
ANALYSIS OF FACTORS INFLUENCING CLEAN AND HEALTHY (CHLB) PRACTICES TO PREVENT PULMONARY TB AMONG STUDENTS AT ISLAMIC BOARDING SCHOOL PALEMBANG

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ABSTRACT

Background: Indonesia ranks second globally for tuberculosis (TB) cases, with 1,060,000 cases and 134,000 deaths annually. This results in 17 deaths every hour. Clean and Healthy Living Behavior (CHLB) is crucial in preventing pulmonary TB. In Islamic boarding schools (pesantren), the risk of TB may rise if students neglect hygiene. Therefore, it is important to analyze factors influencing CHLB practices for preventing TB among students at Zaadul Ma'ad Islamic Boarding School. **Purpose:** This study aims to analyze the factors influencing CHLB practices to prevent pulmonary TB among students at Zaadul Ma'ad Islamic Boarding School, identifying key factors to improve hygiene practices and reduce TB transmission. **Methods:** A quantitative, cross-sectional approach was used with 50 respondents selected via total sampling. A structured questionnaire was employed, and data were analyzed through univariate, bivariate (chi-square test at 95% significance), and multivariate analyses. **Results:** All respondents were male, with 86% in mid-adolescence (15-17 years). 70% had normal nutritional status, and 35% had a history of smoking. Significant factors related to CHLB practices included knowledge, attitudes, facility and resource availability, and support from stakeholders. Attitudes (OR=11.374) and school regulations (OR=9.409) were the most influential factors. **Conclusion:** Islamic boarding schools should implement regulations mandating personal hygiene and provide guidelines for cleanliness to promote better CHLB practices, preventing TB spread.

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INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease that continues to be a significant public health problem worldwide. According to the World Health Organization (Global TB Report, 2023), TB remains a critical health issue globally. TB became the second leading cause of death worldwide after COVID-19 in 2022, with over 10 million people contracting TB each year. Without treatment, TB mortality rates are high (approximately 50%). Globally, in 2022, TB caused around 130 million deaths. With WHO-recommended treatment, 85% of TB cases can be cured. The global number of newly diagnosed TB cases was 75 million in 2022. Thirty high-burden countries accounted for 87% of global TB cases in 2022, with two-thirds of the total global cases occurring in eight countries, including Indonesia (10%) (WHO, 2023).

Indonesia is one of the countries heavily burdened by this infectious disease (Puspasari et al., 2023). According to the Global TB Report 2023, Indonesia ranks second with the highest TB burden globally after India, followed by China. With an estimated 1,060,000 TB cases and 134,000 TB-related deaths annually, 17 people die from TB every hour in Indonesia. As of March 1, 2024, around 821,200 TB cases were notified, but only 88% of Drug-Sensitive TB patients and 73% of Drug-Resistant TB patients have started treatment, leaving some confirmed TB patients untreated and potentially transmitting the disease to others.

The increasing number of TB cases poses challenges to the government's efforts in TB control in Indonesia. One of the serious problems in TB control is the suboptimal detection and management of TB cases, inadequate accessibility to healthcare facilities, and unaffordable treatment for people living in remote or suburban areas. Additionally, public knowledge and ineffective education are obstacles in TB control efforts. The number of pulmonary TB cases in South Sumatra Province has increased yearly. According to the Central Statistics Agency data, pulmonary TB cases in 2021, 2022, and 2023 were 13,514, 18,122, and 23,256, respectively, with Palembang City reporting the highest TB cases: 5,023 in 2021, 6,927 in 2022, and 7,279 in 2023 (BPS Provinsi Sumsel, 2024).

