

Survey of knowledge and practices of dengue fever prevention related to sociodemographic status: community-based study in Bandung, Indonesia

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ABSTRACT

Dengue fever has become an endemic in Bandung city and this disease poses a serious public health threat in Indonesia. This study aimed to examine sociodemographic factors, experiences with dengue fever and their relationship with knowledge and practice related to dengue fever prevention. This research was considered as a cross-sectional and community-based study. Systematic random sampling was performed, and samples were taken at three intervals, where one participant in every third house that researchers passed by was chosen for the interview. The sample was 559 participants. Participants involved in this study met the inclusion criteria, namely individuals aged 18 years and above, local residents, and able to understand the questions. Data were collected using a questionnaire. Data analysis was carried out using logistic regression. Multivariate test results showed high knowledge scores among participants aged over 40 years (OR=30.908, 95% CI 16.490-57.930, P=0.000), participants with an educational degree (OR=4.028, 95% CI 2.226-7.288, P=0.000), participants who worked as private employees and were self-employed were less likely (OR=0.235, 95% CI 0.098-0.560, P=0.001 and OR=0.262, 95% CI 0.107-0.638, P=0.003) to have better knowledge of dengue fever compared to those who worked as government employees, had an income of more than IDR 4,000,000 (OR=2.275, 95% CI 1.318-3.928, P=0.003), and had experienced dengue fever (OR=3.140, 95% CI 1.484-6.640, P=0.003). Meanwhile, dengue fever prevention practice scores were higher in participants aged 25-39 years (OR=18.163, 95% CI 16, 8.056-40.947, P=0.000), those who had an educational degree (OR=6.217, 95% CI 3.793-10.191, P=0.000), and participants who worked as housewives were less likely (OR=0.286, 95% CI 0.129-0.634, P=0.002) to practice dengue fever prevention compared to participants who had other jobs. Participants who had experienced dengue fever were less likely (OR=0.271, 95% CI 0.144-0.510, P=0.023) to practice dengue fever prevention compared to participants who never had dengue fever, and had a high knowledge score (OR=4.037, 95% CI 2.201-7.406, P=0.000). Dengue fever prevention practices are closely related to knowledge scores; therefore, dengue fever prevention should be emphasised through effective education programmes, and public health promotion initiatives by health officials should be conducted especially in densely populated areas.

Key words:

dengue fever; prevention practices; knowledge; sociodemographic

Citation:

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INTRODUCTION

Dengue fever is one of the most common public health problems in tropical and subtropical countries. Over the past decades, the prevalence of dengue fever has increased substantially, with approximately 50% of the global population (0.25 billion people) at risk of dengue infection.¹ Transmitted by *Aedes aegypti* (L.) and *Aedes albopictus* (Skuse), dengue can occasionally progress to a severe stage known as dengue fever, which can cause severe complications and potentially lead to death in humans.² Currently, there is no specific treatment available to cure this disease.

Each year, approximately 50 million dengue virus infections occur and approximately half a million people contract severe dengue, causing significant morbidity and mortality worldwide.³

In 2022, dengue fever continued to affect several countries, with cases reported increasing in several countries including Indonesia. There were 129,650 cases of dengue fever recorded in Indonesia in 2015. This is an increase compared to the number of cases in 2014, which was around 99,499 cases. In addition, in 2022, there were 143,266 cases with 1,237 deaths. The number of cases and deaths due to dengue fever has increased compared to 2021, which was 73,518 cases and 705 deaths. Among the 10 provinces that have reported this outbreak, the incidence rate (IR) in West Java is the highest in Indonesia at 72.29.⁴ The number of dengue cases in

Bandung City in the last three years has increased. In 2020 there were 2,790 cases, which increased in 2021 to 3,743 cases, and increased again in 2022 to 5,205 cases.⁵

