Analysis of Environment Management on The Case of Dengue Fever in Sukomoro Sub-district, Magetan District

Djoko Windu P. Irawan[1(CA)], Denok Indraswati[2], Vincentius Supriyono[3],
Trimawan Heru Wijono[4], Bambang Sunarko[5]

[1(CA)]Department of Environmental Health, Health Polytechnic of Surabaya, Indonesia;
windu_irawan@yahoo.co.id (Corresponding Author)
[2]Department of Environmental Health, Health Polytechnic of Surabaya, Indonesia
[3]Department of Environmental Health, Health Polytechnic of Surabaya, Indonesia
[4]Department of Environmental Health, Health Polytechnic of Surabaya, Indonesia
[5]Department of Environmental Health, Health Polytechnic of Surabaya, Indonesia

ABSTRACT

Dengue Haemorrhagic Fever (DHF) is still a serious health problem because it is endemic and often attacks the community. A comprehensive approach to the prevention of DHF cases should take into account the physical, biological, social and management aspects of the environment. The objectives of the study was to analyze the environmental management and environmental relationship to DHF incident in Sukomoro Sub-district, Magetan District. This study was observational with cross sectional design. The sample were head of family in endemic and non endemic areas, totally 100 head of family. Methods of data analysis used in the study were frequency, Chi-square and Kendall Concordance Coefficient test. The results were: 1) there was no relationship between occupant density, daytime sleeping habits, cleaning habits of water reservoirs, community participation in mosquito nest eradication with DHF incidence, 2) there was a relationship between moisture, place of breeding, resting place, larva, habit of hanging cloth, and physical, biological, and social environmental factors with DHF. Conclusion: physical, biological, and social environmental factors are related to the incidence of DHF. The implementation of environmental management still needs improvement in the aspect of cadre development and the making of work plan and its implementation.

Keywords: Environmental management, Dengue Hemorrhagic Fever

INTRODUCTION

The future picture of society in Indonesia to be achieved through the development of health is the Community, Nation and the State marked by the inhabitants living in the environment and with healthy living behavior, have the ability to reach the quality health services fairly and equally, and have the highest degree throughout the Republic of Indonesia. The environment expected in the future is a conducive environment for the realization of a healthy state that is environment free from pollution, the availability of clean water, adequate sanitation of the environment, housing and healthy settlements, the planning of the area with health perspective, and the realization of community life that help each other by maintaining the nation's cultural values[1].

Haemorhagie Fever Dengue (DHF) an infectious disease is not direct, its transmission through Aedes Aegypti mosquito vector, because of its life in and around the house[2].

DHF disease is endemic, often attacking the community in the form of epidemic and accompanied by a high mortality rate, where morbidity and mortality rates are used as indicators for assessing health outcomes and as a result of national morbidity and mortality rates are always high[3].

Magetan Regency is an endemic area of Dengue Haemorhagie Fever disease, the incidence rate in 2010 reached 385 cases with 12 deaths (Incidence Rate) = 55.52 / 100.000 population and Case Fatality Rate (CFR) = 3.11%), Data from Sukomoro Public Health Center DHF disease in 2010 as many as 44 patients with 5 deaths (Incidence Rate: 10.73 / 10.000 population with CFR: 11.36%). Attempts to Eradicate Mosquito Nest have not succeeded in increasing the Mentle-Free Rate to a safe value ($> = 95\%$). The vector eradication activity that is

considered safer, cheaper and easier because it can be done by anyone is the Eradication of Mosquito Nest, as the environment intervention on breeding place, but to get maximum results Eradication Mosquito Nest need to get an active role from the community. Besides the eradication factor, another factor that should be the concern is environmental or ecological factor of DHF vector[4].

Comprehensive approach to DHF incident in Magetan Regency especially in Subdistrict of Sukomoro needs to pay attention to Physical Environment Aspect, Biology Environment, Social Environment, and Management Aspect consists of Program or Policy, Regulation, Technical Operation and Public Participation in DHF Eradication Program starting from Planning (Planning), Organizing (Actuating) and Monitoring (Controlling). It can be seen from the inputs, processes, outputs and outcomes, so that the identification, analysis and evaluation of the environment on the occurrence of DHF becomes something very important as an effort to reduce the incidence of Dengue Fever[5].

