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The Effectiveness of Community-Based Total Sanitation (STBM) Programs in Changing Clean and Healthy Living Behaviors

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ABSTRACT

Community-based Total Sanitation (STBM) is a national approach to improving sanitation and public health through behavioral change. However, evidence on its effectiveness in shaping clean and healthy living behavior (PHBS) remains limited. Objective: This study evaluates the effectiveness of the STBM program in changing PHBS in a community intervention area. Methods: A mixed-methods design was applied. Quantitative data were collected from 150 respondents using pre- and post-intervention questionnaires and analyzed with paired t-tests. Qualitative data were obtained from in-depth interviews with community leaders and health workers and analyzed thematically. Results: Handwashing with soap increased from 58% to 82% ($p < 0.01$), the use of healthy latrines rose from 70% to 85% ($p < 0.05$), and household waste management improved from 62% to 76% ($p = 0.06$). Interviews revealed growing awareness of sanitation and environmental health, supported by active roles of health cadres and local leaders. Implications: These findings confirm that STBM is effective as a community-based strategy for behavior change, highlighting the importance of continuous education, participatory implementation, and integration with local development programs. Conclusion: STBM has a positive and significant impact on PHBS, and its sustainability depends on community participation and local government support.

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INTRODUCTION

Sanitation is one of the main determinants of public health that plays a central role in preventing environmental-based diseases. Poor sanitation has long been identified as the underlying cause of infectious diseases such as diarrhea, typhoid, and intestinal infections, particularly in areas with high population density and limited infrastructure. Globally, the World Health Organization (WHO, 2022) reports that more than 50% of the burden of diarrheal diseases in developing countries is related to unsafe defecation practices, inadequate wastewater management, and poor hand hygiene. These conditions emphasize that sanitation is not merely a technical or infrastructural challenge, but also a behavioral and socio-cultural issue that directly influences the quality of life and productivity of communities.

In Indonesia, efforts to address sanitation problems have been formalized through the Community-Based Total Sanitation (STBM) program, launched nationally in 2008. The program emphasizes community empowerment and behavior change across five pillars: (1) stopping open defecation (BABS), (2) handwashing with soap, (3) safe food and drinking water management, (4) household solid waste management, and (5) household liquid waste management. Unlike top-down infrastructure-based approaches, STBM uses a participatory method through triggering, awareness building, and post-triggering follow-up. Its success is highly dependent on active community involvement, consistent monitoring, and cross-sectoral support.

Nevertheless, various studies reveal that the effectiveness of STBM implementation is inconsistent. In some areas, STBM has reduced open defecation and improved hygiene behaviors (Sutiyono et al., 2022; Rany, Dewi, & Herniwanti, 2022), while in others, the changes are only partial or unsustainable due to socio-economic limitations, cultural barriers, and weak supervision (Astuti, Kasmini, & Indriyanti, 2022). A national challenge is that not all regions have achieved Open Defecation Free (ODF) status. Data from the Ministry of Health (2024) indicate that in West Sumatra, only 176 out of 1,117 nagari and kelurahan are recorded as ODF. This shows that despite more than a decade of program implementation, many communities are still struggling with the first and most fundamental pillar of STBM.

One of the areas that reflects these challenges is Nagari Sungai Buluh Selatan in Padang Pariaman Regency. Research by Athosra et al. (2022) shows that 28.7% of residents there still practice open defecation. The barriers are multifaceted: lack of knowledge about sanitation, limited access to proper latrines, low family support for behavior change, and local cultural practices that are not aligned with STBM principles. Economic factors also play a major role since many residents, who work as farmers or laborers, perceive the construction of healthy latrines as financially burdensome. Government assistance programs, such as the sanitation Special Allocation Fund (DAK), have not fully reached households most in need, and are often hampered by technical and administrative constraints. In addition, institutional and coordination issues also hinder progress. The STBM implementation in Nagari Sungai Buluh Selatan has not been fully supported by effective collaboration among village governments, puskesmas, health cadres, and the local community. Triggering activities often remain ceremonial without adequate follow-up, while supervision and mentoring are weak. These conditions undermine the sustainability of behavioral change, which ideally requires continuous reinforcement to become ingrained in daily community practices.