Several factors influence the incidence of pulmonary TB, one of which is environmental factors that play a critical role in transmission and prevalence. Previous studies have shown that the physical environment, including housing conditions, air circulation, and occupancy density, can affect the incidence of pulmonary TB (Sari & Yeni, 2024 ; Haeruddin et al., 2020 ; Wubuli et al., 2015 ; Windarti et al., 2024). In addition, the size of the room in a house was found to have a close relationship with the incidence of pulmonary TB (Haeruddin et al., 2020). Furthermore, socio-demographic factors are also associated with pulmonary TB incidence. Studies have highlighted the relationship between socio-demographic predictors and the distribution of pulmonary TB cases, emphasizing the importance of factors such as age, gender, and living conditions (El-Masry & Muzahed, 2022 ; Hanifah et al., 2022 ; Maksuk & Amin, 2024).

The Sustainable Development Goals (SDGs) framework includes efforts to control pulmonary TB through environmental control. As an environmentally-based disease, TB bacteria require specific environmental conditions to spread. One environment with high potential for TB transmission is schools with dormitories, including Islamic boarding schools (pesantren). Although pulmonary TB cases in pesantren are rare (1 or 2 cases), the physical environmental conditions, occupancy density, humidity, and air circulation in pesantren dormitories can lead to high transmission rates from TB-infected students to others. Therefore, primary prevention efforts are needed to reduce the transmission of pulmonary TB among pesantren students through Clean and Healthy Living Behavior (CHLB) practices. Generally, pesantren caregivers acknowledge that CHLB practices have not been maximized and remain at the level of individual understanding among students. Awareness in improving understanding and behavior must be continuously nurtured and developed. Based on this data and facts, the researchers aim to understand the factors influencing CHLB practices in preventing pulmonary TB among students at Zaadul Ma'ad Islamic Boarding School, Palembang, to enhance students' openness to health information regarding pulmonary TB and improve the implementation of CHLB practices. Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*, which can attack various human organs, particularly the lungs (90%), as they are the most easily infected.

Transmission occurs through airborne droplets or mucus from TB patients, making it easy to transmit to others. Previous studies have shown a significant relationship between environmental conditions and prevention practices with CHLB against pulmonary TB incidence. Research by Waitau et al., (2023) and Dahwan et al., (2020) demonstrated that understanding the relationship between Personal Hygiene and Behavioral Sanitation (CHLB) practices and pulmonary TB incidence is essential for developing effective prevention and control strategies. Studies by Windarti et al., (2024) and Madjid et al., (2019) have also shown a significant relationship between physical environmental conditions of the home and the risk of pulmonary

TB. Factors such as ventilation, lighting, humidity, and occupancy density have been identified as significant contributors to the transmission and spread of *Mycobacterium tuberculosis* (Mawardi et al., 2019 ; Waitau et al., 2023). Additionally, behaviors such as cough/sneeze etiquette, sputum disposal practices, and contact history with TB patients have been associated with pulmonary TB incidence (Mawardi et al., 2019 ; Steffanus et al., 2021). Given the high potential for TB transmission among students in Islamic boarding schools, this study aims to explore the relationship between CHLB practices, physical environment, and individual behaviors related to pulmonary TB incidence. By synthesizing existing research findings, this article aims to contribute to the knowledge necessary for designing targeted interventions to effectively combat pulmonary TB.

METHODS

This research employs a quantitative descriptive approach with a cross-sectional design. The study population consisted of all students residing in Zaadul Ma'ad Islamic Boarding School, totaling 50 students from grades X and XI, with three dormitory rooms. The sampling technique was total sampling based on inclusion and exclusion criteria, including active students at Zaadul Ma'ad Islamic Boarding School willing to be respondents, residing in the dormitory, and not currently undergoing pulmonary TB treatment. Respondents were aged 15 years or older. The dependent variables studied were respondent characteristics, physical environment factors, individual factors, and enabling factors. The independent variable was the practice of CHLB to prevent pulmonary TB transmission. Data collection tools included a 4-in-1 environmental level meter, instruments, and observation sheets designed by reviewing textbooks, articles, guidelines, and literature.