METHODS

Research Design

This study was an observational research with cross sectional research design. The explanatory type was to explain the causal relationship between the variables through hypothesis testing. By using survey method that was researchers take samples from population data and use questionnaire as data retrieval tool[6].

Population

It was the society of Sukomoro Sub-district that was spread in 14 villages, the smallest population unit was the Head of Family, totally 8,674 Head of Family and 7 officers in the work area of Sukomoro Public Health Center.

Sample Research

Head of Family residing in endemic area 1,069 Head of Family (4,658 inhabitants) were in Bulu Village and Tambakmas Village. Non-endemic areas 1,311 Heads of Families (5,209 inhabitants) were located in Sukomoro Village and Kedungguwo Village, and 7 officers handling DHF controlling at Sukomoro Public Health Center.

Sampling

Sampling was taken by using proportional cluster random sampling with steps: 1) Determining 2 (two) villages with the highest endemic status, they were Bulu Village and Tambakmas Village, and determining 2 (two) lowest non endemic villages, they were Sukomoro Village and Kedungguwo Village. 2) Determine the size of samples proportionally in each selected village. 3) Determine research samples of each village at random by using lottery. 4) For environmental management variables all officers handling DHF counting program amounted to 7 people sampled[7]. The results of the calculation as follows:

Table 1. Calculation of number of samples

No	Villages	Population (Head of family)	Calculation	Amount of Sample (Head of family)
1	Bulu	502	(502 : 2.380) x 100	21
2	Tambakmas	567	(567 : 2.380) x 100	24
3	Sukomoro	585	(585 : 2.380) x 100	25
4	Kedungguwo	726	(726 : 2.380) x 100	30
	Total	2.380		100

Tools and Methods of Research

1. Measurement tools: a) Questionnaire, to obtain information subject research through interviews. b) The data collected was secondary data by conducting document study / archive of routine report of Sukomoro Public Health Center. c) Primary data obtained by observation.

2. How to research, interviewed interviewers who have been trained to make measurements using questionnaires to know the habits and hygrometer to measure the temperature and humidity to the condition of the respondent's home by visiting each respondent's house and make observations.
3. Variables identification
    a) Independent variables: physical environment, biological environment, social environment and environmental management. b) Dependent variable: DHF incidence. c) Interference variable: knowledge, attitude, education of respondents.

Data Processing and Analysis Techniques

Data were analyzed using: 1) descriptive analysis 2) Chi square test to determine the relationship and risk factor (Odds Ratio) as well as to select variables to be analyzed multivariate (P <0.05). 3) Multivariate analysis was used to know several variables simultaneously to the incidence of DHF with analysis Coefficient Concordance Kendall (Sugiyono, 2006).

RESULTS

Descriptive Analysis

Respondents were people who live in the house (Head of family) which are randomly selected and divided into endemic villages namely Tambakmas Village, Bulu Village. Non endemic villages, namely Sukomoro Village and Kedungguwo Village. Respondents aged 41-50 years old 42 was people, average age 45.5 years, having family member 6-7 people was 66 Head of Family, highest number of education level was senior high school, totally 58 (58%), respondents' professions were mostly farmers, 56 people (56%).

Environment Description

1. Physical Environment
    a. Density of Occupants. The highest non-endemic villages (<10m2 / p) were 5.0 m2 / person and the lowest (<10m2 / p) 23.3 m2 / person, with an average of 12.1 m2. The occupant density for the highest endemic Villages (<10m2 / p) 7.5 m2 / person, and lowest (> 10m2 / p) 24 m2 / person. Average occupancy density of 12.4 m2 / person.
    b. Temperature. The air temperature inside the building ranges from 270C-290C. The air temperature in Sukomoro District always varies every month from 310C up to 350C, with an average temperature of 33.40C.
    c. Humidity. Air humidity ranges from 58-77%, with average in Non Endemic Village 75,7% and in Endemic Village 73,9%
2. Biological Environment
    a. Breeding Place. Survey results according to the number of houses and containers that exist around the house to 100 houses Endemic and non endemic villages is found 15 homes are positively having mosquito larvae.