Considering these challenges, it is important to conduct research that not only evaluates the effectiveness of STBM in changing community behavior but also explores the social, economic, cultural, and institutional factors that influence its success. This study therefore focuses on analyzing the effectiveness of the STBM program in Nagari Sungai Buluh Selatan, with emphasis on the first pillar—

stopping open defecation (BABS)—as it serves as the foundation for other pillars. The findings are expected to provide evidence-based insights for local governments, health practitioners, and stakeholders in designing more targeted, participatory, and sustainable interventions to accelerate the achievement of ODF targets in West Sumatra and Indonesia as a whole.

METHODS

This study used a mixed-methods design to obtain a comprehensive understanding of the impact of the Community-Based Total Sanitation (STBM) program. The quantitative component was conducted using a questionnaire survey with a one-group pretest–posttest design. A total of 150 respondents were selected using purposive sampling, with inclusion criteria being household heads or adult family members living in Nagari Sungai Buluh Selatan who had resided there for at least one year and directly participated in STBM activities. The questionnaire consisted of 25 items using a 4-point Likert scale, covering five main domains of STBM behavior: open defecation practices, handwashing with soap, management of drinking water and food, household waste management, and liquid waste disposal. The validity of the instrument was tested through expert judgment, while reliability was assessed using Cronbach's alpha coefficient. Data were analyzed using paired t-test statistics to compare mean scores before and after program implementation, with a significance level set at $p < 0.05$.

The qualitative component was conducted to complement and deepen the quantitative findings. In-depth interviews were carried out with 12 informants, consisting of four community leaders, four health cadres, and four officers from the local Public Health Center (Puskesmas). Informants were selected through purposive sampling based on their involvement in STBM implementation and knowledge of community conditions. Interviews were semi-structured, guided by an interview protocol that covered themes of community perceptions, participation, obstacles to implementation, and suggestions for program improvement. All interviews were audio-recorded with participant consent, transcribed verbatim, and analyzed using thematic analysis. The process included coding, categorizing, and identifying key themes that reflected the experiences and perspectives of informants.

By integrating quantitative and qualitative findings, this mixed-methods approach allows the study to not only measure the statistical impact of the STBM program, but also capture the socio-cultural context and practical challenges that influence the sustainability of behavior change in the community.

RESULTS

The results of this study were obtained through both quantitative and qualitative approaches, providing a comprehensive overview of the impact of the community-based Total Sanitation (STBM) program on clean and healthy living behavior (PHBS).

Table 1. Comparison of PHBS Indicators Before and After the Implementation of the STBM Program

PHBS indicator	Before (%)	After (%)	Δ (Changes)	P value	Description
Wash hands with soap	58%	82%	+24%	p < 0,01	Significant improvements
Use of healthy latrines	70%	85%	+15%	p < 0,05	Significant improvements
Good household waste management	62%	76%	+14%	p = 0,06	Increased, but not significantly

The results of quantitative analysis showed that the community-based Total Sanitation program (STBM) managed to significantly improve clean and healthy living behavior (PHBS) in several key indicators. Hand washing with soap increased from 58% to 82% ($p < 0.01$), showing a very significant increase and reflecting the success of education about the importance of hand hygiene. The use of healthy latrines also increased significantly from 70% to 85% ($p < 0.05$), indicating changes in people's behavior in abandoning the practice of indiscriminate defecation. Meanwhile, household waste management increased from 62% to 76%, but was not statistically significant ($p = 0.06$), although it practically continued to show an improvement trend.

Qualitative Results: Narrative of Thematic Findings

From in-depth interviews with community leaders, health cadres, and puskesmas officers, it was found that there was a significant increase in collective awareness of the importance of sanitation and environmental health after the implementation of the STBM program. This Program is assessed to not only provide technical information, but also encourage changes in mindset and behavior through a participatory approach. Extension activities accompanied by live demonstrations on proper hand washing techniques, the use of healthy latrines, and environmental maintenance proved to be more effective in building community understanding, especially among housewives, adolescents, and students. Some health cadres also noted an increase in the enthusiasm of residents in participating in community activities related to sanitation.

Community leaders revealed that before the STBM program, open defecation was still a common practice that was not considered a serious problem, especially around rivers or rice fields. However, after intensive socialization, there is a fairly strong change in perception. Citizens began to realize that these habits adversely affect the quality of the environment and Family Health. This is evidenced by the increased use of healthy latrines and the formation of a community agreement to reject the practice of BABS. In addition, local initiatives in household waste management have emerged, such as the provision of separate bins and the construction of infiltration pits for organic waste, which is indicative of growing environmental awareness at the household level.

