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Impact of an Educational Intervention on Dengue Health Literacy among Secondary School Students in Budhiganga Rural Municipality

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ABSTRACT

Background

Dengue fever remains a significant public health issue due to insufficient awareness and preventive measures. Secondary school students can serve as key agents in promoting prevention and disseminating information within communities. This study aimed to assess the impact of an educational intervention on dengue health literacy among secondary school students.

Methods

A pre-post intervention study was conducted among 104 secondary school students in Budhiganga Rural Municipality, Morang, Nepal, from January 2024 to February 2024. Ethical clearance was obtained from the Institutional Review Committee (Ref: IRC-PA-360/2023). A structured questionnaire assessing dengue health literacy was administered before and immediately after the intervention. Statistical analysis was performed using a paired t-test, considering a p-value <0.05 was considered as statistically significant.

Results

The mean±SD age of participants was 14.89±0.93 years, with 59 (56.7%) being male. The pre-intervention mean dengue health literacy score was 11.34 ± 3.77, which increased to 15.45 ± 3.75 post-intervention. The improvement was statistically significant (p-value < 0.001), demonstrating the intervention's effectiveness.

Conclusions

The educational intervention significantly improved dengue health literacy among secondary school students, highlighting the potential of school-based health education programs.

Keywords: dengue; educational intervention; health literacy; students.

INTRODUCTION

Dengue is a major public health concern in tropical regions like Nepal, driven by low awareness, poor prevention and limited access to reliable health information.[1,2] Despite control efforts, outbreaks persist, highlighting need for more effective educational and community interventions.[3,4] Schools are perfect platforms for health education programs that raise awareness and promote prevention, with secondary students serving as knowledge spreaders in their families and communities.[5] Health literacy is essential for effectively understanding, preventing, and managing diseases.[6,7] Studies show that individuals with higher health literacy are more likely to practice proper health behaviors.[8] By evaluating changes in students' health literacy before and after the intervention, this study provides valuable insights into the effectiveness of school-based health education programs. Hence, this study aimed to assess the impact of an educational intervention on dengue health literacy among secondary school students in Budhiganga Rural Municipality, Morang, Nepal.

METHODS

A pre-post intervention study was conducted from January 2024 to February 2024 to evaluate the effectiveness of an educational intervention on dengue health literacy among a secondary school students in Budhiganga Rural Municipality,

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Morang, Nepal. Ethical approval was obtained from the Institutional Review Committee (Ref: IRC-PA-360/2023), ensuring compliance with ethical guidelines and standards. Additionally, gatekeeper consent was acquired from the school administration. A total of 104 secondary school students, available during the data collection period, were enrolled in the study. The sample size was based on the minimum required to ensure statistical validity.[9] Prior to the intervention, students were informed about the details of the educational program. The intervention involved PowerPoint presentations and interactive sessions designed to enhance students' understanding of dengue. The educational content focused on key aspects of dengue, including its symptoms, transmission, prevention, and treatment. To assess the impact of the intervention, a structured questionnaire consisting of 25 items was administered to the students both before and immediately after the educational session. The questionnaire measured the students' dengue health literacy, with each correct response scoring 1 point and incorrect responses scoring 0. The maximum possible score was 25. The self administered printed questionnaire was used both before and after the intervention to directly compare the students' dengue health literacy levels at school setting.

To ensure data privacy, the study maintained confidentiality and anonymity. All responses were collected and entered into Microsoft Excel for analysis. Statistical analysis was performed using SPSS version 23. Descriptive statistics provided an overview of the students' baseline health literacy, while inferential statistics, including paired t-tests, were used to determine whether any observed improvements in health literacy were statistically significant. A p-value of less than 0.05 was considered indicative of a significant difference in health literacy, ensuring that any observed changes could be attributed to the educational intervention rather than to random chance.

RESULTS

The participants had a mean±SD age of 14.89 ± 0.93 years. The majority were male (59, 56.7%). Most participants' fathers (93, 89%) and mothers (82, 78.9%) were literate. Additionally, the majority of participants identified as Hindu (99, 95.2%) (Table 1).

The mean dengue health literacy score before the intervention was 11.34 ± 3.77. After the intervention, the mean score increased to 15.45 ± 3.75. The post-test scores were significantly higher than the pre-test scores ($p < 0.001$), demonstrating that the educational intervention effectively improved dengue health literacy among students (Table 2).

Table 2. Paired t-Test Results for Dengue Health Literacy. (n=104)

Variable	Pre-Test Mean ± SD	Post-Test Mean ± SD	Mean Difference ± SD	t-value	df	p-value
Dengue Health Literacy	11.34 ± 3.77	15.45 ± 3.75	4.12 ± 3.78	11.09	103	<0.001*

** statistical significance*

Table 1. Sociodemographic Characteristics of Study Participants (n = 104)

Variable	Frequency (%)
Age (in years)	
Mean=14.89, Median=15, SD=0.93	
13	5 (4.8%)
14	30 (28.8%)
15	46 (44.2%)
16	17 (16.3%)
17	6 (5.8%)
Sex	
Male	59 (56.7%)
Female	45 (43.3%)
Number of family members	
Mean = 4.98, Median = 5, SD = 1.82	
Education of father	
Illiterate	11 (10.6%)
Literate	93 (89.4%)
Education of mother	
Illiterate	22 (21.1%)
Literate	82 (78.9%)
Occupation of father	
Farmer	16 (15.4%)
Other	88 (84.6%)
Occupation of mother	
Housemaker	67 (64.4%)
Other	33 (35.6%)
Religion	
Hindu	99 (95.2%)
Muslim	3 (2.9%)
Buddhist	2 (1.9%)

DISCUSSION

This study assessed the impact of an educational intervention on dengue health literacy among secondary school students in Budhiganga Rural Municipality, Morang, Nepal. The findings reveal a significant improvement in the health literacy scores of students after the intervention. Specifically, the mean dengue health literacy score increased from 11.34 (±3.77) before the intervention to 15.45 (±3.75) after the intervention, with a statistically significant difference ($p < 0.001$). This outcome suggests that the educational intervention was effective in improving the student's understanding of dengue fever, including its transmission, symptoms, prevention, and vector control measures.

