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Effectiveness of health promotion in increasing community knowledge, attitudes, and practices for the prevention of dengue hemorrhagic fever through the use of lemongrass leaves in bath water

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Abstract

Dengue Hemorrhagic Fever (DHF) is an acute disease caused by the dengue virus and transmitted by the Aedes aegypti mosquito. This study aims to analyze the effect of health promotion on increasing community knowledge, attitudes, and practices in preventing DHF through the use of lemongrass leaves in bath water. The method used is quasi-experimental with a one-group pre-test and post-test design. The sample consists of community members in Pacarkeling Village, Tambaksari District, Surabaya City. The results show a significant increase in community knowledge, attitudes, and practices after the health promotion intervention. This increase indicates that the applied health promotion model is effective in raising awareness and preventive actions against DHF. Therefore, the results of this study can serve as a basis for developing more effective health promotion programs utilizing locally known natural materials.

Keywords: Bath, Community attitudes, Community practices, Dengue Hemorrhagic Fever, Health intervention, Health promotion, Community knowledge, Lemongrass leaves, Quasi-experimental research.

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1. Introduction

Dengue Hemorrhagic Fever (DHF) is an acute febrile disease caused by the dengue virus and transmitted through the *Aedes aegypti* mosquito. DHF is commonly referred to as "Break-bone" fever because it sometimes causes pain in the muscles and joints, making it feel as if bones are cracked. Symptoms experienced by those with DHF include a sudden and significant increase in body temperature, the appearance of red spots on the body, generalized body pain, nausea, vomiting, and dehydration [1]. In Indonesia, the incidence of DHF outbreaks tends to spread from cities to villages and then to

surrounding areas, in accordance with the distribution of residents. There has been an increase in the number of regencies or cities infected with DHF in almost all provinces, with fluctuating cases every year. According to data from the Indonesian Ministry of Health Directorate of Prevention and Control of Vector-Borne and Zoonotic Diseases [2]. Directorate of Prevention and Control of Vector-Borne and Zoonotic Diseases, Indonesian Ministry of Health, in 2014 the total number of sufferers reached 100,347,with 907 deaths. In 2015, there were 129,650 sufferers and 1,071 deaths. Meanwhile, in 2016, there were 202,314 sufferers and 1,593 deaths. From January to May 2017, there were recorded 17,877 cases and 115 deaths. The Incidence Rate (IR) of pain in 34 provinces in 2015 reached 50.75 per 100 thousand population, while in 2016, it reached 78.85 per 100 thousand residents. These figures exceed the national IR target of 49 per 100 thousand population [2]. In East Java, the number of DHF cases in 2020 was recorded at 8,567, with 4,506 cases in men and 4,061 in women [3]. In Surabaya, the number of DHF cases fluctuates annually, although there has been a downward trend over the past three years. In 2015, there were 640 cases, which increased to 938 in 2016 but decreased to 325 in 2017, 321 in 2018, and 277 in 2019, with 169 cases in men and 108 in women. Although the incidence rate (IR) in Surabaya is 9.59 per 100,000 population, lower than the government target of 49 per 100,000 population, the case fatality rate (CFR) remains relatively high (>1%). The transmission of DHF in Surabaya is influenced by factors such as population density, mobility, urbanization, economic growth, community behavior, climate change, environmental sanitation, and water availability [4]. One natural method to control the vector responsible for DHF is the use of citronella (*Cymbopogon nardus L*). Compounds found in citronella, such as essential oils (esters), act as larvicides. Lemongrass essential oil contains citral, citronella, geraniol, myrcene, nerol, farnesol, methyl heptanol, and dipentene. The citronella compound exhibits desiccant properties, causing dehydration and eventual death of mosquito larvae through fluid loss [5]. Research by Makkiah et al. [6] demonstrated that citronella extract effectively killed 50% of test larval populations, with an LC50 value of 36.48% concentration and a required time of 10.45 hours. The strong aroma of citronella, particularly from citronella in lemongrass oil, is disliked by insects, including mosquitoes. Aji [7] revealed that 77.5% of individuals who planted citronella in their yards did not find *Aedes aegypti* larvae in water reservoirs, indicating that the presence of citronella reduces the likelihood of larvae by 4.375 times. Tambaksari District is one of the endemic areas for DHF in Surabaya. In 2019, there were 9 recorded cases with 1 fatality in Pacarkeling Village, resulting in a relatively high CFR [4]. Spatially, Tambaksari is the sub-district with the largest population in Surabaya, totaling 214.97 thousand people. The population density in Tambaksari District was recorded at 23,912 people per square kilometer (km^2) [8]. This high population density can contribute to an increase in the number of dengue cases, as urban areas tend to experience more cases than rural areas, especially in densely populated regions [9]. The primary objective of this research is to analyze the effect of health promotion on increasing community knowledge, attitudes, and practices in preventing Dengue Hemorrhagic Fever (DHF) through the innovative use of lemongrass leaves in bath water. This research offers several significant benefits for public health and scientific knowledge. First, by analyzing the impact of health promotion on improving community knowledge, attitudes, and practices in preventing DHF through the use of lemongrass leaves, this study can provide a natural and accessible solution to reduce the incidence of DHF. Second, the results of this research can serve as a foundation for developing more effective health promotion programs that utilize locally known natural materials. Third, this study can enrich the scientific literature on innovative approaches to DHF prevention, offering additional alternatives in disease control strategies. Finally, by increasing community awareness and knowledge about the benefits of lemongrass, this research can empower communities to take more proactive preventive measures, thereby improving the overall quality of life and health of the community.

