

Effect of clean and healthy living behavior (chlb) training on students' knowledge in *marqiz daarul quran wassunnah islamic* boarding school, Riau: a quasi-experimental study

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ABSTRACT

Introduction: Islamic boarding schools (*pesantren*) face sanitation and behavioral challenges that increase the risk of preventable infectious diseases. Clean and Healthy Living Behavior (CHLB) programs have been promoted nationally; however, limited evidence evaluates the effectiveness of CHLB training on student knowledge in *Marqiz Daarul Quran Wassunnah* Islamic Boarding School in *Kampar*, Riau. Therefore, this study aims to evaluate the effect of CHLB training on students' knowledge at *Marqiz Daarul Quran Wassunnah* Islamic Boarding School using a one-group pretest–posttest quasi-experimental approach.

Methods: This quasi-experimental study involved 62 male students aged 6.5–50 years from *Marqiz Daarul Quran Wassunnah* Islamic Boarding School in *Kampar*, Riau. Knowledge was assessed using a validated 15-item questionnaire before and after a 120-minute structured training session. A paired t-test with 95% confidence level was used to compare mean pre- and post-test scores ($\alpha = 0.05$).

Results: Knowledge improved following training, as indicated by a decrease in the mean number of incorrect responses from 3.46 (pre-test) to 1.77 (post-test), with a statistically significant difference ($p = 0.0429$). However, increased post-test score variability suggested differing levels of understanding among participants.

Conclusion: CHLB training significantly improved students' knowledge, though unequal learning gains suggest that a single training session may be insufficient for comprehensive understanding. Integrating recurring training, structured reinforcement, and *Poskestren* involvement may support long-term behavior change and sustain hygiene practices.

Keywords: Clean and healthy living behavior; community service; health education; Islamic boarding school; quasi-experimental study.

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INTRODUCTION

Islamic boarding schools (*pesantren*) represent one of the oldest and most influential religious-based education systems in Indonesia and serve as environments where students or *santri* live, study, and practice Islamic values under structured communal settings.¹⁻⁴ These institutions foster discipline, spirituality, and character formation; however, their residential nature often presents health and sanitation challenges, making implementation of Clean and Healthy Living Behavior (CHLB)

particularly important.⁵ Reports have indicated that sanitation-related issues, such as overcrowded living spaces, limited hygiene facilities, and inconsistent hygiene practices, contribute to preventable infectious diseases within *pesantren* environments. Despite efforts to introduce CHLB as a behavioral framework supporting disease prevention and hygiene management, studies indicate that adherence levels across *pesantren* remain variable, with many students lacking adequate knowledge and awareness regarding the essential components of a clean and healthy lifestyle.^{6,7} As

a structured behavior model, CHLB encompasses personal hygiene, sanitation management, clean environmental practices, and health-supportive habits that are essential for sustaining wellness in communal living environments.⁵

To address these ongoing public health concerns, the Indonesian Government has introduced initiatives such as the establishment of *Pos Kesehatan Pesantren* (*Poskestren*) under the Ministry of Health to support promotive and preventive efforts tailored to *pesantren* contexts.⁸ Complementary to this initiative, the *Eco-Pesantren* program was developed

to integrate environmental education and sustainability practices aligned with Islamic teachings.⁹ While both programs provide formal frameworks for improving health outcomes, the implementation of structured education and behavioral reinforcement within *pesantren* remains inconsistent, and documented evaluation studies remain limited.

Existing literature acknowledges the potential role of community-based approaches, including capacity building and targeted health education, in improving CHLB implementation.⁵ However, there is limited empirical evidence measuring the effectiveness of structured CHLB training programs in *pesantren* populations using standardized pre–post evaluation designs in Indonesia.^{10,11} This gap underscores the need for research assessing whether structured educational interventions can significantly improve knowledge and awareness among *pesantren* students. Therefore, this study was conducted to evaluate the effect of CHLB training on the knowledge of students at *Marqiz Daarul Quran Wassunnah* Islamic Boarding School using a one-group pretest–posttest quasi-experimental design. The training was embedded within a broader community service program to strengthen *Poskestren* and santri cadres.

METHOD

Study design

A quasi-experimental one-group pretest–posttest design was applied to assess the effectiveness of the CHLB training intervention. This study design was selected due to contextual limitations that prevented the formation of a comparable control group.

Study Setting and Participants

The study was carried out at *Marqiz Daarul Quran Wassunnah* Islamic Boarding School located in *Kampar*, Riau Province. A total of 62 male students participated. Participants ranged in age from 6.5 to 50 years, reflecting the diverse demographic composition of the *pesantren*. Only those who completed both pretest and posttest assessments were included in the data analysis.

