



Stagnant Cleaning Affects Dengue Hemorrhagic Fever Incidence: A Rapid Survey

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Abstract

DHF is still a serious health problem and a threat in a number of areas in Indonesia. The purpose of this study was to intervene regarding the disease and reduce the number of dengue cases and to implement the jumantik program in Bandar Setia Village. This method uses a quick survey with the formula 7×30 clusters in 10 clusters or hamlets, the number of 210 samples is obtained with an additional 10% estimate, namely 21 samples to prevent drop out, the sample is taken randomly using cluster sampling technique, conducted by interview using a questionnaire adopted from various previous research, then the data is transferred into a statistical-based application through various stages, namely coding, cleaning, editing, scoring and entry. After going through these stages the data is analyzed descriptively, namely percentage and frequency, chi square and multiple logistic regression. The results obtained that >50% of people were fogging, the results of statistical tests showed that overall factors had a significant relationship with the implementation of the DHF prevention program with risks ranging from 1.19 to 5.23 times, the results of the multivariate test stated that the category of cleaning puddles was the highest risk in influencing the implementation of dengue prevention programs. This study concludes that at this time DHF has an attempt to go down and someday it could rise again. The results of the multivariate test stated that the category of cleaning puddles was the highest risk in influencing the implementation of the DHF prevention program. This study concludes that at this time DHF has an attempt to go down and someday it could rise again. The results of the multivariate test stated that the category of cleaning puddles was the highest risk in influencing the implementation of the DHF prevention program. This study concludes that at this time DHF has an attempt to go down and someday it could rise again.

Keywords: Dengue Hemorrhagic Fever, Rapid Survey, Stagnant Cleaning

Introduction

Dengue Hemorrhagic Fever (DHF) is still a serious health problem and a threat in a number of areas in Indonesia. This is because this disease does not only attack the health sector, but also the social and economic sectors of the community (Princess et al., 2022). In Indonesia, the number of dengue cases tends to increase from year to year (Iswandari & Ningrum, 2022). The increasing number of dengue fever in various cities in Indonesia is caused by the difficulty of controlling the disease transmitted by *Ae. aegypti* (Lusita et al., 2022). The increase in den-

gue cases continues to occur, especially during the rainy season. The Ministry of Health noted that in 2022, the cumulative number of dengue cases in Indonesia until the 22nd week was reported to be 45,387 cases (Tosepu & Effendy, 2022).

The incidence of cases of Dengue Hemorrhagic Fever (DHF) in Indonesia reached 52,313 people (Ministry of Health, 2021). According to data from the Percut Sei Tuan District Central Statistics Agency in 2020, 17 health problems were found that are still a problem, then they were selected based on data and a comparison of

indicators from 17 health problems. 17 diseases were selected as health problems, namely food processing facilities, Dengue Hemorrhagic Fever (DHF), Sanitation (Healthy Latrine), Drinking Water Facilities, Hypertension Services, BBL receiving IMD and breast milk <6 months, Active family planning, Pregnant women receiving TPD, Immunization for WUS, Diarrhea, Immunization for Pregnant Women Td2+, Elderly Health Services, Hepatitis Immunization, Complete Immunization for Baduta, VIT A for Toddlers (12-54 Months) Toddler Health Services, and Pneumonia in Toddlers (Central Bureau of Statistics, 2020). According to the Health Profile Data of the Bandar Khalipah Health Center in 2020, only 1.5% of dengue cases were detected (Department of Health, 2020). Meanwhile, the results of the team survey showed that cases of Dengue Hemorrhagic Fever (DHF) in Bandar Setia Village currently rose significantly to 15.8% and the highest dengue cases in Bandar Setia Village, which was in Hamlet 4, amounted to 17.8%.

Prevention strategies through treatment are quite difficult considering that there is no vaccine for prevention and no specific medicine for cure, on the other hand, patients with dengue fever who are still sick or are carriers have the potential to transmit it to others through the *Aedes aegypti* and *Aedes albopictus* mosquitoes. Prevention efforts can be done through breaking the chain of transmission. Therefore, prevention of DHF can be done through the eradication of mosquitoes or mosquito nests and mosquito larvae by means of 3 M Plus (draining, closing, burying) mosquito breeding places (containers) plus the provision of fish (fishization) in containers. The activity of eradicating mosquito nests or known as PSN is the real behavior of every individual to prevent dengue disease (Setyadi et al., 2021).