The results of this study align with similar research in other contexts. A study in southern Iran also demonstrated that an educational intervention significantly improved knowledge and preventive behaviors related to dengue fever. They used the Health Belief Model (HBM) in their educational program, which combined lectures and interactive activities to enhance students' understanding and promote preventive actions.[4] Similarly, research in Nepal assessed knowledge, attitudes, and practices (KAP) regarding dengue among non-health undergraduate students, revealing significant gaps in understanding the disease's transmission and symptoms, underscoring the need for educational interventions.[10] Furthermore, a study conducted in India evaluated the impact of a school-based health education program on dengue prevention, demonstrating positive effects on students' knowledge and preventive practices.[11] This supports the notion that structured educational programs can significantly contribute to raising awareness and influencing behavior positively. Likewise, the findings from a review of youth engagement in school health promotion align with the concept that involving students in health education not only enhances their own knowledge but also enables them to disseminate this information to their families and communities. The active engagement of students in the learning process could explain why the intervention in this study was successful in improving health literacy. By fostering active participation, educational interventions have the potential to turn students into knowledge multipliers, promoting dengue prevention beyond the school setting.[5] Moreover, the study on the effectiveness of the Health Promoting Schools framework emphasizes the importance of incorporating broader strategies, including environmental and policy changes, alongside educational interventions. While our study focused on an educational intervention, a study suggested that a more comprehensive approach, combining educational efforts with changes in school policies and environmental settings, may lead to more sustainable behavior changes.[7] This highlights the importance of a multifaceted strategy in promoting lasting public health improvements. Recent studies have further highlighted the effectiveness of educational interventions in enhancing dengue health literacy among students. A scoping review of global educational strategies identified that implementing lectures and distributing educational booklets in schools significantly improved students' understanding of dengue fever and its prevention methods.[12]

In Argentina, a study explored the "learning-by-teaching" approach, where children, after receiving education on dengue, taught their parents about the disease. This method not only reinforced the children's knowledge but also effectively disseminated information to the broader community, demonstrating the potential of students as conduits of health information.[13]

In Indonesia, research focusing on adolescents revealed a significant relationship between health literacy and early detection skills for dengue hemorrhagic fever. The study emphasized the importance of collaboration between schools and health centers to enhance health literacy and early detection capabilities among students.[14] A study in Southern Thailand evaluated a high school-based dengue prevention model, underscoring the importance of formative research in developing effective educational programs. The findings suggested that school-based interventions could play a crucial role

in dengue prevention efforts.[15] In Bangkok, a health literacy enhancement program targeting high school students demonstrated significant improvements in students' awareness and preventive behaviors related to dengue fever risk factors. The program's success highlights the effectiveness of structured health literacy interventions in promoting preventive behaviors among adolescents.[16] A study conducted in Chennai, India, assessed the impact of school-based educational programs on higher secondary students' knowledge of malaria and dengue. The interventions, which included lectures, participatory group activities, and demonstrations, led to significant improvements in students' understanding of dengue transmission and prevention measures. For instance, knowledge about Aedes mosquito bites as the cause of dengue transmission increased from 41.9% to 92.2% after the interventions.[17]

However, challenges persist, as suggested by a study conducted in Hetauda, Bagmati Province, Nepal, which highlighted that although awareness regarding dengue fever improved, the behavior change was not as pronounced. While students gained more knowledge, translating that knowledge into practical preventive actions remained a challenge. This suggests that integrating behavior change strategies alongside education could lead to more significant and sustained changes in behavior.[2] Additionally, research in Malaysia highlighted the effectiveness of educational interventions in enhancing knowledge, attitudes, and practices towards dengue among university students.[18]

Furthermore, study in Pakistan explored the effect of educational interventions on high school students' awareness of dengue fever and its preventive measures. The study found that the mean awareness score increased from 7.13 ± 1.41 before the intervention to 13.69 ± 3.02 after the educational session, indicating a statistically significant improvement. The participants' knowledge about the causative agent, symptoms, transmission modes, and preventive measures, such as environmental control and personal protection, was notably enhanced following the educational program.[19] For these interventions to be most effective, they should be complemented by behavior change strategies, environmental modifications, and policy-level support. Schools and health authorities should collaborate to implement comprehensive health education programs that not only inform but also empower students to take proactive measures in preventing dengue fever. By addressing both knowledge acquisition and behavior transformation, such programs can create a lasting impact on public health outcomes. Collectively, these studies reinforce the notion that educational interventions, particularly those implemented within school settings, are effective in improving dengue health literacy and promoting preventive behaviors among students. By engaging students actively and fostering their role as health educators within their communities, such programs can have a far-reaching impact on public health.

CONCLUSIONS

The educational intervention in this study effectively improved the dengue health literacy of secondary school students in Budhiganga Rural Municipality. The significant increase in students' knowledge regarding dengue prevention, symptoms, and transmission underscores the potential of school-based health education programs in enhancing public health literacy.

Limitations

The study's limitations include being conducted in only one school of a rural municipality, which limits the generalizability of the findings. Additionally, the reliance on self-reported data and the lack of long-term behavior change assessment or consideration of external factors such as community-level interventions may have affected the results. Future studies could explore the inclusion of environmental modifications or policy advocacy within the educational program to further strengthen its impact on dengue prevention.

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