

Research Article

Knowledge of Dengue Hemorrhagic Fever Prevention Among 5th and 6th Grade Elementary School Students in Sambu District, Boyolali

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Abstract: Background: Dengue Hemorrhagic Fever (DHF) remains a significant public health issue in Indonesia. In 2024, Boyolali Regency recorded 963 DHF cases, with Sambu District accounting for the highest number (114 cases and 1 death). Notably, 16% of cases occurred in school-aged children, highlighting the importance of their knowledge regarding DHF prevention. **Objective:** This study aimed to assess the level of knowledge about DHF prevention among 5th and 6th grade elementary school students in Sambu District and identify influencing factors. **Method:** A quantitative descriptive design was applied using a cluster random sampling technique. A total of 62 students from nine elementary schools participated. Data were collected using a validated and reliable questionnaire. **Results:** The majority of students (64.5%) had moderate knowledge about DHF, 24.2% demonstrated good knowledge, and 11.3% had poor knowledge. Most respondents were female (62.9%). **Conclusion:** The overall knowledge level among students was categorized as moderate, with a predominance of female respondents. The results indicate the need for enhanced school-based health education programs to improve students' understanding and preventive practices related to DHF.

Keywords: DHF, Elementary Students, Knowledge, Prevention, Boyolali.

1. Introduction

Dengue Hemorrhagic Fever (DHF) is a health problem that needs attention in the community caused by the dengue virus and transmitted through the bite of *Aedes aegypti* and *Aedes albopictus* mosquitoes. These mosquitoes act as the main vector for the spread of the dengue virus, with *Aedes aegypti* being the most widely found species in Indonesia [1].

The most cases in the world are reported from the World Health Organization (WHO) region with more than 12.5 million cases in 2024. Of those, 53% were laboratory-confirmed and more than 7,000 deaths. Brazil is the country with the most cases (more than 10 million), followed by Argentina, Mexico, Colombia, and Paraguay. Cambodia and Laos reported fluctuations in cases with 17 each. 088 and 18. 488 to November 17, 2024. Malaysia reported 106. 773 cases, Singapore 13. 058, and China 11. 083 in September 2024. Vietnam reported a total of 119. 824 cases as of November 17, while Indonesia has more than 150. 000 cases as of November 25, 2024 [2].

Based on a report by the Indonesian Ministry of Health on March 26, 2024, the number of dengue cases reached 53,131 with 404 deaths. This figure increased dramatically the following week, with 60,296 cases and 455 deaths [3]. Globally, the World Health Organization (WHO) reported more than 3.4 million cases of dengue fever in 2024, with more than 16,000 severe cases and more than 3,000 deaths. This increase in dengue cases is more significant in the Americas, with Brazil reporting more than 9.5 million cases [4].

Dengue cases in Indonesia have also increased rapidly, in the 12th week of 2024, the number of dengue cases reached 43,271 and deaths of 343 people. Meanwhile, in 2023, in the same period, there were 17,434 cases of dengue with a total of 144 deaths. The highest cases of death due to dengue occurred in West Java, with a total of 94 deaths as of February 2024. Central Java is in second place with 77 deaths, and East Java is in third place with 37 cases [5].

Based on data In 2023 in Boyolali regency, 442 cases of dengue were found consisting of 240 men and 202 women, of which the dengue disease rate was 40.2 per 100,000 population. The number of illnesses is the number of people suffering from the disease divided by the total population in a given period of time multiplied by the constant. The number of dengue cases in 2023 has increased compared to 2022 of 297 cases. The most infected age

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group in Sambi sub-district is in adulthood, which records 30%, which is around 35 cases, followed by teenagers, which records 20%, which is around 23 cases, while school children record 16%, which is around 19 cases in 2024 [6].

Based on the data obtained, the number of elementary schools in Sambi is 27, while the number of private elementary schools is 4 and the total number of both public and private elementary schools is 31. Of all elementary schools in the entire Sambi sub-district area, there are 9 elementary schools with dengue cases in 2024, among others, SDN Jatisari recorded the highest number of cases with 5 cases, followed by SDN 1 Jagongan with 4 cases. Other schools have a lower number of cases, ranging from 1 to 2 cases of dengue. This data shows that dengue cases are not common in just one school, but spread across several elementary schools. This identifies that the school environment is an important risk factor in the spread of dengue. Therefore, it is necessary to know the level of knowledge of elementary school students about dengue fever because it belongs to the range group.

Based on a preliminary study on January 2, 2025, data from Sambi health center officers showed that most cases of dengue hemorrhagic fever (DHF) in Sambi were 114 cases in toddler age 7% of cases, preschool children 5% of cases, school-age children 16% of cases, adolescents 20% of cases to adults 30%, while the figure in the elderly was 10%. Based on this background, the researcher is interested in conducting research on "The Knowledge of 5th and 6th Grade Elementary School Students in Sambi District Boyolali for the Prevention of Dengue Hemorrhagic Fever".