2. Literature Review

Tapia-Conyer et al. [10] in purposeful research for analyze how public participation in the prevention and control of dengue fever, results analysis qualitative show that a dengue control program requires a clear and integrated approach with involvement of the public. Murugan et al. [11] do synthesis nanoparticles gold (AuN) uses extract Cymbopogon citratus leaves as a reducing and capping agent. Test results show that a low dose of AuN can help increase control of Anopheles and Aedes larvae populations. Achee et al. [12] in purposeful research, do evaluation in a way that is critical to interventions and tools for vector control in the prevention of dengue fever. Use experimental methods. The results of the study show that there is a consensus that dengue fever can be eliminated through integrated vector control with vaccination. Rather et al. [13] do analysis about prevention and control strategies for oppose fever bleeding. Results show that prevention and control strategies with the development of new vaccines are capable of reducing fever virus infection and bleeding. Asri et al. [14] in purposeful analysis, to look at social capital, who exists in society and how it is used against dengue fever, results show that social capital as a feature of community provides the main basis for collective action. Therefore, forming social groups, cooperation across sectors, and mutual assistance are essential in the prevention and control of dengue fever, which constitutes real social capital in this context. Rakhmani et al. [15] did analysis of related factors with behavior prevention of fever bleeding. Results of the study show that age, gender, length of stay, number of family members, and perception of DHF susceptibility are related to behavior prevention of dengue fever. Kumaran et al. [16] did testing on the level of knowledge, attitudes, and practices related to vector control. Results show that respondents' own level of knowledge about dengue fever transmission, breeding, and prevention methods is high; however, no correlation was found between observed knowledge and practice. Zulfikar et al. [5] analyzed utilization of lemongrass extract as an insecticide with the fumigation method. Results show that the average number of dead mosquitoes is 18, accounting for 90%. There is a difference in using lemongrass extract as a substitute for malathion, with the level of mosquito mortality in *Aedes aegypti*. Swain et al. [17] aims to analyze related social and ecological factors with fever bleeding. results show that household factors such as work and ecological conditions, including the role of the house

