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The Relationship Between Tuberculosis Knowledge and The Attitudes and Behaviors Of Dayah Students

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ABSTRACT

Introduction: Tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis and is one of the leading causes of death worldwide. Indonesia ranks second in global TB case counts, with a high transmission rate, particularly in high-risk environments such as Islamic boarding schools. This study aims to evaluate the knowledge, attitudes, and behaviors related to TB among students at Dayah Madrasah Aliyah Swasta Babun Najah in Banda Aceh. Additionally, it will analyze the relationship between their knowledge, attitudes, and behaviors in the context of TB prevention.
Methods: This study employed an observational analytic method with a cross-sectional design and utilized cluster sampling. Primary data were gathered through questionnaires. The research was conducted at Dayah Madrasah Aliyah Swasta Babun Najah, located in the Ulee Kareng District of Banda Aceh, on August 29, 2024. Bivariate analysis was performed using the non-parametric Spearman's rank correlation coefficient test.
Results: A total of 90 students participated in the study. The findings revealed that 67.8% of respondents had good knowledge, 78.9% demonstrated positive attitudes, and 47.8% exhibited good behaviors regarding tuberculosis (TB) prevention. Spearman Rank analysis indicated a moderately strong positive correlation between knowledge and attitudes ($r = 0.527$) and between knowledge and behaviors ($r = 0.535$), with a p-value of less than 0.025.
Conclusion: Enhancing knowledge among students is crucial for fostering better attitudes and behaviors related to TB prevention, particularly in high-risk environments.

Keywords: Tuberculosis, Knowledge, Attitude, Behavior, Islamic boarding school.
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INTRODUCTION

Mycobacterium tuberculosis (M. TB) is a rod-shaped bacterium that is the primary cause of the contagious disease tuberculosis (TB). While the lungs are the main target of the infection, this pathogen can also affect various other organs in the body. The mortality rate associated with M. TB infections in multiple organs is significantly higher than that of infections limited to the lungs. According to the latest data from the WHO Global Report on TB 2023, there are approximately 10 million new TB cases worldwide each year. Even more concerning is that TB patients who do not receive adequate medical treatment face a mortality risk of up to 50%.[1,2]

Indonesia ranks second in the world, after India, for the number of tuberculosis (TB) cases. Current data indicates that there are approximately 1,060,000 TB cases in the country, resulting in around 134,000 deaths each year—an alarming rate of seventeen deaths per hour. According to the Health Department of Aceh Province, there were 21,128 reported TB cases in 2023, with Pidie Regency recording the highest number at 7,290 cases, followed by Banda Aceh, which reported 2,740 cases.[1,3]

Education aims to enhance a person's knowledge and skills, helping individuals solve problems to achieve specific goals in both educational settings and everyday life. Understanding plays a crucial role in shaping behavior, as actions informed by solid knowledge tend to be more consistent than those without a knowledge base. The level of understanding and awareness about tuberculosis (TB) significantly influences attitudes towards its prevention and transmission methods. This awareness may be lacking among students and staff in Islamic boarding schools, leading to inadequate preventive measures.[4–5]

For instance, poor ventilation and students engaging in close contact during activities such as sleeping, eating, and bathing can increase the risk of TB transmission. The bacterium Mycobacterium tuberculosis spreads when an infected individual coughs, sneezes, or talks. Research examining the relationship between pulmonary tuberculosis occurrences and behavioral patterns indicates that many cases are suspected to involve students who have lived at Al-Hidayah Islamic Boarding School in Kejuruan Muda District, Aceh Tamiang Regency, for over three years. Factors such as lack of ventilation, insufficient window

openings, and inadequate lighting can contribute to the growth of TB bacteria. Of the 100 individuals studied, approximately 13% were suspected to have TB.[4–6]

The data obtained indicates that knowledge plays a crucial role in preventing the transmission and development of tuberculosis (TB). However, there is a lack of specific data regarding this knowledge in Banda Aceh, particularly concerning the behavior of female students who often engage in activities together. Given these factors, the researcher has chosen to examine the relationship between knowledge and attitudes toward tuberculosis among students at Dayah Madrasah Aliyah Swasta Babun Najah. The aim is to measure the level of knowledge these students have about TB and how it relates to their attitudes and behaviors. Therefore, it is essential to conduct research on Dayah students focusing on the factors of knowledge, attitudes, and behaviors in environments that are high-risk for tuberculosis.

