

Original research

Prevention of Dengue Fever Based on Dominant Risk Factors within Elementary School Environment in Bandung City

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Abstract

Background: Dengue fever is an environment-based disease endemic in Bandung City in which average temperature is 25.86°C, creating a humid and cool climate ideal for the *Aedes aegypti* mosquito. With an average of 21.3 rainy days per month and rainfall averaging 200.4 mm, conditions are perfect for *Aedes aegypti* mosquito breeding. Numerous water containers in the area serve as breeding grounds for *Aedes aegypti*. Additionally, a lack of attention to environmental risk factors contributes to the high transmission rates of dengue fever in Bandung City.

Objective: The study aimed to identify the dominant variables in dengue prevention using a cross-sectional design.

Method: The study population consisted of elementary school students in Bandung City. Cluster sampling determined a minimum sample size of 973 from 13 primary schools, with at least 76 sixth-grade students per school. After rounding, the final sample included 988 elementary school students.

Results: Knowledge (p-value = 0.023), attitude (p-value = 0.036), perception (p-value = 0.000), and motivation (p-value = 0.018) were significantly associated with the dengue prevention. Exposure to information media was not associated with the prevention. Perception was the most influential factor with a P-value of 0.000 CI of 2.118 [1.639-2.737]. Students with good perceptions were 2.1 times more likely to prevent dengue fever than those with unfavorable perceptions.

Conclusion: Knowledge, perception, attitude, and motivation are related to dengue fever prevention, with perception being the most dominant. Interventions to improve perceptions are essential for sustaining preventive behavior.

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Background

Dengue hemorrhagic fever (DHF) remains a significant health issue in Indonesia (Harapan et al., 2019). The high incidence of dengue in the country is closely linked to its tropical environment, which supports the breeding of *Aedes aegypti* mosquitoes. These mosquitoes thrive in high humidity levels around 70-90% and temperatures ranging from 24-28°C. *Aedes aegypti* is highly sensitive to weather and climate changes, making it easy for them to adapt to favorable breeding conditions. Consequently, the mosquitoes exhibit behavioral changes to adapt to environmental threats, including human interventions. Epidemiological, environmental, and entomological factors are interconnected in the dengue transmission (Ahmad, 2018). From 2010 to 2013, the months with the highest number of dengue cases were January through May. Humidity and PM₁₀ levels were found to be associated with dengue cases, while temperature did not show a significant correlation (Carneiro, 2017). Nowadays, *Aedes aegypti* can be found both inside and outside homes. Mosquito larvae are frequently discovered in man-made containers, both indoors and outdoors (Begum et al., 2021; Saleh et al., 2020). Observations indicate that these larvae often thrive in water reservoirs with minimal lighting and high humidity, conditions that are ideal for mosquito breeding (Handayani et al., 2023).

In 2022, Indonesia recorded 143,266 cases of dengue, with 1,237 fatalities. By the 26th week of 2023, there were 42,690 cases and 317 deaths. These numbers are expected to rise due to the dry season influenced by the El Niño phenomenon. El Niño, anticipated in mid-2023, is likely to increase dengue cases since drought and temperatures above 30 °C will cause mosquitoes to bite more frequently, 3-5 times a day. Bandung reported the highest incidence of dengue in Indonesia in 2022, with 5,205 cases followed by Bekasi, Medan, and Depok. In 2023, as of the 26th week, Bandung remains the city with the highest incidence, recording 1,124 cases, followed by Denpasar, Badung, Bekasi, and Bima (Direktorat Jenderal Pencegahan dan Pengendalian Penyakit, 2023). Within Bandung, 30 sub-districts reported high case numbers, with Coblong and Buah Batu experiencing the highest incidences (Sutriyawan, 2021).

With the advancement of Science and Technology (IPTEK) and the implementation of government policies related to dengue prevention, continuous and sustainable efforts are essential. One effective strategy for breaking the chain of dengue transmission is the eradication of mosquito breeding sites. This method involves the active participation of all community members, including the school communities. Schools, often situated within broader communities, can become potential breeding ground for *Aedes aegypti* if not properly managed. Therefore, it is crucial to ensure that both community and school environments receive adequate attention. Additionally, weather and climate conditions that favor the breeding of *Aedes aegypti* should be closely monitored. Enhanced mosquito control and dengue surveillance are particularly important during the rainy season to effectively prevent outbreaks (Sutriyawan et al., 2023).

