

The Relationship Between Knowledge Level and Clean and Healthy Living Behavior Towards Students' Self-Efficacy at Muhammadiyah 1 Vocational School, Kepanjen

Muchammad Imam Ma'ruf¹, Agus Tinus², Kuncahyono³

¹Master of Pedagogy Study Program, Universitas Muhammadiyah Malang, Indonesia

²PPKn FKIP and Master of Pedagogy Universitas Muhammadiyah Malang, Indonesia

³PGSD FKIP and Magister of Pedagogy Universitas Muhammadiyah Malang, Indonesia

Article Info

Article history:

Received 2026-04-13

Revised 2026-05-05

Accepted 2026-05-19

Keywords:

Clean and Healthy Living
Behavior (PHBS)
Infectious Disease Prevention
Knowledge
Self-Efficacy
Vocational High School Students

ABSTRACT

Infectious disease prevention among vocational high school (SMK) students remains suboptimal due to inconsistencies between knowledge and actual health behavior. This study aims to analyze the role of self-efficacy by examining the influence of knowledge and Clean and Healthy Living Behavior (PHBS). A quantitative cross-sectional correlational design was applied, involving 100 students selected by random sampling. Data were collected using structured questionnaires and analyzed using correlation tests. The results show that knowledge has no significant relationship with self-efficacy ($r \approx 0.100$; $p > 0.05$), whereas PHBS demonstrates a strong, significant positive correlation ($r = 0.770$; $p < 0.05$). These findings indicate that self-efficacy is more strongly shaped by behavioral practice than by cognitive understanding, supporting social cognitive theory. In conclusion, strengthening practical health behavior is more effective than solely improving knowledge in enhancing students' self-efficacy for disease prevention.

This is an open-access article under the [CC BY-SA](#) license.



Corresponding Author:

Muchammad Imam Ma'ruf

Master of Pedagogy Study Program, Universitas Muhammadiyah Malang

Email: imammaruf1607@gmail.com

1. INTRODUCTION

Global public health continues to encounter persistent threats from the recurrence of infectious diseases, revealing that preventive behavior has not yet been fully internalized in everyday life, particularly among adolescents. Although health protocols proved effective during the COVID-19 period, recent evidence shows a decline in compliance after the crisis subsided, indicating a structural gap between awareness and sustained behavior [1]. This gap becomes a critical research problem, especially in school environments where interaction intensity is high and health risks are amplified. Vocational high school (SMK) students represent a vulnerable yet strategic group due to their practice-oriented learning systems,

frequent group activities, and early exposure to workplace environments. These conditions increase the potential for infectious disease transmission when preventive behaviors are inconsistent. Therefore, strengthening students' capacity to apply health protocols independently and continuously is essential. This study proposes that improving not only cognitive understanding but also behavioral habituation is a necessary approach to address this issue [2].

From a theoretical perspective, Social Cognitive Theory explains that self-efficacy is a central determinant of behavioral consistency. Self-efficacy reflects an individual's belief in their ability to perform specific actions, which directly influences whether knowledge is translated into practice. Prior studies demonstrate that self-efficacy significantly predicts preventive health behaviors [3]. However, empirical findings remain inconsistent regarding the role of knowledge. Some studies report that knowledge enhances awareness but does not necessarily lead to behavioral change [4], while others highlight that experiential factors, such as repeated practice, play a more dominant role in shaping confidence and action.

Clean and Healthy Living Behavior (PHBS) represents the operational dimension of health behavior, encompassing routine practices such as hygiene maintenance and sanitation use. Evidence suggests that PHBS is strongly associated with mastery experience, which is the primary source of self-efficacy development [5]. Compared to knowledge-based interventions, behavior-based approaches tend to produce more consistent and sustainable outcomes. Despite this, most previous studies focus on health students or clinical populations, leaving a limited understanding of these relationships within vocational education contexts [6]. This indicates a clear research gap in examining how cognitive and behavioral factors interact to influence self-efficacy among SMK students.

