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Knowledge, Attitude, and Preventive Behavior of University Students toward Tuberculosis in Kabul, Afghanistan: A Cross – sectional Study

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Abstract

Background: Tuberculosis (TB) remains a critical public health issue in Afghanistan for decades. Insufficient awareness about TB and its symptoms among university students may contribute to delayed diagnosis and treatment, thereby exacerbating the severity of tuberculosis. The present study seeks to assess the knowledge, attitudes, and preventive behavior toward TB among both medical and non-medical universities students in Kabul, Afghanistan.

Methods: This study employed a cross-sectional survey design among male students at Kabul Polytechnic and Kateb Universities. A standardized questionnaire was administrated to a sample of ٥٩٠ students, comprising both medical and non-medical disciplines. Probability sampling methodology was employed for data collection during the year ٢٠٢٣. Data analysis was conducted utilizing SPSS version ٢٤ software.

Results: The research encompassed ٥٨٠ respondents out of ٥٩٠, a response rate of ٩٨٪. The ٤٢٥ (٧٣٪), and ١٥٥ (٢٧٪) was over and under ٢٠ age respectively, and majority ٤٢١ (٧٣٪) were nonsmokers. The average knowledge score ٦,٨٣ and ٦,٣٨ out of ١٠, for both medical and non-medical disciplines, respectively. The average score reflecting preventive behaviors toward tuberculosis among medical and non-medical faculties. Was ٣٥,٤٨ and ٣٢,٦٥, out of a maximum score of ٤٤, respectively, A statistically significant positive correlation was observed among students regarding their knowledge and attitudes toward tuberculosis ($r = ٠,١٢٩$, $p < ٠,٠١$). Additionally, a positive correlation was found between knowledge and preventive behaviors ($r = ٠,١٢١$, $p < ٠,٠١$), as well as between attitudes and preventive behaviors ($r = ٠,٤٣٥$, $p < ٠,٠١$).

Conclusion: This study highlights the Significance of targeted Initiatives to enhance TB awareness and promote preventative actions among students across disciplines. Additionally, attitudes towards TB treatment were generally positive among both groups, the study highlights several key factors influencing preventive behavior, including the role of faculty, awareness of symptoms, and individuals' attitudes toward treatment and education. These findings can inform the development of effective strategies to improve TB prevention efforts among students.

١. Introduction

A bacterial infection called tuberculosis typically spreads via the air when someone talks, coughs, or sneezes [١]. Mycobacterium tuberculosis is the bacteria that causes tuberculosis, or TB. Although it mainly affects the lungs, it can also cause harm to other body parts. Common symptoms include a cough that lasts longer than three weeks, night sweats, fever with chills, appetite loss, exhaustion, and in more severe cases, blood in the cough associated with chest pain [٢] . The infections can spread via the air when a person who has tuberculosis in their lungs or throat coughs, sneezes, or speaks [٢]. Despite being a treatable and prventable disease, TB ranks second globally in terms of infectious disease-related deaths, with ٩,٤ million and ١٤ million cases recorded in ٢٠١٠ [٢] [٣]. Adolescents aged ١٩ to ٢٢ are the most at-risk age group for tuberculosis (TB), with most of them being college or university students[٤]. Due to crowded spaces and a high degree of interpersonal contact, diseases like tuberculosis (TB) are more likely to spread in universities and schools [٥]. There were ١,٥ million tuberculosis-related deaths in ٢٠١٤ out of an estimated ٩,٦ million tuberculosis cases, comprising ٥,٤ million men, ٣,٢ million women, and ١,٠ million children [٦]. Eight countries out of ٣٠ with high tuberculosis rates include India at ٢٠٪, China at ٨,٥٪, Indonesia at ٨,٤٪, the Philippines at ٦,٤٪, Pakistan at ٥,٨٪, Nigeria at ٤,٦٪, Bangladesh at ٣,٦٪, and South Africa at ٣,٣٪, contributing to ٨٦٪ of all reported cases worldwide [٧]. Afghanistan is ranked ٢٤th out of all countries with a high death rate from tuberculosis (TB). Regretfully, there has been a ٣٪ rise in tuberculosis infections in ٢٠٢٣ as opposed to ٢٠٢١ [٨]. TB infection is most likely to affect university students. Infectious diseases, such as TB, are spread by

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people in universities because of their frequent and close contacts (Expectancy. Accessed July ٣, ٢٠٢٣.).

There are an estimated ٣٧ million people living in Afghanistan, a low-income nation. Tuberculosis has a disproportionately high burden that significantly affects people's lives; around ١٣،٠٠٠ deaths are linked to the disease each year [١٠]. and ٩،٨٠٠ deaths are predicted to occur in ٢٠٢٠ [١١]. The high burdens are linked to a number of issues, such as poverty, stigma, inadequate outreach and access to health facilities, illiteracy, and cultural beliefs [١٢]. In Afghanistan, it has also been found that women are more likely than men to contract TB [١٢]. This is consistent with reports from around the globe. For example, a study carried out in China found that TB patients experienced a significant proportion of stigma, especially among females.[١٣]. a study in ٢٠٢٣ indicate that ١٨,١٪ of medical students and ٢,٤٪ of non-medical students have good knowledge, and findings suggest that there is insufficient knowledge among both medical and non-medical students in Afghanistan [٨].

