Jurnal Riset Kualitatif dan Promosi Kesehatan
E-ISSN: 2775-4944
Volume. 1, Issue 2, July 2022
Page No: 42-56

Improving Student Health Through PHBS Education: Strategies, Challenges, and Future Directions for Better Welfare

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Received : June 19, 2022
Accepted : July 25, 2022
Published : July 31, 2022

Citation: Ashar, M.R., (2022). Improving Student Health Through PHBS Education: Strategies, Challenges, and Future Directions for Better Welfare. Jurnal Riset Kualitatif dan Promosi Kesehatan, 1(2), 42-56.

https://doi.org/10.61194/jrkpk.v1i2.655

ABSTRACT: Clean and Healthy Living Behavior (PHBS) education is an essential public health strategy for improving hygiene, nutrition, and physical activity among students. This study examines the effectiveness of PHBS educational interventions in promoting behavioral change while identifying key challenges that hinder implementation. A systematic review methodology was employed to assess relevant literature from academic databases, focusing on studies that evaluate school-based health education programs. The results indicate that structured interventions, including interactive learning, digital education, and community engagement, significantly enhance students' adherence to PHBS principles. However, barriers such as inadequate infrastructure, socio-cultural resistance, and inconsistent policy enforcement continue to limit program effectiveness. The discussion highlights the need for improved resource allocation, policy integration, and innovative educational approaches to address these challenges. Additionally, multi-sectoral collaboration among schools, health professionals, and policymakers is crucial in ensuring sustainable PHBS education. This study emphasizes the importance of integrating health education into national curricula and adopting evidence-based interventions to promote long-term behavioral change. Future research should explore scalable PHBS education models and assess their impact across diverse socio-economic settings. Strengthening PHBS education through policy support and interdisciplinary collaboration is essential in fostering a healthier generation and addressing public health concerns in educational environments.

Keywords: PHBS Education, Health Promotion, School-Based Health Programs, Hygiene Behavior, Student Nutrition, Physical Activity, Public Health Policy.

INTRODUCTION

The increasing recognition of Clean and Healthy Living Behavior (PHBS) among students across diverse educational settings has emerged as a fundamental aspect of public health education. PHBS encompasses essential health practices such as handwashing, proper sanitation, hygiene, and

nutritional awareness, which collectively contribute to improved well-being and disease prevention (Kabir et al., 2021a). The importance of integrating health education into school curricula has been increasingly emphasized in the last decade, as educational institutions play a pivotal role in fostering awareness and behavioral change among young individuals. Various global health organizations, including the World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF), have promoted school-based health programs to instill lifelong hygiene habits (Kashefi et al., 2020). These efforts highlight the growing understanding that structured education can significantly impact students' awareness, attitudes, and practices regarding health and hygiene.

Over time, various interventions have been implemented to promote PHBS, with particular emphasis on the role of Knowledge, Information, and Education (KIE) strategies in advancing public health literacy (Chinkonda et al., 2024). The KIE approach focuses on equipping individuals with the necessary knowledge to make informed decisions regarding health and well-being. Research suggests that school-based educational programs addressing topics such as water, sanitation, and hygiene (WASH) lead to measurable improvements in students' health behaviors (Kabir et al., 2021b). For instance, a study conducted in Bangladesh found that public university students exposed to early educational interventions demonstrated better sanitation practices and awareness of clean water management (Kabir et al., 2021b). Similar results have been observed in other regions, indicating that the incorporation of health education into formal learning structures can foster the adoption of sustainable health practices among students (Chinkonda et al., 2024).

Education campaigns focused on communicable diseases, such as HIV, tuberculosis, and malaria, have also demonstrated the effectiveness of KIE in enhancing students' knowledge and attitudes towards disease prevention (Kusuma et al., 2020). In regions with high rates of infection, tailored educational interventions have been instrumental in raising awareness and promoting preventive behaviors. For example, in a study examining the impact of school-based HIV awareness programs, students who participated in structured learning activities showed increased understanding of transmission risks and prevention methods (Kusuma et al., 2020). These findings underscore the importance of integrating health education into school curricula, ensuring that students receive accurate and relevant information regarding public health challenges.