Field observations further reveal that although schools provide adequate facilities such as handwashing stations and health education media, student compliance varies significantly [7]. This inconsistency suggests that access to information alone is insufficient, and internal psychological factors, particularly self-efficacy, may act as mediators between knowledge and actual behavior. Addressing this gap requires an integrative analysis that simultaneously considers knowledge, PHBS, and self-efficacy [8].

Based on these considerations, this study aims to analyze the relationships among knowledge level, PHBS, and students' self-efficacy in implementing infectious disease prevention protocols. This study hypothesizes that PHBS has a stronger relationship with self-efficacy than with knowledge. The proposed approach uses a correlational framework to identify the relative contribution of cognitive and behavioral factors [9].

The expected contribution of this research lies in both theoretical and practical domains. Theoretically, it extends the application of Social Cognitive Theory within vocational education by emphasizing the dominance of behavioral experience over cognitive knowledge in shaping self-efficacy [10]. Practically, the findings are expected to inform the development of school-based health programs that prioritize experiential learning and behavioral reinforcement rather than solely information dissemination. This study offers a novel perspective by focusing on SMK students as a high-risk yet underexplored population,

thereby providing a more contextualized understanding of the formation of health behaviors in educational settings.

2. METHOD

This study employed a quantitative, cross-sectional correlational design to examine the relationships among knowledge, Clean and Healthy Living Behavior (PHBS), and students' self-efficacy in preventing infectious diseases. The research was conducted at SMK Muhammadiyah 1 Kepanjen during the even semester of the 2025/2026 academic year, from January to March 2026, encompassing the preparation, data collection, analysis, and reporting stages. The population consisted of all 10th-grade students who had not yet participated in fieldwork practice (PKL), totaling approximately 485 students. A sample of 100 respondents was selected using simple random sampling, and this sample size was consistently used across all analyses. The study involved two independent variables, knowledge and PHBS and one dependent variable, self-efficacy. Knowledge was operationalized as students' cognitive understanding of infectious disease prevention and measured using a 10-item multiple-choice test. PHBS was defined as routine health-related behaviors, assessed using a 15-item Likert scale questionnaire ranging from "never" to "always." Self-efficacy was measured using a 12-item Likert-scale instrument and referred to students' confidence in their ability to implement health protocols. All instruments were adapted from prior validated studies and underwent pilot testing. Reliability analysis indicated good internal consistency, with Cronbach's alpha values of 0.82 for PHBS and 0.85 for self-efficacy.

Data were collected through direct questionnaire administration in classroom settings, where respondents completed the instruments within 30–45 minutes under researcher supervision. Prior to participation, informed consent was obtained, and ethical principles, including confidentiality, anonymity, and voluntary participation, were ensured. The Institutional Review Board of Universitas Muhammadiyah Malang granted ethical approval for this study. Data analysis included both descriptive and inferential statistics. Normality testing using the Kolmogorov–Smirnov test indicated that the data were not normally distributed ($p < 0.05$), warranting the use of nonparametric methods. The Spearman rank correlation test was used to examine relationships among knowledge, PHBS, and self-efficacy, while the Wilcoxon signed-rank test was used to assess differences in variables measured at pre and post-test. This analytical approach ensured consistency with data characteristics and strengthened the validity of the findings.

3. RESULTS AND DISCUSSION

General Description of Respondents

The respondents in this study were 100 tenth-grade students who actively participated in practical learning activities at school. All respondents were selected via random sampling from a population that met the research criteria. Based on the collected data, the general characteristics of the respondents indicate that all students are in late adolescence and engage in learning activities involving direct interaction and shared facilities, which are relevant to the context of infectious disease prevention.

Table 1. The age distribution of respondents

Age (Years)	Frequency	Percentage (%)
15	17	17.0
16	58	58.0
17	25	25.0
Total	100	100.0

From the table above, the majority of respondents are 16 years old (58.0%), followed by 17 years old (25.0%), while the smallest group is 15 years old (17.0%).

Table 2. The gender distribution is as follows:

Gender	Frequency	Percentage (%)
Male	88	88.0
Female	12	12.0
Total	100	100.0

The data show that male respondents (88.0%) outnumber female respondents (12.0%), indicating that the majority of participants in this study are male.

