

The Correlation Container Condition with Presence Mosquito Larvae of Vector DHF in Sungai Besar Village, Banjarbaru

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Abstract

Sungai Besar Village is one of the endemic villages of Dengue Hemorrhagic Fever (DHF) in Banjarbaru city. Containers have an important role in the spread of dengue fever as a breeding ground for mosquitoes. The purpose of this research is to know the correlation of container condition with larva. Benefits to provide information that can be used to reduce the number of larvae. The design of this study used an analytical survey with cross-sectional approach on 673 containers from 107 houses in Sungai Besar village in December 2007. The data were analyzed using chi square test with 95% confidence degree. The results showed there was a correlation between container type ($p = 0,002$), container placement ($p = 0,000$), container color ($p = 0,002$), container surface ($p = 0,002$) and container cover ($p = 0,000$) with larva. The existing larvae density distribution is high is House Index (HI) = 63,55% and container index 30,76%. Communities that collect water should use a water reservoir that is easily depleted and has the smallest risk to become a breeding ground and more concerned about proper water reservoirs.

Keywords: *Dengue Hemorrhagic Fever (DHF), Containers, Larvae vector*

I. INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is an acute contagious disease that is still a health problem in Indonesia. This is caused by the disease is very rapid spread and often cause extraordinary events (Outbreaks), causing much pain even to death (Kusuma, 2007). DHF transmission will continue to increase in the absence of eradication efforts and high human contact with DHF vector mosquitoes. High contact with *Aedes aegypti* mosquitoes is influenced by three things, namely human factor, mosquito factor, and the factor of breeding/container. Factor of breeding/container plays an important role in the high contact between mosquitoes and humans as a provider of places conducive to mosquito breeding with the breeding sites suitable for *Aedes aegypti* mosquitoes *Aedes aegypti* mosquito population will increase (Kemenkes, 2003).

Sungai Besar Village is one of endemic areas in Banjarbaru city of South Kalimantan Province and based on data of case distribution and dengue fever of Banjarbaru city in 2006 and January until July 2007 Sungai Besar village is endemic village with highest number of cases with ABJ equal to 88,9 %. ABJ under the standard set by the Ministry of Health indicates that there is a potential for DHF transmission in the area (Dinkes Banjarbaru, 2006). Based on the results of Arsin and Wahidin's research (2004) there is a significant relationship between the condition of the water reservoir and the incidence of DHF in Makassar. For the purpose of eradicating dengue disease, identifying the condition of the landfill where mosquito breeding is more useful than just larva data (larva index). Even in Vietnam the entomology survey has been oriented to the identification of water reservoir and the surveillance of the adult mosquito density (Hasyimi, 2004). The purpose of this study is to study the condition of containers associated with the presence of larvae in the Sungai Besar Village. Benefits that can be obtained from this research include to determine the relationship of the condition of the container with the presence of larvae so that it can be used to carry out prevention activities and can be used to develop policies on the handling of Dengue Event in Banjarbaru City.

II. METHODS

This research was an analytic survey research using cross sectional approach, implemented in Sungai Besar Village of Banjarbaru City, This research was conducted November to December 2017. The population in this study is the container owned by the people who live in the Great River village that is as many as 3560 heads of families, with a sample size of 107 heads of families. Sampling in this research using systematic random sampling technique.

The presence of *Aedes aegypti* mosquito larvae was observed on containers inside and outside the house using observation guidance according to the Technical Guidelines for Eradication of Dengue Hemorrhagic Mosquito Diseases, namely: 1) All places or vessels that can be a breeding ground for *Aedes aegypti* mosquitoes are examined (with naked eye) to determine whether or not there is a larva. 2) To check the large landfill such as

bathtubs, jars, drums and other water reservoirs, if at first sight do not find larvae wait about 30 seconds till 1 minute to ensure that larva does not exist. 3) To check for small breeding places such as flower vases, water plant pots, bottles with turbid water, often the water needs to be moved elsewhere. 4) To check the larvae in a somewhat dark place or turbid water, usually used a flashlight.

III. RESULTS

The examination of mosquito larvae in Sungai Besar village was done visually by looking at the presence or absence of larvae on the container owned by 107 respondents either container which was outside the house or in the house obtained result as follows:

Table 1. Distribution of DHF Vector Mosquito Larvae Density in Sungai Besar village in December 2007

No	Checked	Total	Larva		House Indeks	Container Indeks
			Yes	No		
1.	House	107	68	39	63,55	30.76
2	Container	673	207	466		

Based on Table 1 it is known that from 107 houses examined, positive house of mosquito larvae as much as 68 (63.55%) and house that did not found larva as much 39 (36.45%), so obtained HI equal to 63.55. Container inspection showed that from 673 containers examined there were larvae of 207 containers (30.76%), obtained CI of 30.76.