Table 2. Types of containers observed in non endemic villages

	Kinds of Containers	Sukomoro Village 25 houses			Kedungguwo Village 30 houses		
		Observed	+	%	Observed	+	%
A.	Water Shelter						
1.	Bath Tub	25	1	2.5	15	-	-
2.	WC Tank	20	-	-	14	-	-
3.	Crock	12	-	-	9	-	-
4.	Water Tank	9	-	-	7	-	-
	Total	66	1		45		
B.	Non Water Reservoir						
1.	Flower Vase	12	-	-	19	-	-
2.	Bird drinking place	24	-	-	17	-	-
3.	Used Objects (cans, used tires, etc.)	23	-	-	27	-	-
	Total	59	-	-	63	-	-

In table 2 of 25 existing houses in Sukomoro Village, there were about 66 containers of Water Reservoir (WR) and 59 non-WR containers examined there was 1 container that was positively having a mosquito larva. While in Kedungguwo Village of 30 houses or 45 containers of Water Reservoir (WR) and 63 non-WR containers examined were not found any mosquito larva.

Table 3. Types of containers observed in endemic village

Kinds of Containers	Tambakmas Village 24 rumah			Bulu Village 21 rumah		
	Observed	+	%	Observed.	+	%
A. Water Shelter						
1. Bath Tub	48	2	6.45	32	1	3.44
2. WC Tank	40	-	-	29	2	15.38
3. Crock	9	3	11.1	2	-	-
4. Water Tank	-	-	-	-	-	-
Jumlah	97	5		63	3	
B. Non Water Reservoir						
1. Flower Vase	21	1	4.76	16	2	12.5
2. Bird drinking place	22	-	-	15	-	-
3. Used Objects (cans, used tires, etc.)	12	3	25.0	4	-	-
Total	55	4		35	2	

In table 3 of 24 existing houses in Tambakmas Village there are about 97 containers of Water Reservoirs examined found 5 containers that are positively having mosquito larva, while from 55 containers of non Water Reservoir , there are 4 containers that are positively having mosquito larvae. While in Bulu Village, from 63 containers of Water Reservoirs examined there are 3 containers that are positively having mosquito larvae. While from 35 containers of non Water Reservoir, it was found mosquito larvae in 2 containers.

b. Resting Place

Results of resting place surveys of 55 non-endemic houses found resting places in hanging clothes (1 house), and in 45 endemic houses, it was found 6 houses in curtains and 1 house in hanging clothes.

Table 4. Types of resting place in non endemic villages

No	Village	Number of Houses	Curtain			Clothes		
			No	Yes	%	No	Yes	%
1	Sukomoro	25	25	-	0	24	1	4
2	Kedungguwo	30	30	-	0	30	-	0
	Total	55	55	-	0	54	1	1.8

From table 4 in Sukomoro village found 1 positive house there is a mosquito on a hanging cloth or about 1.8%, while in Kedungguwo was not found.

Table 5. A resting place in endemic village

No	Village	Number of Houses	Curain			Clothes		
			No	Yes	%	No	Yes	%
1	Bulu	21	18	3	14.3	20	1	5
2	Tambakmas	24	21	6	25	23	1	4.3
	Total	45	39	9	19.7	43	2	4.4

From table 5 in Buku Village 21 houses examined found 3 positively houses having mosquitoes in curtains (14.2%) and 1 house in hanging clothes (5%), whereas in Tambakmas Village of 24 houses examined found 6 houses positively having mosquitoes in curtains (25%).

c. The presence of larvae

The survey results of larva presence conducted by the number of houses and containers in the vicinity of Non Endemic Village house shows the following conditions:

Table 6. Number of houses and containers in the observation of non endemic village

No	Village	House	Container		House	Container	Gross
		Observed	Observed	+	Index (%)	Index (%)	Index (%)
1	Sukomoro	25	125	1	4	0.8	0.18
2	Kedungguwo	30	108	-	0	0	0.00
	Tota;	55	233	1	4	0.8	0.18

From table 6 of 55 houses and 233 containers in the observation, there was 1 positively house having mosquito larvae in Sukomoro Village, with House Index 4, Container Index 0.8 and Gross Index 0.18. For Kedungguwo Village , it was not found mosquito larvae, with House Index and Container Index 0 and Gross Index 0.