The text highlights a study from West Java, Indonesia, which assessed the knowledge and attitudes regarding tuberculosis among both medical and non-medical students. The findings revealed that a significant majority of medical students (٦٢,٤٩٪) and a notable number of non-medical students (٣٨,٥٠٪) displayed inadequate knowledge and attitudes regarding tuberculosis. The primary sources of information for both groups were identified as the internet, with social media being the second most influential source. Additionally, the study indicates that these online platforms significantly contribute to shaping the students' awareness of tuberculosis. [١٤].

Students represent a significant segment of the young population and, due to their educational status, can act as role models. Thus, their knowledge, attitudes, and preventive behaviors toward tuberculosis (TB) not only affect their health but also shape community awareness and actions regarding the disease. As young adults develop physically, mentally, and socially, they assume increasing responsibility for their health. This study focuses on a pressing public health concern—TB—within the vulnerable population of Kabul, Afghanistan, by assessing university students' knowledge, attitudes, and preventive behaviors and Identifying existing deficiencies will aid in developing targeted educational interventions and public health strategies. The study findings will assist policymakers in implementing evidence-based interventions in Afghanistan universities, where currently no policies or programs exist to promote TB awareness within educational settings.

٢. Method

Research Design and settings

This cross sectional study was conducted among students of two universities; Polytechnic and Kateb located in Kabul, Afghanistan. The data was collected between November and December ٢٠٢٣, applying questionnaire that was drawn from literature review in ٢٠٢٣, the mentioned universities had ٣،٨٩٨ students and ٨ faculties. Participants were classified on two strata by students of medical and non medical faculties.

The size and sampling method

Sample size calculations were conducted using the Cochran formula and the Morgan table, with a sample size of ٥٩٠ participants out of ٣٨٩٨, and a standard normal variate at a ٥٪, type ١ error level (p < ٠,٠٥), set as ١,٩٦, and an absolute error margin of ٥٪. A systematic sampling method applied in this study. The participants were enrolled students of a public polytechnic university and a private university, Kateb, who met the inclusion criteria and consented to participate. Students with mental health disorders and those not enrolled in the aforementioned universities were excluded from the study.

The procedure for the data collection

For collecting data two research assistants were assigned. The data gathered from the students across various faculties after being briefed on the questionnaire to be disseminated to willing participants in a face-to-face setting. Subsequently, all responses underwent a thorough cleaning process before being entered and stored in a database established using SPSS ٢٤. Access to this database was restricted solely to the authors for subsequent analytical procedures.

Study Instruments

The questionnaire has taken from the litrature review later adapted and translated into local languages by a professional to consider its consistency, comprised ٤٥ questions (Supplementary Questionnaire), including ١٠ demographic inquiries and ٣٤ questions related to depended variables of knowledge, attitude and preventive behaviors toward TB. Before a pilot research with ٤٠ participants was conducted to assess reliability, the questionnaire was subjected to face and content validity testing by KUMS public health experts. The knowledge, attitude, and preventative behavior variables showed acceptable reliability levels of ٠,٦٧, ٠,٨٥, and ٠,٨٤, according to Cronbach's alpha values. As a result, it was discovered that the questionnaire was a legitimate and trustworthy tool [١٥]. Post-pilot adjustments led to a final questionnaire with ١٠ knowledge, ١٣ attitudes, and ١١ preventative behavior questions. Participants responded to knowledge queries with “Yes,” “No,” or “Don’t know,” scoring ١ for correct answers and ٠ for “Don’t know,” with a maximum score of ١٠. Attitude and preventive behaviors inqueries were rated based on a likert scale (١–٤), yielding potential scores of ١٣–٤٥ and ١١–٤٤, respectively.

Statistical Analysis

The number and proportion of students among the participants' demographic characteristics were presented using descriptive statistics. T-tests were used to assess differences in preventive behaviors, attitudes, and knowledge based on participant characteristics. The Spearman correlation coefficient was used to assess the associations between the variables. A linear multiple regression analysis was used to uncover factors that influence preventative behavior. Gender, age, faculty, degree level, residency, smoking status, and past tuberculosis information were converted from nominal scales to dummy codes (٠ and ١). Regression tests were run with a significance level of <٠,٠٠١ to ensure no outliers. The linear regression model was considered adequate since it met the criteria for normality, residuals, collinearity, regression tests, and independent errors. The data was analyzed using SPSS v. ٢٤ software (IBM Corp., Armonk, NY, USA).

٣. Results

Participants Characteristics

Out of a total of ٥٩٠ selected students, ٥٨٠ responded to the questionnaires, resulting in a response rate of ٩٨٪. Among the respondents, ٢٦ students did not provide information about tuberculosis and only mentioned their demographic characteristics. The remaining ٢٪ declined to participate due to reasons such as lack of interest and fatigue.