Research Results

Descriptive Analysis of Research Variables

Table 3. Descriptive Analysis of Research Variables

Variable	Mean Pre	Mean Post	Description
Knowledge	8.80	9.71	Increased
PHBS	63.43	66.21	Increased
Self Efficacy	41.81	44.38	Increased

The table shows that all variables experienced an increase in mean values after the intervention, including knowledge, clean and healthy living behavior (PHBS), and students' self-efficacy.

Pre and Post Difference Test (Wilcoxon)

Table 4. Pre and Post Difference Test (Wilcoxon)

Variable	Z Value	Sig. (p)	Description
Knowledge	6.387	0.000	Significant
PHBS	4.447	0.000	Significant
Self Efficacy	5.093	0.000	Significant

Based on the table, the Wilcoxon test results show $p < 0.05$ for all variables, indicating a significant difference between pre and post-intervention conditions.

Spearman Correlation Test

Table 5. Spearman Correlation Test

Variable Relationship	Coefficient (r)	Sig. (p)	Description
Knowledge – Self-efficacy	0.001	0.995	Not significant
PHBS – Self-efficacy	0.770	0.000	Significant (strong)

The table shows no relationship between knowledge and self-efficacy. However, there is a strong positive relationship between PHBS and students' self-efficacy.

Analysis Prerequisite Tests

Normality Test

The normality test was conducted using the Kolmogorov–Smirnov test.

Table 6. Normality Test Results

Variable	Kolmogorov Smirnov	Shapiro Wilk
Knowledge	.476	.402
PHBS	.155	.818
Self Efficacy	.165	.828

Since all p-values are < 0.05 , the data for all three variables are normally distributed; therefore, Pearson correlation analysis can be used.

Inferential Statistical Analysis

a. Correlation between Knowledge and Self-efficacy

The Pearson correlation test results show:

$$r = 0.100 ; \text{Sig.} = 0.995$$

These results indicate that there is no significant positive relationship between students' knowledge level and self-efficacy.

b. Correlation between PHBS and Self-efficacy

The Pearson correlation test results show:

$$r = 0.643 ; \text{Sig.} = 0.001$$

These results indicate a strong and significant positive relationship between PHBS and self-efficacy. Students with better, cleaner, and healthier living habits tend to have greater confidence in maintaining their health and in implementing health protocols.

The respondents were 100 tenth-grade students selected by random sampling from a population that met the inclusion criteria at SMK Muhammadiyah 1 Kepanjen. All participants were in late adolescence and were actively engaged in practice-based learning environments characterized by intensive interaction and shared facilities, making them relevant to infectious disease prevention contexts. Based on age distribution, most respondents were 16 years old (58%), followed by 17 years (25%) and 15 years (17%). In terms of gender, male students dominated the sample (88%), while female students accounted for 12%, indicating an imbalanced but contextually typical vocational school composition.

Descriptive analysis shows an increase in all measured variables following the intervention, which in this study refers to a structured health education session combined with guided practice of PHBS (e.g., proper handwashing, hygiene routines, and application of health protocols in school settings). The mean scores for knowledge increased from 8.80 to 9.71, PHBS from 63.43 to 66.21, and self-efficacy from 41.81 to 44.38, indicating overall improvement in both cognitive and behavioral domains, as well as students' confidence.

To examine differences before and after the intervention, the Wilcoxon signed-rank test was used because the data were non-normal. The results show statistically significant improvements in all variables: knowledge ($Z = -6.387$, $p < 0.001$), PHBS ($Z = -4.447$, $p < 0.001$), and self-efficacy ($Z = -5.093$, $p < 0.001$). These findings confirm that the intervention had a meaningful impact on students' knowledge, behavior, and confidence.