Table 7. Number of houses and containers observed in endemic village

No	Villages	House	Container		House	Container	Gross
		Observed	Observed	+	Index (%)	Index (%)	Index (%)
1	Tambakmas	24	152	7	29	4.6	0.22
2	Bulu	21	98	5	24	5	0.32
	Total	45	250	12	53	9.6	0.54

While in Endemic Village from table 7 of 45 houses and 250 containers in the observation , there are 7 houses positively having mosquito larvae. They are in Tambakmas Village with House Index 29, Container Index 4.6 Gross Index 0.22. In Bulu Village found 5 positively houses have mosquito larvae, with House Index 24, Container Index 5 and Gross Index 0.32.

3. Social Environment
Data on the social environment include habits of hanging clothes, cleaning Water Shelter, house yard , cleaning habits, daytime sleeping habits and the habit of joining the mosquito nest eradication movement.

Table 8. Respondent practices on hanging habits in the non endemic village

No	Villages	Number of Houses	Hanging Clothes			
			Good	%	Bad	%
1	Sukomoro	25 houses	24	96	1	4.2
2	Kedungguwo	30 houses	28	93	2	6.7
	Total	55 houses	52	94.5	3	5.45

From table 8 of 55 houses in Non Endemic village 52 houses (94.5%) have a habit of hanging clothes less than 2 days or good category, while 3 houses (5.45%) have a habit of hanging clothes more than 2 days or bad category.

Table 9. Respondent practices on hanging habits in the endemic village

No	Village	Number	Hanging Clothes			
			Good	%	Bad	%
1	Tambakmas	24 houses	20	83.3	4	16.7
2	Bulu	21 houses	18	85.7	3	14.3
	Total	45 houses	38	84.5	7	15.5

From table 9 of 45 houses in Tambakmas Village and Bulu Village, there are 38 houses or 84,5% who have habit of hanging clothes less than 2 days or good category, while 7 houses with bad category because have habit of hanging clothes more than 2 days.

Table 10. Respondent practices on habit of cleaning water reservoir in non endemic village

No	Villages	Number	Cleaning Water Reservoir			
			Good	%	Bad	%
1	Sukomoro	25 houses	25	100	-	-
2	Kedungguwo	30 houses	30	100	-	-
	Total	55 houses	55	100	-	-

From table 10 of 55 houses located in Sukomoro and Kedungguwo Village there are 55 houses or 100% who have a habit of hanging clothes less than 2 days or good category.

Table 11. Respondent practices on habit of cleaning water reservoir in endemic village

No	Villages	Number	Cleaning water reservoir			
			Good	%	Bad	%
1	Tambakmas	24 houses	18	75	6	25
2	Bulu	21 houses	19	90.5	2	9.5
	Total	45 house	37	82.7	8	17.8

From table 11 of 45 houses located in the village with Endemic Village category that is Tambakmas Village and Bulu Village found 37 houses or 82,7% with good category. It mean that respondents have habit to clean Water Reservoir at least once a week. While 8 houses or 17.8% have a habit of cleaning the water reservoir more than a week or bad category.

Table 12. Respondent's practice on home cleaning habits in non endemic villages

No	Villages	Number	Home Cleaning			
			Good	%	Bad	%
1	Sukomoro	25 houses	24	96	1	4
2	Kedungguwo	30 houses	30	100	-	-
	Total	55 houes	54	98.2	1	1.8

From table 12 of 55 houses located in Non Endemic Village area of Sukomoro Village and Kedungguwo Village, only 1 house or 1.8% who have habit to clean their home yard more than 4 days during the week or bad category. While 54 houses or 98,2% belongs to good category means they have the habit of cleaning the home yard less than 4 days during the week.