In terms of community acceptance or acceptance, it is considered quite acceptable, because the community is quite familiar with DHF disease and public interest and community participation in socializing and implementing DHF eradication is quite high, around 65%. (Xu et al., 2022). The control or prevention of DHF is supported by the Public Health Center regarding the Jumantik program (Lartic Monitor) with larvae inspection and eradication at residents' homes which aims to achieve the target of the larva-free rate with a target of 95% and the achievement in Bandar Setia Village is now

93% (Alhyan et al., 2022). This prevention and control can be done with the help of Health Officers, Village Health Care cadres, Community Leaders (Umar et al., 2022). Therefore, we intervened regarding the disease to reduce the number of dengue cases and implemented a jumantik program in Bandar Setia Village.

Materials and Method

This survey was conducted using a quantitative approach by design *cross sectional* based on a rapid survey, namely taking 10 clusters or hamlets in Bandar Setia Village, Percut Sei Tuan District. The total population is 25,897 people, the sample is drawn based on the formula $7 \times 30 = 210$ clusters with an additional estimate of 10%, namely 21 samples to avoid dropping out. Samples were taken randomly through cluster sampling technique.

Data were collected by conducting interviews with people who live in Bandar Setia Village using a questionnaire adopted from an introspective survey and a study conducted by (Dja'afar et al., 2022), (Javaria Malik et al., 2022) and (Khan et al., 2022) to obtain information related to the implementation of the DHF prevention program with several questions, namely demographic characteristics, the local government implements the program and behavior towards DHF prevention, after the interview, the data is transferred into a statistical-based application, then through several processes, namely coding, cleaning, editing, entry and scoring to prevent data bias, after going through some of these processes the data were analyzed descriptively to see the percentage and statistical tests, namely chi square and multiple logistic regression to get crude and adjusted odds ratio with a precision or hypothesis of 5% ($p < 0,05$).

Results and Discussion

The results reported that >50% of the respondents were female, aged over 30 years, had a height below 160 cm, weight <60kg, Javanese ethnicity, married status, income <Rp. 3,000,000 and had health insurance and 40% of the community only have education level up to high school (Table 1).

Supporting Factors in Cleaning Puddles Affecting the Incidence of Dengue Hemorrhagic Fever (DHF)

Based on the results of the study showed that more than half (>50%) of respondents had

Table 1. Demographic Characteristics (n=210)

Variable	Frequency (%)
Gender	
Man	36 (17.1)
Woman	174 (82.9)
Age	
< 30 years old	70 (33.3)
> 30 years	140 (66.7)
Height	
< 160 cm	126 (60.0)
> 160 cm	84 (40.0)
Weight	
< 60 kg	117 (55.7)
> 60 kg	93 (44.3)
Ethnic/Tribe	
Aceh	20 (9.5)
Batak	39 (18.6)
Java	108 (51.4)
Malay	7 (3.3)
Minang	36 (17.1)
Marital status	
Not married yet	25 (11.9)
Marry	130 (61.9)
Divorced	18 (8.6)
Death divorce	37 (17.6)
Last education	
SD	47 (22.4)
JUNIOR HIGH SCHOOL	43 (20.5)
High SchoolCollege	85 (40.5)
	35 (16.7)
Family Income	
< IDR 3,000,000	140 (66.7%)
> IDR 3,000,000	70 (33.3%)
Have Health Insurance	
Yes	94 (44.8)
Not	116 (55.2)

heard of DHF, prevented contact with mosquitoes, used insecticide sprays, used window screens at home, cleaned puddles of water, cleaned garbage around the house, disposed of and cleaned water in the water reservoir and in the ditch, using mosquito repellent lotion, doing fogging, wearing long sleeves, cleaning mosquito breeding grounds, closing the water reservoir, closing the water reservoir, and using a fan. However, the same number of people do not use professional pest control, do not clean the bushes, do not use mosquito coils.

Based on the results of the chi square statistical test, it is stated that overall the factors had a significant effect on the incidence of DHF ($p < 0.05$) with risks ranging from 1.19 times to 5.23 times. However, only cleaning the garbage

around the house did not have a significant effect on the incidence of DHF ($p > 0.05$) (Table 3).

Table 4 shows the multivariate analysis of logistic regression tests. The results revealed that not using professional pest control, using window wires at home, cleaning puddles and fogging had a significant relationship with the incidence of DHF. Cleaning puddles is the highest risk factor of 4.17 times for the incidence of DHF.