The questionnaires were tested for validity and reliability. Univariate analysis was conducted to understand respondent characteristics, including age, gender, education level, occupation, smoking habits, nutritional status, socioeconomic conditions, duration of residence, behavioral factors, physical environment factors, and prevention practices. Bivariate analysis was used to analyze the risk factors for CHLB practices in TB prevention using a chi-square test, while multivariate analysis was used to determine the most dominant risk factors. Data were analyzed using SPSS 25 software. This study received ethical approval from the Ethics Committee of Poltekkes Kemenkes Palembang (No. 0550/KEPK/Adm2/III/2024).

RESULTS

This study aimed to analyze the factors influencing Clean and Healthy Living Behavior (CHLB) practices in preventing Pulmonary Tuberculosis (TB) among students at Zaadul Ma'ad Islamic Boarding School, Palembang. Based on the data analysis, several important findings were observed regarding the characteristics of the respondents and the factors affecting CHLB practices. The majority of respondents were mid-adolescents (15-17 years), accounting for 86%, while the remaining respondents were late adolescents (18-21 years). Most of the respondents' parents had completed high school education (76%), and the majority worked in the informal sector (66.7%). Regarding nutritional status, 70% of the respondents had normal nutritional status. In terms of knowledge, 58% of the respondents had good knowledge about TB prevention, while 42% had less knowledge. The attitudes of the respondents towards CHLB were also largely positive, with 78% showing support for good CHLB practices. A total of 67% of the respondents demonstrated good CHLB behaviors, while the remaining respondents exhibited less favorable practices. Additionally, 38% of the respondents had a history of smoking, and 72% reported that the facilities at the boarding school were adequate, although 28% felt that the facilities were insufficient. The availability of resources was equally split, with 50% of respondents indicating that resources were adequate (Table 1).

Table 1
Characteristics of Respondents (n=50)

Variables	n	%
Age (mean; SD; min-max)		
- Mid Adolescents (15-17 years)	43	86
- Late Adolescents (18-21 years)	7	14

Parental Education		
- Junior High School	2	4
- High School	38	76
- Diploma	5	10
- Bachelor's Degree	5	10
Parental Occupation		
- Formal	15	33.3
- Informal	35	66.7
Nutritional Status (mean; SD; min-max)		
- Underweight	12	24
- Normal	35	70
- Overweight	3	6
Knowledge		
- Good	29	58
- Poor	21	42
Attitude		
- Positive	39	78
- Negative	11	22
CHLB Behavior		
- Good	35	67
- Poor	15	33.3
History of TB		
- Yes	5	10
- No	45	90
TB Risk		
- Yes (having >1 primary symptom)	10	20
- No	40	80
Smoking History		
- Yes	19	38
- No	31	62
Availability of Facilities		
- Adequate	36	72
- Inadequate	14	28
Resource Availability		
- Adequate	25	50
- Inadequate	25	50
Support from Kyai (Religious Leaders)		
- Yes	16	32
- No	34	68
Support from Boarding School Administrators		
- Yes	16	32
- No	34	68
Support from Ustadz/Ustadzah		
- Yes	29	58
- No	21	42
Boarding School Regulations		
- Yes	28	56
- No	22	44
Peer Support		
- Yes	41	82
- No	9	18
Support from Healthcare Workers		
- Yes	29	58
- No	21	42

Based on the results of the bivariate analysis presented in Table 2, several factors did not show a significant relationship with Clean and Healthy Living Behavior (CHLB) practices in preventing Pulmonary Tuberculosis (TB) among students at Za'adul Ma'ad Islamic Boarding School, Palembang. These factors include age, parental education level, nutritional status, knowledge about TB, and smoking history. Although these factors may play a role in health, no significant relationship was found between these variables and the implementation of CHLB. However, several other factors showed a significant relationship with CHLB behavior. The most influential factors include a positive attitude towards CHLB, availability of resources and facilities, as well as support from religious leaders, boarding school administrators, teachers, and boarding school regulations that promote CHLB practices. These factors play a crucial role in raising awareness and ensuring the implementation of CHLB within the boarding school environment, contributing to the prevention of TB among the students (Table 2).