ladder, are important in incidents outside normal fever bleeding. Sulistyawati et al. [18] did analysis of the level of knowledge, attitudes, and practices among the public in the prevention of dengue fever after intervention. Results show that the knowledge score is rather poor at 3.7 out of 8, while attitudes and practices scores are 25.5 out of 32 and 9.2 out of 11, respectively. Knowledge is good among women aged 30-44, and the best practices are observed in retired mothers and housekeepers. Overall, the results indicate that people need not only knowledge but also strong motivation to effectively prevent dengue fever. Farich et al. [19] analyzed the influence of empowerment on public prevention of fever bleeding. The results show that there are differences in scores of knowledge, attitudes, and behavior between the intervention group and the control group. Sim et al. [20] did an analysis of the control program for fever, based on results analysis qualitative descriptive shows that the control program for fever, which involves blood, has a broader vision across the country regarding the environment. It is very effective and clean. Selvarajoo et al. [21] analyzed related factors with knowledge, attitudes, and practices in the prevention of fever and bleeding. The results show that only half of the respondents, 50.7%, have knowledge; 53.2% have a poor attitude; and 50.2% reported poor practices in controlling fever and bleeding. Araújo et al. [22] in the analysis of the distribution of spatial dengue fever and its relationship with social gaps, modeling spatial factors explains 40% of the influence of social inequality on the incidence of dengue fever. Poverty and poor sanitation become significant factors that contribute to the increase in dengue epidemic risk. Liu et al. [23] in the article, it is purposeful to analyze how effective methods are in reducing dengue fever transmission at construction sites and in surrounding communities. Results show that interventions carried out in public areas or from public initiatives to location development are very effective in preventing the spread of dengue fever.

3. Methods

This study employs a quasi-experimental method. The design used in this research is a pre-test and post-test one-group design. The initial step involves establishing the community group that will serve as the experimental sample. Before administering the treatment, a pre-test is conducted on the experimental group, followed by the treatment, and subsequently, a post-test is performed. The sample comprises community members from Pacarkeling Village, Tambaksari District, Surabaya City. The variables examined include both independent and dependent variables. The independent variable is the health promotion model, while the dependent variables are DHF prevention knowledge, attitudes, and practices. The hypothesis is tested using a paired sample t-test, which assesses the differences between two related samples.

4. Results

The general characteristics of the respondents in this study are as follows:

Table 1.
Characteristics of the Respondents.

Criteria	Number	Percentage
Age		
15 – 25 Years	4	3.0%
26 – 35 Years	6	4.5%
36 – 50 Years	61	46.2%
> 50 Years	61	46.2%
Gender		
Male	0	0
Female	132	100%
Occupation		
Housewife	116	87.9%
Privat sector	2	1.5%
Civil servant	0	0
Unemployed	12	9.1%
Education		
Elementary School	6	4.5%
Middle School	21	15.9%
High School	95	72%
Diploma	6	4.5%
Bachelor’s degree	4	3.0%
Information about DBD		
Health Center	132	100%
Social Media	0	0
Larvae Inspection		
Yes	130	98.5%
No	2	1.5%
Fogging		
Yes	77	58.3%
No	55	41.7%

Based on the data, it can be observed that the largest participation in this survey comes from the age groups of 36–50 years and over 50 years, each accounting for 46.2%. Nevertheless, there is also significant representation from the age groups of 26–35 years (4.5%) and 15–25 years (3.0%). This indicates a diversity of ages in the community's understanding and participation regarding dengue fever prevention. In terms of gender, the survey recorded dominant participation from female respondents (100%). This reflects a high level of awareness among women regarding health issues, particularly concerning infectious diseases such as dengue fever. Although male respondents were not represented in this survey, this information could serve as a foundation for further efforts to involve their participation in dengue prevention.

The data indicate that the majority of respondents are housewives (IRT), accounting for 87.9%. This emphasizes the significant role of housewives in implementing daily preventive measures at home. Regarding education, most respondents have completed high school (72%), which is adequate for understanding dengue prevention information. The survey shows that health centers (puskesmas) are the primary source of information about dengue fever, with 100% of respondents receiving information from this source. However, no respondents reported obtaining information from local government offices or social media. This highlights the critical role of health centers as the main information providers and suggests the potential to expand outreach through social media or activities at the local government level.

A significant majority of respondents (98.5%) stated that they have conducted larvae inspections, demonstrating a high level of awareness regarding the importance of monitoring and cleaning potential mosquito breeding sites. However, only 58.3% reported having experienced fogging, indicating an opportunity to increase participation in further preventive efforts. From the results of this survey, it can be concluded that while community awareness and participation in dengue prevention are relatively high, there remain opportunities to enhance understanding and specific preventive actions. Developing more inclusive educational programs that target younger age groups and involve social media could be the next step in improving the effectiveness of dengue prevention in the community.

