The Ovitrap Index Measurement of Aedes Sp. in Kertasari Urban Village, Ciamis Sub-District Ciamis District

Ary Nurmalasari[1], Firda Yanuar Pradani[1], Nisa Indah Septiani[1], Mei Widiati[1]
[1]STIKes Muhammadiyah Ciamis, Ciamis, Indonesia

ABSTRACT

Aedes sp mosquitoes are insects that can transmit dengue fever to humans, where transmission is caused by mosquito bites and mosquito population density in an area can illustrate the potential for dengue transmission. Ovitrap index measurement can be used as one of the efforts in controlling and preventing dengue fever. This study aims to determine the presence and density of Aedes sp mosquitoes by the percentage value of the Ovitrap Index (OI) in Pasirangin Neighbourhood. In the study, descriptive method was used by observing ovitraps and calculating the Ovitrap Index on ovitraps in Pasirangin Neighbourhood RW 09 Kertasari Village. Ovitrap installation was placed inside and outside the house as many as 20 houses. The results showed that of the 40 ovitraps installed, the number of positive ovitraps was 15. Based on the calculation of the overall OI percentage, the result was 37.5%. The ovitrap index criteria for the research location has a score of 3 (OI ≤ 40%) which indicates that the area has a moderate potential for dengue disease vulnerability.

INTRODUCTION

Dengue virus is transmitted by two species of mosquitoes, namely Aedes aegypti and Aedes albopictus mosquitoes, the virus is transmitted to humans due to the bite of these mosquitoes in humans (Arfan et al., 2020). DHF is a disease caused by one of four viral serotypes of the genus Flavivirus, family Flaviviridae. The four viral serotypes are DEN-1, DEN-2, DEN-3 and DEN-4. Currently, the disease is still a public health problem and is present in some areas in districts/cities in Indonesia. DHF often appears as an Extraordinary Event (KLB) because its spread is very

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risky to cause death (Sukohar, 2014). Based on the 2020 Indonesian Health Profile (Ministry of Health, 2021), dengue cases totalled 108,303 with a death rate of 747. The highest dengue morbidity rate in West Java is in Ciamis Regency (121.2) and Majalengka Regency (West Java Provincial Health Office, 2021).

Based on data from the Ciamis Health Office in 2021 from January to November, the number of DHF cases in Ciamis Regency reached 227 cases, when compared to 2020 there was a decrease from 1,467 to 227 cases. Based on the statement of the Ciamis Puskesmas DHF Program Holder, in 2021 the highest number of DHF cases was in Ciamis Sub-district with 62 cases covering several villages, namely, Ciamis Village 10, Kertasari 24, Cigembor 2, Benteng 0, Linggasari 2, Sindangrasa 20, and Maleber 4. Kertasari Village is one of the endemic areas in the Ciamis Sub-district DHF with 24 cases, of which 14 cases occurred in the Pasirangin RW 09 environment.

The management and prevention of dengue rely on breaking the chain of transmission through controlling Aedes sp. The index ovitrap can be used as one of the efforts that can be done. Ovitrap is a set of tools used to detect the presence of Aedes sp mosquitoes that have the function of monitoring and controlling Aedes sp. This tool uses natural methods so that it is safer and environmentally friendly (Sholikhatun et al., 2020).

One method recommended by WHO that can be used as a survey tool and mosquito vector control tool is the mosquito egg trap. Ovitrap (oviposition trap) is a mosquito trap, consisting of a container filled with water, used to capture mosquito eggs (Arfan et al., 2020). The Ovitrap Index describes the number of ovitraps that are positive for eggs out of a number of ovitraps observed. OI is a way of describing the egg-laying activity of adult mosquitoes both inside and outside the home, the density of the mosquito population in an area can illustrate the potential for dengue fever. One way to do this is by measuring the ovitrap index (Wijayanti et al., 2017). A high OI in an area allows the mosquito density to be high. If there are dengue patients in areas with high mosquito density, the potential for it to spread to its surroundings is also high due to the presence of vectors that are competent to transmit the dengue virus (Arfan et al., 2020). The purpose of this study was to determine the Ovitraps Index in Kertasari Village, Ciamis District, Ciamis Regency.

METHOD

This study used a descriptive method to describe the presence of Aedes sp. mosquito eggs in ovitraps in Kertasari Village, Ciamis sub-district, Ciamis district in May-June 2022. The research was conducted in several stages, starting with a survey of ovitrap placement locations, collectin Aedes sp. mosquito eggs, then identifying and calculating the Ovitrap Index (OI).

The ovitrap index is the percentage of ovitraps that are positive for eggs per total number of ovitraps observed, which can be determined by the percentage value of the ovitrap index. Ovitrap can be used as an illustration to mosquito population in an area (Arfan et al., 2020). The ovitrap index is the percentage of ovitraps that are positive for eggs per total number of ovitraps observed, which can be determined

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by the percentage value of the ovitrap index. Ovitrap can be used as an illustration to mosquito population in an area (Arfan et al., 2020).