The "Mosquito Nest Eradication" or PSN 3M Plus initiative, combined with the "One House One Jumantik" (Juru Pemantau Jentik) movement, is a government policy implemented by the Ministry of Health of the Republic of Indonesia, as stated in Letter Number PM.01.11/MENKES/591/2016. This policy focuses on preventing dengue transmission by monitoring mosquito larvae and routinely conducting dengue prevention measures in each household to eradicate mosquito nests. The (3M) approach includes three main actions, such as draining water reservoirs, tightly closing water reservoirs, and recycling used items that can hold water. The "Plus" in 3M Plus refers to additional measures such as using larvicides, bathing with shower water, applying mosquito repellents, regulating light and ventilation in the house, using mosquito nets while sleeping, avoiding hanging clothes indoors, keeping mosquito-eating fish, and planting mosquito-repellent plants. The One House One Jumantik Movement reactivates the role of Jumantik, who are responsible for eradicating, monitoring, and checking for *Aedes aegypti* and *Aedes Albopictus* mosquito larvae. Community participation is highly expected, with residents encouraged to become Home Jumantik by monitoring and actively carrying out dengue prevention in their homes. Additionally, the initiative promotes the formation of Neighborhood Jumantik, Jumantik Coordinator, and Jumantik Supervisor at the local RT level, fostering a collaborative effort to combat dengue.

Efforts to prevent dengue continue to be enhanced by taking a comprehensive approach that includes not only environmental measures but also community behavior (Pascapurnama et al., 2017). Key community behaviors in dengue prevention include draining water reservoirs, closing water reservoirs, recycling used goods, and avoiding the habit of hanging clothes, all of which are linked to a lower incidence of dengue (Kurniawati, Ratna Dian; Ekawati, 2020). It's crucial to consider dengue prevention

behaviors not just in the community but also within the school environment. Schools, much like homes, have the potential to become breeding and resting ground for mosquitoes. This includes both indoor and outdoor areas such as classrooms and other facilities. Without proper mosquito control measures, schools can become hotspots for dengue transmission, especially during peak mosquito biting hours, from 07:00 to 12:00 in the morning and 12:30 to 17:30 in the afternoon. During these times, students are typically in school, making it essential to remain vigilant about the behavior of *Aedes aegypti* mosquitoes. Preventive measures in schools are crucial to safeguarding students from dengue transmission.

Schools and all neighborhoods should be free of *Aedes aegypti* larvae to effectively prevent dengue. A comprehensive dengue prevention policy that includes both prevention and control efforts in school environments is essential. This need is stated in the Ministry of Health's Long and Medium Term Plan and Strategic Plan, which includes performance indicator for environmental health and implementing the mosquito nest eradication program (Kementerian Kesehatan Republik Indonesia, 2021). A preliminary study conducted in early July 2023 found that the school community, especially students, had never received socialization about mosquito nest eradication as a means of preventing dengue. The efforts related to dengue prevention were not specifically addressed by the school independently or by the local Puskesmas (Community Health Clinic). The Puskesmas conducts School Health Efforts, including the Little Doctor program, focusing on environmental hygiene, but not specifically on dengue prevention. To effectively combat dengue, communities need to develop their capacity to participate actively in preventing and controlling dengue. Pre-post-intervention assessment or serial assessment should be designed to measure the effectiveness of dengue prevention efforts (Suwanbamrung, 2010). Implementing these measures will ensure a safer, healthier environment for everyone.

Environmental hygiene is addressed only once a year through the school health effort, which is insufficient for effectively eradicating dengue. *Aedes aegypti* eggs can hatch within just two days, making consistent attention to hygiene critical. The school environment, like the home environment, contains water reservoirs that potentially become breeding grounds for these mosquitoes. A previous preliminary study found a high transmission rate of *Aedes aegypti* in school settings. Considering that the flight range of *Aedes aegypti* is less than 100 meters, often located in a residential area, pose a significant risk for dengue transmission. Effective dengue prevention requires attention not only to the mosquito's life cycle but also to human behavior. The proximity of schools to residential areas increases the risk of dengue, as breeding sites and resting places for mosquitoes are easily found in these environments. Based on these observations abovementioned, this research aims to identify the dominant factor in Dengue Fever Prevention within Elementary School Environment in Bandung City.