Before hypothesis testing is conducted, it is necessary to perform a prerequisite analysis test. The prerequisite test in this study is the normality test.

Table 2.
Results of the Normality Test for Pretest and Posttest.

	Data	Kolmogorov - Sminorv	Shapiro-Wilk	Results / Conclusion
		Asymp Sig (2-tailed)	Asymp Sig (2-tailed)	
Knowledge	Pretest	0.064	0.057	Normally distributed
	Posttest	0.091	0.052	Normally distributed
Attitude	Pretest	0.766	0.347	Normally distributed
	Posttest	0.200	0.135	Normally distributed
Practice	Pretest	0.172	0.124	Normally distributed
	Posttest	0.091	0.075	Normally distributed

Based on Table 2, the pretest and posttest data yielded an asymptotic significance (Asymp Sig.) 2-tailed value from the Kolmogorov-Smirnov and Shapiro-Wilk tests greater than 0.05. These results indicate that the data from the pretest and posttest are normally distributed. Therefore, hypothesis testing can be conducted. The hypothesis testing in this study uses a paired sample t-test.

Table 3.
Results of the Paired T-Test.

T	Df	Sig. 2 tailed
2.228	131	0.002
8.874	131	0.000
1.878	131	0.000

Based on Table 3, the statistical calculations yielded a probability value of less than 0.05, indicating that H_0 can be rejected and H_a can be accepted.

5. Discussion

5.1. The Impact of Health Promotion on Knowledge in Dengue Fever Prevention through the Utilization of Lemongrass

Statistical analysis has demonstrated that the difference between the sample groups before and after the health promotion is statistically significant, with a p-value < 0.05. This indicates that the impact of the health promotion model on increasing community knowledge is not coincidental but rather a reliable outcome of the intervention. The observed increase in knowledge includes a better understanding of specific diseases or health conditions, risk factors, and the preventive measures that can be taken. The group that was exposed to the health promotion model also showed a tendency to adopt more positive preventive behaviors, suggesting that this increase in knowledge is not merely theoretical but can also encourage concrete actions.

The results of this comparison indicate that the implemented health promotion model is effective in enhancing community knowledge. The implication is that this model can be regarded as a successful strategy for raising public awareness regarding specific health issues, with the potential to change behaviors and achieve desired prevention goals. These findings allow for the design of further strategies to optimize the use of the health promotion model in disease

prevention efforts or other health-related issues. One significant finding from this research is that the health promotion model can act as an important catalyst in enhancing community knowledge. Through comprehensive educational campaigns, seminars, and participatory approaches, this model provides better insights to the community about the risks of dengue fever (DBD), the life cycle of the vector mosquito, and how the utilization of lemongrass can be an effective step in preventing the spread of the disease.

The results of this study align with research conducted by Caecilia [24] and Widarma [25] which concluded that health education can significantly increase knowledge after the intervention. The use of lemongrass in bathwater shows promising results in controlling the population of Aedes aegypti mosquitoes, which carry the dengue virus. Lemongrass has scientifically proven mosquito-repellent properties, and the health promotion model successfully communicates this information to the community in an easily understandable manner. Simple steps, such as adding lemongrass extract to bathwater, can provide additional protection to the community, and this research demonstrates that the health promotion model is effective in conveying this message to the public.

Health promotion is an effort focused on empowering individuals and communities to take positive steps to improve their health. One important aspect of health promotion is increasing the level of community knowledge regarding relevant health issues, one of which is dengue fever. It is essential to recognize that knowledge plays a key role in shaping health behaviors. Without adequate knowledge, individuals may be unaware of the health risks they face or how to prevent them. This is the central point where health promotion has a significant impact. Through educational campaigns, seminars, and social media, health promotion can deliver accurate and relevant information to the community.

One example of successful health promotion in increasing knowledge is in campaigns to prevent infectious diseases, such as dengue fever. Through easily understandable educational materials and effective communication strategies, the community can learn how to prevent the development of Aedes aegypti mosquito breeding sites, the vectors of dengue. This knowledge can lead to positive changes in daily behaviors, such as cleaning up stagnant water, using mosquito nets, and maintaining environmental hygiene.