Globally, dengue fever transmission has been linked to a variety of social factors, including education level, household characteristics, uncontrolled population growth, water supply (i.e., poor sanitation and water-storing practices), electricity availability, vegetation cover, human behavior, climatic variations, and the abundance of *Aedes* mosquitoes.^{6,7} To achieve effective disease control, society should be empowered with proper knowledge related to dengue fever preventive strategies because human behavior plays a key role in facilitating dengue vectors (providing a favorable environment for breeding and blood meals) and disease transmission.⁸ Society with higher socioeconomic status and a better understanding of dengue fever (in terms of knowledge, attitudes, and prevention practices) has resulted in more successful disease control. For instance, in the Malaysian state of Selangor, human behavior has a significant impact on the spread and transmission of dengue fever.⁹

Prior studies have reported that individuals lacking knowledge about dengue fever demonstrated fewer preventive practices compared to those who had more knowledge about the disease.¹⁰ A recent study found that there is a weak association between knowledge about dengue fever and prevention practices among the Indonesian population.¹¹ Nevertheless, evidence suggests that higher

knowledge did not necessarily result in the adoption of the recommended preventive behaviours.^{12,13} Therefore, further investigation is important to find out the association between knowledge and dengue prevention practices.

In addition, many other studies have investigated the level of knowledge of the general public about dengue fever and how to prevent it. The intended studies had been conducted in Vietnam,¹⁴ Indonesia,¹⁵ Brazil,¹⁶ Republic of Yemen,¹⁷ Mexico, Colombia,¹⁸ Australia,¹⁹ and Malaysia.²⁰ Currently, the prior studies in Indonesia only focused on risk factors associated with dengue fever,²¹ and prevention efforts through removing places where mosquitoes lay eggs.^{22,23} The increasing trends of dengue fever are particularly affecting densely populated and endemic areas. The Indonesian government has supported prevention and control efforts through mosquito nest eradication programs. To support the program, identifying and understanding the role of sociodemographics in the increase of dengue fever cases can provide insights into prevention efforts by targeting individuals prone to dengue fever and improving dengue fever prevention practices, as well as facilitating authorities in dengue fever management. This study aims to identify potential predictors and analyze sociodemographic factors, participants' experiences with dengue fever and their association with dengue prevention knowledge and practices among the communities of Bandung City, Indonesia.

METHOD

Study Design and Location

Cross-sectional quantitative research was conducted in Bandung City, West Java Province, Indonesia. This design was used to analyze the relationship between sociodemographic factors and knowledge and practice of dengue fever

prevention in society. Ethical clearance and permission for this research were obtained from the health research ethics committee of Bhakti Kencana University with Number. 083/09.KEPK/UBK/VII/2023. All research participants had given their permission to be part of the study and voluntarily provided information needed for this study. Informed consent was written and signed by all participants before starting the interview.

Population and study sample

The study population included all people residing in Bandung city, Indonesia. The sample size was calculated using A-priori Sample Size for Structural Equation Models Formulas (power test = 80% and probability level = 5%) and resulted in a sample size of 559 participants. Further, the sampling technique was performed by applying systematic random sampling, where one participant in every third house that researchers passed by was chosen to do the interview. During visits to each house, only the head of the household (father) was interviewed. If the head of the household was unavailable, other eligible family members were randomly selected as long as they could meet the following inclusion criteria such as being 18 years old, local residents, and able to understand the questions asked by the interviewer. Data collection was conducted by researchers and assisted by 5 enumerators. Enumerators were trained before going to the field to collect research data.

Data collection

The questionnaire used in this study is a questionnaire used by previous researchers and translated into Indonesian language. The questionnaire was adapted from "Practices of Dengue Fever Prevention and the Associated Factors among the Orang Asli in Peninsular Malaysia" research by Chandren et al. (2015). The Cronbach's alpha coefficient measurement for dengue fever knowledge

was 0.916, indicating high internal consistency. Meanwhile, the Cronbach's alpha coefficient measurement for self-reported preventive practices in this study was 0.655, indicating good internal consistency.¹⁰

