a study conducted in Ethiopia assessing knowledge of TB among community and the result shown that the community have poor knowledge towards TB [4]. Meanwhile in Italy, the researcher examined the level of knowledge of TB and control measures among undergraduate health care students [5].

The researchers compared between medical students and nursing students and they found that nursing students have poor knowledge of TB compared to medical students. However, overall they conclude that knowledge of TB is sufficient among health care students. Another study was done in Iran, and they also assessing knowledge of TB among medical students and the level of knowledge was also high [6]. However, the result was incongruent with other study, where they found that level of knowledge among medical students is poor [7]. On the other hand, a study conducted at Bangladesh in assessing knowledge of TB among non-medical students and the result was the same; however, the researchers use socioeconomic and demographic factors to find association on level of knowledge of TB [8]. The result showed poor knowledge of TB among students from urban areas and joint family, whereas higher knowledge of TB among student whose parents were highly educated. There was a study done in Malaysia found that poor level of knowledge of TB among students. Nevertheless, further study in this area need to be done to assess the knowledge of TB among undergraduate students.

**Awareness of Tuberculosis disease**

In Sudan, a case control study was done to assess awareness of TB among community and they found that both case and control participants (98%) had heard about TB disease and only two-third of both groups, TB cases (21.9%) and controls (16.7%) had good awareness on TB. Then, the researchers come to a conclusion that there was no significant difference between both groups regarding level of TB awareness which was they had good level of awareness if TB [9]. The result was the same with a study conducted in Iran regards to the level of awareness of TB and found that there were good result with mean score of 30.95 [10]. Besides, they also found that there was no significant difference between gender and level of awareness of TB

but there was significant difference between level of education and level of awareness of TB. Both study been conducted within the community and the result was good level of awareness of TB, however the results were not incongruent with a study done in Saudi Arabia, assessing level of TB awareness among students and they compare the level of awareness among three different courses which were Health, Scientific, and Humanitarian [11]. The result was students in Health course (46.7%) have the highest level of awareness of TB but they conclude overall level of awareness of TB among student was poor. In India, a study was conducted to assess level of awareness of TB among undergraduate and postgraduate students, and the researchers found that postgraduate students (61.01%) had higher awareness of TB compare to undergraduate student (52.58%) [12]. On the other hand, there were two studies done in assessing level of TB awareness among students in Malaysia and both studies found that the level of awareness is poor [13,14].

**Perception towards Tuberculosis disease**

One of the factors that delay in diagnosing TB disease or health seeking among TB patient was stigma

towards them [15-16]. A study conducted in Southwest Ethiopia assessing stigma among community found that majority of community (51.2%) having stigma towards TB patient [17]. In Ethiopia, a qualitative study was conducted to explore the cause of stigma towards TB disease; the researcher found two main causes of stigma which were fear of infection and inappropriate health education messages by media regarding TB disease [16]. In another qualitative study, the researchers found that other causes of stigma towards TB disease, which were shame, social isolation, and God’s punishment [18]. Apart from that, a mixed method study conducted in Zambia found that low knowledge of TB leads to misconception of TB disease and eventually lead to stigma towards TB patient [19]. However this result is incongruent with a quantitative study done in Indonesia, they found that even though 88.7% of respondent having good level of knowledge of TB but 45.9% of the respondent perceive TB as humiliating disease and 23.1% of the respondent would likely shun a TB patient [20]. Meanwhile, a study in Malaysia assessing stigma among students found that majority of students not sure whether they have stigma towards TB patient [13]. Therefore, further study in assessing perception towards TB disease need to be done.