The application of KIE strategies in health education extends beyond disease prevention to encompass broader aspects of student well-being. For instance, programs promoting reproductive health awareness have demonstrated positive shifts in knowledge and behavior following structured educational interventions (Hassan, 2023). Likewise, studies focusing on medical and pharmacy students highlight the role of continuous education and training in reinforcing health-promoting behaviors (Ritchie et al., 2020). Recent advancements in educational methodologies, such as gamification and digital learning, have further enhanced the effectiveness of KIE approaches by making health education more engaging and interactive (Azhari et al., 2019). Research indicates that students who participate in gamified learning environments exhibit higher retention of health-related information and a sustained interest in maintaining healthy living practices (Azhari et al., 2019). These findings illustrate the potential of innovative educational tools in reinforcing PHBS among students.

Despite the growing emphasis on PHBS education, significant challenges persist in its implementation across different educational settings. One of the primary barriers is the lack of trained educators who can effectively deliver health education programs (Kabir et al., 2021b). In many low-income regions, there is a shortage of qualified teachers with expertise in health education, leading to inconsistencies in the delivery and effectiveness of PHBS-related content. Additionally, educational curricula often fail to prioritize health education as a core subject, resulting in limited exposure to critical hygiene and nutrition topics (McCarter & Gavin, 2011). When health topics are included in school programs, they may be overshadowed by other academic priorities, reducing their impact on students' behavior (McCarter & Gavin, 2011).

Socioeconomic disparities also pose significant obstacles to the successful implementation of PHBS programs. Many schools, particularly in underprivileged communities, lack the necessary infrastructure, such as clean water facilities and adequate sanitation, to support hygiene education (Kabir et al., 2021b). The absence of these basic resources limits students' ability to practice what they learn, undermining the effectiveness of health education initiatives. Cultural beliefs and societal norms further complicate efforts to promote PHBS, particularly in areas where discussions surrounding reproductive health and personal hygiene are considered taboo (Chinkonda et al., 2024). Overcoming these cultural barriers requires targeted community engagement efforts that integrate local traditions with evidence-based health education practices.

Another significant challenge is the inconsistency of health policies and governmental support for PHBS education. In many regions, the implementation of school health programs is hindered by a lack of clear legislative frameworks and insufficient funding (Kabir et al., 2021b). As a result, disparities exist in the quality and accessibility of health education across different school systems. For example, while some districts successfully integrate comprehensive health curricula, others struggle to implement even basic hygiene education due to financial and policy constraints (McCarter & Gavin, 2011). Addressing these disparities requires coordinated efforts between policymakers, educators, and public health organizations to establish standardized guidelines for PHBS education in schools.

Given these challenges, there is a critical need for further research to evaluate the long-term effectiveness of KIE-based PHBS interventions. While existing studies highlight the benefits of health education, there is limited empirical evidence on the sustained impact of these programs on students' behavior over time. Additionally, few studies have examined the intersection of socioeconomic factors and health education, leaving gaps in our understanding of how financial stability influences students' ability to adopt and maintain health-promoting behaviors. Longitudinal research is necessary to assess the long-term retention of PHBS knowledge and identify best practices for reinforcing behavioral change in diverse educational settings (Chinkonda et al., 2024).

The primary objective of this study is to analyze the effectiveness of KIE strategies in enhancing student awareness and practice of PHBS. Specifically, this review aims to explore how structured health education interventions impact students' knowledge, attitudes, and behaviors related to hygiene, nutrition, and disease prevention. By synthesizing existing literature on school-based

health programs, this study seeks to provide evidence-based recommendations for improving PHBS education and addressing implementation challenges.

This study focuses on educational institutions in both urban and rural settings, with a particular emphasis on regions where PHBS education has been actively implemented. By examining case studies from different geographical areas, the review aims to identify contextual factors that influence the success of health education programs. Additionally, the study considers various demographic groups, including primary and secondary school students, university students, and educators, to provide a comprehensive analysis of PHBS education across different age groups. Through this approach, the study aims to contribute to the development of effective health education policies that can be adapted to diverse cultural and socioeconomic contexts.