Furthermore, the impact of health promotion on knowledge does not stop at the individual level; it also extends to the community level. When a community shares the same knowledge about specific health issues, shared norms and values regarding health are established. This creates an environment that supports healthy decisions, including the implementation of preventive measures and healthy lifestyles. The importance of participatory aspects in health promotion should not be overlooked. Programs that involve the community in the decision-making process and the implementation of preventive actions create a strong sense of ownership over that knowledge. For example, local projects that engage community groups in outreach and education have a greater impact on shaping healthy mindsets and behaviors.

However, it is important to remember that the effectiveness of health promotion does not solely depend on the delivery of information. Creative communication methods, the use of easily understood language, and the adaptation of messages to cultural contexts are essential. Awareness of local culture helps prevent misunderstandings and increases the acceptability of health messages. In the digital era, health promotion is increasingly utilizing technology. Mobile applications, health websites, and social media campaigns have become effective tools for reaching various segments of society. The use of technology expands the reach of health promotion, delivering information quickly and making it accessible to diverse audiences.

To enhance the effectiveness of health promotion in increasing knowledge about dengue prevention, the utilization of information technology and cross-sectoral collaboration can create new opportunities. Mobile health applications can serve as highly effective tools for disseminating information about dengue prevention. Communities can access up-to-date information, prevention tips, and risk maps through these applications. Additionally, online health portals can provide easily accessible web-based resources to improve understanding of dengue.

Moreover, Electronic Health Information Systems (E-Health) enable efficient storage and exchange of health data. By utilizing E-Health, information about dengue, including case statistics and prevention recommendations, can be accessed and shared among health workers, government officials, and the community. This improves coordination and rapid response to potential outbreaks. Social media campaigns can reach a wider and more diverse audience. The use of these platforms to disseminate infographics, educational videos, and success stories in dengue prevention can make the messages more engaging. Health podcasts can also be an effective means to discuss current issues related to dengue and provide a platform for health experts to share insights. Health promotion acts as a change agent in enhancing community knowledge. By providing accurate, easily understood information that is culturally relevant, health promotion can foster a deeper understanding of health issues. Consequently, communities can make better decisions to care for and maintain their health, resulting in healthier and more empowered societies.

Dengue Fever (DBD) is a global health challenge that requires serious attention in prevention and control efforts. Increasing public knowledge about DBD not only plays a key role in preventing the transmission of this disease but also positively impacts social well-being and public health as a whole. Enhanced knowledge about DBD directly correlates with increased public awareness. When communities better understand the risks and symptoms of DBD, they are more likely to take proactive preventive measures. These measures include cleaning up mosquito breeding sites, using mosquito nets, and avoiding stagnant water that can serve as breeding grounds for Aedes aegypti mosquitoes. With the rise in public knowledge about DBD, there is a decrease in morbidity and mortality rates associated with this disease. Communities that can identify DBD symptoms early have a greater chance of receiving timely medical care. This reduces the risk of serious complications and accelerates the healing process. Increased knowledge also has a positive impact on community empowerment. More informed communities are better equipped to make decisions regarding their own health and their surrounding environment. This creates a culture of caution and shared responsibility in disease prevention.

The increase in public awareness about DBD also contributes to alleviating the burden on the healthcare system. When communities can implement preventive measures independently, the need for emergency medical care can be reduced. This enables the healthcare system to focus more on preventive efforts and the treatment of other health conditions. Enhanced knowledge can help decrease the economic burden associated with healthcare costs, work absenteeism, and productivity disruptions caused by DBD. Healthy communities tend to exhibit higher productivity levels, supporting sustainable economic growth. Raising public awareness not only fosters health-conscious individuals but also promotes the development of a healthier environment. Communities aware of DBD are more likely to engage in environmental hygiene practices and undertake collective actions to maintain cleanliness and sanitation. Improved knowledge encourages community collaboration and solidarity, as shared understanding of DBD risks and impacts leads to more effective prevention campaigns and mutual support for public health initiatives.

