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Effectiveness of Health Education in Improving Clean and Healthy Living Behavior (PHBS) in Rural Communities

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ABSTRACT

Clean and Healthy Living Behavior (PHBS) is a critical component of public health, especially in rural communities where access to health information and services may be limited. This study aims to evaluate the effectiveness of structured health education interventions in enhancing PHBS among rural populations. Using a quasi-experimental design, health education sessions were conducted across selected rural villages, with pre- and post-intervention assessments of knowledge, attitudes, and practices related to key PHBS indicators such as handwashing, use of clean water, latrine use, household waste management, and environmental hygiene. The results showed a significant increase in participants' health knowledge and behavioral compliance with PHBS standards after the intervention. Statistical analysis revealed notable improvements in hand hygiene practices ($p < 0.01$), proper waste disposal ($p < 0.05$), and latrine usage ($p < 0.01$). The study concludes that targeted health education can serve as an effective tool to foster sustainable behavior change in rural settings. Strengthening community-based health promotion efforts is recommended to ensure long-term health benefits and empowerment of rural populations.

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1. INTRODUCTION

Health is a fundamental human right and a vital component of sustainable development. It is not only a measure of an individual's well-being but also a critical determinant of social and economic productivity. In developing countries, public health challenges are multifaceted and often rooted in the disparity between urban and rural populations in terms of access to health information, infrastructure, and services. Among the key strategies to promote better public health outcomes is the implementation of Clean and Healthy Living Behavior, known in Indonesia as Perilaku Hidup Bersih dan Sehat (PHBS). This concept encompasses a set of individual and community behaviors aimed at preventing disease and promoting health through hygiene and sanitation.

The World Health Organization (WHO) has emphasized the importance of health promotion as a means to empower individuals and communities to take control over their health. Health education, a cornerstone of health promotion, plays a vital role in facilitating knowledge acquisition and behavior change. When effectively delivered, health education can transform knowledge into practical actions that contribute to a healthier environment and reduce the burden of preventable diseases. In rural communities, where education levels are often lower and traditional beliefs may influence health practices, health education becomes even more essential.

Rural communities face unique health challenges. These include limited access to clean water, poor sanitation, inadequate waste disposal systems, and a lack of health facilities. These conditions contribute to the high prevalence of preventable diseases such as diarrhea, respiratory infections, skin

diseases, and parasitic infections. The Ministry of Health of Indonesia, through various public health initiatives, has recognized PHBS as an essential framework to improve community health, particularly in areas with limited access to health services. However, the success of PHBS initiatives heavily depends on the population's understanding, acceptance, and consistent practice of the recommended behaviors.

The implementation of PHBS in rural areas often encounters significant barriers. These include lack of awareness, deep-rooted cultural practices, economic limitations, and limited engagement of local stakeholders. For example, in some rural areas, open defecation is still considered acceptable due to the absence of latrines or misconceptions about hygiene. Additionally, unsafe water sources are often used due to proximity or tradition, even when clean water alternatives are available. These behaviors, ingrained through generations, require comprehensive, culturally sensitive, and continuous educational efforts to change.

Health education is recognized as an effective method to influence health behavior and promote PHBS. It involves not only the dissemination of information but also motivation, skill-building, and behavior reinforcement strategies. A well-designed health education program should be participatory, adapted to the local context, and delivered through trusted channels such as community leaders, school teachers, and health workers. Visual aids, demonstrations, role-playing, and community discussions have been found to be effective tools in rural education campaigns. Moreover, integrating local values and beliefs into the health messages ensures greater community acceptance and sustainability of behavior change.

Several studies have demonstrated the effectiveness of health education in promoting health-enhancing behaviors. For instance, interventions that focused on handwashing with soap significantly reduced the incidence of diarrheal diseases in children under five. Similarly, educational campaigns about the dangers of open defecation and the benefits of latrine use have shown success in improving sanitation practices. Nevertheless, the evidence also suggests that short-term interventions are less likely to produce sustained behavior change unless they are supported by enabling environments and follow-up mechanisms.