Knowledge related to the dengue fever section consisted of 6 parts, namely: 1) dengue fever and *Aedes aegypti* and *Aedes albopictus* characteristics; 2) transmission; 3) signs and symptoms of dengue hemorrhagic fever; 4) signs and symptoms of dengue fever; 5) prevention practices for dengue fever; and 6) treatment, curability and precautionary measures for dengue fever. The knowledge questionnaire consisted of 41 items using the Guttman Scale. For each statement, participants could choose between 3 response categories: "yes," "no," and "don't know." For data analysis, participants' responses were given a score of 1 for a correct response and 0 for an incorrect or "don't know" response. Some negatively worded items were reversed and recoded during the data analysis process. Thereby, possible scores ranged from 0 to 41. Higher scores indicated greater knowledge about dengue fever. The cutoff point for knowledge was categorized as a low level of knowledge if the participants' response score was 0-28 (percentage of correct answer score < 70%), while the level of knowledge was high if the participants' response score was 29-41 (percentage of correct answer score $\geq$ 70%)²⁰.

Meanwhile, the dengue fever prevention practices section employed previous research questionnaires. It consisted of 2 parts: 1) preventive measures reducing mosquito breeding habitats; and 2) preventive measures reducing mosquito bites, which were assessed, respectively using items 10 and 8. The questionnaire used a Likert scale with answer options 0 for "never", 1 for "rarely", 2 for "sometimes", 3 for "often", and 4 for

"always". Some negatively worded items were reversed and recoded during the data analysis process. Possible scores ranged from 0 to 72. The cutoff point for preventive practices was categorized as a low score if the participant's answer score was 0-43 (percentage of answer score < 60%), and a high score if the participant's answer score was 44-72 (percentage of answer score $\geq$ 60%)²⁰.

Statistical Analysis

Data obtained in the study was analyzed using IBM SPSS Statistics 26. In addition to descriptive analysis, the data were tested for a significant relationship between the associative variables and the outcome variables using the chi-square test, with $P < 0.05$. Knowledge scores were associated with sociodemographic status and experience with dengue fever. Meanwhile, the dengue fever prevention practice score was associated with sociodemographic status, experience of dengue fever, and knowledge scores using crosstab and chi-square analysis to see how these variables were associated with each other. Multivariate logistic regression model was used to examine the effect of sociodemographic status and experience with dengue fever on knowledge of dengue fever. In addition, a multivariate logistic regression model was used to examine the effect of sociodemographic status, experience of dengue fever, and knowledge of dengue fever prevention practices. In the modeling strategy, variables were included if they had $p < 0.05$ on bivariate analysis. Associations were expressed as adjusted odds ratios with 95% confidence intervals for each variable included in the multivariate model.

RESULTS

A total of 559 participants were involved in this study. Among them, 312

(55.8%) were male and 247 (44.2%) were female participants. Most participants (n = 273, 48.8%) were aged between 25-39 years old. Approximately, 40.8% of participants were Sundanese, with an educational degree and an income of more than Rp. 4,000,000. About 59.9% and 58.7%, 81.9% of participants have jobs, and the majority (75.8%) of participants in this study had no experience with dengue fever. **Table 1** shows that 93.7% (n = 524) of participants answered correctly that dengue fever is transmitted by mosquitoes. Most of them (n = 480, 85.9%) knew that dengue fever is caused by the *Aedes aegypti* and

Aedes albopictus mosquitoes and 94.5% (n = 528) of them knew that draining/cleaning water reservoirs around the house is an effective preventive method for dengue fever. Only a minority of the participants (n = 220, 39.4%) knew that only female *Aedes* mosquitoes bite humans and 46.2% (n = 258) understood that there was no cure for dengue fever. Slightly more than half of the participants knew that *Aedes* mosquitoes that bite infected people can spread the virus to other people (n= 343, 61.4%) and recognized that dengue epidemics only occur in the dry season (n= 333, 59.7%).