METHODS

This analytical observational study is designed with a cross-sectional approach, using cluster sampling for data collection. Primary data was gathered through questionnaires assessing knowledge, attitudes, and behaviors related to tuberculosis among students. In cluster sampling, groups of students (referred to as clusters) are randomly selected, and the students within those clusters complete the questionnaires.

This study was conducted at Dayah Madrasah Aliyah Swasta Babun Najah in the Ulee Kareng District of Banda Aceh on August 29, 2024. The study population included all male and female students from the madrasah at the high school level. Students were randomly selected from several classes across six different batches. The research sample was organized by class using cluster sampling. The sample criteria consisted of both inclusion and exclusion criteria. The inclusion criteria required that students be willing to participate as respondents and be able to communicate actively. The exclusion criteria disqualified students who had not completed the questionnaire, had previously been diagnosed with tuberculosis (TB), or were absent on the day the questionnaire was administered. The sample size was determined using Slovin's formula, allowing for a margin of error of 10%. Based on these calculations, a minimum sample size of 81 students was required. To account for potential dropouts, the sample size was increased by 10%, resulting in a total sample size of 90 respondents.

The variables in this study include knowledge, attitudes, and behaviors as dependent variables, with tuberculosis as the independent variable. Age and gender are considered controlled variables. Univariate analysis was conducted to describe each of the knowledge, attitude, and behavior variables in the study. To analyze the relationship between two correlated variables, bivariate analysis was performed using the non-parametric Spearman's rank correlation coefficient test. This test aims to evaluate the significance of the correlation between the independent and dependent variables, with a p-value of less than 0.05 indicating a significant relationship. The choice of this test is based on the ordinal scale used in the study.

The strength of the relationship was assessed using the correlation coefficient (r) value, which ranges from 0 to 1. A value closer to 1 indicates a stronger correlation, while a value closer to 0 indicates a weaker correlation. A positive r value signifies a direct relationship between the two variables.

For data collection, all information was obtained through a questionnaire (primary data) administered directly to the respondents. This was done by gathering the respondents in a room, explaining the purpose of the study, and recording the measurement results on a research form.

RESULTS

Based on Table 1, it can be seen that the total number of respondents in this study is 90 people (100%). Most respondents are 16 years old, with 33 people (36.7%). The respondents come from three grade levels: X, XI, and XII, which are each divided into 6 classes, with details of 3 male MIPA classes and 3 female MIPA classes. Through the cross-sectional method, classes were selected to be the study sample. Most respondents were in grade XII MIPA 1, with 22 people (24.4%). Most respondents were female, totaling 50 people (55.6%).

According to Table 2, the knowledge levels of the respondents show notable differences among the 90 participants. Specifically, 61 individuals (67.8%) demonstrated good knowledge, 26 individuals (28.9%) had adequate knowledge, and 3 individuals (3.3%) exhibited poor knowledge. The criteria for these categories are as follows: good knowledge is defined as a percentage greater than 75%, adequate knowledge falls within the range of 56% to 74%, and poor knowledge is identified as a percentage below 55%. In summary, the majority of respondents, 67.8%, fall into the category of having good knowledge.

According to Table 3, the characteristics of the respondents regarding their attitude levels indicate that out of a total of 90 respondents, there are notable differences in attitudes: 71 individuals (78.9%) have a good attitude, 18 individuals (20%) have an adequate attitude, and 1 individual (1.1%) has a poor attitude. According to the categorization of attitudes, a good attitude is defined as a percentage greater than 75%, an adequate attitude falls within the range of 56% to 74%, and a poor attitude is below 55%. From these results, we can conclude that the majority of respondents, or 78.9%, exhibit a good attitude.

Based on Table 4, the characteristics of the respondents in terms of behavior levels show that out of the total 90 respondents, there are differences in behavior: 43 people (47.8%) have adequate behavior, 40 people (44.4%) have good behavior, and 7 people (7.8%) have poor behavior. According to the behavior categorization, good behavior is recorded at a percentage greater than 75%; adequate behavior falls within the 56% to 74% range, and poor behavior below 55%. From these results, it can be concluded that most respondents exhibit good behavior, with 47.8% falling into this category.