Table 13. Respondent's practice on cleaning habits home yard in endemic village

No	Village	Number	Cleaning house yard			
			Good	%	Bad	%
1	Tambakmas	24 houses	21	87.5	3	12.5
2	Bulu	21 houses	19	90.5	2	9.52
	Total	45 houses	40	88.89	5	11.1

From table 13 in Endemic Village that is Tambakmas Village and Bulu Village people habit to clean home yard from 45 houses observation found 5 houses that do not do habit of cleaning home yard less than 4 days during the week or 11,1% bad category , and 88,89% % or 40 houses with good categories have a habit of cleaning the home yard less than 4 days during the week.

Table 14. Respondent's practice on daytime sleeping habits in non endemic villages

No	Village	Number	Daytime sleep habit			
			Good	%	Bad	%
1	Sukomoro	25 houses	24	96	1	4
2	Kedungguwo	30 houses	30	100	-	-
	Total	55 houses	54	98.18	1	1.82

From table 14 of 55 houses surveyed, 54 houses that have a habit of napping less than 4 days during the week or good category. While 1 house with bad category because it has a habit of sleeping during the day more than 4 days during the week.

Table 15. Respondent's practice on daytime sleep habits in endemic village

No	Village	Number	Daytime Sleep habit			
			Good	%	Bad	%
1	Tambakmas	24 houses	19	79.17	5	20.83
2	Bulu	21 houses	20	52.23	1	4.76
	Total	45 houses	39	86.67	6	13.3

From table 15 of 45 houses surveyed, It was found 39 houses (86.67%) who had a habit of napping less than 4 days during the week or good category. While 6 houses (13.3%) with bad category because of having the habit of napping day more than 4 days during the week.

Table 16. Respondent's practice about habits of joining the eradication activity of mosquito nest in non endemic villages

No	Villages	Number	Join the Activity			
			Good	%	Bad	%
1	Sukomoro	25 houses	25	100	-	-
2	Kedungguwo	30 houses	30	100	-	-
	Total	55 houses	55	100	-	-

From table 16 of 55 houses majority in Sukomoro and Kedungguwo (100%) communities have a habit of more than one time during the week jointhe mosquito nest eradication activity, or good category.

Table 17. Respondent's practice about habits of joining the eradication activity of mosquito nest in endemic villages

No	Village	Number	Join the activity			
			Good	%	Bad	%
1	Tambakmas	24 houses	19	79.17	5	20.83
2	Bulu	21 houses	20	95.23	1	4.76
	Total	45 houses	39	86.7	6	13.3

From table 17 of 45 houses located in Endemic Villages area of Tambakmas Village and Bulu Village 39 houses have a habit of joining the activity of mosquito nest eradication in outdoor environment less than once a week or 86,7% with good category, while 6 houses with bad category because they are more than a week cleaning the environment outside the home.

Environmental Management

1. Program
   a. Establishment of Working Group
   From interviews and observations of the document, it was obtained information that all the villages (10%) has formed a working group with DHF complete with its staff, even the group is completed with the presence of a decree made by the district and village heads.
   b. Work Program
   1) From the results of observation, there is no documentation data showing the work plan or activities of eradication of Mosquito Nest. Implementation of work by established working groups is incidental. This condition makes the importance of the intervention of the Health Center and the District Health Bureau to provide a deeper understanding of the working group in order to have a clear working guidelines to facilitate the implementation of the work. 2) The fact that, in general, the officers appointed from the village conduct the examination on larva in people's homes if there is an incident or when there is community in certain village or another village which positively diagnosed suffering DHF. This indicates that the prevention efforts are still not based on a clear work program. 3) The organizational structure of the working group that has been formed has not performed its function properly. It is because of the lack of Human Resources , so it has not been able to carry out the government's policy in overcoming DHF diseases.
2. Regulation
   The results of observations shows that there is Laws and Regulations referring to the Law of the Republic of Indonesia Number 36 Year 2009 on Health.
3. Technical Operations
   a. Regular larva Checking. Total of 124 cadres, active 76 people (61,3%). The examination was conducted in water reservoirs and places which are potential as breeding grounds for mosquitoes such as bathtubs, water tanks, flower pots, jars.
   b. Counseling. Conducted group of "Dasa Wisma" and Integrated Service Post. 1 year done 4 times.
   c. Fogging. done in two ways: 1) Massive Fogging, intended to limit the occurrence of the increasing and spreading of disease DHF especially in endemic villages. 2) Focus Fogging, fumigation activities carried out on the homes of DHF sufferers and the surrounding area within 100m radius.