Based on the type, containers in the respondent's house are divided into three, namely water reservoir for daily use, water reservoir is not for daily necessities and natural water reservoir.

Table 2. Distribution of Presence Mosquito Larvae of Vector DHF According to Container Type in Sungai Besar Village in December 2007

No.	Type of Water Reservoir	Total	Larvae Positive	Percentage of Larvae Positive
1.	Water reservoir for daily use	427	152	35.60%
-	Bathtub	133	74	55.64%
-	Wc tub	113	43	38.05%
-	Drum	23	12	52.17%
-	Crock	51	9	17.65%
-	The tank	15	3	20%
-	Kibble	92	11	11.96%
2.	Water reservoir Is not for daily necessities:	184	42	22.82%
-	Flower vase	32	11	34.38%
-	A place to drink animals	11	2	18.18%
-	Storage of waste water behind the refrigerator	73	13	17.81%
-	Dissemination wastewater collection	31	5	16.13%
-	Used cans	9	3	33.33%
-	Used Tres	7	2	28.57%
-	Fractions of bottles and glasses	8	3	37.5
-	Gutter	13	3	23.08%
3.	Natural water reservoir.	62	13	20.97
-	Stagnant water on trees	62	13	20.97

Based on the results of the study it is known that the percentage of larvae from the type of container found in the landfill for daily needs is 35.60%, water reservoir is not for daily purposes as much as 22.82% while for natural landfill is 20.97%.

Table 3 Relationship of container type with Presence Mosquito Larvae of Vector DHF in Sungai Besar Village in December 2007

Container Type	Presence Mosquito Larvae		Total	P Value
	Yes	No		
Water reservoir for daily use	152 (35.6%)	275 (64.4%)	427	0.002
Water reservoir Is not for daily necessities	42 (22.8%)	142 (77.2%)	184	
Natural water reservoir	13 (21%)	49 (79%)	62	
Total	207 (30.8%)	466 (69.2%)	673	

The result of analysis of the relationship between the type of container with the presence of larvae in the results obtained $p = 0.002$ so it can be concluded that there is a meaningful relationship between the type of container with the presence of larva.

Table 4. Presence of Larvae based on container location in Sungai Besar village in December 2007

Container Location	Presence of Larvae		Total	P Value
	Yes	No		
Indoor	147 (36.5%)	256 (63.5%)	403	0.000
Outdoor	60 (22.2%)	210 (77.8)	270	
Total	207 (30.8%)	466 (69.2%)	673	

The result showed statistically significant relationship between container location and the presence of mosquito larvae vector DHF ($p = 0,000$).

Table 5. Presence of Larvae Based on container color in Sungai Besar village in December 2007

Container Color	Presence of Larvae		Total	P Value
	Yes	No		
Dark	111 (37%)	189 (63.0%)	300	0.002
Bright	96 (25.7%)	277 (74.3%)	373	
Total	207 (30.8%)	466 (69.2%)	673	

The results of observation of container color contained in Sungai Besar Village which is dominant is dark color 44,46%. The results of data analysis showed a significant relationship between the color of the container with the presence of larvae ($p = 0.002$).

Table 6. Presence of Larvae Based on the Surface of Containers in Sungai Besar Village in December 2007

Surface of Containers	Presence of Larvae		Total	P Value
	Yes	No		
Rude	99 (37.8%)	163 (62.2%)	262	0.002
smooth	108 (26.3%)	303 (73.7%)	411	
Total	207 (30.8%)	466 (69.2)	673	

The results showed a significant relationship between the surface of the container and the presence of larvae ($p = 0.002$).

Table 7. Presence of Larvae based on Container Cover in Sungai Besar Village in December 2007

Container Cover	Presence of Larvae		Total	P Value
	Yes	No		
Opened	182 (46.1%)	231 (53.9%)	395	0.000
Closed	25 (9.0%)	253 (91.0%)	278	
Total	207 (30.8%)	466 (69.2%)	673	

Based on Table 7 showed that the containers examined generally do not have cover (open) that is as much as 395 containers (58.69%). While container with cover was found 278 containers (41.30%). Indicates a significant relationship between the presence of larvae and the closure of the container ($p = 0,000$).

