

Evaluation of Students' Knowledge at Al-Samawah Technical Institute about Pulmonary Tuberculosis

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ABSTRACT: Pulmonary tuberculosis is a disease known since ancient times and has not yet been completely eradicated. It still poses a threat to human health. Tuberculosis infection is a bacterial condition that involves an interaction between tuberculosis bacteria and the body's physical and psychological defenses.

This study aims to shed light on the level of knowledge and awareness among university youth specifically students of the Medical Laboratory Techniques Department at Al-Samawah Technical Institute about pulmonary tuberculosis.

The fieldwork began on March 13, 2025, at the institute with the participation of 95 students. The study employed a descriptive cross-sectional design. Data were collected using a specially designed questionnaire, which was distributed both electronically and in print.

The questionnaire included four main sections: general demographic information, general knowledge about pulmonary tuberculosis, attitudes and perceptions, and awareness sources.

The results showed a good basic knowledge of pulmonary tuberculosis among the students. Schools and universities ranked highest as a source of information (33.7%), highlighting the pivotal role of academic institutions in shaping students' health knowledge. Social media and the internet followed closely (32.6%), indicating their strong influence on health awareness—either positively or negatively, depending on the content.

The findings also revealed mixed social attitudes toward tuberculosis patients. While many participants believed that these patients suffer from stigma, over half (60%) said they would avoid contact with them.

The results also showed a strong willingness among students to receive further education and awareness. This represents a valuable opportunity to implement effective educational strategies.

The study recommends integrating public health and infectious disease concepts into academic curricula across all fields—not just health sciences—and launching awareness campaigns in cooperation with local health departments. It also suggests involving health students in community outreach programs.

KEYWORDS: tuberculosis, academic stage, awareness information, demographic information Introduction

INTRODUCTION

Pulmonary tuberculosis is a form of tuberculosis that primarily affects the lungs. It is considered the most contagious form of the disease and is caused by infection with *Mycobacterium tuberculosis*, an aerobic bacterium that is resistant to harsh environmental conditions and grows slowly within the body. It was discovered by the German scientist Robert Koch in 1882. [1]

Pulmonary tuberculosis (TB) is one of the serious infectious diseases that continues to pose a global health challenge despite advances in diagnosis, treatment, and prevention. Reports from the World Health Organization indicate that TB remains one of the leading causes of death from infectious diseases in many countries, especially in low-resource communities or those suffering from poor health awareness.[2] Accurate health knowledge and community awareness are considered fundamental factors in preventing this disease and reducing its complications and spread. [3] [4]

In this context, this study aims to highlight the level of knowledge and awareness among university youth, specifically students of the Medical Laboratory Techniques Department at Al-Samawah Technical Institute—about pulmonary tuberculosis. Fieldwork began on March 13, 2025, with the participation of 95 male and female students. Since these students are expected to be directly involved in health issues in the future, evaluating their knowledge about a widespread chronic respiratory disease such as TB is highly important. [5]

The study aims to assess the students' awareness of various aspects of the disease, including its causes, symptoms, transmission methods, treatment, and prevention. It also analyzes their understanding of risk factors and evaluates their attitudes toward the

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disease and those affected by it, especially in terms of potential social stigma.^[6] Additionally, the study seeks to explore the sources from which students acquire their knowledge about TB, whether through media, the internet, academic curricula, or awareness programs, with the goal of proposing appropriate mechanisms to strengthen and enhance the effectiveness of these sources.^[7]

This research aims to provide a comprehensive analytical picture of the students' awareness regarding pulmonary tuberculosis, and to identify knowledge gaps or negative attitudes that may hinder awareness and prevention efforts. It also aims to develop practical and realistic recommendations and strategies that contribute to improving students' health awareness and enhancing the role of academic and health institutions in educating this important segment of society, with long-term positive impacts on public health.

METHODOLOGY

1. Community Study and Study Sample

Fieldwork began on March 3, 2025, at the Technical Institute in Samawah to assess the knowledge of students in the Medical Laboratory Technology Department regarding pulmonary tuberculosis. The study included 95 students of both genders.