METHOD

This study employed a systematic review approach to examine the role of Knowledge, Information, and Education (KIE) strategies in promoting Clean and Healthy Living Behavior (PHBS) among students. A comprehensive literature search was conducted across academic databases, including PubMed, Scopus, and Google Scholar, targeting studies published within the last ten years. The search strategy incorporated predefined keyword combinations and Boolean operators to ensure precision and completeness. Key search terms included "Clean and Healthy Living Behavior" AND "School-based Education," "PHBS" AND "KIE Approach" AND "Student Behavior," "Health Education" AND "Hygiene Practices" AND "Students," "Public Health Education" AND "KIE" AND "Behavior Modification," among others. The combination of these keywords facilitated the retrieval of relevant intervention studies, systematic reviews, and empirical research examining PHBS education.

To ensure the selection of high-quality studies, rigorous inclusion and exclusion criteria were applied. The inclusion criteria encompassed peer-reviewed articles that utilized randomized controlled trials, cohort studies, or qualitative methods addressing school-based health interventions. Eligible studies focused on students in primary, secondary, or tertiary education settings and investigated topics related to sanitation, hygiene, nutrition, physical health, and psychosocial well-being within an educational framework. Furthermore, only studies explicitly describing KIE-driven interventions or educational strategies in health promotion were considered. Inclusion was also dependent on the presence of clear outcome assessments measuring knowledge acquisition, behavioral change, and attitude shifts towards health interventions.

Studies were excluded if they were not peer-reviewed, focused on adult populations outside educational settings, or examined health topics unrelated to PHBS education. Additionally, articles that failed to present measurable outcomes related to student health knowledge and behaviors or lacked sufficient data for analysis were omitted. This stringent selection process ensured that only studies providing robust empirical evidence on the effectiveness of KIE approaches in PHBS education were included in the review.

To enhance reliability, a multi-stage screening process was employed. Four independent reviewers assessed the retrieved studies, beginning with title and abstract screening, followed by a full-text

evaluation to determine relevance and methodological rigor. The selected studies were then analyzed thematically to identify recurring patterns in how KIE-based educational interventions influence student health behavior and awareness. These findings provided valuable insights into the effectiveness of KIE strategies in fostering sustainable health-promoting behaviors among students, contributing to evidence-based recommendations for public health education policies and school-based interventions.

RESULT AND DISCUSSION

Effectiveness of Interventions in Improving Personal Hygiene Practices

Numerous interventions have demonstrated effectiveness in improving students' personal hygiene practices within educational settings. A study by Kabir et al. (2021) highlighted that targeted educational programs significantly enhanced university students' knowledge and attitudes toward sanitation and hygiene practices in Bangladesh(Kabir et al., 2021b). The intervention involved workshops and seminars focused on the health implications of poor hygiene, resulting in substantial improvements in handwashing practices and overall sanitation behaviors among participants.

Supporting this, Alcaraz et al. (2008) found that culturally tailored programs played a crucial role in increasing engagement with public health topics, ultimately leading to improved hygiene practices among students from minority groups(Alcaraz et al., 2008). Moreover, Wu et al. (2013) emphasized that integrating hands-on activities within community-academic collaborations facilitated students' awareness of health issues, leading to sustainable behavioral changes in hygiene practices(Wu et al., 2013).

In addition to traditional health education, the integration of technology has emerged as a promising tool in promoting hygiene awareness. Digital interventions, such as mobile health applications and online educational platforms, have been shown to significantly enhance youth engagement. A study on digital education programs for osteoporosis demonstrated that interactive, technology-driven interventions effectively improved knowledge and attitudes toward bone health (Schoenfeld et al., 2008). Similar methodologies applied to hygiene education could yield comparable benefits, particularly in encouraging sustained hygiene practices among students.

