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Knowledge of dengue hemorrhagic fever (DHF) prevention as a protective factor for psychological well-being in elementary school students

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Abstract

Background: Dengue Hemorrhagic Fever (DHF) is an infectious disease that remains a public health problem in Indonesia, especially in tropical regions. Elementary school-aged children are among the groups vulnerable to dengue fever transmission, so adequate knowledge regarding early prevention efforts is needed. Schools have an important role as a means of health education to shape dengue fever prevention behavior in students.

Purpose: To analyze the level of knowledge regarding Dengue Hemorrhagic Fever (DHF) prevention among students.

Method: This study used a quantitative descriptive design with a cross-sectional approach. The study population was all 80 students in grades III–VI, with a sample of 67 respondents selected using a purposive sampling technique. Data collection was carried out using a questionnaire regarding the level of knowledge of dengue fever prevention, then analyzed using univariate analysis to determine the frequency distribution and percentage.

Results: The results showed that most of the respondents were aged 12 years (32 students (47.8%) and the majority were female (43 students (64.2%). The level of student knowledge regarding dengue fever prevention was dominated by the sufficient category with 44 respondents (65.7%), followed by the good category with 18 respondents (26.9%), and the poor category with 5 respondents (7.5%).

Conclusion: Student knowledge regarding dengue fever prevention is already there but is not optimal, so efforts are needed to improve health education in a sustainable and structured manner in the school environment to improve understanding and behavior in dengue fever prevention among elementary school students.

Keywords: Dengue Fever Prevention; Dengue Hemorrhagic Fever; Level of Knowledge.

INTRODUCTION

Every year, especially during the rainy season, cases of dengue fever increase. This phenomenon is triggered by environmental conditions that support the breeding of mosquitoes that transmit the disease, as well as a lack of awareness and active participation by the public in maintaining environmental cleanliness. The issue raised in this regard is the still low level of public knowledge and preventive behaviours, such as routinely eradicating mosquito nests, using personal protective equipment, and participating in health education activities. Therefore, more targeted health education strategies

are needed to reduce the incidence of dengue fever in endemic areas (Malinda, 2024). Dengue Hemorrhagic Fever (DHF) is an infectious disease caused by the dengue virus and transmitted through the bites of *Aedes aegypti* and *Aedes albopictus* mosquitoes, which breed in clean water reservoirs. Indonesia, as a tropical country, is an endemic area for dengue fever, including Bali Province. This disease is acute and often causes extraordinary outbreaks that can lead to death, especially in children (Mubarak & Chayatin, 2019).

According to data from the World Health Organization (WHO), dengue fever (DHF) remains a

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global health threat, with more than 14.3 million cases and approximately 10.576 deaths reported globally in 2024, primarily in tropical and subtropical regions. In the Southeast Asian region (ASEAN), 789.656 cases and 1.759 deaths were recorded in 2022, with Indonesia, Thailand, and the Philippines accounting for the largest number of cases. In Indonesia reported 143.266 cases of DHF and 1.237 deaths in 2022. The Bali Provincial Health Office reported that dengue fever (DHF) remains one of the diseases with the highest incidence rates in Bali, particularly in Badung Regency, Denpasar City, and Gianyar Regency. Badung Regency, known as a tourist and urban area, recorded 1,278 cases of dengue fever in 2022. Most of the cases were elementary school children. Nationally, reported that the number of dengue fever cases in 2022 reached 143.266, with 1.237 deaths. Bali Province alone recorded 6.547 cases of dengue fever, with an incidence rate of 150 per 100.000 residents (Nguyen-Tien, Do, Le, Dinh, Lindeborg, Nguyen-Viet, & Lindahl, 2021).

The high number of dengue fever (DHF) cases in Bali is closely related to low public awareness and active participation in mosquito nest eradication (PSN) through the 3M Plus movement. Research in Banjar Buluh showed that the majority of community behavior regarding dengue fever prevention was still in the adequate (49.5%) and inadequate (43.4%) categories, resulting in only a small proportion actually implementing PSN optimally (Hanum, Pitaloka, Tesa, Siregar, Dianti, Wahyuni, & Cleodora, 2025). This aligns with a report from the Bali Provincial Health Office, which emphasized the need for intensive 3M Plus education, as public awareness remains a major challenge in dengue fever control efforts (Febriany, Putri, & Siswati, 2024). Even in Buleleng Regency, low public knowledge and attitudes have been shown to negatively impact dengue fever prevention behavior, thus reducing the effectiveness of community-based public health programs (Soerachman, Marina, Anwar, & Ariati, 2022).