There were ٣٣٧ (٥٨,١٪) non-medical students and ٢٤٣ (٤١,٩٪) medical students. The majority of the students (٣١٢, ٥٤٪) lived in rural areas, and ٤٢١ (٧٣٪) were nonsmokers. ٥٥٤ students (٩٥,٥٪) had received information on TB. The main sources of information about tuberculosis were the Internet, with ١١٢ (١٩٪) of students obtaining information this way, and formal education, with ٨٧ (١٥٪) of students relying on this source. (Table ١).

Students’ Knowledge About TB

Medical students had an average knowledge score of ٦,٨٣ ± ١,٧٣, but non-medical students had an average score of ٦,٣٨ ± ١,٦٢ out of ١٠ Rather than Overall level of knowledge and the frequency of each question revealed the same findings; however, there is a slight difference in level of knowledge between health and non-health faculties that is not as common. It is important to analyze each question separately to determine the frequency of correct answers; for more information, see Table ٢.

Students’ Attitude toward TB

The average score for the attitudes of health faculty was ٣٥,١٢, while the average score for non-health faculty was ٣٥,٤ out of ٤٥. If you look at the

table٣, the details of each question frequency and percentages are also compared between health and non-health faculties and showed no difference in attitude among them.

Table ١: Participants Characteristics

Characteristics	Indicators	n (%)
Age Categories	≥٢٠ years old	٤٢٥ (٧٣)
	<٢٠ years old	١٥٥ (٢٧)
Faculty	Health faculties	٢٤٣ (٤١,٩)
	Non-health faculties	٣٣٧ (٥٨,١)
Residence	Urban	٢٦٨ (٤٦)
	Outside/Rural	٣١٢ (٥٤)
Smoker	Yes	١٥٩ (٢٧)
	No	٤٢١ (٧٣)
Have obtained information about TB	Yes	٥٥٤ (٩٥,٥)
	No	٢٦ (٤,٥)
Source of information#	Social media	٧٩ (١٤,٢)
	Formal education	٨٧ (١٦)
	Internet	١١٢ (١٩,٣)
	TV	٣٢ (٥,٧)
	Healthcare providers	٤٢ (٧,٦)
	Relatives	٢٥ (٤,٥)
	Others	١٧٧ (٣٢)

Abbreviations: n, number of students; %, percentage.

Table ٢: Students' Knowledge about TB

	Question	Health Faculties					Non-Health Faculties				
		Yes n (%)	No n (%)	Correct Answer (%)	Mean SD	Rank	Yes n (%)	No n (%)	Correct Answer (%)	Mean (SD)	Rank
Route of infection	١. Tuberculosis (TB) can occur anywhere in the human body	١٥٥ (٥٥,٤)	٧٨ (٢٨,٥)	٥٥,٤	٠,٦٧	١	١٢٥ (٤٤,٦)	١٩٦ (٧١,٥)	٤٤,٦	٠,٣٩	١٠
	٢. TB bacteria are spread in the air	١٨٣ (٤٣,٢)	٥٠ (٣٨,٥)	٤٣,٢	٠,٧٩	٤	٢٤١ (٥٦,٨)	٨٠ (٦١,٥)	٥٦,٨	٠,٧٥	٧
Symptoms	٣. There are no specific symptoms that appear in the early stages of TB infection	١٥٢ (٤٩)	٨١ (٣٣)	٤٩	٠,٦٥	٢	١٥٨ (٥١)	١٦٣ (٦٦,٨)	٥١	٠,٤٩	٩
	٤. When infected with TB, a person will experience a mild fever inthe afternoon	١٥٥ (٤١,١)	٧٨ (٤٤,١)	٤١,١	٠,٦٧	٩	٢٢٢ (٥٨,٩)	٩٩ (٥٥,٩)	٥٨,٩	٠,٦٩	٢
	٥. If mild fever persists and is accompanied by weight loss, it may be	١٦٢ (٣٨,٧)	٧١ (٥٦,٦)	٣٨,٨	٠,٧٠	١٠	٢٥٧ (٦١,٣)	٦٤ (٤٧,٤)	٦١,٣	٠,٨٠	١

	TB										
Preventativeexaminations	٦. Chest X-rays are one way to diagnose TB	١٤١ (٤٢)	٩٢ (٤٢,٢)	٤٢	٠,٦٠	٨	١٩٥ (٥٨)	١٢٦ (٥٧,٨)	٥٨	٠,٦١	٣
	٧. A single administration of the Bacillus Calmette–Guérin vaccinecan protect against TB infection for a lifetime	٩٠ (٣٦,٩)	١٤٣ (٤٦,١)	٤٦,١	٠,٦١	٣	١٥٤ (٦٣,١)	١٦٧ (٥٣,٩)	٥٣,٩	٠,٥٢	٨
Treatment	٨. TB can only be treated if there are obvious symptoms	٩٠ (٤١,٩)	١٤٣ (٤٢,٢)	٤٢,٢	٠,٦١	٦	١٢٥ (٥٨,١)	١٩٦ (٥٧,٨)	٥٧,٨	٠,٦١	٥
	٩. TB is treated by taking medication every day for at least ٦ months	١٧٧ (٤٢,١)	٥٦ (٤١,٨)	٤٢,١	٠,٧٥	٧	٢٤٣ (٥٧,٩)	٧٨ (٥٨,٢)	٥٧,٩	٠,٧٥	٤
	١٠. TB treatment is difficult, and if anti-TB drugs are not taken regularly, it can lead to drug resistance	١٨٣ (٤٢,٥)	٥٠ (٤٠,٧)	٤٢,٥	٠,٧٨	٥	٢٤٨ (٥٧,٥)	٧٣ (٥٩,٣)	٥٧,٥	٠,٧٧	٦
				Total	٦,٨٣				Total	٦,٣٨	