Table 2
The Association Risk Factors and CHLB Behavior

Risk Factors	CHLB Behavior				<i>p-value</i>
	Good		Poor		
	n	%	n	%	
Age Group					
- Mid Adolescence (15-17 years)	29	67.4	14	32.6	0.328
- Late Adolescence (18-21 years)	6	85.7	1	14.3	
Parental Education					
- Middle	27	67.5	13	32.5	0.440
- High	8	80	2	20	
Parental Occupation					
- Formal	10	66.7	5	33.3	0.736
- Informal	25	71.4	10	28.5	
Nutritional Status					
- Normal	22	62.9	13	37.1	0.092
- Not Normal	13	86.7	2	13.3	
Knowledge					
- Good	23	79.3	6	20.7	0.091
- Poor	12	57.1	9	42.9	
Attitude					
- Positive	31	79.5	8	20.5	0.006
- Negative	4	36.4	7	63.6	
TB History					
- Yes	4	80	1	20	0.607
- No	31	68.9	14	31.1	
TB Risk					
- Yes (Has >1 primary signs/symptoms)	7	70	3	30	1
- No	28	70	12	30	
Smoking History					
- Yes	13	68.4	6	31.6	0.849
- No	22	71	9	29	
Facility Availability					
- Adequate	28	77.8	8	22,2	0.054
- Not Adequate	7	50	7	50	
Resource Availability					
- Adequate	34	77.3	10	22.7	0.002
- Not Adequate	1	16.7	5	83.3	
Support from Religious Leaders					
- Yes	15	93.8	1	6.2	0.012
- No	20	58.8	14	41.2	

Support from Boarding School Admin					
- Yes	15	93.8	1	6.2	0.012
- No	20	58.8	14	41.2	
Support from Teachers (Ustadz/Ustadzah)					
- Yes	25	86.2	4	13.8	0.003
- No	10	47.6	10	52.4	
Boarding School Regulations					
- Yes	24	85.7	4	14.3	0.006
- No	11	50	11	50	
Peer Support					
- Available	29	70.7	12	29.3	0.81
- Not Available	6	66.7	3	33.3	
Support from Health Workers					
- Yes	25	86.2	4	13.8	0.003
- No	10	47.6	11	52.4	

The results from Table 3 show that certain factors have a significant relationship with CHLB practices. Notably, resource availability emerged as a crucial factor, with students reporting better adherence to CHLB when they had access to adequate resources. Similarly, the support from religious leaders, boarding school administrators, teachers, and health workers all played a significant role in encouraging students to practice CHLB. These figures, as central figures in the boarding school environment, provided guidance and motivation, fostering better health behavior. Additionally, the presence of clear boarding school regulations related to health and cleanliness also showed a significant impact. Schools that enforced such regulations saw higher adherence to CHLB practices, indicating that institutional support and clear rules are essential for promoting health behaviors. However, some factors, such as knowledge about TB, nutritional status, and the availability of facilities, did not show a significant relationship with CHLB practices. This suggests that while these factors may influence health behavior to some extent, they are not as decisive as the factors related to social support and institutional regulation.

Table 3
Analysis of Factors Related to CHLB Practices

Variables	p-value	Description
Knowledge	0.091	No relationship
Nutritional Status	0.092	No relationship
Facility Availability	0.054	No relationship
Resource Availability	0.002	Significant relationship
Support from Religious Leaders	0.012	Significant relationship
Support from Boarding School Admin	0.012	Significant relationship
Support from Teachers (Ustadz/Ustadzah)	0.003	Significant relationship
Boarding School Regulations	0.006	Significant relationship
Support from Health Workers	0.003	Significant relationship

Table 3, which presents the results of the multivariate analysis, further clarifies the most influential factors in promoting CHLB practices. The analysis identifies students' attitudes as a critical factor, with those holding a positive attitude being significantly more likely to engage in CHLB practices. A positive attitude towards health behavior reflects not only knowledge but also the motivation and willingness to adopt healthy practices. This finding underscores the importance of fostering a positive mindset among students, particularly through educational initiatives that integrate both health education and moral or spiritual guidance. Moreover, boarding school regulations were found to be another dominant factor influencing CHLB practices. The presence of strict regulations governing cleanliness and health in the boarding school setting significantly increased the likelihood of students practicing CHLB.