2. Preliminaries or Related Work or Literature Review

Dengue Hemorrhagic Fever (DHF)

Dengue hemorrhagic fever is a viral infection transmitted by mosquitoes. The symptoms are similar to the severe flu and can be risky. Caused by the dengue virus transmitted through the bite of the *Aedes albopictus* mosquito, the symptoms are high fever (38-40 °C), headache, nausea and vomiting, diarrhea [7]. Dengue Hemorrhagic Fever (DHF) is caused by the Dengue virus which is transmitted through the bite of *Aedes aegypti* and *Aedes albopictus* mosquitoes. Dengue can affect all ages and is related to people's behavior and environmental conditions, dengue fever continues to be a serious health problem in the world. A study from the World Health Organization (WHO) estimates that around 2.5 billion or 40% of the world's population in tropical and subtropical countries are at high risk of being infected with the Dengue virus [8].

The cause of Dengue Hemorrhagic Fever is a virus transmitted by the *Aedes aegypti* and *Aedes albopictus* mosquitoes. These mosquitoes bite an infected person, then can bite others and spread the virus. A person who recovers will have long-term immunity to the virus that infects him, but not to other types. In addition to bites, this virus can also be transmitted from pregnant women to the fetus, blood transfusions, or organ donations [9].

Dengue hemorrhagic fever is common in children under 15 years old, with 50% of sufferers between the ages of 10 and 15. *Aedes aegypti* mosquitoes actively bite during the day, especially between 8 o'clock. 00 to 12.00 and 15.00 to 17.00. In 2010, Indonesia recorded 156,086 dengue cases and 1,358 deaths. The WHO states that between 1968 and 2009, Indonesia had the highest incidence of dengue fever in Southeast Asia. Factors that affect this disease include the causative agent, host, and environment [10].

Child

Children are the shoot, potential, and next generation of the nation's ideals. Children have a strategic role in ensuring the existence of the nation and state in the future. In order for them to be able to shoulder that responsibility, they need to have the widest opportunity to grow and develop optimally, both physically, mentally, and spiritually. They need to get their rights, they need to be protected, and they need to be prosperous. Therefore, all forms of violence against children need to be prevented and overcome [11].

Characteristics come from the word character with the meaning of character/disposition, trait or habit possessed by a relatively fixed individual. Student characteristics are the overall pattern of behavior and abilities that exist in students as a result of the behavior of their social environment so that they determine the pattern of activity in achieving their goals which is influenced by several things, namely individual emotions that occur due to factors from within (age, experience, intelligence, gender), as well as external factors (education, socio-culture, environment, information) [12].

Development is the process of change throughout the life of an organism. These include physical development, behavioral changes, skill enhancement, and changes in thinking. Development occurs in response to internal and external factors, covering different stages in an individual's life [13].

Knowledge

Knowledge is information of understanding or awareness obtained through experience, education, learning or observation from the results of human sense or the results of a person's knowledge of objects through their senses (eyes, nose, ears, and so on). The time of sensing to produce knowledge is greatly influenced by the intensity of attention and perception of objects. Most of a person's knowledge is obtained through the senses of hearing (ears) and the sense of sight (eyes). The intensity or level of knowledge of a person to the object varies [14].

Factors that affect knowledge There are seven factors that affect a person's knowledge, namely education, occupation, age, interests, experience, and culture [15].

3. Proposed Method

Research design is a research strategy in identifying problems before the final design of data collection. The research design is also used to identify the research structure to be carried out. The type of research design used in this study is a quantitative descriptive research design that aims to find out the overview of the knowledge of students in grades 5 and 6 of elementary school in Sambi Boyolali for the prevention of dengue hemorrhagic fever. This research was carried out in elementary schools in Sambi Boyolali in grades 5 and 6 in April 2025.

Population is a subject that meets the criteria that have been set. The population in this study is 164 students taken in elementary schools in grades 5 and 6 in Sambi Boyolali. Based on the results of the calculation using the slovin formula, the number of samples used in this study was obtained as many as the respondents.

Research instruments are tools used to collect data. The data collection stage is related to instruments that can be divided into five parts, including physiological measurements, observations, questionnaire interviews, and scales. The instrument in this study uses a question table in the form of a questionnaire, respondents are only asked to give a check mark (✓) on the answers that are considered appropriate by the respondents. The definition of a questionnaire is a list of questions in the study that are required to be answered by the respondent or informant. The survey in this study used a questionnaire instrument [16] consisting of 20 statements on the Guttman scale. If the answer is correct, you will get 1 point, if the answer is False, the answer is wrong and you will get 0 points (favorable). On the other hand, if the answer is True, it will get 0 points and if the answer is False, it will get 1 point (unfavorable). The level of knowledge is good if the respondent answers with a correct score of 76-100%, knowledge is sufficient if the respondent is able to answer with a correct score of 56-75%, and knowledge is less if the respondent is able to answer with the correct score <56% [17].