Method

Study Design

This study employed a quantitative approach with a cross-sectional design. This study aimed to determine the most dominant variable in the prevention of dengue within the elementary school environment in Bandung City.

Setting

The population in this study were all elementary school students in Bandung City totaling 35,881 grade 6 students. Grade 6 students were specifically selected for their ease of participation in the research process.

Sample/Participants

The research was conducted from July to September 2023. The sample size was calculated using the Slovin formula, which is particularly useful for large populations to determine a manageable sample size that accurately represent the entire population. The minimum sample size was calculated to be 973 students. The multistage sampling technique was employed to select the sample. Initially, elementary schools were chosen using cluster sampling, resulting in 13 elementary schools being selected. Each of these schools contributed a minimum of 76 grade 6 students to the sample, leading to a total of 988 participants. The selection of elementary schools was randomized using a random number generator,

ensuring an unbiased distribution. The inclusion criteria for the study were all grade 6 students, while the exclusion criteria were students who were absent for any reason when the study period.

Data Collection

Data were obtained from 988 students who completed the questionnaire. The questionnaire contained sections on knowledge, attitude, perceptions, and motivations, as well as exposure to media information about dengue fever.

Instruments

The research instrument was rigorously tested for validity and reliability at an elementary school in Bandung City. These tests ensured that the research instrument was valid and legitimate tool for data collection. Primary data was obtained directly from 6th-grade elementary school students who completed the questionnaires. Descriptive analysis was to determine the frequency distribution of variables such as Knowledge, Attitude, Perception, Motivation, and media exposure related to dengue fever, and mosquito nest eradication behavior.

Data analysis

The research data, collected from Grade 6 students, at selected primary schools, were analyzed univariately to describe the study variables, These variables included knowledge, attitude, perception, motivation, and media exposure about dengue fever. The Chi-Square test was employed to determine the relationship between these variables and mosquito nest eradication behaviors, with a significance value of level set at 5% (0.05).

Ethical consideration

Prior to the commencement of the research, ethical approval was obtained from the Research Ethics Commission of Bhakti Kencana University. This research received formal approval from the Health Research Ethics Committee of Bhakti Kencana University (No. 98/09.KEPK/UBK/VII/2023).

Results

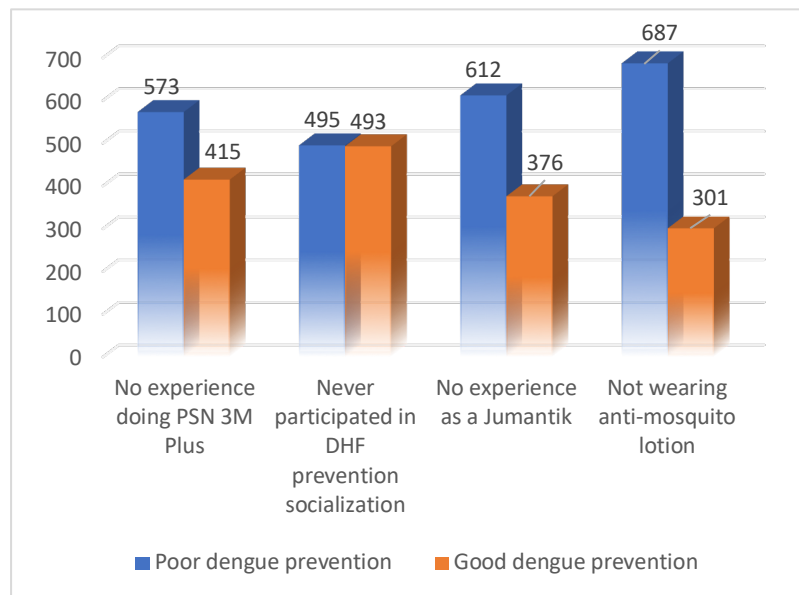
The study was conducted across 13 elementary schools in Bandung city involving a total of 988 grade 6 students. After thorough data collection and analysis, the following results were obtained:

Table 1 Risk factors associated with dengue fever prevention

Variable	Category	Dengue Prevention				P-value	OR
		Not good		Good			
		n	%	n	%		
Knowledge	Enough	319	53.1%	282	46.9%	0.023	1.356 (1.050 - 1.752)
	Good	176	45.5%	211	54.5%		
Attitude	Unfavorable	277	53.4%	242	46,6%	0.036	1.318 (1.026 - 1.693)
	Favorable	218	46.5%	251	53.5%		
Perception	Not good	326	58.1%	235	41.9%	0.000	2.118 (1.639 - 2.737)
	Good	169	39.6%	258	60.4%		
Motivation	Not good	306	53.4%	267	46.6%	0.018	1.370 (1.064 - 1.766)
	Good	189	45.5%	226	54.5%		
Media exposure about dengue prevention	Never been exposed	188	50.4%	185	49.6%	0.935	1.020 (0.788 - 1.319)
	Exposed	307	49.9%	308	50.1%		

Based on the table 1, it is evident that the variables of knowledge (p-value 0.023), attitude (p-value 0.036), perception (p-value 0.000), and motivation (p-value 0.018) are significantly related to the prevention of Dengue Fever.. Meanwhile, the availability of information media about dengue prevention was not found to be related. Knowledge, defined as everything an individual learns through their senses, is crucial for forming behavior. This means that good knowledge will form a better understanding of various

aspects, including health. Notably, primary school students with good knowledge are more capable of preventing dengue.



Graph 1. Distribution of dengue prevention among primary school students

From Graph 1, it can be seen that students lack experience in conducting mosquito nest eradication and have never participated in dengue prevention socialization. They are also unfamiliar with the Jumantik program, do not use anti-mosquito lotion and most are not proficient in preventing dengue through mosquito nest eradication.

Table 2. Risk Factors Affecting Dengue Fever and the Most dominant factor prevention of dengue fever

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Sig.	Exp(B)	95% C.I.for EXP(B)
1334.675 ^a	0.035	0.046			
1334.759 ^a	0.035	0.046			
1335.273 ^a	0.034	0.046	0.000	2.118	1.639-2.737
1336.145 ^a	0.033	0.044			

Based on Table 2, the perception variable significantly affects the prevention of Dengue Fever. The Nagelkerke R Square value is 4.4%, indicating that the perception variable explains 4.4% of the variation in dengue prevention. The remaining 95.6% is influenced by other factors not included in the research.

Discussion

The research revealed that students do not have experience in dengue prevention activities. They have never attended dengue prevention socialization sessions, are unfamiliar with Jumantik, do not use anti-mosquito lotion, and generally lack effective dengue prevention skills. Experience is the best teacher, as the knowledge gained becomes an integral element of an individual's personality. This experience is often acquired from the surrounding environment, such as by imitating the behavior of family members, friends, and others nearby. Such experiences play a significant role in shaping individual personalities, which are reflected in their behaviors. Since students lack experience in dengue Prevention efforts, most are unable to effectively carry out such preventive measures. Behavior is the second most influential factor on an individual's health status, following environmental factors. It can either pose a challenge or serve as an obstacle in dealing with health problems (Yang et al., 2020). Without experience in dengue prevention, students cannot develop proper preventive behaviors. Effective prevention requires a

foundation built on positive stimuli and experiences, which many students currently lack. Prevention experience can be obtained from various environments, both within and outside the family. However, the absence of such experience justifies poor dengue prevention behaviors, as there is no process of learning through imitation from others' experiences.

Students have not participated in socialization programs focused on dengue prevention education. As a result, they lack the experience and stimulus from their surrounding environment to understand and prevent dengue. Elementary school students aged 10-12 years are naturally inclined to join peer groups, due to shared interests/popular activities, which helps them learn to cooperate, develop their skills, and eliminate selfishness (Hurlock, 1978). However, the absence of such socialization in the elementary school environment is a weakness in fostering healthy behaviors, especially dengue prevention.