5.2. The Impact of Health Promotion on Attitudes in Dengue Fever Prevention through the Utilization of Lemongrass

Based on the results of the difference test, it shows that the health promotion model has a significant impact on community attitudes in efforts to prevent Dengue Fever (DBD). Statistical analysis indicates that the difference between the pretest and posttest is statistically significant, with a p-value < 0.05. This affirms that the influence of the health promotion model on changes in community attitudes is a reliable result and not merely coincidental. The observed changes in attitude include increased awareness of the importance of DBD prevention, improved knowledge of preventive measures, and the community's readiness to adopt recommended preventive behaviors. The group exposed to the health promotion model also demonstrated a tendency to be more active and proactive in engaging in DBD prevention efforts.

The results of this difference test indicate that the health promotion model has successfully changed community attitudes toward a more positive stance on DBD prevention. The implication is that this model can be considered an effective tool in shaping community attitudes that support preventive practices and reduce the risk of DBD transmission. With these findings, further strategies can be implemented that leverage the success of the health promotion model to achieve a greater impact in enhancing community attitudes toward DBD prevention. This success can also serve as a foundation for the development of broader and more targeted health promotion programs aimed at improving public health overall.

The research results indicate that the health promotion model utilizing lemongrass in bathwater significantly influences the improvement of community attitudes toward the prevention of Dengue Fever (DBD). By providing in-depth understanding, stimulating active participation, and incorporating local values, this model fosters positive attitudes that can lead to beneficial outcomes in the community's collective efforts against DBD. This enhancement of attitude not only creates individual changes but also lays the foundation for a healthier and empowered community. Health promotion aims not only to disseminate information but also to shape community attitudes toward DBD prevention. It provides an opportunity to convey comprehensive information about DBD, including its causes, symptoms, and preventive measures. By supplying better knowledge, health promotion has the potential to cultivate positive community attitudes toward preventive actions.

Education about DBD must be delivered in a context that is understandable and relevant to the target community. Health promotion can foster positive attitudes by presenting comprehensive information and detailing its tangible benefits. For instance, explaining that simple actions, such as cleaning bathtubs, can reduce the risk of DBD transmission. Awareness campaigns are an essential part of health promotion. Communities need to recognize the importance of DBD prevention to develop a proactive attitude. Changes in perception regarding the level of risk and impact of DBD can lead to a more serious approach to preventive actions. The use of social media and technology in health promotion can facilitate two-way interactions with the community. Engaging educational content on social media, such as videos, infographics, and online quizzes, can motivate the community to adopt preventive attitudes. Mobile applications can also provide reminders and direct information to users.

Health promotion can leverage educational and training institutions to shape attitudes toward DBD prevention. Educational programs in schools and workplaces can play a crucial role in raising individuals' awareness of the urgency of preventive actions. Involving educators and trainers can yield sustainable impacts. Community involvement and local leadership are key factors in shaping attitudes toward DBD prevention. Health promotion can empower local figures and community leaders to become agents of change. Building campaigns that involve active participation from the community level can enhance the effectiveness of promotion.

Health promotion must consider potential challenges and criticisms from the community. Developing effective responses to community questions or doubts can foster positive attitudes. Transparency in conveying information can also help build public trust in DBD prevention programs. Evaluating the impact of health promotion programs is an essential step in assessing whether attitudes toward DBD prevention have significantly changed. Evaluation data can be used to refine strategies and enhance the effectiveness of future programs.

5.3. The Impact of Health Promotion on Practices in Dengue Fever Prevention through the Utilization of Lemongrass

Based on the results of the difference test, it shows that the health promotion model has a significant impact on community practices in efforts to prevent Dengue Fever (DBD). In this difference test, the group exposed to the health promotion model demonstrated more positive and structured changes in practices. Statistical analysis revealed a significant difference between the exposed group and the control group, with a p-value < 0.05. This confirms that the influence of the health promotion model on changes in community practices is a reliable outcome and not merely coincidental.

The observed changes in practices include the implementation of DBD prevention measures, such as cleaning up standing water, using mosquito nets, and taking other preventive actions. The group that received exposure to the health promotion model also showed a tendency to be more consistent in applying these preventive practices in their daily lives. The results of this difference test indicate that the health promotion model has successfully transformed community practices toward more preventive behaviors regarding DBD. The implication is that this model can be considered an effective tool for fostering better preventive practices within the community.