According to Table 5, the relationship between tuberculosis knowledge, attitude, and behavior shows that the correlation between Knowledge and Attitude is 0.527, and the correlation between Knowledge and Behavior is 0.535. These values indicate

Table 1. Respondent Characteristics

Characteristics		Frequency	Percentage
	15	26	28.9%
Age	16	33	36.7%
	17	31	34.4%
Total		**90**	**100%**
	X MIPA 2	18	20%
	X MIPA 3	8	8.9%
Class	XI MIPA 1	19	20%
	XI MIPA 2	14	15.6%
	XII MIPA 1	22	24.4%
	XII MIPA 2	9	10%
Total		**90**	**100%**
Gender	Woman	50	55.6%
	Man	40	44.4%
Total		**90**	**100%**

Table 2. Respondent knowledge

Knowledge	Frequency	Percentage (%)
Excellent	61	67.8
Moderate	26	28.9
Insufficient	3	3.3
Total	90	100

Table 3. Respondent Attitudes

Attitude	Frequency	Percentage (%)
Excellent	71	78.9
Moderate	18	20
Insufficient	1	1.1
Total	90	100

Table 4. Respondent Attitudes

Behavior	Frequency	Percentage (%)
Excellent	43	47.8
Moderate	40	44.4
Insufficient	7	7.8
Total	90	100

Table 5. The relationship between tuberculosis knowledge and the attitudes and behaviors of Islamic boarding school students

	Spearman Correlation Coefficient	*p-value*
The Relationship Between Knowledge And Attitude	0.527	0.000
The Relationship Between Knowledge And Behavior	0.535	0.000

a moderately strong positive relationship between Knowledge and Attitude and between Knowledge and Behavior. This means that the Knowledge variable has a relatively strong positive correlation with both Attitude and Behavior variables. Both p-values also show a value of 0.000, which is smaller than $\frac{\alpha}{2}$ = 0.025, indicating a significant relationship.

DISCUSSION

A total of 67.8% of respondents demonstrated a good understanding of tuberculosis, including knowledge of its symptoms, transmission methods, and prevention strategies. This high level of awareness is likely a result of health education programs implemented in the pesantren environment, which involve teachers, extracurricular activities, and regular health lectures. Asfiya et al. also emphasized that practicing Clean and Healthy Behavior (PHBS) among santri—acquired through education and access to health facilities—is crucial for preventing TB in pesantren. However, 3.3% of respondents exhibited low knowledge, which may be attributed to limited access to health information or a lack of motivation to seek additional knowledge.[7]

Research conducted by Mohammed et al. supports the finding that, despite health education efforts, students at Taif University have varying levels of knowledge, attitudes, and practices regarding tuberculosis (TB). This suggests that unequal access to health information can hinder the improvement of understanding about TB. Therefore, there is a need for more comprehensive and inclusive health education programs. In this context, research by Saputra et al. demonstrates that empowerment through health counseling effectively increases awareness of tuberculosis prevention, particularly in pesantren environments. This study emphasizes the importance of consistently implementing training and health education, involving both students and pesantren management, in fostering healthy behaviors. Overall, it shows that health education should not only aim to enhance knowledge but also be supported by ongoing practices within densely populated communities like pesantren.[8–10]

A positive attitude towards tuberculosis was observed in 78.9% of respondents, indicating a strong awareness of the importance of prevention and treatment, as well as a deep understanding of the associated risks. According to the Theory of Planned Behavior, a positive attitude significantly influences individuals' intentions and actions regarding good health practices. Therefore, fostering supportive attitudes is a crucial first step in preventing infectious diseases like tuberculosis. Research by Nahak et al. highlights that comprehensive health education and access to accurate information foster a positive attitude

toward TB prevention, particularly among high school students. This education enables students to comprehend the transmission mechanisms, symptoms, and the significance of treatment, thereby aiding efforts to reduce the spread of TB within schools and families. The study also underscores the importance of interactive and ongoing educational methods to enhance the effectiveness of health outreach among adolescents. Despite these positive trends, 20% of respondents exhibited an adequate attitude towards tuberculosis, while 1.1% demonstrated a poor attitude. A significant contributing factor to these inadequate attitudes is the social stigma associated with tuberculosis, which continues to pose a major barrier to disease control.[11–13]

Social stigma poses a significant challenge in the control of tuberculosis (TB) within healthcare facilities. Tan et al., in their systematic review, emphasized that stigma often stems from the fear of transmission and a lack of understanding of how TB spreads. As a result, individuals, including healthcare workers, may feel hesitant to openly discuss or acknowledge TB cases in their surroundings. To address this issue, ongoing health outreach is essential to reduce stigma and enhance social acceptance of TB patients. Furthermore, training healthcare workers to deliver clear information and support comprehensive prevention initiatives is vital.[14]