The questionnaire consisted of 20 statements, 9 unfavorable statements, and 11 favorable statements to determine the level of students' knowledge about Dengue Hemorrhagic Fever, as well as to collect data to measure the level of children's knowledge about the knowledge of 5th and 6th grade children of SDN 1 Sambi Boyolali about the prevention of dengue hemorrhagic fever. Respondents were asked to give a check mark (✓) to the option chosen with an alternative answer using the Guttman scale with two answer options "True" and "False". The knowledge level questionnaire on Dengue Hemorrhagic Fever consists of 20 questions.

4. Results and Discussion

This study was conducted to find out the overview of the level of knowledge of 5th and 6th grade elementary school students in Sambi Boyolali for the prevention of Dengue Hemorrhagic Fever. the sample in this study amounted to 62 respondents consisting of several elementary schools, namely SDN 1 Cenden, SDN Nganglik, SDN 1 Ngelembo, SDN 1 Tro-sombo, SDN 1 Tawengan, SDN 1 Babadan, SDN 1 Jatisari, SDN 1 Jagongan, SDN 1 Senting. By using inclusion criteria and exclusion criteria that have been applied previously. This research was conducted in April 2025 using univariate analysis to determine the frequency

distribution of the variables studied, namely the level of knowledge and gender. The univariate analysis carried out in this study is as follows:

Frequency distribution of respondents' gender characteristics

Table 1. Distribution of respondents' gender characteristics

Gender	Frequency	Percentage (%)
Man	23	37.1
Woman	39	62.9
Total	62	100

The majority frequency distribution was based on the gender characteristics of the respondents in the female type, which was 39 respondents (62.9%). Men or women have different levels of knowledge about dengue hemorrhagic fever prevention but in reality it shows that women are more meticulous if given tasks or doing something, but this cannot be fully proven that men have a lower level of knowledge or cognition. In general, men also have more varied thinking and stronger energy abilities than women. This study involved 62 5th and 6th grade students from nine elementary schools in Sammi District, Boyolali. The characteristics of the respondents showed the dominance of the age of 11–12 years and a relatively balanced gender distribution between males and females. This age period is included in the stage of concrete cognitive development according to Piaget's theory, where students begin to be able to understand the concepts of health and the environment [18].

Based on the results of the study, it was found that the majority of respondents were women as many as 39 people (62.9%), while men were 23 people (37.1%). These findings are in line with gender theory in health behaviors that women have a higher tendency to access health information and show concern for a healthy environment. identifies that women have a higher level of knowledge compared to men. This is due to differences in interest in obtaining information [19].

Frequency distribution of respondents' knowledge levels

Table 2. Distribution of respondents' knowledge levels

Category	Frequency	Percentage (%)
Good	27	43.5
Enough	30	48.4
Less	5	8.1
Total	62	100

The results of the frequency distribution of the majority of knowledge levels for the prevention of Dengue Hemorrhagic Fever were in the category of only 30 respondents (48.4%). In line with research [18] with a study entitled "The effect of counseling on improving students' knowledge and attitudes about the prevention of dengue hemorrhagic fever" which indicates that students' knowledge increased significantly after being given an intervention in the form of health counseling with the average result of respondents' knowledge before being given counseling with the discussion method of 16.3 and after being given counseling with the discussion method of 21.44. The attitude of the respondents before being given counseling with the discussion method was 10.21 and after being given counseling with the discussion method was 13.00. With t knowledge calculation is -12.320 and attitude -5.032 and the probability value of knowledge and attitude (p) 0.0001 and the probability is $p < 0.05$, it can be concluded that there is a difference in the knowledge and attitude of the respondents before and after the counseling is given.

Knowledge is the result of human sensing or a person's knowledge of an object through the senses he has so that it produces knowledge, things that are known by people or respondents. A person's knowledge can usually be obtained from experience and information from various sources, namely through mass media, electronic media, poster media, instruction books, close relatives and counseling provided by health workers [20].

Dengue Hemorrhagic Fever (DHF) is a disease transmitted by the *Aedes aegypti* mosquito. Dengue infection is caused by the dengue virus. Symptoms of dengue are bleeding in the nose, gums, mouth, pain in the heartburn continuously, and bruising on the skin. The *Aedes aegypti* mosquito is a mosquito that has a rapid development and infects 390 million people every year [21].

In addition to the school environment, cleanliness can also be applied to the environment around the house, such as fogging, to eradicate dengue fever mosquitoes, spraying

mosquito repellent in the house, when sleeping at night it is mandatory to use mosquito nets or mosquito repellent lotion to prevent dengue fever mosquito bites, plant anti-mosquito plants or mosquito predators to eradicate larvae, and teach children to do the 3M steps, namely draining and brushing the bathtub, closing water reservoirs, and burying used items, sowing abate, cleaning gutters, avoiding hanging clothes, installing wire mesh [21].

5. Conclusions

Most 5th and 6th grade students in Sambu District Boyolali demonstrated moderate knowledge of DHF prevention, with a higher percentage of female respondents. These results underscore the importance of continuous school-based health education programs to strengthen awareness and preventive actions among students in dengue-endemic areas..

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