d. Epidemiological investigation, officers tracking the patient / suspect, especially around the house of the people who stated positively affected by DHF.

e. Abatisation, the implementation of abatement is not only done at the time of DHF incident, but also done periodically as a preventive action to prevent DHF.

Correlation of Physical, Biological and Social Factors with The Incidence of DHF

1. Chi-Square test.
    a. Physical Environment
        1) Relationship between occupant density and DHF incidence.
           The p-value (probability) = 0.061, meaning the occupant density has no significant relationship with DHF incidence.
        2) Relationship between Humidity and DHF incidence.
           The p-value (probability) = 0.030, meaning that humidity has a significant relationship with DHF incidence.
    b. Biological Environment
        1) The relationship between the breeding place and the incidence of DHF.
           The p-value (probability) = 0.017, meaning that breeding place, has a significant relationship with the incidence of DHF.
        2) The relationship between the resort and the incidence of DHF.
           The p-value (probability) = 0.007, meaning that the rest area has a significant relationship with DHF incidence.
        3) The relationship between the presence of larvae and the incidence of DHF.
           The p-value (probability) = 0.017, meaning that the presence of larva has a significant relationship with DHF incidence.
    c. Social Environment
        1) Relations between habits of hanging clothes with DHF incidence.
           P-value (prabability) = 0.005, meaning the habits of hanging clothes have a significant relationship with the incidence of DHF.
        2) The relationship between napping and DBD incidence.
           P-value = 0.071, meaning sleep habits have no significant relationship with DHF incidence
        3) The relationship between the Water Servoir cleaning practices and DHF incidence.
           P-value = 0.071, meaning that Water reservoir cleaning habits have no significant relationship with DHF incidence.
        4) The relationship between the habit of cleaning the home yard with the incidence of DHF.
           P-value = 0.318, meaning the habit of cleaning the home yard has no significant relationship with the incidence of DHF.
        5) The relationship between community participation in Mosquito Nest Eradication and DHF incidents.
           P-value = 0.152, meaning that community participation in Mosquito Nest Eradication has no significant relationship with DHF incidence.
2. Multivariate analysis.
    Multivariate analysis result between physical, biological, and social environmental factors with DHF disease occurrence in Sukomoro district with Kendall Coordination Coefficient test. P-value = 0.000, meaning the breeding place, resting place, larva existence, hanging habits, drainage habit of Water Shelter have a statistically significant relationship with DHF incidence.
3. Analysis of environmental management implementation (programs, regulations, operational techniques) in the tackling efforts of DHF.
    The results of the questionnaire on the implementation of environmental management given to the health worker of Public Health Center of Sukomoro, as follows:

Table 18. Environmental Management Implementation Score

No	Aspect	Score	Category
1	Program	27	
2	Fogging	10	
3	Abatement	10	Good
4	Epidemiology	7	
5	Regulation	12	
	Total	66	

Implementation of Environmental Management in the context of DHF control is included in good category. Although aspects of environmental management in Magetan regency conducted by Public Heath Center of Sukomoro have been well implemented, but DHF incidence are still found. This means that DHF incidence are caused by factors that originate from the community itself , in terms of physical, biological and social environments.

