Home Environmental Conditions With Dengue Hemorrhagic Fever Incidence In West Sumba Regency

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Article Info	ABSTRACT
Keywords: DHF, Home Environment, Dengue Virus, Infectious Diseases	Dengue hemorrhagic fever, caused by the dengue virus and spread by the Aedes aegypti mosquito, is characterised by sudden fever lasting 2 to 7 days without a clear cause, weakness/lethargy, restlessness, heartburn, and skin bleeding in the form of petechiae, ecchymosis, or purpura. Sometimes nosebleeds, diarrhoea, bloody vomit, loss of consciousness, or shock Dengue fever was identified in West Sumba District, mainly in Dira Tana Village, Loli District, with 50 cases. This study examines West Sumba Regency's Dengue Hemorrhagic Fever incidence and home environmental variables. This quantitative case-control study compares Dengue Hemorrhagic Fever patients to controls. This quantitative case-control study compares Dengue Hemorrhagic Fever patients to controls.Statistical analysis with a significance value of 5% (0.05) yielded a p-value of 0.491, indicating no association between house shape or type and dengue illness. Because almost every respondent's house, both stilt and permanent, has waste water drainage channels, breeding places, resting places, and containers inside and outside the house, dengue fever incidence is unrelated to house type.
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INTRODUCTION

Dengue hemorrhagic fever is an infectious disease caused by the dengue virus and transmitted by the Aedes aegypti mosquito, which is characterized by sudden fever lasting 2 to 7 days without a clear cause, weakness/lethargy, restlessness, heartburn, accompanied by signs of bleeding on the skin in the form of bleeding spots (petechiae), bruising (ecchymosis) or rash (purpura). Sometimes nosebleeds, diarrhea, vomiting blood, decreased consciousness or shock.The increase and spread of dengue fever cases may be caused by high population mobility, development of urban areas, climate change, changes in population density and distribution as well as other epidemiological factors that still require further research. Apart from that, the increase in dengue fever cases every year is related to environmental sanitation conditions where there are many breeding places for female mosquitoes, namely vessels containing clear water (bathtubs, used cans and other water reservoirs).

Resting places are also an important medium in the process of maturation of Aedes Aegypti mosquito eggs. After resting and the egg maturation process is complete, the female mosquito will lay her eggs on the wall of her breeding place, slightly above the water surface. 8 Based on the description above, dengue fever is increasing every year and the home

environment is an important factor in the process of transmitting dengue fever, so it is necessary Research was conducted on the relationship between home environmental conditions and the incidence of dengue hemorrhagic fever in Diratana Village, Loli District, West Sumba.

METHODS

This type of research is quantitative research with a case control research design, namely comparing a group of people who suffer from Dengue Hemorrhagic Fever (cases) with a group of people who do not suffer from Dengue Hemorrhagic Fever (controls). Research Time in 2020 Research Location in West Sumba Regency.The research population was all sufferers of Dengue Hemorrhagic Fever and not DHF in Waikabubak City District. The research sample consisted of a case group and a control group. The case group is 32 families domiciled in Waikabubak City District, one of whose family members was treated at a hospital or health clinic in Waikabubak City in the period January to December 2019 and was diagnosed with dengue fever. The control group was 32 families/neighbors of cases who had never experienced high fever for 2-7 days accompanied by two or more other signs/symptoms in the form of: heartburn/nausea, headache, muscle and bone pain, rash on the skin and the presence of bleeding manifestations/positive tourniquet test. Interview data were analyzed univariately and bivariately. Bivariate analysis was carried out using the Chi-square statistical test for know the significant relationship between the two variables with a confidence level of 95%. And to determine the degree of relationship, the Odds Ratio measure is used.

RESULTS AND DISCUSSION

Characteristics of research subjects

Characteristics Based on Gender

Characteristics based on respondent gender can be seen in the following table.

Table 1. Characteristics of Respondents Based on Gender

Gender	Case		Control	
	Number (N)	Percentage (%)	Number (N)	Percentage (%)
Man	21	65.6	10	31.25
Woman	11	34.4	22	68.75
Total	32	100	32	100

Based on table 2 above, the characteristics of respondents according to gender can be seen that there were more male respondents than female respondents (65.6%) and in the control group there were more female respondents than male respondents (68.75%).