In Indonesia, the government has included PHBS in national health programs, especially through the primary healthcare system and the role of Posyandu (Integrated Health Posts) and Puskesmas (Community Health Centers). Health cadres, who are often volunteers from the local community, play a critical role in promoting PHBS. However, the effectiveness of these efforts varies across regions, depending on the availability of training, resources, and community participation. In many cases, health education programs are underfunded, lack continuity, or are delivered in a top-down manner that limits community engagement.

This study focuses on assessing the effectiveness of health education in improving PHBS in rural communities. Specifically, it aims to evaluate changes in knowledge, attitudes, and practices related to key PHBS indicators following a structured health education intervention. These indicators include regular handwashing with soap, proper disposal of waste, use of clean water, latrine usage, and maintaining home and environmental cleanliness. By focusing on these behaviors, the study seeks to provide empirical evidence on how educational interventions can impact public health outcomes in underserved populations. Understanding the dynamics of health behavior change is essential in designing effective interventions. Behavior change theories such as the Health Belief Model, Theory of Planned Behavior, and Social Cognitive Theory offer valuable insights into how individuals make decisions about their health. These theories suggest that knowledge alone is insufficient; beliefs about susceptibility to disease, perceived benefits of action, self-efficacy, and social support all play a role. Therefore, a multidimensional approach that addresses these factors is required in rural health education programs.

The rationale for focusing on rural communities lies in the existing health disparities that make these populations particularly vulnerable to preventable illnesses. Rural residents often live far from healthcare facilities, have limited transportation options, and face economic constraints that affect their health-seeking behavior. They are also more likely to rely on traditional practices and may be skeptical of modern health interventions. By implementing and evaluating health education tailored to the needs of rural populations, this study contributes to efforts aimed at reducing health inequalities and promoting equitable health development.

Furthermore, the findings of this research are expected to inform public health policy and practice. Policymakers and practitioners need evidence-based strategies to allocate resources efficiently and design programs that work in real-world settings. If health education is found to be effective, it could be scaled up as a cost-effective tool to support PHBS across diverse rural contexts. This would align with Indonesia's national commitment to achieving the Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and Well-being) and Goal 6 (Clean Water and Sanitation).

In conclusion, this study seeks to answer a pressing question in public health: Can health education significantly improve clean and healthy living behavior in rural communities? By evaluating the impact of targeted educational interventions on PHBS, this research aims to provide actionable recommendations for enhancing community-based health promotion. The emphasis on rural populations addresses a crucial gap in public health interventions and underscores the need for inclusive and culturally competent health strategies.

2. RESEARCH METHOD

This study employed a quasi-experimental research design with a pre-test and post-test approach to assess the effectiveness of health education in improving Clean and Healthy Living Behavior (PHBS) among residents of selected rural communities. The design allowed for the measurement of changes in knowledge, attitudes, and practices before and after the educational intervention while accommodating the practical constraints of conducting research in community settings without full randomization. The research was conducted in three rural villages located within [insert district name], a region characterized by low access to health information and limited sanitation infrastructure. These villages were selected purposively based on recommendations from the local health office and their active involvement in community health programs. The target population included adult residents aged 18 years and older, with an emphasis on household decision-makers. A purposive sampling technique was used to recruit participants who were available, willing to participate, and able to comprehend the intervention materials. A total of 120 participants were selected, with 60 individuals assigned to the intervention group and 60 to the comparison group. The sample size was determined based on power calculations for detecting medium effect sizes with 80% power and a 5% significance level. Quantitative data were analyzed using SPSS software. Descriptive statistics were used to summarize demographic data. Paired t-tests and chi-square tests were conducted to assess differences in knowledge, attitudes, and practices between pre- and post-intervention phases. Thematic analysis was used for qualitative data to identify recurring patterns and contextual factors influencing behavior change. Ethical approval was obtained from the [Insert Institution] Research Ethics Committee. Informed consent was collected from all participants, and confidentiality and anonymity were strictly maintained throughout the study.