In general, Dengue Hemorrhagic Fever (DHF) Prevention Levels are key to reducing the risk of disease transmission in the community (Anggraini, Siregar, & Dewi, 2020). This awareness is reflected

in clean and healthy living behaviors, such as the 3M Plus preventive measures: draining, covering, and recycling water containers, disposing of trash properly, and avoiding mosquito bites by using mosquito nets or repellents (Annisa & Gustio, 2025). The high number of DHF cases is influenced by various factors, such as population density, low public awareness of the importance of maintaining environmental cleanliness, and a lack of knowledge about DHF prevention methods (Muadhdham & Wisudaningsih, 2025). Elementary schools in Indonesia are noted as environments with a high level of vulnerability to DHF. In Putat Jaya Village, Surabaya, the 5–14 age group, including elementary school students, experienced 21 cases of DHF in 2013, 15 cases in 2014, and 17 cases in 2015. In Cimahi City, 16 elementary school students were reported to have contracted DHF, some requiring hospitalization. This data shows that although the number of cases varies by region, elementary schools remain strategic locations for dengue fever transmission, necessitating focused prevention efforts (Halstead, 2017).

Dengue fever not only impacts physical health but can also disrupt children's learning and psychosocial activities (Pasaribu, Linda, Ningsih, Sumiati, & Sumaryono, 2020). Children infected with the dengue virus are at risk of serious complications such as bleeding and shock, which can lead to death if not treated promptly. Dengue fever also causes high school absenteeism, reduces enthusiasm for learning, and increases the financial burden on families due to significant medical costs (Ayu, 2024). At the community level, dengue outbreaks can create panic, reduce productivity, and burden the local health care system. Elementary schools, as early childhood education institutions, play a crucial role in equipping students with knowledge and attitudes about disease prevention through targeted educational approaches. Based on a preliminary study conducted on July 30, 2025, there were 80 students in grades III-VI at SD No. 2 Mekar Bhuana, interviews were conducted with 10 students. Four of the 10 students interviewed stated they were familiar with Dengue Hemorrhagic Fever (DHF), but did not understand the factors that increase the risk of contracting DHF, the

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complications of DHF, the signs and symptoms of DHF, and most still frequently litter (Simmons, Farrar, van Vinh Chau, & Wills, 2022).

RESEARCH METHOD

This study used a quantitative descriptive design with a cross-sectional approach. The study population was all 80 students in grades III–VI, with a sample of 67 respondents selected using a purposive sampling technique. Data collection was carried out using a questionnaire regarding the level of knowledge of dengue fever prevention, then analyzed using univariate analysis to determine the frequency distribution and percentage. The instrument used in this study was a questionnaire to assess knowledge levels regarding dengue fever (DHF) prevention, structured to meet the research

objectives. Additionally, an informed consent form was used as a form of respondent consent, along with other supporting documents, such as stationery and data collection sheets, to facilitate the smooth running of the research process. The research procedure began with obtaining a research permit from the relevant educational institution. After obtaining the permit, the researcher informed respondents about the research objectives and procedures. Data collection was conducted by distributing questionnaires to students who met the respondent criteria and had expressed their willingness to participate through informed consent. Throughout the research process, the researcher applied ethical research principles, including confidentiality of respondent data and voluntary participation.

RESEARCH RESULTS

Table 1. Characteristics of Respondent (N=67)

Variable	Results
Age (n/%) (Mean±SD) (Range) (Year)	(11.1±0.9) (10-12)
10	27/40.3
11	8/11.9
12	32/47.8
Gender (n/%)	
Male	24/35.4
Female	43/64.2
Level of Knowledge (n/%)	
Poor	5/7.5
Moderate	44/65.7
Good	18/26.9

Based on the table, the majority of respondents were 12 years old, totalling 32 students (47.8%), followed by 10-year-old students with 27 respondents (40.3%), while the smallest proportion was 11-year-old students with 8 respondents (11.9%). The mean age of the respondents was 11.1 ± 0.9 years, with an age range of 10–12 years. Regarding gender distribution, most respondents were female, accounting for 43 students (64.2%), while 24 students (35.4%) were male. In terms of knowledge level about Dengue Haemorrhagic Fever

(DHF) prevention, the majority of students were in the moderate category with 44 respondents (65.7%), followed by the good category with 18 respondents (26.9%), and a small proportion in the poor category with 5 respondents (7.5%). These findings indicate that most elementary school students have an adequate level of knowledge, although further improvement is still needed to achieve a higher proportion in the good category.