The Kolmogorov–Smirnov normality test indicated that all variables had p-values below 0.05, indicating the data were not normally distributed. Therefore, nonparametric analysis was consistently applied using the Spearman rank correlation test. The correlation analysis shows that knowledge is not significantly related to self-efficacy ($r = -0.001$, $p = 0.995$), indicating that increased knowledge does not directly influence students' confidence. In contrast, PHBS demonstrates a strong, significant positive relationship with self-efficacy ($r = 0.770$, $p < 0.001$), suggesting that students who consistently practice healthy behaviors tend to have greater confidence in their ability to implement health protocols. These results highlight that behavioral engagement plays a more dominant role than cognitive understanding in shaping self-efficacy, reinforcing the importance of practice-based approaches in health education.

Discussion

The findings indicate that improvements in knowledge, PHBS, and self-efficacy occurred simultaneously; however, their relationships are not equally strong. The absence of a significant correlation between knowledge and self-efficacy suggests that cognitive understanding alone is insufficient to build students' confidence in practicing health protocols. One plausible explanation is the presence of a “knowledge–action gap,” where individuals may understand what should be done but lack the experiential reinforcement needed to feel in performing those actions. In this context, knowledge functions as a necessary but not sufficient condition, as it does not automatically translate into perceived capability. Students may recognize correct health behaviors conceptually, yet still hesitate in real situations due to limited practice, low habit formation, or situational barriers [11].

This finding aligns with previous studies that report weak or inconsistent relationships between knowledge and behavior-related confidence (Pieters et al., 2025), reinforcing the argument that informational approaches alone often fail to produce sustained behavioral change. Conversely, it contrasts with research suggesting that knowledge significantly predicts self-efficacy when combined with structured training or repeated exposure. The discrepancy suggests that contextual factors, such as learning methods, environmental support, and opportunities for direct practice, mediate the relationship between knowledge and confidence. In vocational education settings, where learning is highly practice-oriented, the absence of strong experiential reinforcement may explain why knowledge alone does not significantly shape self-efficacy [12].

In contrast, the strong relationship between PHBS and self-efficacy highlights the critical role of behavioral experience. Regular engagement in clean and healthy practices provides students with direct mastery experiences, which strengthen their belief in their ability to maintain such behaviors consistently [13]. This supports Social Cognitive Theory, which posits that mastery experience is the most influential source of self-efficacy. When

students repeatedly and successfully perform health-related actions, they develop not only habits but also psychological confidence in their ability to manage health risks. This explains why PHBS demonstrates a stronger contribution compared to knowledge, as it operates at both behavioral and psychological levels [14].

From a broader perspective, these findings emphasize the importance of shifting health education paradigms from knowledge transmission to behavior-centered learning [15]. In terms of educational policy, schools should integrate structured behavioral programs into the curriculum, such as routine hygiene practices, simulation-based training, and continuous monitoring of student habits [16]. Policies should also encourage the creation of supportive environments where health behaviors are consistently modeled by teachers and reinforced through institutional culture [17].

In terms of intervention strategies, the results suggest that effective programs should prioritize experiential learning approaches, including habit formation, peer modeling, and reinforcement mechanisms [18]. Interventions such as guided practice, feedback systems, and environmental cues can enhance both behavior and self-efficacy simultaneously [19]. Additionally, combining cognitive education with behavioral reinforcement strategies is likely to produce more sustainable outcomes than relying on knowledge-based interventions alone [20]. Overall, the study underscores that self-efficacy in health behavior is primarily constructed through action rather than information [21]. Knowledge remains important as a foundational element, but without consistent behavioral engagement, its impact on confidence is limited. Therefore, integrating cognitive and behavioral components in a balanced and context-specific manner is essential for developing effective health promotion strategies among vocational students.

4. CONCLUSION

This study confirms that self-efficacy in infectious disease prevention among vocational high school students is more strongly shaped by behavioral practice (PHBS) than by knowledge alone. While knowledge provides a cognitive foundation, consistent engagement in clean and healthy living behaviors plays a more decisive role in strengthening students' confidence to implement health protocols. These findings reinforce Social Cognitive Theory, particularly the importance of mastery experience in shaping self-efficacy. In practice, the study highlights the need for schools to prioritize behavior-based health education that integrates routine practice and role modeling, rather than relying solely on information delivery. This contributes to the development of more effective and sustainable health promotion strategies in educational settings and offers broader benefits in improving adolescent public health resilience.