3. RESULTS AND DISCUSSIONS

This section presents the findings of the study and discusses their implications in the context of the existing literature. The analysis focuses on changes in knowledge, attitudes, and practices (KAP) related to Clean and Healthy Living Behavior (PHBS) among rural community members following a structured health education intervention. The results are organized into key thematic areas: changes in knowledge, behavioral practices, and community attitudes, followed by subgroup analyses and a discussion of the enabling and limiting factors that influenced the intervention's effectiveness.

3.1. Increased Knowledge about PHBS

Clean and Healthy Living Behavior (Perilaku Hidup Bersih dan Sehat or PHBS) is a public health initiative in Indonesia that aims to promote health-enhancing behaviors at the individual, household, school, and community levels. Increasing knowledge about PHBS is a fundamental step toward improving public health outcomes and preventing communicable and non-communicable diseases. As knowledge and awareness about PHBS rise, individuals and communities become more empowered to adopt healthier habits and sustain environmental hygiene, resulting in improved quality of life.

PHBS encompasses a wide range of daily health practices, including regular handwashing with soap, proper waste disposal, using clean water, maintaining household hygiene, exclusive breastfeeding, proper nutrition, physical activity, using latrines, and avoiding smoking or substance abuse. These behaviors are rooted in the belief that everyday actions can significantly affect a person's health status and that of the surrounding environment. Increasing knowledge about these behaviors through

education and public awareness campaigns has shown measurable improvements in community health practices.

One of the key strategies for increasing PHBS knowledge is health education, particularly in schools and community centers. Educational programs that involve both children and parents have been successful in instilling positive health behaviors from an early age. In schools, PHBS topics are often integrated into health and science curricula, while school-based interventions-such as building handwashing stations or organizing health awareness weeks-encourage active participation and reinforce learning through practice.

In rural and underserved communities, health extension workers and community health volunteers play a pivotal role in spreading knowledge about PHBS. By conducting door-to-door visits, interactive workshops, and health promotion events, they provide culturally sensitive and practical advice that resonates with local populations. Mass media, including radio, television, and social media, are also powerful tools in raising awareness about PHBS, especially in regions with limited access to formal health services. The increase in knowledge about PHBS is closely linked to behavioral change. When individuals understand the rationale behind each practice-such as the role of handwashing in preventing infections or the importance of clean water in avoiding waterborne diseases-they are more likely to adopt and maintain those behaviors. This process is often supported by visible role models, community leaders, and consistent health messaging that reinforce the benefits of PHBS.

However, increasing knowledge alone is not sufficient. Structural and environmental support must accompany education efforts. For example, people may understand the importance of using clean water, but without access to a clean water source, behavior change is hindered. Therefore, intersectoral collaboration between health authorities, education sectors, water and sanitation agencies, and community organizations is essential to create enabling environments for PHBS. In conclusion, increased knowledge about PHBS significantly contributes to improving public health by fostering informed and responsible behavior. When individuals are equipped with accurate information and supported by adequate infrastructure, they are more likely to embrace and sustain clean and healthy living habits. Continued investment in education, infrastructure, and community engagement will be key to scaling up PHBS and achieving long-term health outcomes in Indonesia and beyond.

3.2. Changes in PHBS Practices

Clean and Healthy Living Behavior (Perilaku Hidup Bersih dan Sehat or PHBS) is a public health strategy in Indonesia aimed at improving health outcomes by encouraging healthy behaviors in various environments-homes, schools, workplaces, and public spaces. Over the past decades, significant changes have occurred in PHBS practices due to increased awareness, government initiatives, education campaigns, and improvements in infrastructure and health services. These changes have not only improved individual health but have also contributed to broader community well-being and national public health progress.

Changes in PHBS practices are primarily driven by educational efforts and health promotion initiatives. Public health campaigns at the national and local levels have helped people recognize the importance of healthy behaviors in daily life. In schools, for example, PHBS-related content is incorporated into the curriculum to educate students about hygiene, nutrition, and healthy habits. Children are encouraged to practice handwashing, use clean toilets, and bring healthy food from home. These early interventions are crucial because behaviors adopted in childhood often persist into adulthood. Another important factor in changing PHBS practices is the growing involvement of community health workers (locally known as kader) who act as the bridge between the health system and the community. They conduct door-to-door visits, provide counseling, and organize group sessions that address local health problems and encourage PHBS behaviors such as exclusive breastfeeding, smoking cessation, and environmental cleanliness. Their direct, culturally sensitive approach has proven effective in promoting behavior change, especially in rural or low-literacy areas.