2. Study Design and Data Collection

The study adopted a descriptive cross-sectional design. Data was collected from students using a questionnaire designed for this purpose. It was distributed in two ways: electronically via a questionnaire link, and directly on paper. The questionnaire included four main topics: general information (participant demographics), general knowledge of pulmonary tuberculosis, attitudes and views, and sources and awareness information.

3. Data analysis

The data collected in the study were presented as numbers and percentages. Data were encoded and analyzed using the Statistical Package for Social Sciences (SPSS), version 27. The analysis included the Chi-square test (Chi-Square Test) to determine the statistical significance of differences between variables in the study. A result was considered statistically significant when the p-value was less than or equal to 0.05.

RESULTS

Section One: Demographic Data

Table (1): show the demographic distribution of the study sample of 95 participants. It was found that the percentage of males was the highest, with 49 (51.6) participants (compared to 48.4) females (46). There was no significant difference between the sexes in terms of statistical distribution, with the probability value reaching (p value = 0.393). Regarding the academic stage, second-year students constituted the largest proportion of the sample, with 67 (70.5) participants, while first-year students comprised 28 (29.5) participants. The analysis results showed a significant difference between the two groups (p value = 0.024), indicating a significant difference in distribution by academic stage. Regarding the residential variable, urban students constituted the majority, representing 66 (69.5) participants, while rural students comprised 29 (30.5) participants. The results also showed a significant difference between the two groups (p value = 0.047), indicating that residential location is a statistically significant factor in the sample distribution.

Table (1): Demographic Data of Participants

Variable	Number	Percentage	P-value
Gender: Female	46	48.4%	0.393
Gender: Male	49	51.6%	
First-year students	28	29.5%	0.024*
Second-year students	67	70.5%	
Rural residents	29	30.5%	0.047*
Urban residents	66	69.5%	

*There is a significant difference between the groups (p value > 0.05)

Table (2) show the results of the participants' answers to the question, "Have you ever heard of pulmonary tuberculosis?" It was found that the vast majority of participants reported having heard of the disease before, with 84 (88.4%) participants, compared to only 11.6 (11%) participants who answered "no." To analyze the statistical relationship between the participants' answers, the chi-square test was used to measure the significance of the differences between the two groups. The results showed a statistically significant difference, with the probability value (value) reaching 0.038, which indicates that the level of general awareness about pulmonary tuberculosis among students is high with a statistically significant degree (0.05).

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Table (2): Have you heard of Pulmonary Tuberculosis?

Response	Number	Percentage	P-value
Yes	84	88.4%	0.038*
No	11	11.6%	

*There is a significant difference between the groups (p value > 0.05)

Section Two: Knowledge about pulmonary tuberculosis

Table (3): show the participants' answers about the main cause of pulmonary tuberculosis, where the majority of participants chose "bacterial infection" as the correct answer (57.9%), while (25.3%), (24%), believed that the cause was a virus, and 11 (11.6) participants answered that they did not know), while 5.35% of participants considered that the disease was hereditary. The Chi-square test was used to analyze the significance of the differences between these answers, and the results showed a significant difference between the answer categories, as the value of the probability function reached (p value = 0.027), which indicates the presence of a significant statistical difference In the level of knowledge among students about the real cause of the disease, and at the same time reflects the need to enhance awareness of the correct information.

Table (3): What is the main cause of pulmonary TB?

Response	Number	Percentage	P-value
Bacterial infection	55	57.9%	0.027*
Viral infection	24	25.3%	
Don't know	11	11.6%	
Hereditary disease	5	5.3%	

*There is a significant difference between the groups (p value > 0.05)

Table (4): shows participants' answers regarding the method by which pulmonary tuberculosis is transmitted. The majority of participants correctly answered that the disease is transmitted through the air via coughing or sneezing, with a percentage of (70) 73.7 %. Meanwhile, (10) 10 participants believed it was transmitted through blood. (6) 6.3 % indicated that it was transmitted through contaminated food and water, while (9) 9.5 % answered that they did not know. The chi-square test was used to analyze the differences between these answers, and the results showed a statistically significant difference between the response categories, with the probability value reaching (0.019). This result indicates a noticeable variation in the level of students' knowledge about the method of transmission of the disease, although the largest percentage were aware of the correct method, reflecting the importance of promoting accurate health information among students.