This highlights the critical role of institutional policies and their enforcement in creating an environment conducive to health behaviors. Boarding schools that implement clear rules and actively monitor compliance are more successful in ensuring that students engage in behaviors that prevent TB transmission. In

conclusion, the findings indicate that both individual attitudes and institutional regulations are pivotal in shaping CHLB practices. To effectively prevent TB in Islamic boarding schools, efforts should focus on nurturing positive attitudes towards health and ensuring the implementation of strict health regulations. These factors, when combined, can create a supportive environment that encourages students to adopt and maintain healthy behaviors.

Table 4
Final Model of Factors Influencing CHLB Practices for TB Prevention among Students

Variables	B	SE	Wald	df	Sig.	Exp (B)	95% CI for Exp (B)
						Lower	Upper
Boarding School Regulations	2.242	0.852	6.923	1	0.009	9.409	1.772
Students' Attitude	2.431	0.927	6.877	1	0.009	11.374	1.848
Constant	-2.695	0.776	12.064	1	0.001	0.068	

DISCUSSION

The bivariate analysis identified several variables that do not have a significant relationship with the practice of Clean and Healthy Living Behavior (CHLB) in preventing Pulmonary Tuberculosis (TB) among students at Za'adul Ma'ad Islamic Boarding School, Palembang. The analysis shows no significant relationship between the respondent's age and CHLB practices in TB prevention. This indicates that age differences (mid-adolescents 15-17 years and late adolescents 18-21 years) do not affect CHLB practices in this boarding school. This is consistent with Maharani et al. (2022), who found that age differences do not always significantly impact health behavior if similar environmental factors, such as collective settings and regulations in an educational institution like a boarding school, are present. No significant relationship was found between parental education and CHLB practices. Although parental education can influence health behavior in some contexts, its influence seems less significant in the boarding school environment. As a community that emphasizes collective care and uniform rule enforcement, differences in parental education levels are less relevant to the daily behavior of the students (El-Masry & Muzaheed, 2022).

The analysis results also show that the parents' occupation, whether formal or informal, does not have a significant relationship with CHLB practices. This may be due to the similar environmental conditions in the boarding school, reducing behavioral differences that might arise from variations in parental occupation. Perdana & Putra, (2020) support these findings, noting that in tightly regulated communities such as boarding schools, parental occupation does not significantly affect children's health behaviors. Respondents' nutritional status, whether normal or abnormal, did not show a significant relationship with CHLB practices. This could be because of similar eating arrangements and nutritional monitoring in the boarding school, so differences in nutritional status do not directly affect CHLB behaviors. According to Ginting & Andrico Napolin Lumbantobing, (2021), nutritional status often does not significantly influence health behavior if the individual is in an environment with consistent health oversight and intervention.

Knowledge about TB and CHLB also does not have a significant relationship with CHLB practices. Although knowledge is often considered an important factor in influencing health behavior, this study shows that knowledge alone is insufficient to guarantee good CHLB practices. Warasti & Wulandari, (2023) mentions that although health knowledge is essential, attitudes and motivation influenced by social support and a conducive environment play a more dominant role in determining an individual's health behavior. There is no significant relationship between TB history and TB risk with CHLB practices. This can be interpreted that students with a history of TB or who are at risk of TB do not show different CHLB behaviors compared to students without a history or risk of TB. According to a study by Zhang et al., (2022), in a controlled environment like a boarding school, differences in health history do not always significantly affect health behavior due to the strict regulations that apply equally to all students.

