

Evaluation of Vector Control Activities for Dengue Hemorrhagic Fever in Surabaya City

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Abstract- At this time there is an increase in urbanization, industrialization, advancement of science and technology, globalization and the rapid development of transportation in Indonesia. Its may bring positive and/or negative impacts on the quality of the environment or ecosystem that will affect the risk of disease occurrence and transmission such as dengue hemorrhagic fever disease. There are 650 dengue hemorrhagic fever cases in Surabaya City in 2015 and increased to 938 cases in 2016. Dengue Hemorrhagic Fever Disease Eradication Program (DHFDEP) is a government program that aims to anticipate the increase in the incidence of DHF cases by controlling the *Aedes aegypti mosquito*, the main vector that cause dengue. This study aims to evaluate the vector control activities for DHF disease which is part of the DHFDEP. This study used a qualitative approach by selecting 5 public health centers in Surabaya with total respondents of the study were 29 people. The evaluation result is the activity of mosquito vector control and the activity of larval vector control has not been done well. The community has not fully implemented eradication of mosquito breeding nest activities. The community thinks that fogging is the main solution in reducing the number of DHF disease. To solve this problem, cross-sectoral cooperation is required in order to increase community participation, promote health promotion to the community through media that is often used by the community, such as promotion using social media.

Key words - Evaluation, Dengue, Vector Control

1. INTRODUCTION

Dengue Hemorrhagic Fever (DHF) has become an endemic disease in more than 100 countries, some of which are countries located in the Asian continent. This disease is a contagious infectious disease caused by dengue virus which is transmitted by female *Aedes aegypti*.

After the World War, increasing urbanization in Southeast Asia resulted in increased transmission and caused a severe and fatal epidemic of DHF that occurred in Southeast Asia^[1]. Dengue Hemorrhagic Fever (DHF) disease is a health problem in Indonesia. In 1968, DHF patients in Indonesia were 58 cases. In 2014, DHF cases in 34 provinces in Indonesia reached 100,346 people with 907 people died. In 2015 increased to 126,675 people with 1,229 people died^[2].

The persistent problems of DHF in Indonesia can be caused by increasing mobility of population and uncontrolled urbanization, rapid development in urban areas, uncertain climate change, density change and population spread and other factors that still need further research^[3]. The impact of DHF is the productivity of the community and the improvement of the health budget needed in the effort to overcome DHF. To overcome these problems, the Ministry of Health launched a program that is Dengue Hemorrhagic Fever Disease Eradication Program (DHFDEP). Implementation of this program began in

1992 based on Minister of Health Decree number 581 about Eradication of Dengue Hemorrhagic Fever^[4].

Based on Circular Letter of Mayor of Surabaya number 443 year 2016 about Dengue Hemorrhagic Fever (DHF) Outbreak Alertness^[5], community are expected to be active in mosquito nest eradication activities with Eradication of Mosquito Breeding (PSN) 3M Plus (to drain, to cover, and to bury or reuse) water reservoir in their area. The success of Eradication of Mosquito Breeding Nest (PSN) 3M Plus can be measured by Free Larva Index (ABJ)^[6].

The community is also expected to be active in environmental monitoring in their area by participating in 1 House 1 Jumantik program organized by the government. Jumantik or Larva monitoring cadres is the person in charge of checking the mosquito larvae in the water reservoir. The purpose of 1 House 1 Jumantik program is if people know the existence of larvae in his house, they are expected to implement 3M Plus activities.

2. RESEARCH METHOD

This study aims to evaluate the implementation of fogging as an activity of mosquito eradication and mosquito breeding nest eradication with 3M Plus (to drain, to cover, and to bury or reuse) as an activity to eradicate mosquito larvae.

This study used a qualitative approach to obtain information from relevant informants in the implementation of dengue vector control activities in

Surabaya City. This research was conducted at Sememi Public Health Center, Tembok Dukuh Public Health Center, Sidotopo Wetan Public Health Center, Tenggilis Public Health Center and Kedurus Public Health Center. There are 29 respondents, consisting of environmental health officers in public health centers and Jumantik as community representatives. Primary data obtained from interviews to respondents using checklists and interview guidelines. Secondary data obtained from activity documents contained in Public Health Center.

3. RESULT

Table 1. Vector Control Activities at each Public Health Center

Public Health Center	Vector Control Activities	
	Fogging	PSN 3M Plus
Sememi	Sufficient	Sufficient
Tembok Dukuh	Sufficient	Sufficient
Sidotopo Wetan	Sufficient	Sufficient
Tenggilis	Good	Sufficient
Kedurus	Sufficient	Sufficient

Based on table 1 shows fogging as an activity of mosquitos eradication has not been implemented in accordance with the procedure in 4 Public Health Center. Mosquito breeding nest eradication activities with 3M Plus (to drain, to cover, and to bury or reuse) as an activity to eradicate mosquito larvae has not been implemented well in all Puskesmas.

Table 2. Free Larva Index at each Public Health Center

Public Health Center	Free Larva Index (ABJ)	
	January 2018	February 2018
Sememi	92,00	94,00
Tembok Dukuh	93,20	93,88
Sidotopo Wetan	90,00	90,00
Tenggilis	87,00	89,90
Kedurus	94,00	93,81

Based on table 2 shows the Free Larva Index (ABJ) in January and February 2018 at 5 Public Health Center has not reached the standard 95%.