DISCUSSION

Physical Environment

1. Occupancy Density. The occupancy density of the highest non-endemic area is 7.5 m2 / person, and the lowest occupancy density is 24 m2 / person. The average occupancy density in non-endemic villages is 12.4 m2 / person. Whereas in endemic areas, the highest occupancy density is 5.0 m2 / person, and the lowest occupancy density is 23.3 m2 / person. The average occupancy density in endemic villages is 12.1 m2 / person. Based on the result of statistical analysis it was found that occupancy density did not have significant relation with DHF ($p = 0.117$). There was no significant relationship between occupancy density and DHF incidence, due to DHF incidence is coused by the presence of Aedes aegypti mosquitoes that bite humans. If in a large house found a place for breeding Aedes aegypti mosquitoes, then the occupants of the house will have the risk of being exposed to DHF.
2. The temperature, ranging from 31 ^{0}C-35 ^{0}C, with an average temperature of 33 ^{0}C. The outside air temperature of the respondent's house was not statistically analyzed, considering that the measured temperature in the entire house was obtained the same result between 31 ^{0}C-35 ^{0}C and an average of 33 ^{0}C.
3. Humidity, ranging from 48-54%, with an average in Non Endemic Village 51% and Endemic Village 52.5%. Based on the result of statistical analysis, there was no significant correlation between humidity and DHF incidence. The statistically not correlated humidity factor with DHF incidence, becouse the fact that the number of houses in the humid category is relatively small from the entire house being investigated. However, theoretically humidity can affect the occurrence of DHF, which is caused by humidity factors with the life of mosquitoes. Good humidity ranges from 40% -70%.

Biological Environment

1. Breeding Place. The result of the survey of Breeding Places found 13 houses positively used as breeding ground. The place of breeding has a significant relationship with the incidence of DHF ($p = 0.037$). The spot that has been proven to be related to the DHF incident is caused by the pantry place in the tub, flower vase, tub of WC, crock , used tire and cans etc, making the presence of Aedes aegypti mosquito which is the cause of DHF. Aedes aegypti female mosquitoes lay eggs and incubate on the surface of the water.
2. Resting Place. Results of a survey of 55 non-endemic homes found a resting place in hanging clothes and in 45 endemic homes found in curtains and hanging clothes. Resting places had a significant association with DHF incidence ($p = 0.017$). The presence of meaningful relationships is due to the resting place being a place for the growth of mosquitoes that allow the occupants of the house will have the risk of exposure to DHF. DHF transmission season generally occurs at the beginning of the rainy season. This is because in the rainy season the DHF disease vector population increases followed by the increasing number of mosquito breeds outside the home as a result of poor sanitation. While in the dry season Aedes aegypti lodges in water-filled vessels such as tubs, jars, drums and water reservoirs.
3. The presence of larvae. Survey results from 55 homes and 233 containers were observed there were some homes positively have larvae. While in the Village Endemic of 45 houses and 250 Containers) found 12 houses positively has mosquito larvae. The statistical analysis of the presence of larvae had a significant relationship with DHF incidence ($p = 0.037$). The existence of a meaningful relationship between the presence of larvae with the incidence of DHF is because in a positive house there is Aedes aegypti mosquito larvae, it means there is Aedes aegypti mosquito that has grown, that can transmit dengue virus.

Social Environment

1. The habit of hanging clothes, has a significant relationship with the incidence of DHF ($p = 0.014$). A statistically significant relationship between hanging clothes and DHF incidence is because hanging clothes can become a resting place for Aedes aegypti mosquitoes and allow mosquitoes to live longer.
2. The habit of cleaning the Water Reservoir has a statistically significant relationship with the incidence of DHF ($p = 0.014$). A statistically significant relationship between the habit of cleaning the Water Reservoir with DHF is caused because the Water Shelter is one of the breeding places for Aedes aegypti mosquitoes.

3. The habit of cleaning the yard, has no significant relationship with the incidence of DHF (p = 0.692), because in general the people only cleaned the yard of the visible house and paid less attention to places that can be a place of mosquito breeding such as vases, crocks, tendons water and so on.
4. The habit of joining Eradication Activity (EA) has no significant relationship with the incidence of DHF (p = 0.317), due to the lack of mosquito nest extermination conducted outside the home such as cleaning of village roads, gardens and so on. Places that have the potential to become a place of Aedes aegypti mosquito that is generally around the house such as vases, jars and so on are also less attention.
5. The increasing number of cases as well as the increasing number of affected areas is caused by the better transportation facilities of residents, the presence of new settlements, the lack of community behavior towards mosquito nest cleaning, the presence of mosquito vectors in almost all corners and the presence of four virus-type cells circulating throughout the year.