**Table-1: Summary of included article in chronological**

No.	Title	Author/ Publication Year	Type/ Method	Sample size and sample method	Instrument	Findings
1.	Knowledge, health seeking behaviour and perceived stigma towards tuberculosis among tuberculosis suspects in a rural community in Southwest Ethiopia.	Abebe <i>et al.</i> , [17]	Quantitative, cross-sectional study	<i>n</i> : 395 TB suspects  Sample method: Cluster sampling	Questionnaire.  It contains question about sociodemographic characteristics, knowledge about TB, health care seeking behaviour and stigma towards TB.	Stigma towards TB disease Mean stigma for study population was 23.82. Around 190 (48.8%) had low stigma and 199 (51.2%) reported high stigma towards TB.  Stigma not associated with gender, knowledge about cause and treatment of TB, literacy status, religion, marital status, age, previous anti-TB treatment and previous exposure to a TB patient.
2.	Tuberculosis in Malaysia: A study on the level of societal awareness and stigma	Mokhtar, Rahman, Shariff, Asna, & Mohd, [13]	Quantitative, cross-sectional study	<i>n</i> : 400 students  Sample method: Simple random sampling	Questionnaire.  It was divided into four part: - Part A (profile of respondent) - Part B (awareness of TB disease) - Part C (stigma towards TB patients) - Part D (strategy to	Knowledge regarding TB disease 80.3% of the respondent know about TB disease, however, 326 out of 400 students answers the questions wrongly. The researchers conclude that majority of respondent who claimed they know about TB disease have inaccurate understanding regarding TB disease. Therefore, knowledge on TB disease is

					improve TB awareness)	poor among students. Awareness towards TB disease Level of awareness regarding TB disease is still poor even though the respondents claim they are aware about the disease. Stigma towards TB patient Majority of respondents were not sure whether they have stigma towards TB patient or not, however the researchers found that, respondents who have positive outlook towards TB patients were lower compared to negative outlook towards TB patient
3.	Assessment of college student's awareness about tuberculosis in Ahmednagar	Kadam, Shaikh, Bhati, Singh, & Dhakne [3]	Quantitative, cross-sectional study	<i>n</i> : 540 students  Sample method: Simple random sampling	Questionnaire.  It contains 15 questions regarding knowledge and awareness about TB.	Awareness towards TB disease 52.58% undergraduate (UG) students and 61.01% postgraduate (PG) students respond correctly the questionnaire. PG students exhibit more knowledge about TB than UG students. PG students have high awareness about TB than UG students.
4.	Perceptions of tuberculosis among immigrants and refugees at an adult education centre: A community-based participatory research approach	Wieland <i>et al.</i> [18]	Qualitative, phenomenological study	<i>n</i> : 83 participants  Sample method: Snowball sampling	Focus group discussion.  A structured focus group questions design to know learners' perceptions of TB and perceived barriers to testing and treatment.	Perceptions towards TB disease Negative feelings and perceptions towards TB were fear, secrecy and shame, isolation, and God's punishment.
5.	Assessment of patients' knowledge, attitude, and practice regarding pulmonary tuberculosis in Eastern Amhara Regional State, Ethiopia: A cross-sectional study	Esmael <i>et al.</i> [4]	Quantitative, cross-sectional study	<i>n</i> : 422 respondents (230 smear-positive and 192 smear-negative TB)  Sample method: Simple random sampling	Questionnaire.  It consists of socio-demographic characteristics, knowledge, attitudes, and health-seeking practice towards TB.	Knowledge regarding TB disease Majority of respondents had several misconceptions in TB disease, therefore, the researchers conclude that the level of knowledge among community is still poor.