Table (4): How is pulmonary TB transmitted?

Response	Number	Percentage	P-value
Airborne (coughing/sneezing)	70	73.7%	0.019*
Blood transmission	10	10.0%	
Contaminated food/water	6	6.3%	
Don't know	9	9.5%	

*There is a significant difference between the groups (p value > 0.05)

Table (5): displays participants' responses regarding the common symptoms of pulmonary tuberculosis. 69.5% of the participants (66) indicated that persistent cough was the most prominent symptom, which is the most common and most likely correct answer. (9) 9.5% of participants indicated "unexplained weight loss," and another 9.5% answered "I don't know." The selection rates for persistent fever (7) 7.4% of participants, nighttime cough for more than two weeks, and night sweats (2) 2.1% of participants for each symptom were selected. The results were analyzed using the chi-square test, and showed statistically significant differences between the response categories, with the p-value reaching (0.016). This result indicates a clear disparity In participants' knowledge of the common symptoms of pulmonary tuberculosis, which calls for strengthening health education about the disease's early signs and symptoms.

Table (5): What are common symptoms of pulmonary TB?

Symptom	Number	Percentage	P-value
Persistent cough	66	69.5%	

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Unexplained weight loss	9	9.5%	0.016*
Don't know	9	9.5%	
Persistent fever	7	7.4%	
Night cough	2	2.1%	
Night sweats	2	2.1%	

*There is a significant difference between the groups (p value > 0.05)

Table (6): displays participants' opinions about the possibility of treating pulmonary tuberculosis. 56.8% of the participants (54) reported that the disease was treatable, while (21) 22.1% responded negatively, and (20) 21.1% expressed their lack of knowledge. The chi-square test was used to analyze the differences between response categories, and the results showed a statistically significant difference, with the probability value (value) = 0.041. This result indicates a significant variation in participants' perceptions of the possibility of treating pulmonary tuberculosis, reflecting the need to raise awareness about the effectiveness of treatment and the importance of early detection to ensure complete recovery from the disease.

Table (6): Do you think pulmonary TB is treatable?

Response	Number	Percentage	P-value
Yes	54	56.8%	0.041*
No	21	22.1%	
Don't know	20	21.1%	

*There is a significant difference between the groups (p value > 0.05)

Table (7): show the participants' responses regarding the most effective method for preventing pulmonary tuberculosis, where the majority of the participants, (67) 70.5 %, indicated that all of the above represented the correct choice, which reflects their good awareness of the importance of combining several preventive measures such as avoiding contact with infected people, receiving the BCG vaccine, and ventilating closed spaces. In contrast, (19) 20.0 % chose to receive the BCG vaccine, and (8) 8.4 % chose to avoid contact with infected people, while only (1) 1.1 % chose to ventilate closed spaces well as a preventive measure. The data were analyzed using the Chi-square test to detect differences between the response categories, and the results showed a statistically significant difference, as the probability value reached 0.035. These results indicate a difference in the level of preventive awareness among students, noting that the largest percentage was characterized by a comprehensive awareness of integrated preventive measures.

Table (7): What is the most effective way to prevent pulmonary TB?

Response	Number	Percentage	P-value
Avoiding contact with infected individuals	8	8.4%	0.035*
Receiving BCG vaccine	19	20.0%	
Ventilating enclosed spaces well	1	1.1%	
All of the above	67	70.5%	

*There is a significant difference between the groups (p value > 0.05)

Table (8): present participants' opinions regarding whether people with pulmonary tuberculosis suffer from social stigma. 44.2% of the participants (42) indicated that they believed there was a social stigma against patients, while (27) 28.4% denied it, and (26) 27.4% expressed their lack of knowledge. The data were analyzed using the chi-square test to determine the significance of differences between response categories. The results showed a statistically significant difference, with the p-value reaching 0.046. These results indicate that a significant percentage of students believe that tuberculosis patients may face social stigma, highlighting the importance of integrating the psychological and social dimension into awareness-raising and treatment efforts, with the aim of reducing stereotypes and enhancing patient acceptance within the community

Table (8): Do you think TB patients face social stigma?

