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Original Article

Habitat Characteristics of Aedes Sp Larval Containers and Density of Container Index (CI) In the Area Endemic and Non-Endemic to DHF In Makassar City

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ABSTRACT

Aedes sp has breeding habitats in water reservoirs or containers with relatively clear water, both inside and outside the house and in public places. The existence of containers as a breeding habitat for *Aedes sp* mosquitoes can increase the population density of *Aedes sp* mosquitoes, triggering high transmission of the dengu virus in the city of Makassar. The purpose of the study is to determine the characterisitic relationship of containers with the index of aedes sp larvae in dengue endemism areas in Makassar city in 2022.

This study is an analytical observational study. Quantitative analysis with a cross-sectional approach. The sample sampling technique is a technique with simple purposive sampling. The sample was 600 houses in endemic and non-endemic areas in makassar city.

The results of this study are container types with CI density in endemic areas, namely bucket 242 (CI = 9.5), while in non-endemic areas namely bucket 298 (CI = 5.4), container materials with CI density in endemic areas namely plastic 422 (CI = 10.9), while in non-endemic areas namely plastic 482 (CI = 5.6), and container locations with CI materials and densities namely in indoor locations with plastic material 398 (CI = 8.0), while in non-endemic areas with CI materials and densities, namely in indoor locations with plastic material 455 (CI = 5.5). The results of the chi-square test in the endemic area obtained a value of p = 0.478 which means that there is no relationship between the container type and the presence of aedes sp larvae in Tamamaung, Chi-square test results in non-endemic areas obtained a value of p = 0.217 which means that there is no relationship between the container type and the presence of Aedes sp larvae in the new Malimangan Village. The results of the chi-square test in the endemic area obtained a value of p = 0.000 which means that there is a relationship between the location and the presence of aedes sp larvae in tamamaung, and Meanwhile, the results of the Chi-Square test in non-endemic areas obtained a value of p = 0.631 which means that there is no relationship between the location and the presence of Aedes sp larvae in the new malimongan. There is no relationship between CI density and endemic and non-endemic regions. All six regions fall into the moderate category. His advice for the Makassar City Health Office, especially in Tamamaung, Pisang Utara, Pampang, Malimongan Baru, Kalukuang and Rappojawa villages, is that it is necessary to conduct counseling / information about the importance of environmental cleanliness and mosquito breeding sites to residents evenly and distribute abate, so that the community can be vigilant and avoid the transmission of dengue fever.

Key words: Characteristics of Container Habitats, Larval Density, Endemic and Non-Endemic.

INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is one of the infectious diseases that can cause outbreaks that often cause death. DHF disease is an infectious disease by the Dengue virus transmitted through the bite of the Aedes aegypti mosquito, with the characteristics of a sudden high fever accompanied by manifestations of bleeding and tendency (tendency) to cause climbing (failure of maintenance) and death.[1]

According to Indonesian data in 2017, it was recorded that the number of dengue cases reached 68,407 cases, then in 2018 there were 65,602 cases. In 2019 (January – July 2020) there were recorded the number of dengue sufferers in Indonesia spread across 34 provinces as many as 71,663 patients and the number of patients who died as many as 459 patients. The number of dengue cases at the end of 2009 to December 2019 has reached 110,921 cases.[2]

Dengue Hemorrhagic Fever (DHF) cases that occurred in Indonesia with a total of 71,633 cases during 2020 are still lower than in 2019, namely the number of cases as many as 112,954. Likewise, the number of deaths in 2020 amounted to 459, while in 2019 it was 751. From data from the Ministry of Health, it is stated that areas with many dengue cases are the areas with the highest Covid-19 cases such as West Java, Lampung, NTT, East Java, Central Java, Yogyakarta and South Sulawesi. This phenomenon allows a person infected with Covid-19 to also be at risk of being infected with DHF. In principle, it is the same, where DHF is a disease whose vaccine has not been very effective and one of the ways to prevent it is to avoid mosquito bites.[3]

South Sulawesi is a province in Indonesia with 3,747 dengue cases recorded and 29 deaths (Dinkes Prov. South Sulawesi 2020). The total population in South Sulawesi Province in 2021 amounted to 9,139,531 people spread across 24 regencies/cities, with the largest population of 1,427,595 in Makassar City (BPS Sulses 2022).

