

Rapid Diagnosis Methods for Tuberculosis among Medical Students: A Cross-Sectional Survey

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Abstract

Original Research Article

Background: Tuberculosis (TB) is still a health issue worldwide, especially in developing countries. Rapid diagnostic methods have improved early detection and treatment outcomes. However, awareness and knowledge of these tools among medical students future healthcare providers are crucial. The goal is to find out how well-informed and knowledgeable medical students at Osh State University's International Medical Faculty (IMF) are about rapid TB diagnostic methods. **Methods:** A cross-sectional survey was conducted among IMF students using structured questionnaires and visual data collection. The survey explored students' knowledge about TB diagnosis, particularly rapid methods such as GeneXpert (CBNAAT), sputum smear microscopy, and interferon-gamma release assays (IGRA). The majority of students correctly identified Mycobacterium tuberculosis as the cause of TB, demonstrating their awareness of the disease as a major infectious disease. Among diagnostic methods, 85% recognized GeneXpert as a rapid and sensitive tool, while 60% knew about sputum smear microscopy. However, only 35% were familiar with IGRA and molecular line probe assays. Almost seventy percent of students agreed that early and prompt diagnosis is crucial to reducing transmission. Main sources of knowledge were lectures (65%) and WHO guidelines (25%). **Conclusion:** The findings highlight good general awareness but limited detailed understanding of modern rapid TB diagnostics among medical students. It is suggested that practical sessions and instruction in molecular diagnostics be incorporated into the curriculum.

Keywords: Tuberculosis (TB), Rapid diagnostics, Medical students, GeneXpert (CBNAAT), Sputum smear microscopy, Interferon-gamma release assays (IGRA).

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INTRODUCTION

Tuberculosis (TB) is one of the top infectious killers worldwide, caused by Mycobacterium tuberculosis. In 2023, the World Health Organization (WHO) estimates that 10.6 million people will be infected with tuberculosis and 1.3 million will die from it. Programs to combat TB require prompt and precise diagnosis, particularly in low- and middle-income nations. Conventional diagnostic methods such as sputum smear microscopy are inexpensive but have limitations in sensitivity. Rapid diagnostic methods, including GeneXpert MTB/RIF, Line Probe Assay (LPA), and Interferon-Gamma Release Assays (IGRA), have revolutionized TB detection.

Medical students must be familiar with these technologies as future clinicians, particularly in endemic regions like Central Asia. Hence, this survey was

designed to evaluate the awareness and understanding of TB rapid diagnostics among IMF students at Osh State University.

MATERIAL AND METHODS

Study Design:

Osh State University's International Medical Faculty (IMF) medical students participated in a descriptive cross-sectional survey.

Participants:

A total of 100 undergraduate medical students (3rd–6th year) participated voluntarily.

Data Collection:

Data were obtained through structured questionnaires distributed during academic sessions, and

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group findings were displayed in infographic posters (survey images).

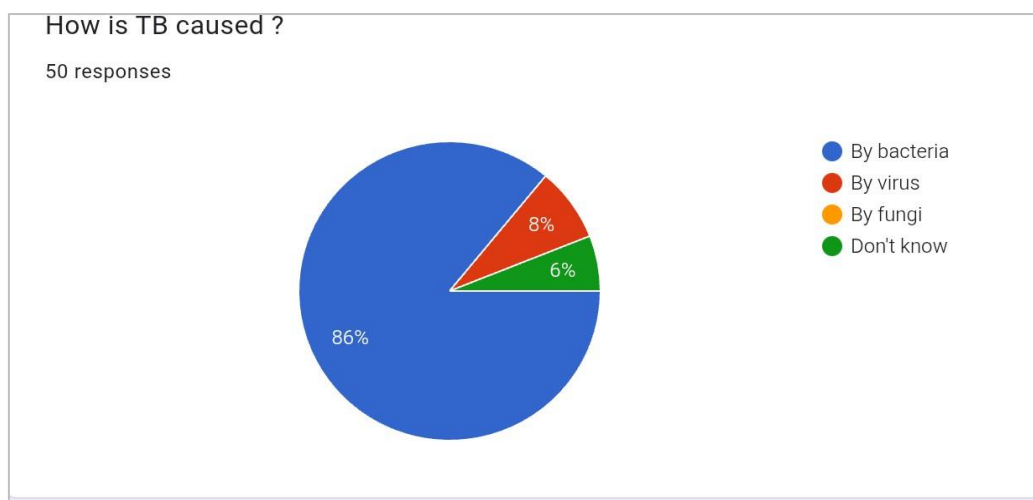
The questionnaire assessed:

Knowledge of TB etiology and transmission
Awareness of diagnostic methods Understanding of

rapid tests (GeneXpert, LPA, IGRA) Perception of infection control and TB isolation.

Data Analysis:

Descriptive statistics were utilized to present the survey data in the form of percentage summaries.



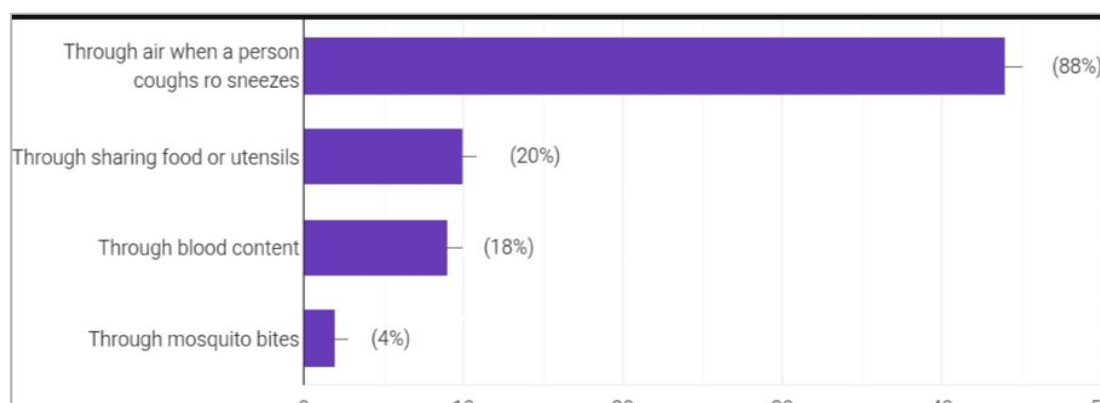
A total of 50 students from the International Medical Faculty (IMF), Osh State University, participated in the survey.

Findings:

By bacteria: 86% of respondents
By virus: 8% of respondents
By fungi: 0% of respondents
Don't know: 6% of respondents

Interpretation:

The majority of students (86%) correctly identified that tuberculosis is caused by bacteria — specifically *Mycobacterium tuberculosis*. However, a small portion (8%) mistakenly thought TB is viral in origin, and 6% were unsure, indicating that a minor educational gap still exists regarding the etiology of TB.



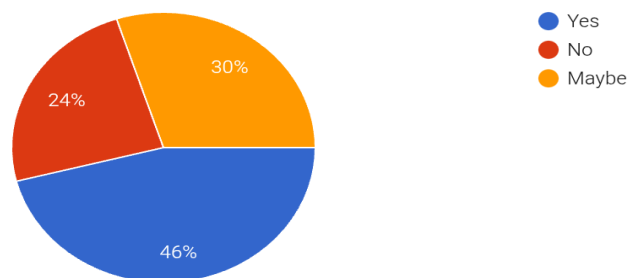
Finding:

A survey conducted among 50 IMF students of Osh State University and International Medical Faculty on the spread of Tuberculosis (TB) revealed that the vast majority, 88% (44 respondents), correctly identified that TB spreads through the air when a person coughs or sneezes. However, the findings also highlighted common misconceptions regarding other routes of transmission,

with 20% (10 respondents) incorrectly believing it spreads through sharing food or utensils, 18% (9 respondents) suggesting transmission through blood content, and 4% (2 respondents) mentioning mosquito bites. Overall, the results indicate a strong understanding of the primary mode of transmission but also point to a need for educational clarification to address persistent myths about how the disease is spread.