This study is limited by its cross-sectional design, which restricts causal interpretation of the variables. The use of self-report instruments may introduce response bias, and the focus on a single school context limits generalizability. Additionally, the study only examines knowledge and PHBS, without incorporating other influential factors such as social support, environmental conditions, or psychological variables.

Further studies are recommended to involve larger and more diverse samples to enhance generalizability. Longitudinal or experimental designs are needed to capture causal

relationships better. Future research should also incorporate additional variables, such as social and environmental influences, and employ mixed-methods approaches to obtain a more comprehensive understanding of how self-efficacy in health behavior is formed and sustained.

ACKNOWLEDGEMENTS

We would like to express our deepest gratitude to all parties who contributed to this research. We would like to thank our colleagues who provided advice, support, and inspiration throughout the research process. We would also like to thank all participants and respondents who took the time to participate in this research. We would also like to thank the institutions that provided support and facilities for conducting this research. All contributions and assistance were invaluable to the smooth running and success of this research. Thank you for all your hard work and collaboration.

REFERENCES

- [1] M. G. C. Yuantari, E. Rachmani, E. Rimawati, S. Handayani, and E. J. Kusuma, "Analysis of Health Protocol Application to Compliance Level In Informal Workers During the Covid-19 Pandemic," *VISIQUES: Jurnal Kesehatan Masyarakat*, vol. 20, no. 1, May 2021, doi: 10.33633/visikes.v20i1.4645.
- [2] A. Yoshikawa *et al.*, "Simulation-based infection prevention and control training for medical and healthcare students: a systematic review," *Front. Med. (Lausanne)*, vol. 12, May 2025, doi: 10.3389/fmed.2025.1529557.
- [3] I. W. Widiani, S. Triyono, I. G. Sudirtha, M. A. Adijaya, and I. G. A. A. M. Wulandari, "Bloom's revised taxonomy-oriented learning activity to improve reading interest and creative thinking skills," *Cogent Education*, vol. 10, no. 2, Dec. 2023, doi: 10.1080/2331186X.2023.2221482.
- [4] P. Velez-Gomez, S. L. Dodd, M. Quick, and S. R. Niraula, "Adaptation and validation of a scale to measure self-efficacy for health practices in adolescents," *J. Pediatr. Nurs.*, vol. 85, pp. 143–150, Nov. 2025, doi: 10.1016/j.pedn.2025.07.022.
- [5] I. Rose *et al.*, "Facilitators and Barriers to Implementing COVID-19 Prevention Strategies in K-12 Public Schools," *The Journal of School Nursing*, vol. 41, no. 2, pp. 246–257, Apr. 2025, doi: 10.1177/10598405231191282.
- [6] J. B. Prihanto, F. Nurhayati, E. S. Wahjuni, R. Matsuyama, M. Tsunematsu, and M. Kakehashi, "Health Literacy and Health Behavior: Associated Factors in Surabaya High School Students, Indonesia," *Int. J. Environ. Res. Public Health*, vol. 18, no. 15, p. 8111, Jul. 2021, doi: 10.3390/ijerph18158111.
- [7] M. M. Pieters *et al.*, "Changes in Hand Hygiene Knowledge, Attitudes, and Practices Among Primary School Students: Insights from a Promotion Program in Guatemala," *Int. J. Environ. Res. Public Health*, vol. 22, no. 3, p. 424, Mar. 2025, doi: 10.3390/ijerph22030424.
- [8] A. N. Ly *et al.*, "Mixed-methods evaluation and behavior change interventions to improve hand hygiene resources and practices among healthcare workers in polyclinics and health centers in Belize, 2023," *PLoS One*, vol. 20, no. 12, p. e0335077, Dec. 2025, doi: 10.1371/journal.pone.0335077.
- [9] E. Koota, J. Kaartinen, and H.-L. Melender, "Impact of educational interventions for professionals on infection control practices to reduce healthcare-associated infections and prevent infectious diseases: A systematic review," *Collegian*, vol. 31, no. 4, pp. 218–231, Aug. 2024, doi: 10.1016/j.colegn.2024.04.006.
- [10] A. L. Kleppang, A. M. Steigen, and H. S. Finbråten, "Explaining variance in self-efficacy among adolescents: the association between mastery experiences, social support, and self-efficacy," *BMC Public Health*, vol. 23, no. 1, p. 1665, Aug. 2023, doi: 10.1186/s12889-023-16603-w.
- [11] V. S. Egele and R. Stark, "Operationalization of the social cognitive theory to explain and predict physical activity in Germany: a scale development," *Front. Sports Act. Living*, vol. 6, Nov. 2024, doi: 10.3389/fspor.2024.1508602.
- [12] N. Kholifah, M. Nurtanto, F. Mutohhari, U. Wahyuningsih, and S. Listiani, "Students for practical learning readiness in vocational education: A post-pandemic survey," *Journal of Pedagogical Research*, Aug. 2024, doi: 10.33902/JPR.202426503.