Characteristics of respondents based on age

Table 2. Characteristics of Respondents Based on Age

Age	Case		Control	
	Number (N)	Percentage (%)	Number (N)	Percentage (%)
20-30	9	28.1	7	21,875
31-40	8	25.0	11	34,375

Age	Case		Control	
	Number (N)	Percentage (%)	Number (N)	Percentage (%)
41-50	6	18.8	9	28,125
51-60	9	28.1	5	15,625
Total	32	100	32	100

Based on the table above, the characteristics of respondents according to age can be seen that the respondents in the case group were mostly in the age range 20 -30 years and 51-60 years (28.1%), while in the control group the majority were aged 31-40 years (34,375). %).Some respondents were parents of patients suffering from dengue fever. The majority of the dengue fever epidemic in Indonesia occurs in the age group <12 years. This is because the immune system of the <12 year old group is still low.

Characteristics of respondents based on education

Table 3. Characteristics of Respondents Based on Education

Education	Case		Control	
	Number (N)	Percentage (%)	Number (N)	Percentage (%)
No school/ not completed in primary school	3	9.4	5	15,625
Elementary school/equivalent	6	18.8	7	21,875
SLTP/equivalent	5	15.6	10	31.25
SMA/SMK	15	46.9	9	28,125
Academic /College	3	9.4	1	3,125
Total	32	100.0	32	100

Based on the table above, the characteristics of respondents according to education level can be seen that in the case group the highest level of education was SMA/SMK (46.9%) and in the control group the highest level of education was SMP (31.25%).A high level of education is expected to have adequate knowledge and take action to prevent disease in the surrounding environment. Adequate knowledge about dengue fever and methods to prevent it must be understood before someone is willing to actively participate in PSN activities.

Univariate Analysis of Research Variables
Results of Analysis of DHF Incidence

From the research results, data on the frequency distribution of dengue fever episodes were obtained as follows:

Table 4. Frequency Distribution of DHF Incidents

Dengue fever incidence	Number (N)	Percentage (%)
Case	32	50
Control	32	50
Total	60	100

The table above explains that the group that experienced dengue fever (cases) was 32 people and the 30 respondents who did not experience dengue fever were used as the control group.

Results of univariate analysis of house shape and type

Table 5. Frequency Distribution of House Shapes and Types

The shape or type of house	Dengue fever incidence			
	Case		Control	
	N	%	N	%
Stage	6	18.75	4	12.5
Permanent	26	81.25	28	87.5
Total	32	100	32	100

The most common type of house of respondents in this study in the case group was a permanent house (81.25%) compared to a house on stilts (18.75%), while in the control group the most common type of house in this study was a permanent house (87 .5%).

Results of univariate analysis Residential density in the respondent's house

Table 6. Frequency Distribution of Residential Density

Residential density in the house	Dengue fever incidence			
	Case		Control	
	N	%	N	%
Solid, if < 9 m2/capita	7	21,875	0	0
Not dense ≥ 9 m2/capita	25	78.125	32	100
Total	32	100	32	100

In this study, the condition of the houses in the case group was determined by the density of people in the house≥ 9 m2/capita more (78.125%) compared to densely occupied housing conditions (21.875%), whereas in the control group all houses studied were in conditionsNot dense ≥ 9 m2/capita (100%).

Results of univariate analysis of the existence of breeding places in the home environment

Table 7. Frequency Distribution of the Existence of Breeding Places in the Home Environment

The existence of a breeding place	Dengue fever incidence			
	Case		Control	
	N	%	N	%
There is	15	46,875	9	28,125
There isn't any	17	53.125	23	71,875
Total	32	100	32	100

In this study, in both the case and control groups, there were more breeding places in the respondents' homes that did not have breeding places.

Results of univariate analysis of the presence of larvae in the home environment

Table 8. Frequency distribution of the presence of larvae in the home environment

The existence of larvae	Dengue fever incidence			
	Case		Control	
	N	%	N	%
There is	23	71,875	5	15,625
No. There is	9	28,125	27	84,375
Total	32	100	32	100

Air temperature in the house	Dengue fever incidence			
	Case		Control	
	N	%	N	%
Optimal if ≥25 - 30℃)	7	21,875	0	0
Less than optimal, if <25 - >30℃)	25	78.125	32	100
Total	32	100	32	100

In this study, the presence of larvae in the case group was 71.875% more than there were no larvae in the home environment, while in the control group there were more respondents' homes where there were no larvae in the home environment (84.375%).