Note: Reverse item.
Abbreviation: SD, standard deviation; n, number of students; %, percentage.

Table ٣: Students' attitude about TB

		Health Faculties						Non-Health Faculties					
	Questions	SA n (%)	**A n (%)**	**DA n (%)**	**SDAn (%)**	**Mean (SD)**	**Rank**	**SA n (%)**	**A n (%)**	**DA n (%)**	**SDA n (%)**	**Mean (SD)**	**Rank**
Recognitionof TB	١. If I got TB, I should immediately inform my family and/or my lecturers	٩٩ (٤٢,٥)	١٠٥ (٤٥,١)	١٨ (٧,٧%)	١١ (٤,٧٪)	٣,٢٥	٣	١٤٤ (٤٤,٩)	١٣٦ (٤٢,٤)	٢٢ (٦,٩)	١٩ (٥,٩)	٣,٢٦	٣
	٢. I may experience obstacles in my family and academic life ifI were infected with TB	٥٩ (٢٥,٣)	١٣٨ (٥٩,٢)	٢٣ (٩,٩%)	١٣ (٥,٦٪)	٣,٠٤	١١	٨٥(٢٦,٥)	١٦٦ (٥١,٧)	٥٠ (١٥,٦)	٢٠ (٦,٢)	٢,٩٨	١١
	٣. I think that TB is a very serious disease	٧٣ (٣١,٣)	١٢٧ (٥٤,٥)	٢٤ (١٠,٣%)	٩ (٣,٩٪)	٣,١٣	١٠	١٣٨ (٤٣)	١٤٣ (٤٤,٥)	٢٦ (٨,١)	١٤ (٤,٤)	٣,٢٦	٥
Preventativeexaminations	٤. I think, regular medical examinations every year can preventTB	٧٨ (٣٣,٥)	١٢٠ (٥١,٤)	٢٤ (١٠,٣٪)	١١ (٤,٧٪)	٣,١٤	٩	١١٥ (٣٥,٨)	١٦٢ (٥٠,٥)	٣١ (٩,٧)	١٣ (٤)	٣,١٨	١٠
	٥. I think a person should be examined for TB if there is a TBpatient among his family or friends	٨٤ (٣٦,١)	١١٦ (٤٩,٨)	٢٢ (٩,٤٪)	١١ (٤,٧٪)	٣,١٧	٨	١٣٧ (٤٢,٧)	١٢٧ (٣٩,٦)	٣٨ (١١,٨)	١٩ (٥,٩)	٣,١٩	٦

Treatment	٦. If I were diagnosed with TB I would take anti-TB drugs regularly for at least ٦ months, as directed by the doctor	٩٦ (٤١,٢)	١٠١ (٤٣,٣)	٢٨ (١٢ %)	٨ (٣,٤٪)	٣,٢٢	٧	١٥٤ (٤٨)	١٢٢ (٣٨)	٣٧ (١١,٥)	٨ (٢,٥)	٣,٣١	٢
	٧. If a friend discontinued taking anti-TB drugs, I would persuadehim to continue regular TB treatment	١٠٦ (٤٥,٥)	٩١ (٣٩,١)	٢٣ (٩,٩٪)	١٣ (٥,٦٪)	٣,٢٤	٤	١٢٨ (٣٩,٩)	١٤٨ (٤٦,١)	٢٧ (٨,٤)	١٨ (٥,٦)	٣,٢٠	٧
	٨. I would encourage those with TB around me to obtaintreatment	١٠٨ (٤٦,٤)	٩١ (٣٩,١)	٢١ (٩٪)	١٣ (٥,٦٪)	٣,٢٦	٢	١٤٣ (٤٤,٥)	١٣٦ (٤٢,٤)	٢٣ (٧,٢)	١٩ (٥,٩)	٣,٢٦	٤
Preventative education	٩. I think TB can be cured if it is detected and treated early	١١١ (٤٧,٦)	٨١ (٣٤,٨)	٢٥ (١٠,٧٪)	١٦ (٦,٩٪)	٣,٢٣	١	١٦٧ (٥٢)	١٠٧ (٣٣,٣)	٣٠ (٩,٣)	١٧ (٥,٣)	٣,٣٢	١
	١٠. I am interested in finding out more about TB disease	١٠٥ (٤٥,١)	٨٣ (٣٥,٦)	٣٢ (١٣,٧٪)	١٣ (٥,٦٪)	٣,٢٠	٥	١١٦ (٣٦,١)	١٤٤ (٤٤,٩)	٤٣ (١٣,٤)	١٨ (٥,٦)	٣,١٢	٩
	١١. I think education about TB is very much needed	١٠٤ (٤٤,٦)	٩٣ (٣٩,٩)	٢٥ (١٠,٧٪)	١١ (٤,٧٪)	٣,٢٤	٦	١٢٥ (٣٨,٩)	١٤٩ (٤٦,٤)	٢٩ (٩)	١٨ (٥,٦)	٣,١٩	٨
					Total	٣٥,١٢					Total	٣٥,٤	