Smoking history does not show a significant relationship with CHLB practices. Although smoking is often associated with worse health risks, these results show that smoking history does not directly affect CHLB practices among students. This may be due to strict smoking bans in the boarding school and effective health education about the dangers of smoking, so smoking history does not determine CHLB behavior (Chiang et al., 2014). The availability of facilities such as clean water and adequate sanitation does not show a significant relationship with CHLB practices. Although the p-value is close to the significance threshold, these

results indicate that the existence of facilities alone is not enough to ensure good CHLB practices. A study by Budi et al., (2018) emphasizes that while physical facilities are important, their effectiveness largely depends on supervision, regulatory support, and individual motivation to utilize the facilities correctly.

Peer support does not show a significant relationship with CHLB practices. This may be because, in the boarding school environment, behavior is more heavily influenced by institutional authority and rules than by peer influence (Mawardi et al., 2019). Moreover, because students live in a highly structured environment, peer influence may be minimized by stronger control from the boarding school administrators and religious leaders.

Based on the bivariate analysis, several variables were also found to have a significant relationship with the practice of Clean and Healthy Living Behavior (CHLB) in preventing Pulmonary Tuberculosis (TB) among students at Za'adul Ma'ad Islamic Boarding School, Palembang, including: A positive attitude towards CHLB has a significant relationship with CHLB practices. About 79.5% of respondents with a positive attitude tend to practice CHLB well. A positive attitude influences a person's actions because it reflects readiness and willingness to act according to the knowledge they possess (Effendy et al., 2023). In the context of boarding schools, an educational approach that focuses not only on knowledge but also on fostering a positive attitude through spiritual and moral motivation from teachers and boarding school administrators helps strengthen students' adherence to CHLB (Haradhanalli et al., 2019).

There is a significant relationship between resource availability and CHLB practices, about 77.3% of respondents who stated that resources were adequate tended to apply CHLB practices well. The availability of resources, such as health facilities, clean water, and proper sanitation, is very important in supporting CHLB practices because it facilitates students in maintaining clean and healthy living habits (Madjid et al., 2019). According to Waitau et al., (2023), adequate facilities in the boarding school or school environment can facilitate effective CHLB implementation and prevent the transmission of pulmonary TB.

Support from religious leaders has a significant relationship with CHLB practices ($p = 0.012$). Respondents receiving support from religious leaders are 93.8% more likely to practice CHLB well. Religious leaders, as central figures in the boarding school, play a key role in guiding student behavior through religious and spiritual approaches (Muslimin, 2020). The involvement of religious leaders in supporting CHLB can increase students' awareness of the importance of maintaining health as part of religious responsibility. Support from boarding school administrators shows a significant relationship with CHLB practices ($p = 0.012$). This support includes strict supervision and control of the cleanliness of the boarding school environment and motivation for students to implement CHLB. A study by Selviana, (2019) shows that support from boarding school administrators, in the form of providing adequate sanitation facilities and regular monitoring of dormitory cleanliness, is very important in enhancing CHLB behavior among students.

Support from teachers has a significant relationship with CHLB practices ($p = 0.003$). Teachers often serve as role models for students and have a significant influence in teaching and supervising the implementation of CHLB. They also play a role in providing health education that is relevant to the cultural and religious context of the boarding school Windarti et al., (2024). According to a study by Sahadewa et al., (2019), intensive interaction and continuous education from teachers to students have been proven effective in promoting healthy living behavior in boarding schools. The presence of boarding school regulations also shows a significant relationship with CHLB practices. Islamic boarding schools with regulations related to CHLB tend to be more successful in controlling cleanliness and health practices among students. Research by Maharani et al., (2022) emphasizes that clear and firm institutional regulations can create an environment conducive to CHLB implementation and the prevention of infectious diseases like pulmonary TB.