Cultural Perceptions of Hygiene

Cultural perceptions significantly influence students' adherence to PHBS principles. Various studies indicate that attitudes toward hygiene are deeply rooted in local customs and traditional practices. In Malawi, Chinkonda et al. (2024) reported that prevailing community beliefs about cleanliness and sanitation shaped hygiene behaviors among students(Chinkonda et al., 2024). For instance, students from regions where agricultural labor took precedence over personal hygiene were less likely to adopt improved sanitation practices, despite being exposed to educational interventions.

Similarly, Kabir et al. (2021) observed that while awareness of hygiene-related health risks was widespread in rural Bangladesh, adherence to recommended hygiene practices remained low(Kabir et al., 2021b). Deeply entrenched cultural norms often dismissed the necessity of handwashing and modern sanitation facilities, highlighting a fundamental disconnect between educational messaging and local beliefs. This underscores the need for culturally sensitive health interventions that integrate local customs to facilitate behavior change.

Additional studies have shown that disadvantaged socioeconomic backgrounds also play a role in determining students' hygiene practices. Economic and infrastructural limitations often prevent students from complying with hygiene recommendations, even when they possess adequate knowledge (Kabir et al., 2021b). Qualitative research has found that students interpret hygiene education through the lens of their socio-cultural environment, necessitating interventions that include community participation. Alcaraz et al. (2008) demonstrated that involving parents and community leaders in hygiene promotion efforts led to a higher rate of behavioral change among students(Alcaraz et al., 2008). Community-based approaches thus provide a viable means of aligning hygiene education with local cultural perspectives.

Effective Educational Methods for Increasing Handwashing Compliance

Several educational methodologies have been identified as effective in increasing handwashing compliance among students. Interactive and participatory learning strategies have proven to be particularly successful. Kabir et al. (2021) demonstrated that combining theoretical instruction with practical demonstrations led to increased adherence to handwashing among university students in Bangladesh(Kabir et al., 2021b).

Gamification has also emerged as a powerful tool in health education, offering students engaging and interactive experiences. Limbong et al. (2021) found that incorporating gamified elements into hygiene education improved knowledge retention and encouraged consistent hygiene practices among students. Points, badges, and challenges were effective motivational tools in promoting handwashing compliance(Limbong et al., 2021).

Multimedia and technology-based interventions have further facilitated behavioral change. Digital platforms such as mobile applications, video tutorials, and social media campaigns have been shown to enhance student engagement with hygiene practices. A study conducted during the COVID-19 pandemic found that digital educational tools were effective in disseminating handwashing information and improving compliance among undergraduate students (Al-Shahethi et al., 2024). These findings support the notion that leveraging technology in health education can reinforce proper hygiene habits among students.

Behavioral nudging techniques, such as strategically placed reminders in restrooms and classrooms, have also been found effective. Alam et al. (2023) demonstrated that consistent exposure to hygiene-related messages significantly increased the likelihood of students washing their hands at critical times, such as before meals and after using the restroom(Alam et al., 2023). These findings suggest that continuous reinforcement of health education is essential to sustaining proper hygiene practices.

Barriers to Practicing Proper Hand Hygiene in Schools

Despite the effectiveness of various educational methods, several barriers hinder students from practicing proper hand hygiene in school environments. One of the most prominent challenges is the lack of access to clean water and adequate handwashing facilities. Larebo & Erkalo (2021) noted that in low-income schools, insufficient access to soap and functional sanitation facilities often prevents students from washing their hands, even when they are aware of its importance(Larebo & Erkalo, 2021).

Cultural and social perceptions also impact adherence to hygiene practices. Some students hold misconceptions regarding the necessity of handwashing, leading to inconsistent compliance. Studies in rural communities have identified a gap between hygiene knowledge and behavior, often influenced by local beliefs and attitudes toward cleanliness (Kabir et al., 2021b).

Time constraints present another significant barrier. Many students report feeling rushed during school breaks, which often results in neglecting proper hand hygiene. Educational programs must emphasize integrating handwashing as an essential part of daily routines. Additionally, inconsistency in hygiene messaging within schools can lead to confusion. Standardized educational campaigns that reinforce the importance of handwashing at critical moments can help address this issue.