Abbreviations: SA, strongly agree; A, Agree; DA, Disagree; SDA, Strongly disagree; SD, Standard deviation; n, number of students; %, percentage.

Students' Preventive behavior toward Tuberculosis

The study found that the average score for preventative behavior toward tuberculosis among medical students was ٣٥,٤٨, while the average score for non-medical students was ٣٢,٦٥, out of a maximum score of ٤٤. this finding reveal that the difference between health and non-health faculties preventive behavior, medical students had good preventive behavior than non-medical students, and if you look at the below table ٤. the analysis of each question frequency, percentage and mean of correct answer also revealed that health faculties have a little bit good preventive behavior than non-health faculties. And for further information refer to the Table ٤.

Table ٤: Students' Preventive Behavior against TB

Questions	**Health Faculties**						**Non-Health Faculties**					
	SA n (%)	**An (%)**	**DA n (%)**	**SDAn (%)**	**Mean (SD)**	**Rank**	**SA n (%)**	**An (%)**	**DA n(%)**	**SDAn (%)**	**Mean (SD)**	**Rank**
Route ofinfection ١. When I sneeze or cough, I cover my mouth	١٣٦ (٥٨,٤)	٧٥ (٣٢,٢)	١٥ (٦,٤)	٧ (٣)	٣,٤٦	١	١٤٣ (٤٤,٥)	١٣٢ (٤١,١)	٢٨ (٨,٧)	١٨ (٥,٦)	٣,٢٥	١
٢. I often open the window for good air circulation	١١٥ (٤٩,٤)	٩٥ (٤٠,٨)	١٧ (٧,٣)	٦ (٢,٦)	٣,٣٧	٢	١٢١ (٣٧,٧)	١٦٣ (٥٠,٨)	٢٣ (٧,٢)	١٤ (٤,٤)	٣,٢٢	٤
٣. I cover my mouth with a handkerchief or	١١٣ (٤٨,٥)	١٠١ (٤٣,٣)	١٣ (٥,٦)	٦ (٢,٦)	٣,٣٨	٣	١٢٤ (٣٨,٦)	١٣٥ (٤٢,١)	٤٣ (١٣,٤)	١٩ (٥,٩)	٣,١٣	٣

	tissue whenI cough												
	٤. I have regular chest X-rays every year	٧٧ (٣٣)	٩٧ (٤١,٦)	٤٠ (١٧,٢)	١٩ (٨,٢)	٣	١١	٤٣ (١٣,٤)	٨٢ (٢٥,٥)	١٤٤ (٤٤,٩)	٥٢ (١٦,٢)	٢,٣٦	١١
Preventativeexamination	٥. If I had a cough for more than ٢ weeks, I would go to a community health center, medical clinic, or hospital to get myself checked	٩٤ (٤٠,٣)	١١١ (٤٧,٦)	١٦ (٦,٩)	١٢ (٥,٢)	٣,٢٣	٥	١١٧ (٣٦,٤)	١٣٥ (٤٢,١)	٥٢ (١٦,٢)	١٧ (٥,٣)	٣,١٠	٥
Preventativeeducation	٦. I often read materials designed to raise awareness about TB	٨٢ (٣٥,٢)	١١٤ (٤٨,٩)	٢٤ (١٠,٣)	١٣ (٥,٦)	٣,١٤	٨	٧٢ (٢٢,٤)	١٣١ (٤٠,٨)	٩٥ (٢٩,٦)	٢٣ (٧,٢)	٢,٩٧	٨
	٧. I actively participate in education about TB	٧٤ (٣١,٨)	١٠٩ (١٦,٨)	٣٥ (١٥)	١٥ (٦,٤)	٣,٠٤	١٠	٥٠ (١٥,٦)	١٤٤ (٤٤,٩)	١٠٣ (٣٢,١)	٢٤ (٧,٥)	٢,٦٩	١٠
	٨. I usually eat a balanced nutritious meal to maintain health	٧٩ (٣٣,٩)	١١٨ (٥٠,٦)	٢٥ (١٠,٧)	١١ (٤,٧)	٣,١٤	٩	٦٨ (٢١,٢)	١٥٤ (٤٨)	٧٥ (٢٣,٤)	٢٤ (٧,٥)	٢,٨٣	٩
Healthylifestyle	٩. I do not overeat because it can influence my immune systemand overall health	٨٩ (٣٨,٢)	١١٧ (٥٠,٢)	١٧ (٧,٣)	١٠ (٤,٣)	٣,١٩	٧	٩١ (٢٨,٣)	١٤٣ (٤٤,٥)	٧١ (٢٢,١)	١٦ (٥)	٢,٩٦	٧
	١٠. I wash my hands after going out or exercising	٨٩ (٣٨,٢)	١١٧ (٥٠,٢)	١٧ (٧,٣)	١٠ (٤,٣)	٣,٢٢	٦	١١٣ (٣٥,٢)	١٥٥ (٤٨,٣)	٣٩ (١٢,١)	١٤ (٤,٤)	٣,١٤	٦
	١١. I exercise regularly to maintain good health	١٠٧ (٤٥,٩)	١٠٠ (٤٢,٩)	١٨ (٧,٧)	٨ (٣,٤)	٣,٣١	٤	١٣٣ (٤١,٤)	١٣٣ (٤١,٦)	٣٩ (١٢,١)	١٦ (٥)	٣,١٩	٢
					Total	٣٥,٤٨					Total	٣٢,٦٥	