Instrument and Scoring Procedure

Knowledge levels were measured using a 15-item questionnaire developed based on CHLB indicators from the Ministry of Health and *pesantren*-specific health standards. Content validity was established through expert judgment by public health professionals. Items were presented in a true–false response format, with correct responses scored as one and incorrect responses scored as zero, yielding a total possible score range of 0–15.

Intervention Procedure

The intervention consisted of a structured CHLB training session delivered using a lecture method supported by visual media and interactive discussion. The session was conducted in a single 120-minute delivery format. The content included hand hygiene, sanitation behavior, waste management, environmental cleanliness, and personal hygiene practices relevant to *pesantren* living conditions.

Data Analysis

Data were analyzed using a paired t-test to examine differences in mean knowledge scores before and after the intervention. Statistical significance was set at $p < 0.05$ with a confidence interval of 95%.

Ethical Considerations

Approval for data collection was obtained from the leadership of *Marqiz Daarul Quran Wassunnah* Islamic Boarding School and the local health authority

supervising the institution. Participation was voluntary. Informed assent was obtained from younger students, and facilitator assistance was provided where literacy concerns were present.

RESULT

The community service activity involved training on CHLB at *Marqiz Daarul Quran Wassunnah* Islamic Boarding School. The training was conducted by dr. Winarto, M.Kes., using an interactive lecture format along with a question-and-answer session. (Figure 1)

A total of 62 male students participated in this study; however, only data from respondents who completed both the pre-test and post-test assessments were included in the final analysis. Descriptive characteristics of participants are presented in Table 1. The age range of participants varied substantially (6.5–50 years), reflecting the heterogeneous learning structure within the *pesantren* environment.

Table 2 presents the comparison of pre- and post-test knowledge scores. The mean number of incorrect responses before training was 3.46, which decreased to 1.77 following the intervention. This reduction indicates a measurable improvement in knowledge after receiving the CHLB training.

A paired t-test was performed to determine whether the difference in scores was statistically significant. The analysis



Figure 1. Delivery of CHLB training materials by dr. Winarto, M.Kes.

demonstrated a significant improvement in participants' CHLB-related knowledge after the intervention ($p = 0.0429$, $\alpha = 0.05$). Although most participants demonstrated improved knowledge, the post-test scores exhibited a wider distribution, suggesting variability in the degree of learning and retention among participants.

Figure 2 illustrates the comparison of incorrect responses for each item before and after the intervention. Overall, the number of incorrect answers decreased across most items following the training, demonstrating improved understanding of CHLB concepts. In the pre-test, the highest incorrect answer frequency occurred in QN-15, QN-1, and QN-2, while in the post-test, the highest number of incorrect answers shifted to QN-6, followed by QN-15 and QN-9. This pattern suggests that although learning gains were achieved, certain topics remained challenging for participants. The error bars also show a wider spread in post-test scores, indicating increased variability in response accuracy. This suggests that while some participants achieved substantial improvement, others demonstrated limited progression. These findings align with the overall statistical result, confirming that the intervention improved knowledge ($p = 0.0429$), although learning was not uniform across all test items.

DISCUSSION

CHLB reflects the actualization of a healthy lifestyle achieved by applying learning experiences gained daily, including educational environments such as Islamic boarding schools.⁵ These include proper handwashing, safe waste disposal, using sanitary toilets, consuming healthy food, maintaining personal hygiene, and performing regular physical activity, etc.¹² The findings demonstrated a statistically significant reduction in the mean number of incorrect responses following the intervention ($p=0.0429$), indicating that the delivery of CHLB education was effective in improving participants' knowledge (Table 2). Although most respondents showed improvement, variability in the post-test scores suggests that the training may not have been uniformly effective across all participants.