Table 1. Results of knowledge score about dengue fever and *Aedes aegypti*

Statements	No. (%)
Knowledge about dengue and <i>Aedes</i> mosquito	
DHF is transmitted by mosquito	524 (93.7)
DHF can be fatal	516 (92.3)
Dengue Fever may become Dengue Hemorrhagic Fever	507 (90.7)
DHF is a viral infection	500 (89.4)
An individual can only get dengue once	486 (86.9)
DHF outbreaks occurs only during rainy season	495 (88.6)
DHF is transmitted by the <i>Aedes aegypti</i> and <i>Aedes albopictus</i> mosquitoes	480 (85.9)
<i>Aedes</i> mosquito has black and white stripes on its leg and body	488 (87.3)
<i>Aedes</i> mosquitoes breed in clean stagnant water	424 (75.8)
<i>Aedes</i> mosquitoes bite during dusk and dawn	301 (53.8)
<i>Aedes</i> mosquitoes prefer to live in shaded areas	274 (49.0)
Only female <i>Aedes</i> mosquitoes bite humans	220 (39.4)
Knowledge about the transmission of dengue	
Dengue fever usually appear 4-7 days after being bitten	502 (89.8)
Transmission from an infected person by touch	424 (75.8)
Transmission from an infected person by air	404 (72.3)
An individual only can get dengue fever once	408 (73.0)
Transmission from an infected person by body fluids	390 (69.8)
Transmission from an infected person blood	434 (77.6)
<i>Aedes</i> mosquito biting an infected person can spread it to another	343 (61.4)
Dengue epidemic only occurs during dry season	333 (59.7)
<i>Aedes</i> mosquito eggs can contain dengue virus	318 (56.9)
Knowledge of Signs and Symptoms of dengue hemorrhagic fever	
Small red or purple spots under the skin	463 (82.8)
Severe headache or fainting	450 (80.5)
Bleeding in gums	437 (78.2)
Bleeding in the nose	388 (69.4)
Shortness of breath	276 (49.4)
Blood in stool and urine	255 (45.6)

Statements	No. (%)
Knowledge of Signs and Symptoms of dengue fever	
Headaches	495 (88.6)
Chills	431 (77.1)
High fever for 5-7 days	476 (85.2)
Joint, muscle pain and rash	468 (83.7)
Nausea and vomiting	347 (62.1)
Pain in the eyes	320 (57.2)
Knowledge of prevention practices for dengue	
Periodically emptying or drying out containers that retain water around the house	528 (94.5)
Covering water containers	518 (92.7)
Weekly change of stored water	525 (93.9)
Proper disposal of items that can retain water	501 (89.6)
Apply larvicide treatment in water containers	449 (80.3)
Knowledge of treatment, curability, precautionary measures for dengue	
No medication for dengue treatment	258 (46.2)
Only immediate treatment can prevent complications and death	510 (91.2)
There is a vaccine to prevent dengue fever	288 (51.5)

Information : n = 559

DHF = Dengue Hemorrhagic Fever

Table 2 shows a multivariate logistic regression analysis, highlighting that participants aged over 40 years were more likely (OR=30.908, 95% CI 16.490-57.930, P=0.000) to have better knowledge of dengue fever compared to the 18-24 years and 25- 39 years age groups. Further, participants who had an educational degree were more likely (OR=4.028, 95% CI 2.226-7.288, P=0.000) to have better knowledge of dengue fever compared to participants who did not achieve an educational degree. Participants who worked as private employees or were self-employed were less likely (OR=0.235, 95% CI 0.098-0.560, P=0.001 and OR= 0.262, 95% CI 0.107-0.638, P=0.003) to have better knowledge of dengue fever compared to those who worked as government employees. Participants with an average monthly household income of more than IDR 4,000,000 were more likely (OR=2.75, 95% CI 1.318-3.928, P=0.003) to have better knowledge of dengue fever compared to participants who had an income of less than IDR 4,000,000. Meanwhile, participants who had experienced dengue fever had a higher likelihood (OR=3.140, 95% CI 1.484-6.640, P=0.003) to demonstrate better knowledge of dengue fever compared to participants who had never had dengue fever.