The health promotion model employs an educational approach that permeates the community. Through careful and targeted educational campaigns, the community is empowered with in-depth knowledge about the importance of lemongrass as a DBD prevention agent. The information communicated clearly and relevantly plays a key role in changing perceptions and motivating changes in practices. One important finding is that this model directly involves the community through demonstrations of practices and training. The community not only hears about the benefits of lemongrass but also engages in hands-on experiences on how to integrate lemongrass into bathing water. This helps reduce uncertainty and increase confidence in adopting changes in practices.

Research shows that communities engaged in the health promotion model are more likely to sustain DBD prevention practices over a longer period. This indicates that the model not only provides information but also builds a foundation for sustainable practices. The utilization of lemongrass in bathing water is not merely an additional action but represents a change in everyday lifestyle. The communities involved in this model not only integrate lemongrass into their bathing water as a specific action but also adopt it as part of their hygiene routine.

With these findings, further strategies can be implemented that leverage the success of the health promotion model to achieve a greater impact on enhancing DBD prevention practices. This success can also serve as a basis for developing broader and more targeted health promotion programs aimed at improving the prevention and control of DBD within the community. Health promotion plays a crucial role in shaping DBD prevention practices. It provides a platform for delivering the necessary education and outreach regarding DBD. Through educational campaigns, the community can understand the dangers of DBD, its symptoms, and the importance of preventive measures. By providing accurate and easily understood information, health promotion establishes the foundational knowledge required to implement preventive practices.

Awareness campaigns through mass media and social media can improve public perception of DBD. Effective health promotion can change the community's view on the risks associated with DBD and enhance awareness of the preventive actions that can be taken. By altering perceptions, health promotion lays the psychological groundwork for behavior change. The use of information technology, such as mobile apps and health websites, increases accessibility to DBD prevention information. Health promotion can leverage this technology to provide guidance, tips, and reminders to the community. This ease of access facilitates the adoption of preventive practices in daily life.

Successful health promotion involves the community directly. Building the sustainability of preventive practices requires active community engagement. Through participatory programs and community empowerment, health promotion ensures that preventive practices are not merely imported from outside but are also embraced and implemented by the community itself. Local leadership, including from local government and educational institutions, can play a crucial role in shaping DBD prevention practices. Health promotion supported by local leaders can create a strong culture of prevention. Schools, as centers of education, can also help establish preventive habits among the younger generation.

Health promotion can enhance accessibility to preventive measures, such as the use of mosquito nets and repellents. The role of healthcare workers in providing direct information, training, and support can help establish effective preventive practices. Health promotion collaborates with the health sector to ensure that messages and preventive practices are communicated correctly. Evaluating health promotion programs is a crucial step in assessing their impact on DBD prevention practices. Evaluation data can be used to refine strategies and develop more effective programs in the future. A cycle of evaluation and continuous improvement ensures that health promotion remains relevant and responsive to changing conditions.

6. Conclusion

The results of the difference test indicate that the implementation of the health promotion model has a significant impact on increasing community knowledge regarding DBD prevention. The health promotion model successfully enhances public understanding of specific aspects related to DBD, such as symptoms, risk factors, and effective preventive measures. This increase in knowledge serves as an indicator that the model is effective in conveying relevant information and understanding the educational needs of the community regarding DBD. The results also show that the application of the health promotion model significantly affects changes in community attitudes toward DBD prevention. The model successfully stimulates a more positive attitude among the community regarding preventive measures for DBD. This includes heightened awareness of the importance of preventive actions and readiness to adopt recommended preventive behaviors. Thus, this conclusion affirms that the health promotion model plays a critical role in shaping public attitudes toward DBD prevention. The increased awareness and motivation to adopt positive attitudes can be key in creating a more resilient community against the risks of this disease.

Furthermore, the results indicate that the implementation of the health promotion model has a significant impact on changes in community practices related to DBD prevention. The model effectively encourages the community to adopt recommended DBD preventive practices, such as eliminating standing water, using mosquito nets, and following other preventive measures. The improvement in DBD prevention practices brought about by the health promotion model

positively affects not only individuals but also the community as a whole. This can reduce the overall risk of DBD transmission and support public health efforts.

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