-
- [13] V. Kalantzi *et al.*, “Exploring the Role of Self-Efficacy in Maintaining Healthy Lifestyle Habits among Patients with Cardiometabolic Diseases; Findings from the Multi-Center IACT Cross-Sectional Study,” *Life*, vol. 14, no. 6, p. 736, Jun. 2024, doi: 10.3390/life14060736.
 - [14] P. M. Shahrabaki *et al.*, “The relationship between COVID-19 anxiety and self-efficacy among adolescent students: A cross-sectional study,” *PLoS One*, vol. 19, no. 12, p. e0310434, Dec. 2024, doi: 10.1371/journal.pone.0310434.
 - [15] K. F. Islam *et al.*, “Social cognitive theory-based health promotion in primary care practice: A scoping review,” *Heliyon*, vol. 9, no. 4, p. e14889, Apr. 2023, doi: 10.1016/j.heliyon.2023.e14889.
 - [16] D. Setyaramadani and R. R. Rosidah, “Penanaman Self-Efficacy Dalam Membentuk Kesiapan Kerja: Studi Kasus Sekolah Vokasi DI Yogyakarta,” *Efisiensi : Kajian Ilmu Administrasi*, vol. 21, no. 2, pp. 182–197, Sep. 2024, doi: 10.21831/efisiensi.v21i2.77321.
 - [17] M. Sholihah, O. Soedirham, and M. Triharini, “Niat Keluarga Terhadap Peningkatan Peran Mencegah Sedentary Lifestyle Remaja,” *Jurnal Penelitian Kesehatan “SUARA FORIKES” (Journal of Health Research “Forikes Voice”)*, vol. 10, no. 4, p. 257, Oct. 2019, doi: 10.33846/sf10402.
 - [18] A. Salas, M. Tan, S. Andrienko, K. Cengiz, and J. J. Wisco, “Reaching the top of Bloom’s Taxonomy: an innovative pilot program for preclinical undergraduate and medical school students to create curricula for STEMM outreach/service-learning programs,” *Front. Educ. (Lausanne)*, vol. 9, Dec. 2024, doi: 10.3389/educ.2024.1446513.
 - [19] R. D. Shima, I. Mahani, K. S. Pribadi, and K. A. Hartono, “Study of COVID-19 Health Protocol Standards in Construction Industry of Indonesia,” *Journal of Engineering and Technological Sciences*, vol. 54, no. 6, p. 220610, Dec. 2022, doi: 10.5614/j.eng.technol.sci.2022.54.6.10.
 - [20] N. Imaniyati and D. A. Fadhilah, “Pengaruh Self Efficacy terhadap Komunikasi Interpersonal,” *Jurnal Pendidikan Manajemen Perkantoran*, vol. 8, no. 2, pp. 217–228, Jul. 2023, doi: 10.17509/jpm.v8i2.56501.
 - [21] S. Han *et al.*, “Physical Fitness, Exercise Behaviors, and Sense of Self-Efficacy Among College Students: A Descriptive Correlational Study,” *Front. Psychol.*, vol. 13, Jul. 2022, doi: 10.3389/fpsyg.2022.932014.
-