Bivariate analysis of research variables

Bivariate analysis aims to determine the relationship between the independent variable and the dependent variable with a statistical test adjusted to the scale of the existing data (Chi-Square Test) and determining the Odd Ratio value of the risk factor with a confidence level (CI) of 95% and a significance level of 0.05 .

The relationship between the shape/type of house and the incidence of dengue fever in West Sumba Regency

Table 9. Relationship between shape/type of house and the incidence of dengue fever

The shape or type of house	Dengue fever incidence				P-value
	Case		Control		
	N	%	N	%	
Stage	6	18.75	4	12.5	
Permanent	26	81.25	28	87.5	0.491
Total	32	100	32	100	

The results of the Chi Square statistical test, with a significance value of 5% (0.05), obtained a p-value of 0.491, where this value is greater than alpha 5% (0.05) so that Ha is rejected, which means there is no relationship between shape or form. type of house with the incidence of dengue fever, so it was no longer continued with OR analysis.

The relationship between residential density in the house and the incidence of dengue fever in West Sumba Regency

Table 10. Relationship between residential density in the house and the incidence of dengue fever

Residential density in the house	Dengue fever incidence				P-value	OR (95%CI)
	Case		Control			
	N	%	N	%		
Solid, if < 9 m2/capita	7	21,875	0	0	0.005	2,260
Not dense ≥ 9 m2/capita	25	78,125	32	100		
Total	32	100	32	100		

The results of the Chi Square statistical test, with a significance value of 5% (0.05), obtained a p-value of 0.005, where this value is smaller than alpha 5% (0.05) so that Ha is accepted which means there is a relationship between residential density in home with dengue fever. An OR value of 2.260 or > 1 indicates that the respondent has a residential

density of< 9 m2/capita is 2,260 times more at risk of developing dengue fever compared to respondents whose residential density in their house is ≥ 9 m2/capita.

The relationship between indoor air temperature and the incidence of dengue fever in West Sumba Regency

Table 11. Relationship between air temperature in the house and the incidence of dengue fever

Air temperature in the house	Dengue fever incidence				P-value	OR (95%CI)
	Case		Control			
	N	%	N	%		
Optimal if ≥25 - 30°C)	7	21,875	0	0	0.005	2,260
Less than optimal, if <25 - >30°C)	25	78,125	32	100		
Total	32	100	32	100		

The results of the Chi Square statistical test, with a significance value of 5% (0.05), obtained a p-value of 0.005, where this value is smaller than alpha 5% (0.05) so that Ha is accepted which means there is a relationship between temperature and events. dengue fever. An OR value of 2.260 or > 1 means that the respondent has room temperature in the house≥25 - 30°C is 2,260 times more at risk of developing dengue fever compared to respondents whose house temperature is <25 - >30°C.

The relationship between indoor air humidity and the incidence of dengue fever in West Sumba Regency

Table 12. Relationship between air humidity in the house and the incidence of dengue fever

Air humidity in the house	Dengue fever incidence				P-value	OR (95%CI)
	Case		Control			
	N	%	N	%		
OK, if ≥ 60%	6	18.75	0	0	0.010	2,231
Not good, if < 60%	26	81.25	32	100		
total	32	100	32	100		

The results of the Chi Square statistical test, with a significance value of 5% (0.05), obtained a p-value of 0.010, where this value is smaller than alpha 5% (0.05) so that Ha is accepted which means there is a relationship between indoor air humidity. home with dengue fever. An OR value of 2.231 or > 1 indicates that the respondent's air humidity in the house is≥ 60% 2.221 times more risk of developing dengue fever compared to respondents whose indoor air humidity was < 60%.