Discussion

The first factor is not using professional pest control which is the cause of the implementation of the dengue prevention program at 1.9 times risk. This is in line with the results of a study from Naing, et al, namely the average score (IQR) of knowledge about HPS is 77.00 (6.25,

Table 2. Factors Affecting DHF Incidence (n=210)

Variable	Frequency (%)
Ever heard of DHF	140 (66.7)
Prevent mosquito contact	138 (65.7)
Using insecticide spray	109 (51.9)
Do not use professional pest control	158 (75.2)
Using window wire at home	128 (61.0)
Cleaning Puddles	118 (56.2)
Not cleaning the bushes	108 (51.4)
Do not use mosquito coils	108 (51.4)
Cleaning up trash around the house	155 (73.8)
Dispose of the water in the water reservoir	145 (69.0)
Use mosquito repellent	149 (71.0)
Fogging	112 (53.3)
Wearing long sleeves	151 (71.9)
Doing nothing to reduce mosquito bites	169 (80.5)
Clean up mosquito breeding grounds	134 (63.8)
Close the water reservoir	121 (57.6)
Cleaning water in water reservoirs and ditches	177 (84.3)
The local government does not implement the fogging program	141 (67.1)
Using the fan	184 (87.6)

Table 3. Bivariate Analysis of Factors Affecting DHF Incidence in Bandar Setia Village

Variable	Implementation of the DHF Prevention Program		COR (95% CI)**	P-Value
	Yes (%)	Not (%)		
Ever heard of DHF	40 (58.0)	41 (29.1)	0.56 (0.31-1.03)	0.008
Prevent mosquito contact	34 (49.3)	37 (26.2)	0.34 (0.18-0.63)	0.001
Using insecticide spray	33 (47.8)	65 (46.1)	0.78 (0.44-1.39)	0.046
Do not use professional pest control	32 (46.4)	121 (85.8)	5.23 (2.68-10.21)	0.000*
Using window wire at home	44 (63.8)	57 (40.4)	1.19 (0.65-2.16)	0.006*
Cleaning Puddles	45 (65.2)	68 (48.2)	1.74 (0.96-3.16)	0.007*
Not cleaning the bushes	30 (43.5)	69 (48.9)	0.73 (0.41-1.31)	0.030
Do not use mosquito coils	22 (31.9)	61 (43.3)	0.35 (0.19-0.65)	0.001
Cleaning up trash around the house	51 (73.9)	37 (26.2)	1.00 (0.52-1.94)	1,000
Dispose of the water in the water reservoir	42 (60.9)	38 (27.0)	0.57 (0.31-1.05)	0.008
Use mosquito repellent	61 (88.4)	53 (37.6)	4.59 (2.03-10.34)	0.000
Fogging	54 (78.3)	83 (58.9)	5.15 (2.65-9.99)	0.000*
Wearing long sleeves	51 (73.9)	41 (29.1)	1.16 (0.60-2.22)	0.007
Doing nothing to reduce mosquito bites	53 (76.8)	25 (17.7)	0.71 (0.35-1.44)	0.035
Clean up mosquito breeding grounds	48 (69.6)	55 (39.0)	1.46 (0.79-2.70)	0.028
Close the water reservoir	51 (73.9)	71 (50.4)	2.87 (1.53-5.39)	0.001
Cleaning water in water reservoirs and ditches	40 (58.0)	4 (2.8)	0.40 (0.01-0.12)	0.000
Using a fan	69 (37.5)	26 (18.4)	0.62 (0.59-0.69)	0.000

Table 4. Multivariate Analysis of Factors Related to the Implementation of the DHF Prevention Program

Variable	B	SE	Wald	P-Value	AOR*	95%CI
Do not use professional pest control	0.690	0.452	2,331	0.127	1.99	0.82-4.83
Using window wire at home	0.883	0.374	5.557	0.018	2.41	1.16-5.03
Cleaning Puddles	1,429	0.360	15,725	0.000	4.17	2.06-8.45
Fogging	0.627	0.364	2,962	0.008	1.87	0.91-3.82
Constant	-0.612	0.374	2,676	0.102	0.543	

73.75-80.00) with a range of 43 to 87, and 38 (19.6 %) secondary school teachers have a high level of knowledge. For the level of attitude towards the HPS program, the average score (IQR) was 105.00 (11.25, 100.00-111.25) with 82 minimum scores and a maximum score of 129. Among the total high school teachers, 48 (24, 7%) high school teachers have a positive attitude. The average score (IQR) of involvement in HPS activities is 95.00 (16.25, 85.75-102.00) with a range of 51-117 and 46 (23.7%) high school teachers have good involvement (Naing et al., 2022).