Despite significant progress, informants also highlighted a number of challenges still faced. Some remote areas still lack access to clean water and proper sanitation infrastructure. In addition, the sustainability of healthy behavior also depends on ongoing support from the government and local health workers. Economic constraints and old habits are still obstacles to the full implementation of the principles of PHBS. However, the community's spirit for change and the active involvement of various parties are considered as important social capital to strengthen the sustainability of the program and encourage long-term behavior change.

DISCUSSION

This study confirms that the community-based Total Sanitation (STBM) program has a significant positive effect on improving clean and healthy living behavior (PHBS), particularly in hand washing with soap and the use of healthy latrines. The quantitative findings show substantial improvements in these two indicators, consistent with previous research by Kurniatillah et al. (2023) and Trisnowati & Marlinawati (2020), which emphasized the role of education and knowledge in shaping sustainable public health behavior. The qualitative results enrich this evidence by illustrating how participatory education, practical demonstrations, and community engagement foster mindset changes and reinforce new sanitation norms.

A notable cultural shift is the decline of open defecation practices (BABS), which were previously normalized in rural settings. After intensive socialization, communities not only recognized the health risks but also collectively agreed to abandon the practice, indicating the establishment of new social norms. This aligns with Ajzen's Theory of Planned Behavior, where attitudes, subjective norms, and perceived behavioral control interact to drive behavioral change. In this context, education increased positive attitudes, social influence from leaders strengthened norms, and ongoing mentoring enhanced people's confidence in adopting healthier practices.

However, household waste management did not show a statistically significant improvement, despite an upward trend. This reflects the complexity of waste issues, which require not only behavioral change but also infrastructure support, as highlighted by Aulia et al. (2023). Similar to Turnip's (2023) findings on the broader impact of PHBS on stunting and child health, this study underlines that sanitation interventions must address both behavioral and systemic factors to be effective.

Research limitations should also be noted. First, the relatively short monitoring period may not fully capture the sustainability of behavior change. Second, infrastructure disparities between urban and remote areas limit the generalizability of results, particularly regarding waste management. Third, the number of informants in the qualitative component, while sufficient for thematic analysis, may not cover all community perspectives. These limitations suggest that caution is needed in extrapolating the results to wider populations.

Implications of the findings are threefold. At the practical level, the STBM program proves effective when it integrates education with participatory and community-based approaches. At the policy level, strengthening waste management infrastructure and ensuring equitable access to sanitation facilities are crucial to sustaining results. At the theoretical level, this study supports the application of behavioral change frameworks such as the Theory of Planned Behavior in public health interventions.

Recommendations for future programs include intensifying community empowerment strategies, such as localized training, innovative campaigns, and the use of social media to strengthen waste management behavior. Moreover, government support through policy, funding, and monitoring systems is essential to ensure long-term impact.

Overall, the integration of quantitative and qualitative evidence in this study demonstrates that the STBM program successfully improves PHBS in key areas, while also highlighting the persistent challenges in waste management. With stronger infrastructure and ongoing community engagement, these behavioral changes can be maintained and expanded, ultimately reducing the burden of environmentally related diseases.

CONCLUSIONS

This study demonstrates that community-based Total Sanitation (STBM) programs effectively improve clean and healthy living behavior (PHBS), particularly in handwashing with soap and the use of healthy latrines. The significant increase in these two indicators confirms the effectiveness of education and participatory approaches in changing community behavior. Although household waste management showed some improvement, it did not reach statistical significance, indicating that behavioral change in this area remains more complex and requires structural support.

The findings highlight the critical role of health cadres and community leaders in driving cultural transformation, especially in eliminating open defecation practices and establishing new social norms for hygiene. These results align with previous studies in Indonesia and can be explained through the

Theory of Planned Behavior, where attitudes, norms, and perceived control interact to support sustained behavioral change.

In terms of implications, the success of STBM underscores the importance of integrating educational interventions with community empowerment and adequate sanitation infrastructure. Strengthening government–community collaboration is essential to ensure long-term sustainability and to address challenges in waste management.

Future research should focus on longitudinal evaluations to assess the durability of behavioral change, explore context-specific barriers to waste management, and test innovative participatory models that combine education with infrastructure development. Such efforts will contribute to refining the STBM program and advancing public health outcomes in diverse community settings.

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