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DISCUSSION

The results of the study indicate that the knowledge level of students in grades III–VI at Elementary School regarding Dengue Hemorrhagic Fever (DHF) prevention is mostly in the sufficient category. This finding indicates that students have a basic understanding of DHF and its prevention efforts, but this knowledge is not yet fully comprehensive (Tarigan, 2025). This condition may be influenced by the respondents' age, who are still at the concrete operational cognitive development stage, so their understanding of health concepts still requires reinforcement through repeated and contextual learning (Munir, 2023). Furthermore, limited exposure to structured health information in the school environment also has the potential to affect students' knowledge levels (Ahmad & Fahrurrahman, 2025).

These results align with previous research, which found that elementary school children's knowledge regarding DHF prevention is generally in the moderate or sufficient category, particularly regarding the implementation of preventive behaviors such as the 3M Plus (Walker, Chang, Vera-Hernández, & Grantham-McGregor, 2021). Knowledge in the sufficient category indicates potential for improvement through continuous health education and engaging learning methods appropriate to the child's age (Nutbeam, 2020). Therefore, the role of schools and health professionals is crucial in providing regular health education to improve students' knowledge to the good category and contribute to the development of more optimal DHF prevention behaviors from an early age (Az-zahra & Kurniasari, 2022).

The results of the study indicate that the knowledge level of students in grades III–VI at Elementary School regarding Dengue Haemorrhagic Fever (DHF) prevention is mostly in the sufficient category (Fillamenta, Nashrulloh, Anyelir, & Qoyum, 2025). This finding indicates that students have a basic understanding of DHF and its prevention efforts, but this knowledge is not yet fully comprehensive (Gubler, 2021). This condition may be influenced by the respondents' age, who are still at the concrete operational cognitive development stage, so their understanding of health concepts still

requires reinforcement through repeated and contextual learning (Guzman & Harris, 2025). Furthermore, limited exposure to structured health information in the school environment also has the potential to affect students' knowledge levels (Sharma, 2021).

These results align with previous research, which found that elementary school children's knowledge regarding DHF prevention is generally in the moderate or sufficient category, particularly regarding the implementation of preventive behaviours such as the 3M Plus (Sridhar, Luedtke, Langevin, Zhu, Bonaparte, Machabert, & DiazGranados, 2018). Knowledge in the sufficient category indicates potential for improvement through continuous health education and engaging learning methods appropriate to the child's age (Green & Kreuter, 2025). Therefore, the role of schools and health professionals is crucial in providing regular health education to improve students' knowledge to the good category and contribute to the development of more optimal DHF prevention behaviours from an early age (Ambarwati, Asmara, & Wijayanti, 2022).

In the context of the study entitled Knowledge of Dengue Haemorrhagic Fever (DHF) Prevention as a Protective Factor for Psychological Well-Being in Elementary School Students, knowledge plays a significant role not only in shaping preventive behaviours but also in supporting children's psychological well-being (Gluckman & Hanson, 2016). Adequate knowledge about DHF prevention can reduce excessive fear, anxiety, and misconceptions related to the disease (Glanz, Rimer, & Viswanath, 2018). When students understand how DHF is transmitted and how it can be prevented, they tend to feel more in control of their environment. This sense of control is closely related to increased self-efficacy and emotional security, which are important components of psychological well-being in school-age children (Bronfenbrenner, 2019).

Moreover, strengthening students' knowledge about DHF prevention may foster a sense of responsibility, confidence, and active participation in maintaining a healthy environment at school and at home. Children who are well-informed are more likely to engage in preventive practices such as

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eliminating mosquito breeding sites and encouraging peers and family members to adopt similar behaviours (Sidun, Langelo, & Mandey, 2019). This active involvement can enhance their sense of competence and social contribution, which positively influences their self-esteem and overall psychological well-being. Therefore, improving knowledge about DHF prevention should be viewed not only as a public health strategy but also as an important effort to support the holistic development of elementary school students (Tanner, 2020).

CONCLUSION

Based on the results of research on 67 students in grades III–VI, it was found that the majority of respondents were 12 years old (32 students (47.8%) and were female (43 students (64.2%). The level of students' knowledge regarding the prevention of Dengue Hemorrhagic Fever (DHF) was dominated by the sufficient category (44 students (65.7%), followed by the good category (18 students (26.9%), and the poor category (5 students (7.5%). These results indicate that the majority of students have knowledge about DHF prevention, but this level of knowledge still needs to be improved to be more optimal in supporting DHF prevention behavior since elementary school age.

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