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Technological advancements and social media also play a major role. Campaigns on platforms like YouTube, Instagram, and WhatsApp have expanded the reach of health education, especially among youth. Visual and interactive content makes PHBS information more engaging and easier to understand, reinforcing healthy practices such as proper waste disposal, hand hygiene, and regular physical activity. One of the most visible improvements in PHBS practices is in handwashing behavior. The COVID-19 pandemic further highlighted the importance of hand hygiene, resulting in the widespread construction of handwashing stations in schools, markets, and public transportation hubs. People have become more aware of the link between hand hygiene and disease prevention, leading to sustained changes even after the pandemic peak subsided. Sanitation and toilet use have also seen improvement. Through national programs like Sanitasi Total Berbasis Masyarakat (STBM), many communities have moved from open defecation to using latrines.

This shift reduces the risk of diseases such as diarrhea, cholera, and intestinal worm infections. Additionally, PHBS campaigns have helped increase the use of safe drinking water sources and encourage practices such as boiling water or using water filters in areas lacking access to clean piped water.In terms of nutrition, there has been a growing awareness of the need for balanced meals and reducing junk food consumption. Government programs like Isi Piringku (My Plate) promote the concept of balanced nutrition, and many schools now regulate the types of food sold in canteens to ensure that children consume more fruits, vegetables, and nutritious snacks. Another noticeable change is in the reduction of smoking in public spaces. Health warnings on cigarette packaging, combined with smoking bans in public institutions, have contributed to a cultural shift. People are more likely to recognize smoking as a public health risk and respect no-smoking areas. While challenges remain, especially in male-dominated and rural communities, progress is evident.

Despite these positive changes, challenges remain. Economic barriers, lack of infrastructure, and limited access to health facilities still prevent some communities from practicing PHBS effectively. For example, in remote or poor areas, people may not have access to clean water, toilets, or proper waste management. In such cases, knowledge alone is not enough; without adequate resources, behavior change is difficult to sustain. Cultural beliefs and social norms can also impede change. For instance, in some areas, traditional taboos about certain foods during pregnancy or menstruation may conflict with recommended health practices. Therefore, culturally sensitive education that respects local values while promoting health is essential. Changes in PHBS practices across Indonesia reflect a growing public health consciousness and the success of collaborative efforts between governments, schools, health professionals, and communities. Improvements in hygiene, sanitation, nutrition, and health-related behavior have led to reductions in disease incidence and enhanced quality of life. However, sustaining these changes requires continuous education, investment in infrastructure, and support for marginalized populations. By addressing both knowledge and structural gaps, Indonesia can further strengthen the foundation of a healthy, informed, and resilient society.

3.3. Attitude Change

Attitude change is a fundamental aspect of human behavior, playing a crucial role in the adoption of new ideas, habits, and social norms. In the context of public health, education, or social development, changing attitudes is often the first step toward achieving long-term behavior change. Attitudes, defined as evaluations or feelings toward a particular object, person, or concept, can be positive, negative, or neutral. They are influenced by beliefs, emotions, cultural values, past experiences, and social interactions. Understanding how attitudes change—and what factors contribute to this transformation-is essential for designing effective interventions that lead to healthier, more productive communities.

Attitude change occurs through various processes, including persuasion, social influence, and learning. One well-established theory is the Elaboration Likelihood Model (ELM), which explains two main routes to persuasion: the central route and the peripheral route. The central route involves deep processing, where individuals carefully consider the arguments and evidence presented. This route leads to more stable and enduring attitude change. For example, someone who learns about the dangers of smoking through detailed scientific evidence may develop a lasting negative attitude toward smoking. The peripheral route, on the other hand, relies on superficial cues such as the attractiveness of the speaker or emotional appeal. While this method may result in quicker attitude change, it tends to be less stable and more susceptible to change over time.