IV. DISCUSSION

A. Distribution of Larva Density

The indicators used to measure the density of mosquito larvae in this study are House Index (HI) and Container Index (CI). HI is the percentage of positive home larva. CI is the percentage of positive larvae containers. To find the value of HI and CI is by the formula as follows:

$$HI = \frac{\text{Positive house total}}{\text{House checked Total}} \times 100\%$$

$$CI = \frac{\text{Positive Container total}}{\text{Container checked Total}} \times 100\%$$

Very moderate vector density against DHF incidence. According to the Ministry of Health, of all vector density index, HI is the best indicator, with a 5% benchmark to indicate the likelihood of DHF transmission. If HI is smaller than 5% then the likelihood of transmission is low, while HI greater than 5% indicates very potential for transmission of DHF in the area.

Table 1 showed that HI of 63.55% and CI of 30.76%. HI results are much larger than the established 5% standard. Research in Singapore in recent years shows that HI of 2% can cause an outbreak of dengue virus infection. Based on these results it is known that the density of mosquitoes in Sungai Besar Village is high category so that the mosquito transmission risk is high enough for the occurrence of DHF transmission.

B. The Correlation Between Types Of Containers And The presence of larvae

Based on the results in Table 2, the largest number of larva obtained in the bath (55.64%). Hasyimi and Soekirno (2004) stated that the use of landfill in residential areas where daily water needs are managed by PDAM often creates problems as vector breeding sites because of the large population holding water in the landfill. For this reason, mosquito breeding dengue vectors tend to be large enough to extend virus transmission. The statistical result showed a significant relationship between the type of container with larva ($p = 0,002$). This is in accordance with Chan's report in Hasyimi et al. (2004) which states that in urban areas *Aedes aegypti* mosquito habitats vary greatly, but 90% are places made by humans. Fock DA in Hasyimi (2004) states that jars, drums and bathtubs are the three types of containers that many become breeding place larvae *Aedes aegypti* become adults because all three are large landfill and difficult to replace the water. Inadequate water supply conditions for daily use cause residents to store water, so that the tub or drum is rarely drained or cleaned. This causes the breeding of mosquitoes into adult mosquitoes greater chances.

C. The Correlation between Container location and the presence of the larva

Table 4 shows that most containers are located in indoor location (59.89%), with a positive percentage of larvae 36.5%. The relationship between the container location and the presence of larvae showed a statistically significant relationship ($p = 0,000$). Based on the location of the container it was found that containers located inside the house had a greater chance of being found by a dengue vector mosquito larvae. This is influenced by the condition of the dark house due to lack of light in the house so that the air inside the house tend to be damp. Conditions that are moist and protected from direct sunlight provide a sense of safety and quiet for mosquitoes to lay eggs, so the number of larvae found more. In addition, the dark atmosphere causes the larva to be invisible when cleaned.

D. The Correlation between Color Container and the presence of the larva

From the results of observation of container color contained in Sungai Besar Village which is dominant is dark color 44,46%. The result of data analysis using Chi Square test with 95% confidence level showed a significant correlation between container color with larva ($p = 0,002$). Mosquitoes prefer to breed in dark places. The dark atmosphere causes mosquitoes to feel safer to lay their eggs, otherwise it becomes invisible when it is cleaned.

E. The Correlation between the Container surface and the presence of larvae

The results showed a significant relationship between the surface of the container and the presence of larvae ($p = 0,002$). This is because mosquitoes are more interested in laying eggs on containers that have rough surfaces than smooth surfaces, because female mosquitoes more easily adjust the body position when laying eggs. In a container

with a smooth surface the mosquitoes can not hold tight and can not adjust its position properly so that the eggs are scattered on the surface of the water and cause it to die submerged before hatching.

F. The Correlation Between Closure Container And The presence of larvae

Mosquito larvae are found in open containers (46.1%), this is because open containers make it easier for mosquitoes to enter and breed. In container with lid, there is still found larvae this may be due to containers used as reservoirs of spare water are rarely used so rarely cleaned. In addition, due to the cover is not tight or there is a hole in the cover of the container.

V. CONCLUSION

1. The larval density in Sungai Besar village has a HI rate of 63.55%, CI of 30.76%.
2. There is a relationship between the presence of larvae and the type of container, the more a breeding place for mosquitoes is water reservoir for daily purposes.
3. There is a relation between larva and container location, container inside the house preferably by mosquito.
4. There is a relationship between the presence of larvae and the color of the container, the dark colored containers found more larvae.
5. There is a relationship between larvae luster and the surface of the container, the container with the rough inner surface is found more larvae.
6. There is a relationship between the presence of larvae and the closure of the container. In containers with more open conditions found larvae.

VI. SUGGESTION

1. The people who hold the air using the landfill is easily depleted and has a risk to be a place to larva larvae.
2. The community is more concerned about proper water reservoirs.
3. For researchers to conduct a similar study with regard to variable characteristics of respondents, environmental conditions, conditions, and population density

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