A potential place for the use or development of Aedes aegypti mosquitoes is a clean water reservoir

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(TPA) and is used in everyday life, namely drums, bathtubs, toilet tubs, barrels, buckets and others. Other non-landfill or development sites are flower vases, old tires, used bottles, bird drinking places, trash cans and others, as well as natural landfills (Aedes albopictus), namely tree holes, banana leaves, leaf sheaths, stone holes, and others. The presence of containers in places of worship, markets and uneventful rainwater channels around the house is also a good breeding ground.[4]

According to (Azlina *et al.*, 2016)[5] In Lubuk Buaya Village, there is a high presence of DHF vector larvae with HI 35.45%, CI 13.41%, BI 50% and Density figure / Df = 5. There is a meaningful relationship between mosquito nets eradication measures and the presence of DHF vector larvae in Lubuk Buaya village (p = 0.001).

Research Results from (Listiono & Novianti, 2020)[6] in Palembang, it shows that the type of container (p value: 0.011), container location (p value: 0.001) and container lid condition (p value: 0.013) have a significant relationship with the presence of Aedes aegypti mosquito larvae, while the color of the container (p value: 0.135) does not have a significant relationship to the presence of Aedes Aegypti mosquito larvae. Where based on the data collected, the Palembang City Health Office (Dinkes) throughout January 2019, from 18 sub-districts, it was obtained that sako district is the district with the highest percentage of incidence with a percentage of: 29.1%.

Aedes sp has breeding habitats in water reservoirs or containers with relatively clear water, both inside and outside the house and in public places. The breeding habitat of Aedes sp mosquitoes according to the Ministry of Health of the Republic of Indonesia can be grouped as follows: 1) Water Reservoirs (TPA) for daily purposes, such as: drums, reservoir tanks, crocks, bathtubs / toilets, and buckets. 2) Water Reservoirs are not for daily purposes such as: bird drinking places, flower vases, ant traps, water disposal control basins, refrigerator/ dispenser water dumps, clogged gutters, used items (example: tires, cans, bottles, plastics, etc.). 3) Natural Water Reservoirs such as: tree holes, stone holes, leaf sheaths, coconut shells, banana fronds, and bamboo strips and brown/rubber shells, etc.[7]

The existence of containers as a breeding habitat for Ae. aegypti can increase the population density of Ae. aegypti thus triggers a high risk of transmission of the dengue virus. Soedarto explained that the density of Aedes sp. larvae is high. judging from the size of entomological parameters such as the House Index (HI), Container Index (CI), and Breteau Index (BI), these values can interpret the meaning of the DHF transmission ratio. The higher the density of mosquitoes, the higher the risk of being infected with the dengue virus. Research results from (Tomia *et al.*, 2019)[7] in Ternate City, North Maluku based on the Maya Index, as many as 1,990 houses in 20 urban villages in Ternate City are included in the medium risk category (78.64%) with CI (43.95%), HI (84.99%), BI (228.91), and DF values in the high category (DF = 8.7). That most patients' homes still have the potential for transmission of Dengue virus infection. The status of the maya index and environmental sanitation conditions in Ternate City are in the moderate category. The density of Ae larvae. aegypti in Ternate City is in a high category meaning that Ternate City has a high risk of transmission to the spread of dengue disease.

Ae. Aegypti love to lay eggs in clear water not directly related to the soil. The main breeding grounds are water reservoirs in the form of puddles that are accommodated in a place or vessels in or around the house or public places, usually not exceeding a distance of 500 meters from the house. These mosquitoes are usually unable to breed in puddles that are directly related to the soil.[8]

According to the results of the study (Uliya *et al.*, 2020)[9] Perilaku bertelur nyamuk *Ae. aegypti* pada media air yang jernih secara teori sudah berbeda, terdapat pola adaptasi pada perilaku bertelur nyamuk *Ae. aegypti* yang bertelur di air comberan (Got), air sabun, air sumur gali dan juga air PAM dengan ketahanan hidup dan pertumbuhan nyamuk yang berbeda, dengan tingkat ketahanan hidup pada air got yaitu 100%.[9]

A specific treatment for dengue disease has not yet been found. Another way to prevent dengue infection is to use the dengue vaccine, but the vaccine is still in the development stage.