4. DISCUSSION

Fogging is a vector control of dengue disease regulated by Minister of Health Decree number 581 year 1992 about Eradication of Dengue Hemorrhagic Fever. The purpose of fogging is to break the chain of transmission between infected mosquitoes to humans by spraying insecticides on mosquito breeding nests based on epidemiological investigation. Requirements and step of fogging are^[7]:

1. There is a report of DHF from hospital/Public Health Center
2. Public Health Center officers do an epidemiological investigation (PE) in the environment of DHF patients within the previous 1 week
3. If there is a patient with fever without a clear reason, Public Health Center officer will do a Tourniquet test.
4. Public Health Center officer perform larvae examination in water reservoir in house/building located 100 m from the patient's residence
5. Report the results of an epidemiological investigation to the Health Office
6. If there is an other patient and/or find 3 or more DHF suspects and/or Free Larva Index (ABJ) in house or building located 100 m from the patient's residence is less than 90%, fogging must be implemented.
7. Fogging implemented at the DHF patients and the house/building in the vicinity within a radius of 200 meters

The result of the evaluation is fogging implementation hasn't compatible with requirements. Communities still think that the main act of prevention of DHF is by doing fogging. If there is a DHF cases in community it caused by government mistakes that do not do fogging regularly. Other related issue about fogging implementation as an activity of mosquito eradication and mosquito breeding nest is there are some people refuse the implementation of fogging at their home. They don't want the house dirty, don't want any stranger to come inside their home, and don't want their pet to die.

When insecticide fogging prevented DHF, it also reduced immunity in the host population. The long-term effects that may be caused by these toxins will be carcinogenic, mutagenic, and teratogenic. Furthermore, if fogging is sprayed regularly, it has an impact to insecticide-resistance in the mosquitos^[8].

There are several things that influence the level of mosquito resistance to an insecticide; the concentration of insecticide, the frequency of spraying, and the spraying area. If the implementation of fogging is not in accordance with the procedure

then the mosquitoes will adapt and potentially bring the nature of resistance to the offspring^[9].

Free Larva Index (ABJ) is a measure of the success of mosquito breeding nest eradication with 3M Plus as an activity to eradicate mosquito larvae. If ABJ is more than or equal to 95%, it is expected that DHF transmission can be prevented or reduced. The low achievement of Free Larva Index (ABJ) is caused by the behavior of the community in the Eradication of Mosquito Breeding (PSN) 3M Plus^[10].

Communities have an important role in the prevention of DHF^[11]. Dengue Hemorrhagic Fever Disease Eradication Program (DHFDEP) can be achieved if the community and government together play a role. Communities can take part in mosquito breeding nest eradication with 3M Plus (to drain, to cover, and to bury or reuse) activities. The result of the evaluation is Eradication of Mosquito Breeding (PSN) 3M Plus hasn't been done well in every Public Health Center.

Circular Letter of Mayor of Surabaya number 443 year 2016 about Dengue Hemorrhagic Fever (DHF) Outbreak Alertness explain various activities of PSN 3M Plus:

1. Drain or brush clean the bathtub at least once week
2. Closely sealed the water reservoir
3. Reduce, reuse, recycle trash or waste
4. Replace water in vase, bird drinking place or other similar place every once a week
5. Fixed a clogged or damaged waterways or drainage system
6. Sprinkle larvae powder (larvicide) in a place that is difficult to drain
7. Keep the larvae fish in the pond
8. Install the wire screen in the window or door of the house
9. Avoid the habit of hanging clothes in the room
10. Seek adequate lighting and ventilation
11. Planting of lavender flowers

There are some people who have a habit of hanging clothes and do not drain the shelter of water, especially people who are elderly and people who have a large water reservoir. People who have a larver water reservoir because in that area water hasn't been flowing regularly. Water only flows in certain times so at that time people hold as much water as possible in small water reservoir then move it to the large one.

To solve this problem, Public Health Center officer gives larvicide Abate (temephos) to them. Abate (temephos) is one of the groups of pesticides used to kill insects at the larval stage. Abate (temephos) is usually shaped sand (sand granules) which then sprinkled in water reservoirs with a dose of 1 ppm or 1 gram to 10 liters of water. Abate

(temephos) is defined as part of *Aedes aegypti*'s mass eradicate mosquito larvae in Indonesia^[11].

Community behavior has an influence on the environment because the environment is a land for the development of the behavior. If the community wants to do Eradication of Mosquito Breeding (PSN) 3M Plus regularly and continuously it can prevent the development of larva *Aedes aegypti* and prevent the incidence of Dengue Hemorrhagic Fever^[12].

5. CONCLUSION

Implementation of fogging as an activity of mosquito eradication in 5 Public Health Centers in Surabaya City wasn't been implemented in accordance with the procedure. Mosquito breeding nest eradication with 3M Plus (to drain, to cover, and to bury or reuse) as an activity to eradicate mosquito larvae didn't work well in every Public Health Center.

6. SUGGESTION

To increase participation and change community habits, cross-sectoral cooperation is required. For example, cooperation between Public Health Center with activities often followed by the community. It is hoped that by utilizing community activities, the promotion of vector control activity can be communicated and changed the behavior of the community.

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