6.	A survey of TB knowledge among medical students in Southwest China: is the information reaching the target?	Zhao, Ehiri, Li, Luo, & Li [7]	Quantitative, cross-sectional study	<i>n</i> : 1486 medical students  Sample method: Simple random sampling	Questionnaire.  Self-administered questionnaire assessing knowledge about TB signs and symptoms, transmission, management, and control.	Knowledge regarding TB disease Less than 10% answer correctly on signs and symptoms of TB, 88% of women respondent and third-year students (86.1%) knew about TB transmission, 80% students knew TB can be cured, and only 30% of students know about the duration of TB disease. The researchers generally conclude that medical students have poor knowledge of TB.
7.	Assessment of knowledge, attitudes and practices regarding tuberculosis among final year students in Yazd, central Iran	Behnaz, Mohammadzade, Mousavi-e-roknabadi, & Mohammadzadeh, [6]	Quantitative, cross-sectional study	<i>n</i> : 140 final-year medical students  Sample method: Simple random sampling	Questionnaire.  It consists of demographic information, questions about knowledge and items about attitudes and practices.	Knowledge regarding TB disease In this study, the researchers found that level of knowledge about TB disease among final-year medical students are from moderate to high. Meanwhile, the researcher concludes that general knowledge on TB disease among final-year medical students (64.8%) was high.
8.	Knowledge about tuberculosis among undergraduate health care students in 15 Italian universities: A cross-sectional study	Montagna <i>et al.</i> [5]	Quantitative, cross-sectional study	<i>n</i> : 2220 nursing and medical students  Sample method: Simple random sampling	Questionnaire.  It consists of 3 sections which are questions regarding socio-demographic characteristics, general knowledge of TB disease, and personal experiences and practices related to TB.	Knowledge regarding TB disease The researchers compared the knowledge about TB disease between nursing students and medical students. The result was medical students have better understanding about TB compared to nursing students. However, the researchers concluded that knowledge about TB among health care students (>60%) was sufficient.
9.	The social determinants of knowledge and perception on pulmonary tuberculosis among females in Jakarta, Indonesia	Ahmad, Pakasi, & Masyur, [20]	Quantitative, cross-sectional study	<i>n</i> : 2,323 female respondents  Sample method: Simple random sampling	Questionnaire.  It consists of socio-demographic data (sex, age, education level, family incomes, residence status, having health saving and having health insurance), TB knowledge and perception about TB	Stigma towards TB patient Stigma is due to misinformation of TB disease such as transmission of spread or cause of TB disease.  Good level of knowledge cannot be associated with proper perception of TB. The researchers found that 88.7% of respondents having good level of knowledge about TB, however, 45.9% of respondent perceive TB as a humiliating disease and

						23.1% will shun a TB patient.
10.	Tuberculosis awareness in Gezira, Sudan: Knowledge, attitude and practice case-control study	Suleiman, Sahal, Sodemann, Elsony, & Aro [ 9]	Quantitative, case-control study	<i>n</i> : 425 TB cases, 850 controls  Sample method: Simple random sampling	Questionnaire.  It consists of sociodemographic data (age, sex, residence, occupation, level of education), and level of TB awareness of respondent (measured using a standard modified WHO TB instrument for knowledge, attitude, and practice surveys)	Awareness towards TB disease 98% of both groups cases and controls have heard about TB disease. Only two-third of both groups cases (21.9%) and controls (16.7%) had good level of awareness towards TB disease. No significant different between cases and controls regarding their level of awareness about TB disease.
11.	Tuberculosis-related awareness among people living in rural areas of Gorgan District: A cross-sectional study	Ghaffari, Moradi, & Mehrabi [10]	Quantitative, cross-sectional study	<i>n</i> : 672 respondents  Sample method: Cluster sampling	Questionnaire.  It consists of demographic information and awareness assessment questions.	Awareness towards TB disease High level of awareness among population with mean score 30.95. The researchers found there is no association between gender and level of TB awareness but there was an association between level of TB awareness and level of education.
12.	Tuberculosis: Awareness among students in a Saudi University	Alsalem <i>et al.</i> , [11]	Quantitative, cross-sectional study	<i>n</i> : 499 students  Sample method: Stratification sampling	Questionnaire.  It contains three parts: demographic data of respondents, knowledge regarding TB, and attitude towards TB.	Awareness towards TB disease The researchers compare between three courses in the university, health, humanitarian, and science. The result was, health students (46.7%) have highest level of awareness on TB disease compare to others. However, the researchers conclude that, the level of awareness on TB disease is still poor.
13.	Assessing consequences of stigma for tuberculosis patients in Urban Zambia	Cremers <i>et al.</i> , [19]	Mixed method	<i>n</i> : 300 TB patients  For in-depth interview ( <i>n</i> : 30 TB patients)  Sample method: Simple random sampling	Questionnaire and focus group discussions	Stigma towards TB disease Through in-depth interview, the researchers found that all respondents repeatedly mention low knowledge of TB leads to misconception of TB and eventually leads to stigma towards TB patient.