Response	Number	Percentage	P-value
Yes	42	44.2%	0.046*
No	27	28.4%	
Don't know	26	27.4%	

*There is a significant difference between the groups (p value > 0.05)

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Table (9): illustrates participants' attitudes toward dealing with someone with pulmonary tuberculosis. 60.0% of the participants (57) indicated that they would avoid dealing with the infected person, while 22.1% (21) participants responded that they would not avoid dealing with the infected person. (17) 17.9% expressed their lack of knowledge or hesitation in taking a clear position. The chi-square test was used to analyze the differences between response categories, and the results showed a statistically significant difference, with the probability value reaching (value = 0.026). These results highlight the presence of negative or cautious attitudes among a large percentage of students toward those infected with tuberculosis, reflecting the impact of social stigma and emphasizing the need for awareness programs that focus on correcting misconceptions and promoting empathy and community support for those infected.

Table (9): Would you avoid contact with a person who has pulmonary TB?

Response	Number	Percentage	P-value
Yes	57	60.0%	0.026*
No	21	22.1%	
Don't know	17	17.9%	

Table (10) presents participants' opinions on the necessity of raising awareness about pulmonary tuberculosis in the community. The vast majority of participants, (86) 90.5%, expressed their belief in the importance of awareness, while only (9.5%) participants believed that awareness was unnecessary. The data were analyzed using the chi-square test to detect differences between response categories. The results showed a statistically significant difference, with a value of (0.042) (value). This result indicates a high general awareness among students of the importance of health education about tuberculosis, reflecting their awareness of the role of awareness in preventing and reducing the spread of the disease within the community.

Table (10): Is awareness about TB important in society?

Response	Number	Percentage	P-value
Yes	86	90.5%	0.042*
No	9	9.5%	

*There is a significant difference between the groups (p value > 0.05)

Table (11): illustrate the information sources participants relied on to learn about pulmonary tuberculosis. School or university was the most common source, with (32) 33.7 participants, followed by the internet and social media, with (31) 32.6 participants. Meanwhile, 18.9 (18) participants reported obtaining their information from healthcare workers. In contrast, media outlets such as television, radio, and newspapers were a source Of information for (7) 7.4 participants, the same percentage as those who indicated they had "never heard of the disease before." The chi-square test was used to analyze the differences between response categories, and the results showed a statistically significant difference, with the probability value of 0.018. These results indicate a clear disparity in the sources of knowledge about the disease, with educational institutions and digital media being the primary sources. This confirms the importance of promoting reliable health content in these channels to support student awareness

Table (11): What is your main source of information about pulmonary TB?

Source	Number	Percentage	P-value
Internet and social media	31	32.6%	0.018*
Healthcare professionals	18	18.9%	
School or university	32	33.7%	
Never heard of TB before	7	7.4%	
Media (TV, radio, newspapers)	7	7.4%	

Table (12) illustrates participants' opinions on the need for greater awareness about pulmonary tuberculosis. The overwhelming majority of participants, (92) 96.8%, believed in the need to enhance awareness, while only 3.2% (3) responded that there was no need. The data were analyzed using the chi-square test to measure differences between response categories. The results showed a highly significant statistical difference, with a p-value of (0.0036). These results indicate a near-universal awareness among students of the importance of expanding tuberculosis awareness campaigns, which reflects a positive health awareness and supports the need for broader educational interventions within educational and community institutions

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Table (12): Do you think more awareness about TB is needed?

Response	Number	Percentage	P-value
Yes	92	96.8%	0.0036*
No	3	3.2%	

*There is a significant difference between the groups (p value > 0.05)

DISCUSSION

This study aims to highlight the level of knowledge and awareness among university youth, specifically students of the Medical Laboratory Techniques Department at Al-Samawah Technical Institute - about pulmonary tuberculosis TB.