Table 2. Univariate, Bivariate and multivariate analysis between sociodemographic status and knowledge

Sociodemographic Status	Knowledge					
	Univariate	Bivariate		p-value	Multivariate logistic regression	
	n (%)	Low Score (0-28) n (%)	High Score (29-41) n (%)		P and OR	(95% CI)
Gender						
Male	312 (55,8)	188 (60.3)	124 (39.7)	0.057		
Female	247(44,2)	169 (68.4)	78 (31.6)			
Age						
18-24 years	122 (21,8)	104 (85.2)	18 (14.8)	0.000		
25-39 years	273 (48,8)	229 (83.9)	44 (16.1)		0.000 (20.772)	9.780-44.116
≥ 40 years	164 (29,3)	24 (14.6)	140 (85.4)		0.000 (30.908)	16.490-57.930
Tribes						
Sundanese	228 (40,8)	147 (64.5)	81 (35.5)	0.993		
Javanese	139 (24,9)	89 (64.0)	50 (36.0)			
Malay	93 (16,6)	58 (62.4)	35 (37.6)			
Batak	60 (10,7)	39 (65.0)	21 (35.0)			
Betawi	39 (7,0)	24 (61.5)	21 (38.5)			
Level of Education						
No formal education	224 (40,1)	191 (85.3)	33 (14.7)	0.000		
Primary education	335 (59,9)	166 (49.6)	169 (50.4)		0.000 (4.028)	2.226-7.288
Occupation						
Government employee	122 (21,8)	51 (41.8)	71 (58.2)	0.000		
Private employee	117 (20,9)	69 (59.0)	48 (41.0)		0.001 (0.235)	0.098-0.560
Self-employed	89 (15,9)	54 (60.7)	35 (39.3)		0.003 (0.262)	0.107-0.638
Farmer	59 (10,6)	38 (64.4)	21 (35.6)		0.252 (0.564)	0.212-1.503
Laborer	71 (12,7)	56 (78.9)	15 (21.1)		0.179 (0.482)	0.166-1.396
Housewife	101 (18,1)	89 (88.1)	12 (11.9)		0.059 (0.354)	0.121-1.038
Income						
< IDR 4,000,000	231 (41,3)	170 (73.6)	61 (26.4)	0.000		
≥ IDR 4,000,000	328 (58,7)	187 (57.0)	141 (43.0)		0.003 (2.275)	1.318-3.928
Experience of dengue fever						
No	424 (75,8)	247 (58.3)	177 (41.7)	0.000		
Yes	135 (24,2)	110 (81.5)	25 (18.5)		0.003 (3.140)	1.484-6.640

Table 3 reported multivariate logistic regression analysis results and showed that participants aged 25-39 years were more likely (OR=18.163, 95% CI 16, 8.056-40.947, P=0.000) to practice dengue fever prevention compared with participants aged 18-24 years. Participants who had an educational degree were more likely (OR=6.217, 95% CI 3.793-10.191, P=0.000) to practice dengue fever prevention compared to participants who did not have an educational degree. Further, participants who worked as housewives were less likely (OR=0.286, 95% CI 0.129-0.634, P=0.002) to practice dengue fever prevention compared to participants who had other jobs. Participants who had experienced dengue fever were less likely (OR=0.271, 95% CI 0.144-0.510, P=0.023) to practice dengue fever prevention compared to participants who never had dengue fever. Meanwhile, participants who had high knowledge were more likely (OR=4.037, 95% CI 2.201-7.406, P=0.000) to practice dengue fever prevention compared to participants with less knowledge.