Only 47.8% of respondents exhibited good preventive behavior regarding tuberculosis, despite most having a fairly strong understanding of the disease. According to Anna's study, this finding highlights a significant gap between knowledge and behavior. She observed that even though respondents were well informed about how to prevent and manage tuberculosis, factors such as social stigma, a lack of trust in treatment effectiveness, and deeply rooted societal habits often hindered appropriate actions. The study also revealed that knowledge does not always translate directly into preventive actions; individuals often require additional motivation, moral support, and external encouragement to change their behavior.[15]

The research conducted by Widiastuti and Rusmini supports the idea that although high school girls recognize the importance of taking iron tablets to prevent anemia, only a few demonstrate a strong adherence to this recommendation. Key barriers influencing their behavior include external factors such as lack of family support, negative experiences with the side effects of the tablets, and limited access to healthcare facilities. This highlights the crucial role of family and community in creating a supportive environment that encourages individuals to follow through with treatment and preventive measures effectively.[16,17]

A Spearman Rank correlation analysis conducted using SPSS revealed a significant relationship between knowledge and attitude ($r = 0.527$) as well as between knowledge and behavior ($r = 0.535$). The p-value for both relationships was 0.000, which is less than $\alpha/2 = 0.025$. This result leads to the rejection of the null hypothesis (H0) and acceptance of the alternative hypothesis (H1). Consequently, it can be concluded that there is a meaningful relationship between the knowledge of tuberculosis and the attitudes and behaviors of pesantren students. This finding aligns with research by Hanifah, which indicates that a higher level of knowledge correlates with more positive attitudes and preventive behaviors toward COVID-19. Additionally, research on tuberculosis patients in North Surabaya found a significant relationship between knowledge and preventive behavior ($p = 0.001$). This underscores the necessity for a comprehensive approach to health interventions that focus on enhancing knowledge while also taking into account socio-demographic factors and support systems that influence preventive behaviors.[18]

A study conducted by Zulaikhah et al. in the Bandarharjo Semarang Health Center area supports this finding. The study indicates that the relationship between knowledge and behavior is not always as strong as the connection between knowledge and attitude regarding tuberculosis (TB) prevention. This discrepancy arises because various other factors, such as home environment conditions, motivation, access to healthcare facilities, and social influences, play a crucial role. The research highlights the importance of considering environmental factors as significant determinants in TB transmission. Unhealthy living conditions can increase the risk of transmission, even when the public has good knowledge about the disease. Therefore, TB prevention efforts should not focus solely on enhancing knowledge; they must also aim to improve environmental conditions and address other supportive factors.[19]

LIMITATIONS

1. This research relies solely on questionnaires for measurement. To obtain more in-depth information, it would be beneficial to combine this method with interviews.
2. The research focuses only on analyzing the relationship between knowledge, attitudes, and behavior. It would be helpful to examine additional risk factors that might influence the results.
3. The researcher encountered challenges in providing a dedicated space for respondents to complete the questionnaires. This may have affected their comfort and concentration while answering, potentially leading to suboptimal results.

CONCLUSION

Research findings indicate a relationship between students' knowledge about tuberculosis and their attitudes and behaviors at Dayah Madrasah Aliyah Swasta Babun Najah. These results underscore the importance of having a solid understanding of tuberculosis, as it helps foster positive attitudes and behaviors that contribute to the prevention and management of the disease. To enhance health education, it is recommended that schools improve their programs by incorporating regular counseling sessions, utilizing engaging learning materials, and providing relevant health resources. Healthcare professionals should take a proactive approach by offering guidance through counseling activities and regular health check-ups. Additionally, students are encouraged to seek out information and adopt clean and healthy living habits in their daily routines.

For future research, it would be

beneficial to expand the study's scope by considering environmental factors, family influences, and social support. Employing mixed methods, such as in-depth interviews or observations, could also enrich the data collected.

CONFLICT OF INTEREST

None.

AUTHOR CONTRIBUTION

The research supervisors played a key role in developing the concept, designing the study, and overseeing the manuscript. They provided guidance on data analysis, reviewed the manuscript, and approved the final version for submission to the journal.

ETHICAL CONSIDERATION

This study has been approved by the Health Research Ethics Committee of the Faculty of Medicine, Syiah Kuala University (Permit number: 114/EA/FK/2024).

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