Furthermore, students also have no experience as Jumantik, despite clean and healthy behavior programs in schools that include larvae eradication. The technical application of larvae eradication has never been practiced leaving students without hands-on experience in this critical aspect of dengue prevention. Additionally, none of the students used anti-mosquito lotion, indicating a lack of knowledge on how to prevent mosquito bites. Student behavior is influenced by both internal experiences from family and external influences from the surrounding environment and school. Changes in an individual's behavior are motivated by predisposing factors such as knowledge, attitudes, behaviors, and beliefs; enabling factors like the availability of infrastructure; and reinforcing factors such as support from community leaders (Toma), religious leaders (Toga), health workers (Guad et al., 2021). These crucial influences have not been effectively experienced by students, resulting in a lack of change in health behaviors, especially in dengue prevention.

Further research has found that variables such as knowledge, attitude, perception, and motivation are related to the prevention of Dengue Fever. Knowledge, which is the result of an individual's sensing and identification process, acts as a stimulus for behavior change. However, it was found that most students with sufficient knowledge do not effectively prevent dengue fever. This means that the dengue prevention efforts are not maximized or effective, possibly due to the incompleteness of the knowledge they receive. Currently, students and the elementary school community have never received specialized education about dengue prevention, although eradicating larvae is a key indicator in the PHBS (Clean and Healthy Living Behavior) school program. The environmental health material provided by the Puskesmas (community health center) as part of the School Health Effort (UKS) program, conducted only once a year, is insufficient. The limited material does not adequately provide further understanding for specific dengue prevention measures, resulting in ineffective prevention practices.

The study found a significant relationship between knowledge and dengue prevention, with a p-value of 0.023, which is less than the threshold of 0.05. This means that the null hypothesis (H₀) is rejected and the alternative hypothesis (H_a) is accepted. The study also showed that students with good knowledge had a 1.4 times higher chance of practicing effective dengue prevention, with a confidence interval (CI) of 1.356 (1.050 - 1.752). Good knowledge will encourage the understanding of the information received, continuous information about dengue prevention through socialization or counseling serves as a strong stimulus for behavior change. This continuous stimulus encourages the formation of lasting preventive behaviors, leading to more effective dengue prevention.

The study in Jeddah found that there was an increase in knowledge, attitudes, and practices regarding dengue fever prevention across all groups, with students showing the highest increase in average knowledge scores after the program. This highlights the need to expand the educational program on dengue fever prevention and control to all high schools in Jeddah (Ibrahim, 2009). Good knowledge of Mosquito Nest Eradication is associated with effective dengue prevention, with those possessing this knowledge estimated to perform Mosquito Nest Eradication activities 10 times more frequently (95% CI: 6.57 - 15.13) (Saraswati, 2014). Basic knowledge of dengue, the school larval index, and the household larval index were associated with risk factors for dengue, indicating the necessity for coordinated efforts to eliminate *Aedes aegypti* mosquito breeding sites in the community (Suwanbamrung, 2013).

However, the study also revealed that most of the students were not supportive of dengue prevention efforts, which hindered effective prevention. Students with sufficient knowledge cannot understand the health needs well so students will tend to be unsupportive because they feel they cannot accept the concept of dengue prevention. Likewise, with students' perceptions, most students have unfavorable perceptions and do not prevent dengue well. Perceptions, influenced by individual

experiences, play a crucial role in personality formation. Limited experience is part of the formation of a personality with unfavorable perceptions of dengue prevention. Attitude about Mosquito Nest Eradication is related to good dengue Prevention. The more positive the attitude about Mosquito Nest Eradication, the 2.2 times more likely it is to perform good Mosquito Nest Eradication (Saraswati, 2014).