The relationship between the existence of a breeding place and the incidence of dengue fever in West Sumba Regency

Table 13. Relationship between the existence of a breeding place and the incidence of dengue fever

The existence of a breeding place	Dengue fever incidence				P-value
	Case		Control		
	N	%	N	%	
There is	15	46,875	9	28,125	0.121

The existence of a breeding place	Dengue fever incidence				P-value
	Case		Control		
	N	%	N	%	
There isn't any	17	53.125	23	71,875	
total	32	100	32	100	

The results of the Chi Square statistical test, with a significance value of 5% (0.05), obtained a p-value of 0.121, where this value is greater than alpha 5% (0.05) so that Ha is rejected which means there is no relationship between the existence of breeding place with the incidence of dengue fever, so it was no longer continued with OR analysis.

The relationship between the existence of a resting place and the incidence of dengue fever

Table 14. Relationship between the presence of a resting place and the incidence of dengue fever

The existence of resting place	Dengue fever incidence				P-value	OR (95%CI)
	Case		Control			
	N	%	N	%		
There is	21	65,625	4	12.5	0.0001	13,364
There isn't any	11	34,375	28	87.5		
Total	32	100	32	100		

The results of the Chi Square statistical test, with a significance value of 5% (0.05), obtained a p-value of 0.0001, where this value is smaller than alpha 5% (0.05) so Ha is accepted which means there is a relationship between resting places with dengue incidents. The OR value is 13,364 or > 1, indicating that 13,364 respondents have a resting place at home.times more at risk of developing dengue fever compared to respondents who do not have a resting place at home.

The relationship between the presence of larvae and the incidence of dengue feverin West Sumba Regency

Table 14. Relationship between the presence of larvae and the incidence of dengue fever

The existence of larvae	Dengue fever incidence				P-value	OR (95%CI)
	Case		Control			
	N	%	N	%		
There is	23	71,875	5	15,625	0.0001	13,800
There isn't any	9	28,125	27	84,375		
Total	32	100	32	100		

The results of the Chi Square statistical test, with a significance value of 5% (0.05), obtained a p-value of 0.0001, where this value is smaller than alpha 5% (0.05) so that Ha is accepted which means there is a relationship between the existence of larvae with dengue fever. An OR value of 13,800 or > 1 indicates that 13,800 respondents have a resting place at home.times more at risk of contracting dengue fever compared to respondents who do not have larvae in the house.

Discussion

Relationship between house type and dengue fever incidence in West Sumba Regency

The results of statistical analysis with a significance value of 5% (0.05) obtained a p-value of 0.491, which means there is no relationship between the shape or type of house and the incidence of dengue fever. There is no relationship between the type of house and the incidence of dengue fever because almost every respondent's house, both houses on stilts and permanent houses, has the same environmental characteristics as the incidence of dengue fever, such as the presence of waste water drainage channels, the existence of breeding places, the existence of resting places, and the presence of containers inside and outside the house. The factors studied were not based on the physical requirements of a healthy house but only looked at the type of building, namely the type of house on stilts and permanent house, because during initial observations before the research there were several houses on stilts where water pooled under the house during the rainy season.

Relationship between residential density in the house and the incidence of dengue fever in West Sumba Regency

The results of the study show that there is a relationship between residential density in the house and the incidence of dengue fever with a value of p=0.0005 and OR= 2,260 (95% CI) which means there is a relationship between residential density in the house and the incidence of dengue fever in West Sumba Regency. Results calculations are categorized according to the criteria of the Minister of Health regarding healthy houses, namely if they meet the requirements if they are ≥9m²/capita (not dense) and do not meet the requirements if <9m²/capita (solid). The frequency of mosquitoes biting humans is influenced by human activity, people who are still (not moving) are 3.3 times more likely to be bitten by Aedes aegypti mosquitoes compared to people who are more active, thus people who are less active are at greater risk of contracting the dengue virus. . Apart from that, the frequency of mosquitoes biting humans is also influenced by the presence or density of humans, so it is estimated that Aedes aegypti mosquitoes in densely populated houses will have a higher frequency of biting humans than in less densely populated areas.

The relationship between indoor air temperature and the incidence of dengue fever in West Sumba Regency

The results of the research show that there is a relationship between air temperature and the incidence of dengue fever in West Sumba Regency with a value of p = 0.005 and OR = 2.260 (95% CI) which means that the risk of dengue fever in respondents who have optimal indoor air temperature for mosquito development is 2, 2 times greater than respondents whose air temperature in their house was less than optimal for the development of mosquitoes.The results of this study are in line with Maria (2013), namely that there is a relationship between temperature and dengue fever. The successful development of the Aedes aegypti mosquito is determined by the breeding sites which are limited by annual temperatures and seasonal changes. One of the environmental factors that influences the reproduction of Aedes aegypti mosquito larvae is air temperature.