Therefore, vector control and eradication is the most effective method for preventing dengue fever, namely the Eradication of Mosquito Nests (PSN) 3M plus with the 1 House 1 Jumantic Movement which is a family-based program.[10]

Another indicator used for efforts to control dengue disease is the larvae-free number (ABJ). Until 2014, ABJ nationally had not reached the program target of ≥ 95%. In 2014 ABJ in Indonesia amounted to 24.06%, a significant decrease compared to the average achievement for the previous 4 years. However, the validity of the ABJ data above cannot be used as a definitive measure to describe the density of larvae nationally. This is because ABJ data reporting does not cover all districts/cities in Indonesia. Most puskesmas do not carry out Periodic Jentik Monitoring (PJB) activities regularly, besides that the activities of the Jentik Monitoring Worker (JUMANTIK) cadres do not run in most areas due to limited budget allocations in the regions for these two activities.[11]

According to research results from (Bedah dan Hardanti, 2019), ABJ results in this study were 62%. The results were said to not meet ABJ's target of ≥ 95%. The same results were also obtained in a study conducted by Murdani, *et al.* (2015), where ABJ in Purwoharjo District, Banyuwangi Regency, East Java was less than 95%. Murdani, *et al.* (2015) stated that if ABJ ≥ 95% it is expected that dengue transmission can be prevented or reduced.[12]

RESEARCH METHODS

This study is an analytical observational study using a Cross-Sectional approach. This research was conducted in three endemic areas, namely Tamamaung Village, Pampang Village, Kalakuang Village and non-endemic areas, namely North Banana Village, Malimongan Baru Village and Rapojawa Village, Makassar City. The study was conducted in June-September 2022. The population in this study was all homes that had suffered and never had dengue fever. Sampal in this study is to use the sampling technique by simpe purposive sampling, namely the technique of taking samples based on certain intentions and objectives in accordance with the criteria and exclusion criteria. The method of data collection is by means of interviews, obervation and documentation. As well as the instruments used are survey sheets and some laboratory equipment. The data used are primary data obtained directly from the residents of the house and with observations in the home environment and secondary data in this study were obtained from data from the Makassar City Health Office and previous research references.

Data analysis in this study using univariate analysis is used to get an overview by describing each variable used in the study, namely by looking at the frequency distribution picture in the form of a table. Bivariate analysis was carried out to see the relationship between independent variables and dependent variables. Independent variables include container type, container material, container location, larval density. The dependent variable is the Larval Presence. Bivariate analysis was used with statistical testing and the Chi Square test (x2) or by using α=0.05 and using bar charts to look for relationships of independent and dependent variables. The presentation of the processed data will be presented in the form of a frequency distribution table and an analysis table of the relationship between dependent variables and independent variables as well as narratives to discuss research results.

Table 1: Table of distirbusi container types with CI density in endemic areas in Makassar city.

Container Type	N (Container)	Container (%)	positive (N)	Density CI
bathtub	55	11,4	7	12,7
tub wc	4	0,8	1	25,0
drum	3	0,6	1	33,3
Crock	81	16,8	6	7,4
bucket	242	50,1	23	9,5
basin/baking sheet	54	11,2	7	13,0
Vase/pot	1	0,2	0	0,0
pond/aquarium	6	1,2	1	16,7
gutters	2	0,4	0	0,0
dispenser	35	7,2	11	31,4
Total	**483**	**100,0**	**57**	

Source: Primary data 2022

Table 2: Table of distirbusi container types with CI density in non-endemic areas in Makassar city.

Container Type	N (Container)	Container (%)	Positive (N)	Density CI
bathtub	53	10,0	2	3,8
tub wc	3	0,6	0	0,0
drum	2	0,4	0	0,0
Crock	88	16,6	9	10,2
bucket	298	56,1	16	5,4
basin/baking sheet	76	14,3	3	3,9
Vase/pot	0	0,0	0	0,0
pond/aquarium	0	0,0	0	0,0
gutters	0	0,0	0	0,0
dispenser	11	2,1	1	9,1
Total	**531**	**100,0**	**31**	

Source: Primary data 2022

Table 3: Indoor container distribution table with CI density in endemic regions.

Indoor Location	Sum	Larval Positive	
Container Materials	n (%)	n	CI
Cement	19	1	5,3
Soil	1	1	100,0
Plastic	398	32	8,0
Glass	4	0	0,0
Ceramics	20	5	25,0
Metal	0	0	0,0
Total	**442**	**39**	

Source: Primary data 2022

RESEARCH RESULTS

Distribution of container types with CI density in dengue endemic areas in Makassar city

Based on the table above, the total container types in the endemic region are 483 containers. Where the most container types are Bucket 242 (50.1%), Crock 81 (16.8%), Bathtub 55 (11.4%), Basin / Pan 54 (11.2%), Dispenser 35 (7.2%), Pond / aquarium 6 (1.2%), Tub wc 4 (0.8%), Drum 3 (0.6%), Gutter 1 (0.2%), Vas / pot 1 (0.2%).