Based on the results of the study, it was found that the p-value was 0.036, meaning that the p-value of $0.036 < (P 0.05)$, then H_0 was rejected and H_a was accepted. So there is a relationship between attitude and dengue prevention. Attitude has a CI of 1.318 (1.026 - 1.693) meaning that students with a supportive attitude had a 1.3 times more likely to practice good dengue prevention. Attitude is a response that is still closed so that it cannot be seen in the form of behavior, especially dengue prevention behavior. However, attitudes can be a tendency or willingness of individuals to behave when facing certain stimuli or stimuli. The stimulus can be in the form of information or knowledge obtained by students. The stimulus will stimulate the formation of a tendency to behave in a certain way, even though it still cannot be observed because it is not yet reflected in student behavior.

Research shows that most health and education staff have positive attitudes towards the objectives and strategies of the integrated dengue fever community-based prevention and control program and its approach. Teachers and students participated in larval control activities, with 80% of teachers incorporating these lessons and 94.4% of students taking part in the activities. Two to three years after the project, 62.5% of the provinces and 64.3% of the districts surveyed reported a reduction in dengue morbidity rates among school children (Wangroongsarb, 1997).

The motivation of each individual is a real push within themselves to do something that is considered to be their need. Most students' motivation is not good in preventing dengue. Motivation is an interaction between the environment and behavior that can reduce, increase, or maintain behavior. Motivation is an invisible psychological concept, meaning that It cannot be directly observed, but motivation can be inferred from the behavior, feelings, and words of individuals. There is no experience in carrying out prevention, no experience in participating in socialization or counseling, and having no experience in becoming a Jumantik becomes a student's experience in forming a personality in behavior. So it can be ascertained that students' health behavior in preventing dengue is not good. The most obvious condition is students who do not use anti-mosquito lotion which functions to prevent bites from mosquitoes. This means that understanding is not formed due to the lack of stimulus in forming knowledge of dengue prevention so that motivation will not arise in students. Knowledge and motivation with the implementation of the dengue Prevention. A lack of knowledge cannot be a good stimulus for the implementation of dengue Prevention. Sufficient motivation can encourage individuals to carry out the dengue Prevention (Kurniawati, 2022).

Based on the results of the study obtained a P-value of 0.018, meaning that the p-value of $0.018 < (P 0.05)$, H_0 is rejected and H_a is accepted. So there is a relationship between motivation and dengue prevention. Motivation has a CI of 1.370 (1.064 - 1.766) meaning that students with good motivation have a 1.4 times more likely to engage in effective dengue prevention. Motivation is the drive from within an individual to behave to achieve certain goals. Motivation is the result of an internal or external process that creates persistence and enthusiasm in carrying out activities through increased ability and willingness. Students with good motivation will have good dengue-prevention behavior.

Perception is individualized even when looking at the same object. Individual feelings and experiences will encourage differences in perception from each individual as part of the stimulus received. This means that students' perceptions of dengue prevention are very complex because they can be motivated by student's experiences and knowledge of different dengue prevention. A good perception will certainly encourage students to see that dengue prevention must be done well. Poor perception and motivation can be an impetus for not implementing dengue Prevention so there is a significant relationship between perception and motivation with the implementation of dengue Prevention as an effort to prevent dengue (Kurniawati, 2022).

Most students (70%) knew dengue fever and how to control it. Information received by almost all students were based on television (82%). Most students (72%) knew that mosquitoes are the causative agent of disease but only a small proportion of students (13%) realized that mosquito biting can transmit disease. Most students (66%) believed that dengue infection can be controlled and a small proportion of students (33%) thought that mosquito elimination is the right way to control the disease. 59% of students had good knowledge about dengue fever and its control methods but only a small proportion (21%) practiced it (Habibullah, Sultana; Ashraf, 2013).

Based on the results of the study, it was found that the p-value of 0.000 means that the p-value of $0.000 < (P 0.05)$, so H_0 is rejected and H_a is accepted. So there is a relationship between perception and dengue prevention. Perception has a CI of 2.118 (1.639 - 2.737). This means that students with good perceptions have a 2 times chance of doing dengue prevention well. Perception is a process of sensing when information is received as a stimulus by the individual and the information is processed and interpreted into a perfect perception. Students are limited in receiving information on dengue prevention both at school and outside school. So that the sensing process as a stimulus does not occur properly. This is what drives the lack of perception in dengue prevention.