Research participants

The population in this study was in Pasirangin Neighbourhood RW 09 Kertasari Village with a total of 20 houses. Research Samples the samples used in this study were 40 ovitraps which were placed in 4 RTs with a total of 20 houses. Placement and selection of places were carried out based on research (Wikurendra, 2020).

Research procedure

In this study, researchers conducted research by placing ovitraps in respondents' homes inside and outside. Ovitrap was installed in RW 09 Kelurahan Kertasari which was included in the sample inclusion criteria. The selection of houses was carried out based on houses whose residents had been affected by DHF and houses within a 100 metre radius of houses that had been affected by DHF (Susmaneli et al., 2021).

Ovitrap sampling process that has been installed in RW 09 Pasir Angin Neighbourhood, Kertasari Village was observed after 7 days of installation, observed whether there were eggs then collected.

After calculating the ovitrap index (OI), mosquito eggs trapped in the ovitrap were identified by transferring the eggs on the filter paper to the glass object using a drop pipette and then covered with a cover galss and viewed under a microscope with 10X magnification.

Instrument

The analytical processes in this study are:

Straw Soaked Water Attractant Preparation

The attractant (substance that has an attraction for mosquitoes) used in this study is straw soaking water. It was prepared by putting 125 grams of dried straw into a container, adding 20 litres of water, closing the container and letting it sit for 7 days, until it produced carbon dioxide, ammonia gas, and octenol compounds (Sayono, 2008).

How to Make Oviposition Trap (ovitrap)

The plastic bottle is coated on the outside using black plastic, so that the inside looks dark, filter paper cut with a size of 5 x 15 cm is placed in a circle at the top of the ovitrap approximately 1 cm so that the surface is submerged in water for mosquitoes to lay eggs (Fathan, 2017). A total of 40 ovitraps were installed with two ovitraps per house.

Data analysis

Positive ovitrap results are calculated by the percentage ratio of ovitraps containing eggs to the number of ovitraps installed using the formula OI:

$$\text{Ovitrap Index} = \frac{\text{Number of Positif Ovitrap}}{\text{Number of ovitraps installed}} \times 100\%$$

Tabel 1. Kriteria Indeks Ovitrap

Kriteria Indeks Ovitrap FEDH Hongkong 2017, dalam (Wijayanti et al., 2017).

Ovitrap Index	Skore	Criteria
Level 1 : IO < 5%	1	Very Low
Level 2 : 5% ≤ IO < 20%	2	Low
Level 3 : 20% ≤ IO < 40 %	3	Medium
Level 4 : IO ≥ 40 %	4	High

RESULTS AND DISCUSSION

The distribution of Aedes sp based on the ovitrap index in Lingkungan Pasirangin RW 09 Kelurahan Kertasari Kecamatan Ciamis, which was installed in each house a total of 40 pieces, all scattered in 20 houses with the provision of one indoors and one outside or yard. The number of positive ovitraps can be known from the ovitrap index (IO) value and the abundance of each location, as shown in table 2. The results of the distribution of ovitraps that have been installed in Lingkungan Pasirangin RW 09 Kelurahan Kertasari Kecamatan Ciamis show the results of almost all positive houses containing Dengue Fever disease vectors, namely adult Aedes sp female mosquitoes with positive results in each house varying with a total of 15 positive ovitraps from 40 installed ovitraps, besides that there are houses that show negative results.

Table 3 shows that the number of positive ovitraps stored indoors is more than the number of ovitraps stored outdoors, the indoor OI result of 55% is included in the high level category, while the outdoor OI result is 20% which is included in the low category. Based on the FEHD IO scale, the total OI in RW 09 Pasirangin Neighbourhood, Kertasari Village of 37.5% is included in the medium IO criteria according to the scale.

Location	Ovitrap Indoor	Ovitrap Outdoor	Quantity
RM 1	+	-	1
RM 2	-	+	1
RM 3	+	-	1
RM 4	-	-	0
RM 5	+	+	2
RM 6	-	-	0
RM 7	+	-	1
RM 8	+	-	1
RM 9	-	-	0
RM 10	+	-	1
RM 11	-	-	0
RM 12	-	-	0
RM 13	+	+	2
RM 14	+	-	1
RM 15	-	-	0
RM 16	+	-	1
RM 17	-	-	0
RM 18	-	+	1
RM 19	+	-	1
RM 20	+	-	1
Total			**15**