Table 3. Univariate, Bivariate and multivariate analyses between sociodemographic status, knowledge and practice of DHF prevention

Sociodemographic Status	Prevention Practices					
	Univariate	Bivariate		p-value	Multivariate logistic regression	
	n (%)	Low Score (0-43) n (%)	High Score (44-72) n (%)		P and OR	(95% CI)
Gender						
Male	312 (55,8)	144 (46.2)	168 (53.8)	0.924		
Female	247(44,2)	113 (45.7)	134 (54.3)			
Age						
18-24 years	122 (21,8)	92 (75.4)	30 (24.6)	0.000		
25-39 years	273 (48,8)	143 (52.4)	130 (47.6)		0.000 (18.163)	8.056-40.947
≥ 40 years	164 (29,3)	22 (13.4)	142 (86.6)		0.024 (2.158)	1.109-4.200
Tribes						
Sundanese	228 (40,8)	113 (49.6)	115 (50.4)	0.415		
Javanese	139 (24,9)	66 (47.5)	73 (52.5)			
Malay	93 (16,6)	40 (43.0)	53 (57.0)			
Batak	60 (10,7)	23 (38.3)	37 (61.7)			
Betawi	39 (7,0)	15 (38.5)	24 (61.5)			
Level of Education						
No formal education	224 (40,1)	115 (69.2)	69 (30.8)	0.000		
Primary education	335 (59,9)	102 (30.4)	233 (69.6)		0.000 (6.217)	3.793-10.191
Occupation						
Government employee	122 (21,8)	42 (34.4)	80 (65.6)	0.000		
Private employee	117 (20,9)	50 (42.7)	67 (57.3)		0.720 (0.882)	0.445-1.751
Self-employed	89 (15,9)	37 (41.6)	52 (58.4)		0.478 (0.787)	0.406-1.525
Farmer	59 (10,6)	22 (37.3)	37 (62.7)		0.295 (0.680)	0.330-1.400
Laborer	71 (12,7)	38 (53.5)	33 (46.5)		0.022 (0.385)	0.170-0.870
Housewife	101 (18,1)	68 (67.3)	33 (32.7)		0.002 (0.286)	0.129-0.634
Income						
< IDR 4,000,000	231 (41,3)	110 (47.6)	121 (52.4)	0.570		
≥ IDR 4,000,000	328 (58,7)	147 (44.8)	181 (55.2)			
Experience of dengue fever						
No	424 (75,8)	74 (54.8)	61 (45.2)	0.023		
Yes	135 (24,2)	183 (43.2)	241 (56.8)		0.000 (0.271)	0.144-0.510
Knowledge						
Low Score	357 (64,9)	224 (62.7)	133 (37.3)	0.000		
High Score	202 (36,1)	33 (16.3)	169 (83.7)		0.000 (4.037)	2.201-7.406

DISCUSSION

Dengue fever is a viral infection transmitted through the bite of an infected mosquito that can cause morbidity, hospitalization, and, in some cases, death.^{24,25} The spread of dengue is expected

to increase in Indonesia due to various factors. These include failure to control *Aedes* mosquito populations, uncontrolled urbanization, unprecedented population growth, and climate variations.^{26,27} This present study also informs that the preventive action most preferred by participants is periodically emptying or

drying out containers that retain water around the house such as bathtubs, jugs, water towers, drums and other water reservoirs (76.5%), and applying larvicide treatment and other mosquito repellents (70.8%). The application of mosquito-proof nets will not be effective in preventing *Aedes* mosquito bite incidents because most mosquito-proof nets are only used at night.²⁸ The present findings show that more than half (55.2%) of the participants responded that clearing and repairing clogged drains and gutters to prevent water from accumulating could be a preventive measure. This finding supports a previous study where more than half (55.7%) of the participants mentioned environmental cleaning as an important preventive practice.²⁹

Surprisingly, in this study, although most participants had high knowledge about the *Aedes* mosquito and dengue fever, only a small portion of them carried out preventive measures and practiced controlling the *Aedes aegypti* mosquito breeding. The key finding of this study is that the good practice level was lower than the knowledge level although there was a significant relationship existing between knowledge and preventive practices. These findings on the level of practice are similar to a previous study which reported high levels of knowledge but low levels of practice.³⁰ In fact, if the gap between knowledge and practice is not decreased, this will become an important challenge in controlling dengue fever and *Aedes aegypti* populations.