Support from health workers is also significantly related to CHLB practices. Health workers involved in counseling, routine check-ups, and health follow-ups for students can increase awareness and adherence to CHLB practices. According to Ginting & Lumbantobing, (2021) the role of health workers in providing direct education and medical interventions to vulnerable populations, such as students, can improve the adoption of healthy living behaviors and reduce the risk of infectious diseases. The results of previous studies showed that knowledge was closely related to early detection of pulmonary TB in at-risk community groups (Maksuk & Amin, 2024).

Based on the multivariate analysis results, there are two variables were found to have a significant relationship with the practice of Clean and Healthy Living Behavior (CHLB) in preventing Pulmonary Tuberculosis (TB) among students at Za'adul Ma'ad Islamic Boarding School, Palembang: the variables of students' attitudes and boarding school regulations. The multivariate analysis showed that students' attitudes towards CHLB had a highly significant relationship with CHLB practices in preventing TB with an odds ratio

(OR) of 11.374. This means that students with a positive attitude towards CHLB are 11.374 times more likely to practice CHLB compared to students with a negative attitude. A positive attitude is crucial in determining health behavior because it reflects an individual's beliefs and motivation to act. According to Effendy et al., (2023), a positive attitude towards health practices increases individual adherence to behaviors that promote health, including CHLB. In the boarding school environment, students' attitudes are often influenced by health education and spiritual motivation provided by religious leaders, teachers, and boarding school administrators. Emphasizing the importance of health as part of religious and moral responsibility tends to foster a positive attitude among students towards CHLB (Haradhanalli et al., 2019).

In the context of a boarding school, fostering a positive attitude can be achieved through education integrated with religious values. A study by Manurung & Tambunan, (2022), showed that health education programs incorporating spiritual and moral elements are more effective in changing students' attitudes towards health behavior. Therefore, interventions focusing on developing a positive attitude towards health and CHLB will be very effective in improving TB prevention behavior in boarding schools. Boarding school regulations also show a significant relationship with CHLB practices with an odds ratio (OR) of 9.409. This indicates that boarding schools with regulations related to CHLB are 9.409 times more likely to implement CHLB practices compared to those without clear regulations. The existence of boarding school regulations governing CHLB provides clear guidelines and standards for students in maintaining health behavior. Research by Maharani et al., (2022) emphasizes that clear and strict regulations in institutional settings, such as boarding schools, are vital to ensuring compliance with health behaviors. These regulations not only serve as guidelines but also as tools for enforcing discipline and motivating students to follow CHLB practices.

Boarding schools that strictly enforce CHLB regulations can create a more conducive environment for preventing infectious diseases such as TB. This is also supported by a study by Jannah et al., (2023), which shows that the existence of strict cleanliness and health regulations in educational institutions can increase compliance with health behaviors among students. With strong regulations, boarding schools can establish a sustainable health culture and encourage students to consistently implement CHLB practices.

CONCLUSION

Based on the results of this study, it can be concluded that students' attitudes and boarding school regulations are two key factors in enhancing the practice of Clean and Healthy Living Behavior (CHLB) in Islamic boarding schools. The implications that can be drawn are: Strengthening Positive Attitude Education: The boarding school should continually strengthen education that promotes a positive attitude toward CHLB by integrating health education with religious values. This can be done through regular lectures, group discussions, or health campaigns that actively involve students. Strict Enforcement of Regulations: The boarding school must ensure that regulations regarding CHLB are implemented consistently and strictly.

This may involve imposing penalties for violations, providing incentives for compliant students, and conducting regular monitoring by school administrators or health workers. By optimizing these two factors, Islamic boarding schools can be more effective in preventing the spread of pulmonary TB through better implementation of CHLB practices among students.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

AUTHOR CONTRIBUTIONS

HD conceptualized the study, designed the methodology, and conducted the data analysis. IK contributed to the literature review, assisted in data collection, and contributed to the final draft of the manuscript. IW participated in the data collection and performed statistical analysis. LD reviewed and provided critical feedback on the manuscript. All authors have read and approved the final version of the manuscript.

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