The second factor, namely using window wires at home is also the cause of the implementation of the dengue prevention program and has a moderate risk by 2.4 times. According to Seifert et al., the positive effect of on-demand exclusive digital purchase releases on exclusive channels (0.326, $p = 0.0002$), indicating that consumers are aware of limited access to exclusive distribution channels and receive exclusive digital offers. (Seifert et al., 2022).

The third factor in the form of cleaning puddles is also the cause of whether or not the implementation of the dengue prevention program is running with the highest risk of 4.1 time. This is in line with research conducted by Arin in Rahman et al. that 98% of respondents have knowledge of *Aedes* breeding grounds while 98.4% of respondents have attitudes and beliefs that dengue fever can be controlled. However, 73% of respondents did not carry out effective dengue prevention activities (Rahman et al., 2022).

The last factor is fogging is also a factor that causes the prevention program to run or not. The lowest risk of DHF is 1.8 times. The study from Kamarudin also discussed the same thing, namely that according to them, participants could experience hearing loss 12 times higher in the duration of noise exposure in the group > 3 years compared to the group 3 years (95% CI = 4.02-40.5, $p < 0.01$). The likelihood of having hearing loss in the high-risk group was 20 times higher than in the low-risk group (95% CI = 3.98-105.1, $p < 0.01$) when adjusted for age, smoking, and pesticide exposure (Kamarudin et al., 2022).

According to Thadchanamoorthy, et al. Dengue fever is a viral infection transmitted by mosquitoes and is recognized as a tropical disease that is often neglected by the World Health Organization (WHO), this condition has had a major impact on the Sri Lankan economy in providing

primary and secondary health care over the past two decades. It has a myriad of clinical manifestations that range from self-resolving subclinical infection to fatal dengue shock syndrome, atypical presentation and multiorgan involvement recognized under the umbrella of expanded dengue syndrome in 2012 by WHO, various manifestations reported in expanded dengue syndrome, including cardiac involvement, brain, kidney, liver, spleen, pancreas, and gastrointestinal tract, complications that are not commonly reported are myocarditis, encephalitis, (Thadchanamoorthy et al., 2022).

The solution to this problem is that conventional vector control strategies are less effective because mosquitoes are highly domesticated. Other new strategies of vector control, such as the release of genetically modified male mosquitoes that sterilize wild-type female populations, can lead to a reduction in vector density. The embryonic introduction of the obligate intracellular bacterial strain *Wolbachia* into *aegypti*, which makes mosquitoes resistant to DENV, is an alternative method. personal protection such as adequate clothing and use of insect repellent has benefits, the development of a vaccine for DENV is very challenging for many reasons, the vaccine must cover all four serotypes, otherwise immune augmentation may occur, so, the hope is to produce a tetravalent vaccine, furthermore, (Kularatne & Dalugama, 2022).

Research by Nurdin, et al reported that the highest prevalence of DHF cases occurred in 2019, and there was no correlation (0.154), and there was also no significant relationship between the prevalence of DHF cases and air temperature with p -value (0.633), moderate and negative correlation with ($r=0.468$) value, but there is no significant difference between the average rainfall and the prevalence of DHF cases in Bukittinggi, the precipitation and prevalence of DHF cases in Bukittinggi during the 2015-2019 period, there is a significant relationship between rainfall and the prevalence of DHF cases, namely in 2018 which was included with level of strong positive correlation ($r = 0.759$). This condition can be caused by the position of Bukittinggi which is at an altitude and is in the equatorial region which has two peaks in October, November, and March-May. The average rain every month is quite high, ie more than 150 mm. This pattern is influenced by shifts to the north and south of the ITCZ or the solar equinox. The peak of the rain usually occurs when the position of the Sun is above the area which is the Intertropical Convergence Zone

(Nurdin et al., 2022).

Conclusion

This study can conclude that the problem with the current public health status is that DHF has an effort to go down and someday it could rise again. There are >10 factors that cause the implementation of the DHF prevention program to run or not with an average statistical test of $p < 0.05$ with risks ranging from 1.19 times to 5.23 times, the description of the trend of DHF cases is different from 2020 - 2022 which was initially 1.5% currently amounts to 15.8%, the priority problem in Bandar Setia Village is Dengue Hemorrhagic Fever (DHF).

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