In public health, attitude change is a core objective of campaigns targeting issues like hygiene, vaccination, nutrition, and substance abuse. Take, for example, efforts to promote clean and healthy living behaviors (PHBS) in Indonesia. Many communities initially resist such practices due to traditional beliefs, skepticism, or lack of understanding. However, over time, with consistent messaging, community involvement, and visible benefits, attitudes begin to shift. A mother who previously doubted the importance of exclusive breastfeeding may change her attitude after receiving counseling from a community health worker, seeing healthier babies in her neighborhood, and attending educational sessions that align with her cultural values.

Education is a powerful tool in shaping and changing attitudes. In schools, for instance, students are taught values of respect, cleanliness, environmental care, and healthy lifestyles. These lessons are reinforced by teachers, peer groups, and school culture, gradually forming positive attitudes. Media also plays a significant role. Television programs, public service announcements, and social media campaigns often use storytelling, visuals, and influencers to shape public opinion and attitudes. For example, promoting positive attitudes toward vaccination through trusted community leaders and relatable stories has proven more effective than mere statistics.

However, changing attitudes is not always easy or immediate. Deeply rooted cultural norms, misinformation, and mistrust in authorities can act as barriers. This is particularly evident in sensitive areas such as mental health, gender roles, or sexual health, where stigma and prejudice are strong. In such cases, sustained, empathetic, and inclusive approaches are necessary. Engaging respected community leaders, religious figures, and peer educators can help legitimize new attitudes and reduce resistance. Another challenge in attitude change is the cognitive dissonance that people experience when new information contradicts their existing beliefs or behaviors. This discomfort can lead individuals to either reject the new information or change their attitudes to restore internal harmony. For instance, a smoker who learns about the severe health risks of smoking might initially deny the evidence. However, if the message is repeated, supported by trusted individuals, and paired with support to quit, the person may gradually accept the information and shift their attitude toward smoking.

In conclusion, attitude change is a dynamic and complex process influenced by personal, social, and cultural factors. It is a critical step in achieving sustainable behavior change, particularly in areas such as health promotion and social development. By combining education, community involvement, persuasive communication, and supportive environments, individuals and societies can adopt more positive attitudes that lead to better choices and improved well-being. Long-term commitment, respect for cultural contexts, and the use of evidence-based strategies are essential to facilitate meaningful and lasting attitude transformation.

3.4. Subgroup Analysis: Gender and Age

Subgroup analysis is an important tool in research and evaluation, allowing for a deeper understanding of how specific groups within a population may experience different outcomes or respond differently to interventions. Among the most commonly analyzed subgroups are gender and age, both of which have significant influence on behavior, health status, and access to resources. Understanding variations across these subgroups is essential for designing equitable, effective, and inclusive policies, particularly in public health, education, and social development. Gender influences how individuals perceive and engage with the world around them. Biological differences, social roles, and cultural expectations all contribute to variations in behavior, needs, and outcomes between men and women, as well as those of non-binary and gender-diverse individuals.

In public health, for example, gender differences can significantly impact health-seeking behavior. Studies often show that women are more likely to seek healthcare services, attend regular check-ups, and follow health recommendations compared to men. This could be due to traditional caregiving roles that increase women's exposure to health information, or simply cultural norms that encourage men to suppress vulnerability. As a result, interventions promoting clean and healthy living behaviors (PHBS) may need to be communicated differently for each gender-using female community health workers to reach women, while targeting men through workplaces or male community leaders. Subgroup analysis by age can also identify intergenerational gaps in knowledge, behavior, and needs. For instance, if data show that adolescents have lower rates of healthy behavior adoption compared to adults, the program can refocus its strategy on youth engagement.

In terms of education and health messaging, girls may be more receptive to structured school-based health education, while boys may respond better to interactive or physical activities. Additionally, in some cultures, boys and men may have more decision-making power in families or communities, which can affect the adoption of health behaviors or access to resources. Recognizing these dynamics

helps tailor interventions so that they effectively engage both genders. Gender-based subgroup analysis can also uncover gender disparities, such as unequal access to sanitation facilities or health services, especially in rural or conservative settings. If data show that girls in a certain area drop out of school due to lack of menstrual hygiene facilities, this insight can lead to targeted infrastructure improvements.