Table 3. Ovitrap Index Value Results

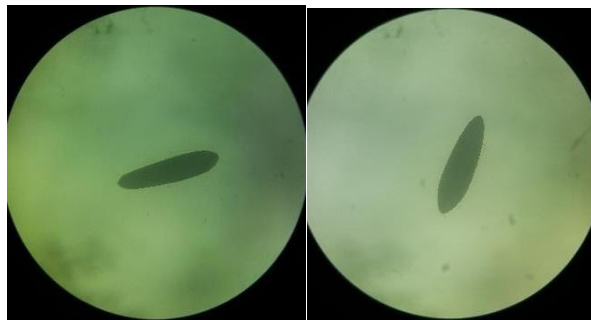| Location	Ovitrap placement	Ovitrap (+) Eggs	Ovitrap Installed	Ovitrap Index (%)	Criteria
RW 09 Lingkungan Pasirangin, Kelurahan Kertasari	Indoor	11	20	55	High
	Outdoor	4	20	20	Low
Total		**15**	**40**	**37,5**	**Medium**

Figure 1. Egg Identification Results 10X magnification (Documentation of the study).

The results of identification carried out on eggs attached to filter paper in the ovitrap obtained eggs with characteristics that resemble Aedes sp eggs (Figure 1), namely, oval or elliptical striped walls with both ends forming a slightly acute angle and sticking one by one to the filter paper in the ovitrap.

The Pasirangin RW 09 neighbourhood in Kertasari Village, Ciamis District, Ciamis Regency is a DHF endemic area where the area has the highest DHF cases in the ciamis village in 2021. Before this index ovitrap measurement research was carried out, respondents first received education about this research material by means of researchers providing explanations, after being given education the respondent was asked to fill in informed consent if the respondent was willing. In this study, Ovitrap storage was carried out for 7 days, this is in accordance with the mosquito life cycle, especially in the egg to pupa stage. So it is expected that within seven days the eggs produced do not become adults. Eggs trapped in the ovitrap only contained eggs with the genus Aedes. Aedes eggs are known from morphological identification, namely black in colour, oval shape, placed one after another on the surface of filter paper on the ovistrip or a little water surface.

Based on the observations made on ovitraps that were positive for eggs, the number of positive ovitraps stored indoors was higher than the number of ovitraps stored outdoors. This indicates that Aedes sp mosquitoes in RW 09 Pasirangin neighbourhood, Kertasari urban village, are more likely to lay eggs (oviposition) inside the house. This is in accordance with research conducted by (Wikurendra, 2020) in Surabaya City, research (Puspitasari, 2012) in Semarang City and research (Hidayati et al., 2017) in Sukabumi City which showed that ovitraps installed inside the house produced more trapped eggs and outside the house obtained less. This is due to the similarity of environmental conditions where the area has a fairly high light intensity or the area is quite hot, it shows that mosquitoes are less able to live and develop in places that have high light intensity or bright (Nurdiana & Eka, 2015).

However, in contrast to research conducted by (Sholikhatun et al., 2020) in Banjarnegara City which found that the ovitrap index outside the house was greater than inside the house where the difference in these results was related to the conditions of the research area, where the conditions of residential areas in the area were very supportive with temperature and humidity and good vegetation for Aedes sp mosquitoes. Judging from the ovitrap environment installed in RW 09 Pasirangin Neighbourhood which is outdoors, it is attempted not to be exposed to direct sunlight and protected from rain. Since

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Aedes sp mosquitoes tend to lay eggs in dark places, dark and humid rooms are optimal growth conditions for mosquitoes. So that when the ovitrap is in an outdoor location that tends to be bright, it causes mosquitoes to not want to put their eggs in the ovitrap. The overall OI percentage result is 37.5%, the percentage result is then compared with the OI scale criteria according to FEHD, the OI result is at level 3 including in the moderate level category, thus further surveys and controls need to be carried out to reduce the Aedes sp mosquito population.

CONCLUSIONS AND RECOMMENDATIONS

The results showed that of the 40 ovitraps installed, the number of positive ovitraps was 15. Based on the calculation of the overall Ovitrap Index percentage, the result was 37.5%. The ovitrap index criteria for the research location has a score of 3 (IO ≤ 40%) which indicates that the area has a moderate potential for DHF disease vulnerability.

Although the study area is categorised as moderate, it needs to be a concern, especially if there are DHF patients who allow transmission in the vicinity due to the presence of competent vectors for dengue transmission. For this reason, it is necessary to carry out PSN or mosquito nest eradication measures which aim to eliminate mosquito breeding sites. Or better known in the Indonesian community with 3M, namely "Menguras, Menutup dan Mengubur" (Draining, Covering and Burying). Drain water reservoirs regularly, at least once a week, because mosquito eggs take about 7-10 days to turn into adult mosquitoes. Closing water reservoirs tightly, this is also done so that these places cannot be used by mosquitoes to breed. Burying and removing used items that can hold water.

In addition, it is necessary to take other measures by using larvicides

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