14.	Factors associated with DELAY in diagnosis among tuberculosis patients in Hohoe Municipality, Ghana	Osei, Akweongo, & Binka, [15]	Quantitative, cross-sectional study	<i>n</i> : 73 TB patients  Sample method: Consecutive sampling	Questionnaire.  It consists of demographic data, health seeking behaviour, factors that influence health-seeking behaviour.	Stigma towards TB disease In this study, factors that lead to delay diagnosis among TB patient is stigma.
15.	Assessment of knowledge regarding tuberculosis among non-medical university students in Bangladesh: a cross-sectional study	Rana <i>et al.</i> [8]	Quantitative, cross-sectional study	<i>n</i> : 839 non-medical university students (male: 572 students, female: 267 students)  Sample method: Stratified random sampling	Questionnaire.  Had four parts: - General information - Demographic characteristics - Parents socio-economic characteristics - General and specific knowledge about TB	Knowledge regarding TB disease Male students (30.9%) have higher knowledge compare to female students (23.2%).  Overall, non-medical students have high level of knowledge on TB disease. Meanwhile, in this study the researchers compare between socioeconomic and demographic factors with level of knowledge of TB disease. The result was poor knowledge of TB among students from urban areas and joint family, whereas higher knowledge of TB among student whose parents were highly educated.
16.	Stigma against tuberculosis patients in Addis Ababa, Ethiopia	Tadesse [16]	Qualitative, phenomenological study	<i>n</i> : 10 respondents (5 males, 5 females)  Sample method: Purposive sampling	Face to face interview with interview-guide question prepare in Amharic language	Stigma towards TB patient The researcher found the causes of stigma were fear of infection and improper health education messages by media.
17.	The descriptive study of knowledge and awareness of tuberculosis among students in Universiti Tun Hussein Onn Malaysia.	Sanusi, Talip, & Mohamed [14]	Quantitative, cross-sectional study	<i>n</i> : 270 students  Sample method: Simple random sampling	Questionnaire.  It divided into two parts: - Part A: profile of respondent - Part B: awareness of TB on clinical symptoms, risk factors, and treatments	Knowledge regarding TB disease Majority of students have fairly good knowledge on TB as majority of students (29.6%) do not know the length of treatment and only 67.8% of students knows the availability of TB drugs. Awareness towards TB disease Level of awareness among students was fairly good.

## DISCUSSION

The strength of this review was, all articles included been search using various databases. Apart from that, table of findings were presented in this review. This review also includes different type of studies which are qualitative, quantitative, and mixed method study, in order to provide intensive information for the interest in this field. Besides, majority of article found used power analysis in order to calculate the sample size. Power analysis is needed to ensure adequate sample throughout the study and for generalizing the result to other population [21].

Nevertheless, this review also has its limitation. Firstly, the articles review in this literature do not include unpublished studies, therefore it might alter the findings for the level of knowledge, awareness, and perception towards TB disease due to publication bias. Secondly, regardless for an intensive search of article throughout different source of databases, this review might miss out other articles that discussing on level of knowledge, awareness, and perception towards TB disease. Thirdly, most of the article use questionnaire as a tool instead of objective tools to measure level of knowledge, awareness, and perception towards TB disease. Hence, this can lead to subjective bias that can affect the findings in this review.

More studies been done in assessing level of knowledge and awareness of TB among university students in Malaysia and also other country. However, studies in assessing level of knowledge and awareness of TB among healthcare students in Malaysia is still inadequate. Only two studies were found in Malaysia and both studies conducted on university students not healthcare students. Thus, a cross-sectional study may need to assess the level of knowledge and awareness of TB among healthcare students. Besides, knowledge and awareness on TB disease, there is only one study been found in assessing perception towards TB disease among university students in Malaysia. Meanwhile, there was one study conducted in Ghana mentioned that low knowledge of TB cause people to have negative perception towards TB disease but this finding is incongruent with a study conducted in Indonesia whereby the researchers mention there is no association between level of knowledge and how people percept TB disease.

## CONCLUSION

Overall, this review helps in creating future research study which is assessing level of knowledge, awareness, and perceptions towards TB disease among health care students. Therefore, future research study is needed to be done since the healthcare students are going to be the front liner in future healthcare system. It is important in assessing their level of knowledge and awareness on TB disease and also to explore their perception towards TB disease itself. Thus, a further study in assessing knowledge, awareness, and

perception towards TB disease among health care students is needed.

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