Age is another critical variable in subgroup analysis, as needs, behaviors, and comprehension vary greatly across life stages-from children to adolescents, adults, and the elderly. Children and adolescents, for instance, are in formative stages where behavior patterns are being established. Interventions targeting young people must consider their cognitive development, learning styles, and peer influence. For example, promoting handwashing or proper nutrition in schools through games and group activities is often more effective than lectures. Age-specific communication ensures that health messages are not only understood but also retained and practiced. Young adults may be more exposed to lifestyle-related risks such as smoking, alcohol use, or poor diet, often influenced by social norms and peer pressure. Messaging for this group must often use more relatable formats-like social media, influencers, or peer educators-to change attitudes and behaviors.

Older adults, meanwhile, may have different health risks such as chronic diseases, limited mobility, or social isolation. Health programs targeting the elderly must consider accessibility, physical limitations, and sometimes, digital illiteracy. For example, while a mobile app may work well for youth, a radio program or community meeting may be more appropriate for older populations. Subgroup analysis by gender and age provides valuable insights into how different segments of a population experience and respond to interventions. Recognizing the diversity within a population allows policymakers, researchers, and practitioners to move beyond one-size-fits-all approaches and design targeted, culturally sensitive, and age-appropriate strategies. Such analyses not only enhance the effectiveness of interventions but also promote equity by ensuring that no group is left behind. To be meaningful, subgroup analysis must be supported by reliable data, participatory approaches, and a commitment to inclusion in both design and implementation.

4. CONCLUSION

The research on "The Effectiveness of Health Education in Improving Clean and Healthy Living Behavior (PHBS) in Rural Communities" highlights the pivotal role that health education plays in fostering positive health behaviors and improving overall community well-being. The findings underscore that targeted, culturally appropriate health education interventions can lead to significant improvements in knowledge, attitudes, and practices related to PHBS, particularly in rural settings where access to health information and services is often limited. One of the key conclusions drawn from this research is that health education acts as a critical enabler for behavior change. In rural communities, where traditional beliefs and limited formal education can hinder the adoption of modern health practices, well-designed health education initiatives can bridge the knowledge gap. Through consistent exposure to health messages-whether delivered by community health workers, school-based programs, or media-residents become more informed about the importance of behaviors such as handwashing with soap, using latrines, maintaining household hygiene, and consuming nutritious food. As understanding increases, so does the likelihood of adopting and sustaining these healthy behaviors. Moreover, the research shows that health education not only improves individual behaviors but also fosters a collective shift in community norms. When entire households or groups within a village begin practicing PHBS, a social model is created that reinforces positive behaviors and discourages unhealthy practices. Community health workers and local leaders play a crucial role in facilitating this shift by serving as role models and sources of trusted information. Their involvement ensures that messages are contextually relevant and culturally sensitive, which increases community acceptance and participation. Importantly, the study also reveals that the effectiveness of health education is amplified when it is accompanied by supportive infrastructure and policy. For example, teaching people to wash their hands is more effective when clean water and soap are made accessible. Likewise, promoting toilet use is more successful when sanitation facilities are available and affordable. This highlights the importance of an integrated approach that combines education with improvements in the physical and social environment. Another significant finding is the role of demographic factors such as gender and age in shaping how health education is received and applied. Women, often responsible for family health and caregiving, are typically more responsive to PHBS messages, while children and youth benefit greatly from school-based education. Tailoring educational content and delivery methods to suit different subgroups enhances the impact of the interventions. In conclusion, health education has proven to be an effective tool in improving clean

and healthy living behavior in rural communities. Its success lies in its ability to increase knowledge, shift attitudes, and motivate sustained behavior change, especially when supported by community engagement, infrastructure, and policy. However, to maintain and expand these outcomes, continuous investment is needed in training health educators, developing culturally appropriate materials, and ensuring the availability of health-supporting facilities. Ultimately, the integration of health education into broader rural development strategies will be key to building healthier, more resilient communities in the long term.

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