Abbreviations: SA, Strongly agree; A, Agree; DA, Disagree; SDA, Strongly disagree; SD, Standard deviation

Differences in Knowledge, Attitudes, and Preventive Behavior Based on Student Characteristics

Students from health faculties demonstrated better knowledge and attitudes towards tuberculosis compared to non-health faculties (t = ٢,٩٩٤, p < ٠,٠٣ and t = ٠,٤٥٦, p < ٠,٠٠١, respectively). Nonsmoking students were more knowledgeable about tuberculosis than smokers (t=-٢,٣١٢, P=٠,٠٢١). Students over ٢٠ years old had better knowledge and attitude in comparison to students under or equal to ٢٠ years old (t=-١,٣٤٥, P=٠,١٧٩ and (t=-٢,١٧٤, P=٠,٣٠). and Students whose primary residence is in the city had more knowledge compared to students living in rural areas (t=-١,٢٠٧, P=٠,٢٢٨), for further details refer to the Table ٥.

Table ٥: Differences in Students' Knowledge, Attitudes, and Preventative Behaviors Toward TB According to Students' Characteristics

Variables	Categories	Knowledge		Attitude		Preventative Behavior	
		Mean (SD)	t (p)	Mean (SD)	t (p)	Mean (SD)	t (p)
Faculties	Health faculties	٦,٨٣ (١,٧٣٤)	٢,٩٩٤ (<٠,٠٣) *	٣٥,١٢ (٦,٤٩٠)	-٠,٤٥٦ ٠,٦٤٩)	٣٥,٤٨ (٥,٩٩٥)	٥,٦٣٥ (٠)
	Non-healthfaculties	٦,٣٨ (١,٦٢٨)		٤٣,٧٥ (٤,٠٩)		٣٣,١٦ (٤,٤٠)	
Age	<٢٠ years	٦,٤ (١,٨٢٣)	–١,٣٤٥ (٠,١٧٩)	٣٤,٣٢ (٦,٨٧٨)	–٢,١٧٤ (٠,٣٠)	٣٥,٠٢ (٥,٥٦٢)	٢,٨٣٣ (٠,٠٥)
	≥٢٠ years	٦,٦٢ (١,٦٣٠)		٣٥,٦٥ (٦,٢٣٩)		٣٣,٤١ (٦,٠٧٤)	
Residence	Urban	٦,٦٥ (١,٦٧٩)	– ١,٢٠٧ (٠,٢٢٨)	٣٥,٠١ (٦,٨٣٩)	٠,٩٦١ (٠,٣٣٧)	٣٣,٦٣ ٦,١٢٤)	٠,٤٢١ (٠,٦٧٤)
	Outside/ Rural	٦,٤٨ (١,٦٩٠)		٣٥,٥٤ (٦,٠٧٦)		٣٤,٠٢ (٥,٨٥٦)	
Smoking	No	٦,٦٦ (١,٧٠٥)	– ٢,٣١٢(<٠,٠٢١) *	٣٥,٦٨ (٦,٤٠٢)	– ٢,٢٩٢(٠,٠٢٢) *	٣٣,٧٧ (٥,٧٣)	٠,٤٢١ (٠,٦٧٤)
	Yes	٦,٣٠ (١,٦٠٨)		٣٤,٢٩ (٦,٤٤٣)		٣٤,٠١ (٦,٥٨)	
Have obtained information about TB	No	٤,٦٧ (١,٥١)	–٣,٤٧٠ (<٠,٠٠١) *	٤١,٣٨ (٦,٦٨)	–٢,٤١٢ (٠,٠٠٢) *	٣٨,٧٦ (٦,٣٧)	–١,٥٤٠ (٠,٠١٤) *
	Yes	٦,٢٧ (١,٤٥)		٤٢,٩١ (٦,٧٤)		٣٩,٤٣ (٥,٧٩)	

Notes: All analyses were done by *t*-test; *Significance level was set at p-value < ٠,٠٥.