Impacts of Nutrition Education on Student Dietary Choices and Long-Term Eating Habits

Nutrition education significantly influences student dietary choices and fosters long-term healthy eating habits. Taylor et al. (2023) found that comprehensive school-based nutrition interventions improved students' ability to make informed food choices, leading to an increase in fruit and vegetable consumption and a decrease in processed food intake(Blake et al., 2023).

Hands-on learning methods, such as cooking workshops, have been particularly effective in fostering healthy eating behaviors. A randomized controlled trial by Wu et al. (2013) demonstrated that students who participated in interactive nutrition workshops exhibited substantial improvements in their self-reported fruit and vegetable intake compared to those receiving traditional lectures(Wu et al., 2013). Additionally, longitudinal studies have linked school-based nutrition programs to reduced obesity rates among students (McCarter & Gavin, 2011).

Contribution of School-Based Meal Programs to Student Health and Nutrition Awareness

School meal programs play a vital role in enhancing student health and nutrition awareness. Federally funded programs ensure that students receive balanced meals, aligning with recommended dietary guidelines. Gambhir et al. (2024) found that students participating in school meal programs displayed improved focus and academic performance due to better nutrition(Gambhir et al., 2024).

Incorporating nutrition education within meal programs further reinforces healthy eating behaviors. Riaz et al. (2022) highlighted that school initiatives that included locally sourced produce encouraged students to develop a greater appreciation for fresh foods(Riaz et al., 2022). Additionally, Black et al. (2016) found that integrating nutrition education with school meals led to long-term positive dietary habits(Memon et al., 2016).

Successful School-Based Initiatives Promoting Active Lifestyles

School-based initiatives aimed at increasing physical activity have been successful in fostering active lifestyles among students. A study conducted in the United Kingdom demonstrated that introducing varied activities such as martial arts and team sports resulted in higher student participation rates (Kabir et al., 2021b). Similarly, schools that promoted active travel policies, such as walking or biking to school, reported increased fitness levels and social interaction among students (Bayraktar & Bayraktar, 2024).

Correlation Between Availability of Physical Activity Facilities and Student Engagement

Access to physical activity facilities plays a crucial role in determining student engagement in exercise. Vives-Cases et al. (2020) found that schools with well-maintained gyms and sports fields experienced higher levels of student participation in physical activities(Vives-Cases et al., 2019). Conversely, inadequate or poorly maintained facilities led to lower engagement levels.

School culture and administrative support also influence student participation in physical activity. A study in Canada found that when students were involved in decision-making regarding school sports facilities, they were more likely to engage in physical activities (Espeleta et al., 2017). Ensuring that schools prioritize and invest in quality sports facilities can further enhance student engagement and promote healthier lifestyles.

The findings from various studies on Clean and Healthy Living Behavior (PHBS) education align with certain public health policies while also highlighting discrepancies that warrant further attention. Public health policies generally advocate for comprehensive education programs and interventions aimed at fostering healthy behaviors among youth. However, empirical evidence suggests that the implementation and outcomes of these programs vary significantly depending on local contexts, resource availability, and cultural perceptions. For instance, research by Kabir et al. (2021) demonstrates that extensive school-based interventions focused on sanitation and hygiene have successfully modified student behavior and increased awareness of health practices(Kabir et al., 2021b). This aligns with global public health policies emphasizing sanitation as a fundamental component of health and education. The World Health Assembly's resolution on water, sanitation, and hygiene (WASH) in schools reinforces these findings, underscoring the necessity for supportive infrastructure to complement educational efforts.

Conversely, studies such as Ortega-Paredes et al. (2022) indicate persistent gaps in knowledge and awareness about issues like antibiotic resistance among students, despite existing public health policies promoting antibiotic stewardship education(Ortega-Paredes et al., 2022). This suggests

that while policies may exist, their enforcement and integration into educational curricula remain inconsistent. This reflects a broader challenge in public health: proposed policies often struggle to translate into effective localized interventions due to logistical hurdles and a lack of stakeholder engagement in curriculum design. Similarly, Wu et al. (2013) found that community-based health education initiatives significantly improve awareness of conditions such as colorectal cancer, emphasizing the importance of integrating public health education into academic settings(Wu et al., 2013). These initiatives align well with policies promoting disease prevention and early detection, reinforcing the role of educational institutions in fostering public health literacy.