The relationship between indoor air humidity and the incidence of dengue fever in West Sumba district

The results of statistical analysis show that there is a relationship between air humidity and the incidence of dengue fever in respondents in West Sumba Regency where the p value = 0.010 and OR = 2.2 (95% CI).The results of this study are in line with Maria (2013) in Makassar City, namely that a damp house is a risk factor for the incidence of Dengue Hemorrhagic Fever (DHF) with an OR value = 4.23,364 (95% CI 1.49-7.59). The risk of respondents who live in damp houses contracting Dengue Hemorrhagic Fever is 3.36 times greater than respondents who live in houses that are not damp. At humidity less than 60%, the lifespan of mosquitoes is short, so there is not enough virden breeding cycle on the mosquito's body.

The relationship between the existence of a breeding place and the incidence of dengue fever in West Sumba district

The results of the statistical analysis showed no relationship between the existence of a breeding place in the home environment and the incidence of dengue fever in West Sumba Regency with a value of p = 0.121. This research is in line with Arghinta's research (2016) which states that there is no relationship between breeding places and the incidence of dengue fever. Based on the results of observations, the majority of respondents already have the awareness to routinely drain the water reservoir (breeding place) in the house. Especially for respondents in dengue cases who tend to be more traumatized because family members have dengue fever. Meanwhile, for control respondents, the awareness and knowledge to routinely drain and clean the breeding place in the house has begun to be implemented routinely because of the experience of neighbors affected by dengue fever.

The relationship between the existence of resting places and the incidence of dengue fever in West Sumba Regency

The research results show that there is a relationship between the resting place and the incidence of dengue fever. Based on the results of statistical tests, the p-value was obtained, namely 0.0001 with an OR value of 13.364. This research is in line withSuyasa's research states that there is a positive relationship between the habit of hanging clothes as a resting place for mosquitoes and the presence of dengue vectors. Mosquito Ae. Aegypti rest on clothes hanging in the room that have been used, because clothes contain several substances that can attract mosquitoes such as amino acids, lactic acid and other substances. Mosquitoes are attracted to human body odor due to carbon dioxide from exhalation. Furthermore, if the clothes are hung up it will increase the population of mosquitoes living in the house. This is contrary to the research that the researchers conducted, because the percentage of hanging clothes in the case and control samples has a small comparison. .

The relationship between the presence of larvae and the incidence of dengue fever in West Sumba district

The results of statistical analysis showed that there was a relationship between the presence of larvae in containers inside and outside the house and the incidence of dengue fever in West Sumba Regency, with a value of p = 0.0001 (p < 0.05) and OR = 13,800 (95% CI). This is in accordance with the results of research conducted by previous researchers

which stated that the higher the larval density, the higher the risk of dengue fever transmission.The presence of larvae shows that there are Aedes agypti mosquitoes in the house because these mosquitoes are domestic, so to lay eggs they will look for the nearest breeding place, namely in the house itself. The breeding place for the Aedes aegypti mosquito is in the form of standing water collected in a place or vessel. Water storage for daily needs including a bathtub.

CONCLUSION

The research conclusion shows a)There is no relationship between the shape or type of house and the incidence of dengue fever in West Sumba Regency. b) There is a relationship between residential density in the house and the incidence of dengue fever in West Sumba Regency. c) There is a relationship between temperature and the incidence of dengue fever in West Sumba Regency. d) There is a relationship between air humidity in the house and the incidence of dengue fever in West Sumba Regency. e) There is no relationship between the existence of a breeding place and the incidence of dengue fever in West Sumba Regency. f) There is a relationship between resting places and the incidence of dengue fever in West Sumba Regency. g) There is a relationship between the presence of larvae and the incidence of dengue fever in West Sumba Regency. Research suggestions are a) Cross-sector collaboration is needed to pay attention to environmental sanitation conditions so that it does not become a good breeding place for the Aedes aegypti mosquito to breed. b) Provide education to the community that focuses on the source of the problem, and the community can prevent dengue transmission by breaking the chain of transmission through 3 M Plus activities.

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