Abbreviation: SD, standard deviation.

Relationships Between Knowledge, Attitudes, and Preventive Behavior

Positive correlations were identified between students' knowledge and attitudes against tuberculosis (r = ٠,١٢٩, p < ٠,٠١), knowledge and preventative behavior (r = ٠,١٢١, p < ٠,٠١), and attitudes and preventative behavior (r = ٠,٤٣٥, p < ٠,٠١). See Table ٦ for more information.

Table ٦: Spearman correlation Coefficient result

Spearman correlation coefficient		Knowledge	Attitude	Preventive Behavior toward TB
Knowledge	Correlation Coefficient	١,٠٠٠	.١٢٩**	.١٢١**
	Sig. (٢-tailed)		٠,٠٠٢	٠,٠٠٤
	N	٥٥٤	٥٥٤	٥٥٤
Attitude	Correlation Coefficient	.١٢٩**	١,٠٠٠	.٤٣٥**
	Sig. (٢-tailed)	٠,٠٠٢		٠,٠٠٠١
	N	٥٥٤	٥٥٤	٥٥٤
Preventive Behavior	Correlation Coefficient	.١٢١**	.٤٣٥**	١,٠٠٠
	Sig. (٢-tailed)	٠,٠٠٤	٠,٠٠٠	
	N	٥٥٤	٥٥٤	٥٥٤

**. Correlation is significant at the ٠,٠١ level (٢-tailed).

Table ٧: linear Multiple Regression Analysis

Variable	B	SE	B	t	P
Age	-٠,٨١٤	٠,٥٧٨	-٠,٠٦	-١,٤٠٨	٠,١٦
Faculty	-٢,٧٧	٠,٥٢٩	-٠,٢٣	-٥,٢٣٤	٠
Smoking status	٠,٣٠٤	٠,٥٥٧	٠,٠٢	٠,٥٤٦	٠,٥٩
Residence	-٧٦٣	٠,٥	-٠,٠٦	-١,٥٢٥	٠,١٢٩
Knowledge					
Root of infection	١,٤٤٦	٠,٢٩٧	٠,١٧	٤,٨٧٥	٠
Symptoms	٠,٣٨٢	٠,٤٢٦	٠,٠٥	٠,٨٩٦	٠,٣٧
Preventive examination	٠,٨٧٢	٠,٧٦٥	٠,١١	١,١٤١	٠,٢٦
Treatment	-٠,٤٢٥	٠,٥٢٥	-٠,٠٧	-٠,٨١	٠,٤١٨
Attitude					
Diagnosis of TB	٠,٢٩	٠,١١٤	٠,٠٩٥	٢,٥٤٩	٠,٠١١
Preventive examination	٠,٠٠٧	٠,٥٣٦	٠,٠٠١	٠,٠١٤	٠,٩٨٩
Treatment	-٠,٠٧٦	٠,٦٨١	-٠,٠١	-٠,١١٢	٠,٩١١
Preventive Education	١,٩٥٣	٠,١٤٣	٠,٥٠٣	١٣,٦٦٦	٠

Variables Impacting Students' TB Prevention Behavior

The findings show that the variables impacting students' TB prevention behavior were developed using linear multiple regression analysis. There were six variables that influenced preventative behavior: faculty (β = -٠,٢٣), age (β = -٠,٠٦٠), knowledge of symptoms (β = ٠,٠٥٤), knowledge of preventative examinations (β = ٠,١١), attitudes toward preventative examinations (β = ٠,٠٠١), attitudes toward treatment (β = -٠,٠١٤), and attitudes toward preventative education (β = ٠,٥٠٣. Health faculty students exhibited better understanding of symptoms and preventative examinations, more positive attitudes about preventative examinations, treatment, and prevention education, and demonstrated more preventative activity; see table ٧ for more information.

٤. Discussion

The study consists of ٥٩٠ selected students, and response rate of ٩٨٪, Notably, ٥٨,١٪ were non-health faculty students, while ٤١,٩٪ were health faculty students. Most students (٩٥,٥٪) had received information about tuberculosis, with the Internet and formal education being the primary sources. Moreover, Health faculty students scored (٦,٨٣±١,٧٣) in knowledge, (٣٥,١٢±٦,٤٩) in attitudes, and (٣٥,٤٨±٥,٩٩) in preventive behaviors regarding tuberculosis, while non-health faculty students scored (٦,٣٨±١,٦٢), (٣٥,٤٠±٦,٤٠), and (٣٢,٦٥±٥,٦٨), respectively. Both groups displayed inadequate knowledge, although medical students had significantly good knowledge (P=٠,٠٠٣). In this study, the levels of knowledge, attitude, and preventive behavior among health and non-health faculties were the same, and the linear multiple regression analysis showed There were six variables that influenced preventative behavior: faculty (β = -٠,٢٣), age (β = -٠,٠٦٠), knowledge of symptoms (β = ٠,٠٥٤), knowledge of preventative examinations (β = ٠,١١), attitudes toward preventative examinations (β = ٠,٠٠١), attitudes toward treatment (β = -٠,٠١٤), and attitudes toward preventative education (β = ٠,٥٠٣. Students in the health faculty had a better understanding of symptoms and preventative examinations, as well as more positive attitudes toward preventative examinations, treatment, and prevention education.