Environmental Management

The environmental management aspect concerns four areas of Planning, Organizing, Actuating and Controlling in this research into 4 (four) fields is reduced to 3 parts of program, regulation and technical operational (Ahmadi, Umar Fahmi. 2005).
1. Program. 100% of the existence of working groups in all villages already exist. Despite this, the working groups that have been established do not yet have a work program, it is related to the still low existing Human Resources so that they have not been able to run the organization professionally, among which create work programs that guide in carrying out the work.
2. Regulation. Public Health Center and Magetan Health Offices have Laws, Regulations, Circulars, Decrees and others that are used as the basis for program management to implement DHF mitigation. All such laws and regulations are top down as part of the implementation of policies that have been made by the government.
3. Technical operations. The presence of 124 cadres still can not prevent the onset of DHF. This is due to the limitations of cadres in preventing DHF, as it does not have a clear work program. Fogging activities that have been done incidently (if any cases), have not been able to prevent the occurrence of DHF is possible because of mosquito resistance to malathion material used in fogging. Nevertheless, to test the resistance of Aedes aegypti mosquitoes it is necessary to do further research. The result of interview with the officer of Public Health Center Sukomoro was obtained information that the epidemiological investigation activity was carried out in accordance with the existing provisions. Officers conducted the tracking of suspects / suspects, especially around the houses that were positive affected by DHF. Likewise with abatisation. Still unresolved DHF incidence with epidemiological investigation efforts and abatisation can be due to the fact that epidemiological investigations are not done properly and abatisation is not comprehensive as for example only done in water reservoirs such as bathtubs and water tanks. Monitoring and technical guidance of DHF management program by District Health Office of Magetan Regency has not been able to run effectively considering the limited of cost and Human Resources at village level including operational cost of monitoring activity. The finding of community residents in Sukomoro district which is positively affected by DHF in the research area is caused by socialization and advocacy of health program still in phase at Provincial and Regential level, while Public Health Center level has not been effective yet.

CONCLUSION

1. Physical Environment: the density of non-endemic villagers is highest at 5.0 m2 / person. The highest endemic village is 7.5 m2 / person. There was no relation between occupant density and DHF incidence (P> 0,05), mean humidity in non endemic village 75,7% and endemic village 73,9%, there was correlation between humidity and DHF incidence (P <0.05) Breeding Place (15 breeding houses) positive for mosquito larvae, there was a relationship between the breeding site and the incidence of DHF (P <0.05).
2. Biological Environment: Resting Place 12 resting places (shirts and curtains) positively have mosquitoes, there is a relation between the rest area with the incidence of DHF (P <0.05), the existence of 57% house index (HI), Container Index (CI) 10.4%, Gross Index (BI) 0.45% there is a relationship between the presence of larvae with the incidence of DHF (P <0.05).
3. Social Environment:
   a. Hanging habits 90 (90%) good, there is a relationship between the habit of hanging clothes with the incidence of DHF (P <0.05).
   b. The habit of cleaning the water reservoir 92 (92%) is good, there is no relation between the habit of cleaning the water reservoir with DHF (P> 0,05).
   c. The habit of cleaning the home page 94 (94%) is good, there is a relationship between the habit of cleaning the home page with the incidence of DHF (P <0.05).

   d. Daytime habits 93 (93%) are good, there is no correlation between daytime sleep habits with the incidence of DHF (P> 0.05).

   e. The habit of joining the mosquito nest eradication activity (PSN): 94 (94%) is good, there is no relationship between community participation in mosquito nest eradication with DHF incidence (P> 0,05) There is a relationship between physical, biological, and social environmental factors with the incidence of DHF (P <0.05).

4. Environmental Management:

   a. Work Program: the working groups that have been established do not yet have a work program.

   b. Regulation: has rules as the basis for implementing DHF mitigation.

   c. Technical assistance and handling of DHF countermeasure programs have not been effective.

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