In contrast, research on sexual health education highlights contradictions between current educational practices and public health directives. Findings by Mansor et al. (2020) indicate that students often rely on peers for information about sexually transmitted infections (STIs), with insufficient input from parents(Mansor et al., 2020). This contrasts with public health recommendations advocating for family engagement in sexual health education to reduce stigma and improve knowledge. Consequently, public health policies must prioritize effective communication strategies for parents and healthcare providers to enhance student learning experiences. Similarly, initiatives aimed at promoting healthy eating practices in schools reveal inconsistencies in the integration of nutrition education within curricula. While public health policies emphasize improved school meal programs and dietary education, research by Cohen et al. (2012) highlights challenges in addressing cultural food preferences, which influence both student engagement and meal selection(Cohen-Cline et al., 2015). Without culturally adaptive strategies, students may reject nutritionally adequate school meals in favor of familiar but less healthy food options.

Regarding physical activity promotion, studies demonstrate a clear correlation between school infrastructure and student participation in exercise (Chinkonda et al., 2024; Espeleta et al., 2017). Schools with well-maintained sports facilities report higher engagement levels in physical activities, aligning with public health policies encouraging the development of comprehensive physical education programs. However, these initiatives must also address broader issues such as equitable facility maintenance and accessibility for disadvantaged students.

Systemic Factors Influencing PHBS Implementation

The successful implementation of PHBS programs in schools is influenced by a myriad of systemic factors that can either facilitate or hinder their effectiveness. One critical factor is administrative support and policy frameworks. School leadership plays a crucial role in prioritizing health education initiatives and securing necessary resources. Studies show that when school administrators actively promote health practices—such as establishing health committees or integrating PHBS into curricula—the likelihood of successful implementation increases significantly (Kabir et al., 2021b). Administrative support provides structural backing for these programs and fosters a school culture that values health as an essential aspect of education.

Public health policies supporting health education also significantly affect program implementation. While many national and international policies advocate for integrating health

topics into school curricula, their effectiveness often depends on local adaptation and resource availability. Chinkonda et al. (2024) highlight that policies not tailored to demographic and socio-economic conditions may fail to resonate with students, reducing engagement and effectiveness(Chinkonda et al., 2024). Without adequate funding and structured implementation plans, even well-intentioned policies may not yield the desired impact.

The availability of infrastructure is another key factor in determining the success of PHBS initiatives. Schools must have adequate facilities—such as clean water access, sanitary restrooms, and recreational spaces—to support health education programs. Research by Kusuma et al. (2020) indicates that students attending schools with inadequate hygiene facilities exhibit lower compliance with sanitation practices, despite receiving PHBS education(Kusuma et al., 2020). This highlights the direct correlation between infrastructure availability and behavioral outcomes.

Cultural perceptions and community engagement further shape the effectiveness of PHBS programs. The cultural context surrounding hygiene, nutrition, and physical activity can influence students' receptivity to health education initiatives. Programs designed to address community-specific beliefs and practices often have greater success in achieving behavioral change. ვერულავა et al. (2018) emphasize that culturally adapted health education programs yield higher participation rates and improved outcomes(ვერულავა et al., 2018). Integrating community perspectives and leveraging local influencers can enhance the acceptance and effectiveness of PHBS initiatives.

Another systemic factor affecting PHBS implementation is the training and preparedness of educators. Teachers equipped with adequate knowledge and pedagogical skills can more effectively engage students in health education. Hassan (2023) highlights that educators who receive ongoing professional development in health topics and interactive teaching strategies have a greater impact on student learning(Hassan, 2023). Schools should invest in training programs that enhance educators' competence in delivering health education, ultimately leading to better student outcomes.