The findings of this study are consistent with a ٢٠٢١ Indonesian study trends, with medical students scoring (٧,٠٣±٢,٣٦) in knowledge compared to (٤,٩٨±٢,٢٠) for non-medical students, and consistently higher scores in attitudes and preventive behaviors. Both studies reported positive correlations among knowledge, attitudes, and preventive behaviors, highlighting the critical role of knowledge in influencing tuberculosis prevention practices [١٦].

This result of this study is aligned with studies conducted in different countries, In this study, students from health faculties exhibited better levels of knowledge and attitudes than students from non-health faculties, this finding is consistent with that of a study of final-year students in Iran, in which the majority of students from health faculties showed good knowledge and attitudes regarding tuberculosis [١٧]. Other studies' have revealed inconsistent results, though [١٨] [١٩] [٢٠]. The reason for this is that students from health faculties receive formal training on health issues, particularly tuberculosis, as part of their curriculum and during their undergraduate courses. As a result, health faculty students have good knowledge, awareness, and positive behavior when it comes to tuberculosis prevention. Furthermore, because students from health faculties are more likely to contract tuberculosis in their future careers, and because their preventive behavior is better than that of non-health faculty, they need to understand more about tuberculosis. This will contribute to greater awareness and preventive behavior among health faculty students than non-health faculty.

The educative level of students affected their knowledge, attitudes, and behavior toward TB, and these findings are also aligned with a study in Bangladesh, which reported that those with lower levels of education tend to have inadequate knowledge of TB [٢١]. The consistency of these two studies may be due to the same geographical similarity and cultural and the same method of teaching and learning.

This study findings indicates that there is significant corrolation ((P<٠,٠٢١) between the Knowledge of the student and smoking status that is not alighned with A study conducted at Taif University in Saudi Arabia indicated that there was no significant association between participants' knowledge scores and their smoking status [٢٢]. The inconsistency may be due to the differences in smoking patterns or drugs abuse among these two studies participants.

In a survey of soldiers in Korea, the average scores for awareness, attitudes, and preventative practices about tuberculosis were (١١,٦٤±٤,٠٣) out of a possible ٢٠ points, (٣,٢١±٠,٣٨) out of ٤ points, and (٢,٨٨±٠,٤٢) out of ٤ points respectively, additionally, Non-smokers demonstrated a greater level of knowledge about tuberculosis compared to smokers. Similarly, in the present study, non-smokers also exhibited a good level of knowledge than smokers .[٢٣] this similarity may be due to the awareness those who do not smoke in both studies may be aware of the consequences of smoking.

Thus, efforts to promote communication and dissemination of TB information, particularly among students, are required. Educational programs can be included into the curriculum to provide fundamental health information to both health and non-health faculty students. Furthermore, students were observed to get knowledge on tuberculosis via the internet and social media. As a result, various methods of information transmission should be used to educate pupils about tuberculosis. Tuberculosis prevention is a joint responsibility of the health and non-health faculties. As a result, the study findings can be used to create a consistent TB curriculum for first-year students, raising everyone's awareness regarding TB prevention. Additional action can be taken through partnership in the form of field studies and community service involving students from both health and non-health universities.

This study has some limitations due to government restrictions on girls' education, which prevented females from participating in the current research. The data were acquired from only two universities: Kabul Polytechnic and Kateb, both campuses in Kabul, Afghanistan; thus, they do not represent the knowledge, attitudes, and preventative practices against tuberculosis of all university students in Afghanistan. Despite these limitations, the data can still be used to develop TB education programs for university students and to assist the Afghan government in reducing the prevalence of tuberculosis in Afghanistan.

٥. Conclusion

This study found that students enrolling in health faculties had

better knowledge and more positive attitudes toward tuberculosis (TB) than their counterparts in non-health faculties. Additionally, non-smoking students demonstrated a higher level of knowledge than those who smoked. The findings underscore the significance of diverse information sources, particularly the internet, in enhancing students' awareness and understanding of TB. Moreover, health faculty students not only displayed commendable preventative behaviors but also maintained a proactive stance towards TB prevention. These results illuminate the disparities in knowledge, attitudes, and behaviors across different student groups, suggesting critical avenues for targeted interventions and educational programs. Future research should focus on female students and further explore the effectiveness of social media as a tool for TB prevention. Such initiatives could contribute significantly to reducing TB incidence and fostering a more informed and health-conscious student population.

Ethical consideration

The study was conducted in accordance with the principles indicated in the Declaration of Helsinki ١٩٦٤. The public health faculty of KUMS, provided ethical clearance because it was a completion of a bachelor's degree that the supervisor closely adhered to before taking part in the study, all participants gave written informed consent for both participation and publishing. Participation in the study was entirely voluntary, and rigorous confidentiality precautions were taken to protect participant information. To protect confidentiality, data collection was conducted anonymously.

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