The variable of exposure to information media on dengue prevention is not related to the prevention of dengue fever through dengue Prevention. This indicates that if the information media that is not on target will not be effectively used. In today's high-tech era, information media is easily accessible. This is also the case with information media on dengue prevention. However, what needs to be understood together is that information media must be chosen and used wisely according to the target and target. Students have never been exposed to any printed information media on dengue prevention because there is none in the environment, while electronic media that is easily accessible can be an opportunity for students to be exposed to dengue prevention information. However, this condition does not necessarily guarantee that students can prevent dengue well. Elementary school students aged 10-12 years still need guidance in understanding the material, including dengue prevention material. Stimulus through media that is not well received becomes ineffective for dengue prevention behavior. However, a similar study stated that information about dengue fever was obtained by most children from elementary school teachers (73.6%) and their parents (68.5%) (Suwanbamrung, 2021). Similar research states that exposure to information on Mosquito Nest Eradication is associated with good dengue Prevention. A person who is exposed to information about Mosquito Nest Eradication has a 2.2 times more likely to perform these activities effectively (Saraswati, 2014).

Based on the study results, it was found that the p-value was $0.935 > (P 0.05)$, so H_0 was accepted and H_a was rejected. So there is no relationship between exposure to information media and dengue prevention. Exposure to information media on dengue prevention has a CI of 1.020 (0.788 - 1.319), suggesting that students exposed to information media on dengue prevention have a one-time chance to prevent dengue effectively. Information media is one source of information or knowledge that can stimulate behavior change, especially dengue prevention behavior. Information on dengue prevention can encourage changes in attitudes, perceptions, and motivation in individuals which will lead to changes in dengue prevention behavior. Information will make an individual experience a process from not knowing to understanding, willingness, and ability to perform health behaviors in the dengue prevention. Stimulus through information media will be the right step in encouraging behavioral changes toward dengue prevention.

The study identified that perception is the most dominant variable associated with dengue prevention among elementary school students. This perception involves complex processes interconnected with all the studied variables. Perceptions are formed from the different knowledge and experiences of students. Experience in getting incomplete information from various sources without guidance to understand will influence forming unfavorable perceptions in dengue prevention. Students' knowledge of health efforts is limited to environmental hygiene without knowing comprehensively and specifically the purpose of environmental hygiene, especially in eradicating mosquito larvae as part of dengue prevention. Limited knowledge and experience will shape unfavorable attitudes related to dengue prevention. When knowledge and experience are still very limited, the stimulus is not effective in shaping attitudes that support dengue prevention. Consequently, a less supportive attitude becomes an internal barrier, leading students to distance themselves from actions perceived as burdensome.

Students often perceive that maintaining the cleanliness of the school environment is the responsibility of school janitors rather than being a shared responsibility among students. This perception significantly impacts their motivation to carry out dengue prevention properly. Consequently, the perception formed about dengue prevention is not good so students do not carry out dengue prevention properly. An unfavorable perception of dengue prevention is an unfavorable condition if left unchecked. The school environment in the middle of a residential area has the same risk of a potential spread of the dengue vector, namely the *Aedes aegypti* mosquito breeding. Given that Bandung is an endemic area, the density of *Aedes aegypti* mosquito larvae in the elementary school environment is high. High-risk factors

for *Aedes aegypti* transmission arise when the density of mosquito larvae that cause dengue is high (Sutriyawan, 2023).

Conclusion

Based on the research findings, the variables associated with the prevention of Dengue Fever are knowledge, attitude, perception, and motivation. Meanwhile, variables that were not related to the prevention of DHF were exposure to information media on DHF prevention. Among these factors, perception emerged as the most influential in Dengue Fever prevention through PSN DBD (Dengue Hemorrhagic Fever National Program). Understanding environmental conditions and risky behaviors related to the breeding of *Aedes aegypti* is crucial in combating dengue hemorrhagic fever. This insight underscores the importance of awareness and proactive measures in curbing the spread of the disease among school-aged children.

Declaration Conflicting Interest

The authors declare no competing interest.

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Author Contribution

Each author played a significant role in every aspect of the work, from its inception to its final form. They all agreed on the publication of the final version, chose the journal for submission, and accepted responsibility for the entire project.

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Author Biography

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