Table 1. Participant Characteristics

Age category	n (%)
Children (6–12 years)	10 (16.13)
Adolescents (13–18 years)	24 (38.71)
Adults (>18 years)	28 (45.16)
Total	62 (100)

Table 2. Comparison of Pre- and Post-test Knowledge Scores

Variable	Mean (Incorrect Answers)	Standard Deviation	n	p-value
Pre-test	3.46	1.51	62	
Post-test	1.77	1.88	62	0.0429

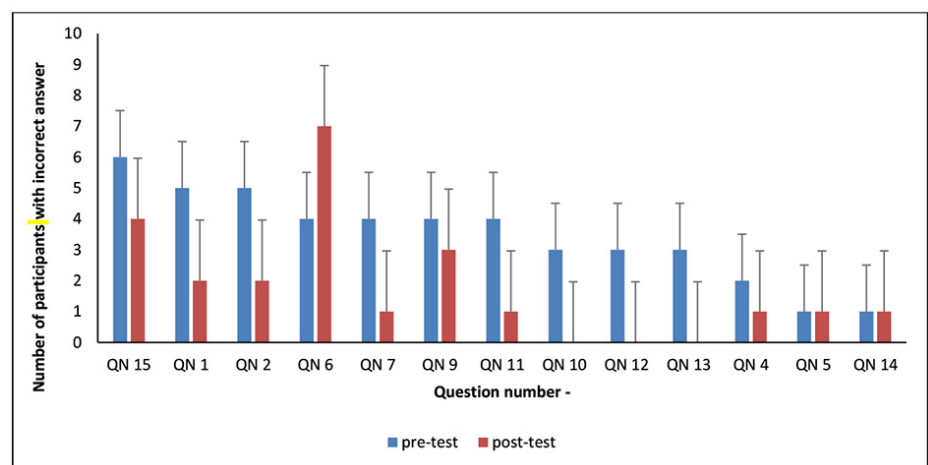


Figure 2. Number of incorrect answers per CHLB item before and after training. Different notation shows significant differences ($p < 0.05$). QN: Question number-

The variation in learning outcomes could be influenced by several factors, including differences in age groups, different literacy skills, and familiarity with the training material. The broad age range (6.5–50 years) may have contributed to heterogeneous cognitive abilities and learning readiness, resulting in differing levels of knowledge absorption. Additionally, the intervention consisted of a single 120-minute training session, which may have limited the opportunity for reinforcement and long-term retention.

When compared with previous studies, the findings of this study are consistent with research demonstrating that health

education interventions can significantly influence knowledge outcomes in *pesantren* or similar communal educational environments.^{5,13-14} Earlier studies have also reported that improvements in CHLB knowledge do not always translate immediately into behavioral change and may require repeated exposure, structured supervision, and environmental support to be sustained.¹⁵⁻¹⁶

The results of this study highlight the importance of structured health promotion strategies in *pesantren* environments. Strengthening *Poskestren* initiatives, incorporating regular CHLB education, and establishing student health

cadres may support long-term knowledge retention and behavioral reinforcement. Such approaches may also contribute to the development of sustainable hygiene practices aligned with *pesantren* health programs and government policies.¹⁷⁻²⁰

This study has several limitations. One notable limitation relates to the wide age range of participants, spanning from 6.5 to 50 years. This variation reflects the demographic characteristics of the *pesantren*, where students are not limited to school-aged children but also include adults from surrounding communities who reside and study within the institution. As a result, differences in cognitive development, learning readiness, and prior exposure to health education may have influenced the level of knowledge acquisition, contributing to variability in post-test outcomes. The sample size was relatively small and limited to a single institution, which may restrict generalizability. Additionally, the absence of a control group limits the ability to attribute improvements solely to the intervention. The short duration of follow-up and reliance on test-based measurement may also limit conclusions regarding long-term behavioral impact. Despite these limitations, the study provides evidence supporting the role of structured training in improving CHLB knowledge among *pesantren* students and contributing to the growing body of literature supporting health promotion in religious educational settings.

CONCLUSION

This study demonstrated that CHLB training was effective in improving students' knowledge within an Islamic boarding school setting, as evidenced by a significant decrease in incorrect response scores following the intervention. While knowledge gains were observed, variability in post-test performance indicates that a single training session may be insufficient to ensure consistent learning outcomes across diverse age groups.

Findings from this study support the integration of structured CHLB education into routine *pesantren* activities. Strengthening *Poskestren* programs, implementing repeated training sessions, and involving student health cadres

may enhance long-term knowledge retention and contribute to sustained improvements in hygiene practices. Continued development and adaptation of educational strategies are recommended to support consistent behavioral outcomes aligned with public health goals in *pesantren* environments.

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CONFLICT OF INTERESTS

The authors declared no conflict of interest.

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AUTHOR CONTRIBUTION

W contributed to the concepts, study design, definition of intellectual content, experimental studies, data acquisition, manuscript preparation, and acted as the guarantor of the study. F and D contributed to the study design, experimental studies, and data acquisition. SN contributed to the study design, literature search, data analysis, statistical analysis, manuscript preparation, editing, and review.

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