Do you think TB patients should be isolated from others completely?

50 responses

**Results (Based on Responses):**

Yes: 46% of students

No: 24% of students

Maybe: 30% of students

Interpretation:

The majority (46%) of IMF students believe that TB patients should be completely isolated to prevent the spread of infection. However, 30% of respondents were uncertain, indicating a need for better understanding of infection control protocols and the balance between isolation and patient care.

Meanwhile, 24% disagreed with complete isolation, possibly reflecting awareness of modern TB

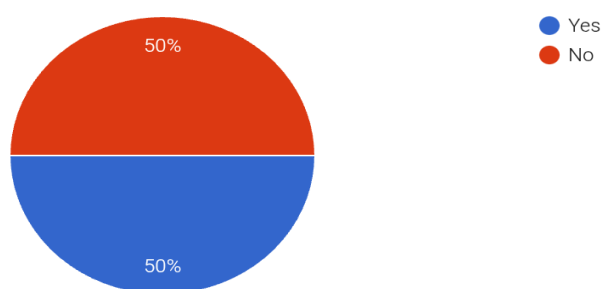
management guidelines, which recommend isolation mainly during the infectious phase rather than throughout the treatment period.

CONCLUSION

The survey highlights varying perspectives among medical students regarding TB isolation practices. While most support strict isolation, a considerable number express uncertainty or disagreement-emphasizing the importance of educational reinforcement on TB transmission, public health measures, and WHO guidelines for patient management.

Have you ever been screened or tested for TB ?

50 responses



The students' response is equally divided on their personal screening history, with 50% having been screened or tested for TB and 50% having not, which may warrant a review of institutional screening policies or awareness campaigns give that they are medical students who are often at higher risk and require frequent screening.

TB Screening and Testing History:

Shows an equal split in personal screening history:

Even Split:

The student population is divided exactly in half regarding their past TB screening:

50% (25 respondents) reported "Yes" to being screened or tested for TB. 50% (25 respondents) reported "No" to being screened or tested for TB.

RESULTS**1. General Awareness:**

90% correctly identified *Mycobacterium tuberculosis* as the causative organism.

82% recognized TB as an airborne infection.

75% were aware that prompt diagnosis lowers the risk of transmission.

2. Understanding of Diagnostic Techniques:

Correct Understanding of Use Awareness (in percent) of the Diagnostic Method;

Sputum Smear Microscopy 60% 50%

MTB/RIF GeneXpert 85% 70% Line Probe Assay (LPA) 40% 25%

Interferon-Gamma Release Assay (IGRA) 35%20%

Chest X-ray 55% 45%.

3. Source of Information:

Lectures in the classroom – 65% WHO/CDC materials – 25% 10% of peer discussion.

4. Attitude toward Quick Diagnostics:

70% strongly agreed that rapid diagnostic methods are essential for TB control.

65 percent believed that public hospitals should routinely offer molecular diagnostics. 80% showed interest in learning practical use of GeneXpert.

5. Knowledge of TB Isolation and Infection Control (based on survey results):

60% of students were aware of negative-pressure isolation rooms.50% knew that surgical masks are inadequate for TB protection; N95 respirators are required.

40% were unsure of the duration of drug-resistant TB cases' isolation.

and the GeneXpert test Knowledge of other diagnostic tools for molecular diseases Gaps in infection control and isolation practices.

Recommendations

1. Integrate TB molecular diagnostics modules into microbiology and public health curricula.
2. Organize practical workshops in collaboration with regional TB centers.
3. Encourage participation in the WHO and CDC's electronic TB education programs.

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CONCLUSION

The results of the cross-sectional survey of IMF medical students showed: a lot of awareness about TB