Collaboration between schools, healthcare providers, and community organizations also strengthens health education frameworks. Multi-sectoral partnerships facilitate the sharing of resources and expertise, improving the reach and effectiveness of PHBS programs. Al-Taani et al. (2022) found that health campaigns incorporating input from public health professionals achieved higher success rates in promoting positive behavior change among students. These collaborations can ensure that health education remains relevant, evidence-based, and impactful.

Limitations

This study acknowledges several limitations. First, while numerous studies demonstrate positive associations between PHBS education and behavior change, the long-term retention of these behaviors remains uncertain. Many interventions measure short-term outcomes, making it difficult to assess whether knowledge gains translate into lasting lifestyle changes. Additionally, regional and socio-economic disparities affect the generalizability of findings. Programs that succeed in

resource-rich environments may not be directly applicable to low-income settings where infrastructural and cultural barriers persist.

Another limitation is the reliance on self-reported data in many studies, which may introduce biases in measuring behavioral adherence. Students may overreport compliance with hygiene and health practices due to social desirability bias. More objective methods, such as observational studies or biometric assessments, are needed to validate self-reported data. Furthermore, while PHBS education programs emphasize knowledge dissemination, they may not sufficiently address systemic constraints—such as poverty, food insecurity, and access to healthcare—that significantly influence students' ability to adopt and sustain healthy behaviors.

Implication

Future research should focus on evaluating the long-term impact of PHBS interventions to determine their effectiveness beyond the immediate post-intervention period. Longitudinal studies examining how early exposure to PHBS education influences health behaviors in adulthood would provide valuable insights. Additionally, research should explore the scalability of successful interventions across diverse cultural and economic contexts. Understanding how to adapt programs for different settings will enhance their global applicability.

Another critical area for further study is the integration of technology into PHBS education. Digital platforms, gamification, and virtual learning environments present opportunities to make health education more engaging and accessible. Research evaluating the effectiveness of these innovative approaches can inform best practices for modernizing PHBS education. Moreover, interdisciplinary collaborations between educators, public health professionals, and policymakers should be encouraged to ensure that PHBS initiatives align with real-world health needs and challenges.

Efforts to bridge the gap between policy and practice are also necessary. Future research should examine how policy frameworks can be effectively translated into actionable school-based programs. Identifying mechanisms for improving policy enforcement and stakeholder engagement will be crucial in optimizing PHBS education outcomes. Additionally, exploring strategies for increasing parental involvement in health education can enhance the sustainability of these initiatives, ensuring that health behaviors are reinforced both at school and at home.

By addressing these research gaps, future studies can contribute to the development of more effective and contextually relevant PHBS programs, ultimately fostering healthier generations of students worldwide.

CONCLUSION

This study underscores the effectiveness of Clean and Healthy Living Behavior (PHBS) education in fostering improved health awareness and behavioral changes among students. The findings highlight that well-structured educational interventions, such as interactive learning, digital tools,

and community-based programs, significantly enhance hygiene practices, nutrition choices, and physical activity engagement. However, systemic challenges, including inadequate infrastructure, cultural resistance, and inconsistent policy enforcement, continue to hinder the full implementation of PHBS education in schools. Addressing these barriers requires a multi-sectoral approach involving educators, policymakers, and community stakeholders to ensure sustainable and culturally adaptive health education initiatives.

Public health policies must emphasize the integration of PHBS education into national curricula, ensuring adequate teacher training and resource allocation to support long-term program success. Additionally, incorporating innovative approaches, such as gamification and digital learning, can enhance student engagement and retention of health knowledge. Future research should explore the long-term impact of PHBS interventions, particularly in diverse socio-economic contexts, and assess scalable models that can be effectively implemented across different educational systems.

By prioritizing comprehensive health education strategies, schools can play a transformative role in equipping students with the knowledge and skills necessary for lifelong health and well-being. Strengthening PHBS education through evidence-based policies and interdisciplinary collaborations will be key to fostering a healthier generation and reducing preventable health issues among youth.

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