The total container types in the endemic region are 483 containers. Where the most container type is the bucket container type with a total of 242 with a container index (CI) density of 9.5.

Distribution of container types with CI density in non-endemic areas in Makassar city

Based on the table above, the total container types in non-endemic regions are 531 containers. Where the most types of containers are Bucket 298 (56.1%), Crock 88 (16.6%), Basin / pan 76 (14.3%) Bathtub 53 (10.0%), Dispenser 11 (2.1%), Tub wc 3 (0.6%), Drum 2 (0.4%).

The total container types in non-endemic areas are 531 containers. Where the most container types are bucket container types with a total of 298 with a container index (CI) density of 5.4.

Table 4: Table of Container Index (CI) densities in endemic and non-endemic regions.

No	Area	CI		Information
		%	DF	
1	Tamamaung (Endemic)	20,6%	5	keep
2	Pampang (Endemic)	11,4%	4	keep
3	Kalukuang (Endemic)	5%	2	keep
4	North Banana (Non-Endemic)	3,1%	2	keep
5	New Malibongan (Non-Endemic)	9,7%	3	keep
6	Rappojawa (Non-Endemic)	4,2%	2	keep

Source: Primary data 2022

Table 5: Table of relationship between container type and the presence of larvae in endemic areas of Tamamaung village, Makassar city.

Container Type	Larval Presence				Total		p= value
	Positive		Negative				
	N	%	N	%	N	%	
Bathtub	6	26,1%	17	73,9%	23	100,0%	0,478
Wc tub	1	25,0%	3	75,0%	4	100,0%	
Drum	1	33,3%	2	66,7%	3	100,0%	
Crock	2	25,0%	6	75,0%	8	100,0%	
Bucket	10	14,9%	57	85,1%	67	100,0%	
Basin/baking sheet	5	33,3%	10	66,7%	15	100,0%	
Aquarium pond	1	100,0%	0	0,0%	1	100,0%	
Gutters	0	0,0%	1	100,0%	1	100,0%	
Dispenser	1	25,0%	3	75,0%	4	100,0%	
Vase/pot	0	0,0%	0	0,0%	0	0,0%	

Source: Primary data 2022

Table 6: Table of relationship of container types with the presence of larvae in non-endemic areas of Malimongan Baru village, Makassar city.

Container Type	Larval Presence				Total		p= value
	Positive		Negative				
	N	%	N	%	N	%	
Bathtub	1	5,0%	19	95,0%	20	100,0%	0,217
Wc tub	0	0,0%	1	100,0%	1	100,0%	
Drum	0	0,0%	2	100,0%	2	100,0%	
Crock	6	18,8%	26	81,3%	32	100,0%	
Bucket	7	7,1%	92	92,9%	99	100,0%	
basin/baking sheet	3	10,3%	26	89,7%	29	100,0%	
dispenser	1	50,0%	1	50,0%	2	100,0%	
pond aquarium	0	0,0%	0	0,0%	0	0,0%	
vase/pot	0	0,0%	0	0,0%	0	0,0%	
Gutters	0	0,0%	0	0,0%	0	0,0%	

Source: Primary data 2022

Table 7: Table of relationship of container location with the presence of larvae of endemic areas of Kelurahan Tamamaung Makassar city.

Container Locations	Larval Presence				Total		p= value
	Positive		Negative				
	N	%	N	%	N	%	
Indoor	15	14,6%	88	85,4%	103	100,0%	0,000
Outdoor	12	52,2%	11	47,8%	23	100,0%	

Source: Primary data 2022

Table 8: Table of relationship of container location with the presence of larvae in endemic areas of Malimongan Baru village, Makassar city.