In this study (69.5%) of the students from urban areas had better knowledge than students from rural areas (30.5%). This disparity may be influenced by differences in living environments and habits. Han nationality students or urban students may have greater exposure to knowledge about TB which was similar to the findings of other studies. [8]

The results showed majority (88.4%) of the participants had heard information about TB. As it was expected that, having information may raise the level of knowledge among participants. The finding of this study regarding information about TB is nearly in line with studies done in the Mecha district, where (87.8%) of participants had heard information about TB. [9] [10] However, the present finding is lower than study done in Awash Valley of Afar region where (95.6%) had heard information about TB. [11]

The result revealed that (57.9%) of participants knew the etiology of the diseases is Bacteria. Knowing the exact cause of the disease is the starting position for having a positive attitude as well as for applying effective prevention methods. [9][14]

The finding also showed that (69.5%) of participants answered the correct symptoms of TB, more specifically as Persistent cough, (9.5%) stating weight loss while (7.4%) mentioned as Persistent fever and only (2.1%) stated as night sweat. However, the finding is not consistent with studies done in Shinile, northeast Ethiopia and Philippines. [11][12][13] The possible explanation for this variation may be a lack of basic knowledge and information about the sign and symptoms of TB. Having information about the sign and symptoms of the disease is important for early treatment-seeking which could decrease the transmission in the community. [9]

Although the majority of participants were aware of comprehensive preventive measures, only (8.4%) indicated that avoiding contact with infected people was the most effective method, and only 1.1% chose to avoid contact with infected people. Indoor ventilation," a small percentage that reflects a lack of awareness of some aspects of environmental protection. This suggests a partial understanding of risk factors, which necessitates strengthening practical aspects of awareness programs, especially those related to the residential and study environment.

The predominance of school and university as a source of information, [8] [15] at (33.7%), demonstrates the central role of academic institutions in shaping students' health knowledge. However, the almost equal reliance on the internet and social media (32.6%) indicates that these platforms strongly influence health awareness, whether positively or negatively, depending on the quality of the content available. Hence, the need to direct students toward reliable scientific electronic sources and integrate digital health education into the university curriculum. At the same time, the low reliance on traditional media and health workers highlights a gap in community and health communication, which calls for strengthening this role in the future.

The results of the attitude tables reveal a mixture of social acceptance and rejection of those infected with tuberculosis. While a large number of participants believe that patients suffer from a social stigma, we find that more than half of the sample (60%) would avoid interacting with those infected. Social stigma remains a socially stigmatized disease [16], affecting health outcomes, including healthcare-seeking behavior and treatment progress [17]. Providing personal support and enhancing communication between healthcare providers and patients assistances to reduce the stigma surrounding TB and associated lung diseases. [18] This discrepancy between theoretical knowledge and practical behavior highlights a significant challenge in dealing with chronic and infectious diseases, which requires an awareness-raising intervention that addresses the psychological and social aspects in addition to the medical aspect. Furthermore, students' awareness of the importance of awareness in society, as shown In Table (10), constitutes a positive motivation for designing campaigns aimed at changing attitudes and views toward more supportive and humane ones.

The responses In Table (12) indicate a strong willingness among students to receive further awareness, which represents an important opportunity to implement educational strategies.

CONCLUSIONS

1. This study, which included 95 participants, revealed that:

- The majority of participants were male (51.6%), with females accounting for 48.4%, and no statistically significant difference in gender distribution.
- Most participants were from the second academic year (70.5%), showing a significant difference compared to first-year students.
- The majority resided in urban areas (69.5%), also with a statistically significant difference compared to rural residents.

2. The study revealed a good basic level of knowledge about pulmonary tuberculosis among students, yet also highlighted

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knowledge gaps, especially regarding symptoms and prevention strategies—such as avoiding contact with infected individuals and ensuring good ventilation.

3. Students primarily relied on school/university and the internet as information sources, indicating the strong influence of social media and online platforms on their health knowledge.

4. The study also found the presence of social stigma associated with the disease. A large proportion of students reported they would avoid contact with TB patients, despite having a fair level of awareness.

5. Encouragingly, students showed a strong willingness to learn more about tuberculosis, creating an excellent opportunity to enhance their health literacy through structured awareness initiatives.

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