This study found that age, level of education, occupation, household income, and previous experience with dengue fever were significantly associated with participants' knowledge about dengue fever. The results of this investigation show that the majority of participants have knowledge about the concept of dengue fever, the morphological characteristics of *Aedes aegypti*, modes of transmission, and suitable habitats for this mosquito. Good

knowledge of mosquito vectors and the signs and symptoms of dengue fever is very important for identifying this disease and implementing appropriate preventive measures to reduce the incidence of this disease.³¹ These results confirm the outcomes of studies reported in Malaysia,¹⁰ India,³² Nepal,³³ and Thailand.³⁴

It is essential to note that based on multivariate analysis, people aged over 40 years are more likely to have better knowledge of dengue fever. This relationship is consistent with what has been observed in other studies.³⁵ In addition, with increasing age, there is an increase in the frequency of positive attitudes and practices to control transmission. Other findings from China suggest that age is directly associated with certain knowledge about the disease and its transmission mechanisms.³⁶

Another important finding is that participants with a higher level of education had much higher knowledge scores. Previous studies showed that the level of education has a significant influence on knowledge related to dengue fever.^{37,38} These findings indicate that knowledge about dengue fever is relatively low among people with low education. Therefore, more effective education programs to increase public awareness need to be implemented among societies with low levels of education, especially in large cities with high population density where dengue fever dominates. This present study also revealed that participants with incomes above IDR 4,000,000 had higher knowledge levels. This may be because people with higher economic status may have better access to sources of information about dengue fever.³⁹

At the same time, participants who had experienced dengue fever had significantly higher knowledge scores. This may be because they actively seek information when facing the disease or receive information from health workers while undergoing treatment. These findings

are consistent with those observed in Puerto Rico where individuals previously diagnosed with dengue fever were more knowledgeable about dengue fever and were concerned about others contracting it.⁴⁰

Based on the findings of this study, it is suggested that dengue fever prevention should be emphasised through effective education programmes, and public health promotion initiatives by health officials should be conducted especially in densely populated areas focusing on dengue fever transmission, *Aedes* mosquito breeding sites, early diagnosis of dengue fever and treatment procedures. Policymakers have the opportunity to design steps to increase awareness, understanding and surveillance through the use of community-based education initiatives. The Government of Indonesia should also provide and train an adequate number of health workers to deliver appropriate counselling in an effort to bring about community behaviour change and encourage dengue prevention practices. In addition, continuous education and monitoring should be conducted to ensure long-term behaviour change towards successful dengue prevention.³⁰

There are several strengths to our study. Firstly, the researchers conducted the research study in a dengue endemic location. Second, the researchers used a randomised sample to reduce selection bias. Third, the researchers used a questionnaire that has been proven to be consistent, hence the information obtained in this study can describe the actual level of knowledge and practice of dengue prevention. Limitations of this study include the fact that it was conducted in one city and most of the participants were Sundanese. This may not be representative of all Indonesians, hence making generalisation of the results difficult. All information obtained from the interviews was self-reported, therefore

there may be a bias towards the desired responses and behaviours.

CONCLUSION AND RECOMMENDATIONS

From this study, several conclusions could be inferred, firstly, this study highlights that the majority of participants have a high level of knowledge about the concept of dengue fever, the morphological characteristics of *Aedes aegypti*, modes of transmission, and suitable habitats for this mosquito. Secondly, age, education, occupation, household income, and previous experience with dengue fever are significantly associated with knowledge about this disease. Thirdly, dengue fever prevention practices can be influenced by the level of knowledge and sociodemographic status (age, education, occupation, and experience with dengue fever). Therefore, it is suggested that dengue fever prevention should be emphasised through effective education programmes and public health promotion efforts by health officials should be conducted, especially in densely populated areas. Moreover, the Government of Indonesia should also provide and train an adequate number of health workers to deliver appropriate counselling, in an effort to bring about community behaviour change and encourage dengue prevention practices.

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