Container Locations	Larval Presence				Total		p= value
	Positive		Negative				
	N	%	N	%	N	%	
Indoor	16	9,4%	155	90,6%	171	100%	0,631
Outdoor	2	14,3%	12	85,7%	14	100%	

Source: Primary data 2022

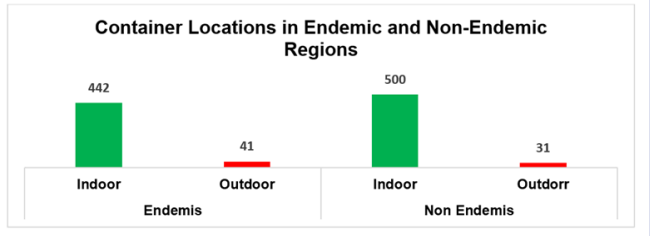

Figure 1: Distribution diagram of containers found at indoor and outdoor locations
Source: Primary data 2022

Distribution of container locations in endemic and non-endemic areas in the city of Makassar

Based on the diagram above, more container locations were found in indoor locations, namely 442 containers in endemic daearah and 500 in non-endemic daearah. Meanwhile, in the endemic area of outdoor locations, 41 containers were found and 31 in non-endemic areas.

Based on the table above, the total location of indoor containers based on materials in the endemic area is 442 materials. Where indoor locations found the most container materials, namely plastic with a total of 398 with a container index (CI) density of 8.0.

Container Index (CI) density in endemic and non-endemic regions

Based on the table above, density figure values in endemic areas (Tamamaung, Pampang, and Kalukuang) are 5, 4 and 2, respectively. While in Non-Endemic areas (North Banana, Malibongan Baru, and Rappojawa) are 2, 3 and 2, respectively. This suggests that the density of larvae in all study areas is in the moderate category. Based on the highest Container Index (CI) value in the Tamamaung and Pampang areas, which shows that this area has the most potential for dengue transmission.

Relationship of container type with the presence of Aedes Sp larvae in the endemic area of Tamamaung village

Based on the table above, it was found that the presence of positive jenitik bathtub was 6 containers, wc tubs 1 container, drums 1 container, crock 2 containers, buckets 10 containers, bakom / Pan 5 containers, ponds / aquarium 1, dispensers 1 container and for the presence of negative larvae in the bathtub 17 containers, wc tubs 3 containers, drums 2 containers, crocks 6 containers, bucket 57 containers, basin/ bucket 10 containers, gutters 1 container, and dispenser 1 container.

Based on the table above, it is known that the chi-square statistical test for the endemic area of the container type with the highest larval presence was obtained 0.478 (p>0.05) which means that there is no relationship between the container type and the presence of Aedes SP larvae.

The relationship of container types with the presence of larvae in non-endemic areas of Malimongan Baru Village

Based on the table above, it was found that the presence of positive larvae of the bathtub was 1 container, a crock of 6 containers, a bucket of 7 containers, a bakom / pan of 3 containers, a dispenser of 1 container and for the presence of negative larvae in the bathtub 19 containers, a wc tub 1 container, a drum 2 containers, a crock 26 containers, a bucket 92 containers, a basin / bucket 26 containers, and a dispenser 1 container.

Based on the table above, it is known that the chi-square statistical test for non-endemic areas of container type with the highest larval presence was obtained 0.217 (p>0.05) which means that there is no relationship between container type and the presence of *Aedes Sp* larvae.

The relationship between container location and the presence of endemic larvae in Tamamaung village

Based on the table above, it was found that the presence of positive larvae was in indoor locations with 15 (14.6%) and outdoor locations with 12 (52.2%), while locations with negative larvae were in indoor locations with 88 (85.4%) and outdoor locations with 11 (47.8%).

Based on the table above, it is known that the chi-square statistical test for the endemic area of the location with the highest larval presence was obtained 0.000 (p<0.05) which means that there is a relationship between the location of the container and the presence of *Aedes sp* larvae.

The relationship of container location with the presence of larvae in non-endemic areas in the new Malimongan village

Based on the table above, it was found that the presence of positive larvae was in indoor locations with a total of 16 (9.4%) and outdoor locations with a number of 2 (14.3%), while locations with the presence of negative larvae were in indoor locations with a total of 155 (90.6%) and outdoor locations with a number of 12 (85.7%).

Based on the table above, it is known that the chi-square statistical test for the nonn endemic location area with the highest larval presence was obtained 0.631 (p>0.05) which means that there is no relationship between the container location and the presence of *Aedes sp* larvae.

DISCUSSION

Distribution of container type characteristics in endemic and non-endemic areas of DHF in Makassar city

Based on the results found, the total type of container in the endemic area is 483 containers. Where the largest container type is buckets with a total of 242 (50.1%) containers and the lowest is the type of vase / pot container with a number of 1 (0.2%) container. Meanwhile, the total number of container types in non-endemic areas is 531 containers. Where the largest container type is a bucket with 298 (56.1%) containers and the lowest is a drum container type with 2 (0.4%) containers.

The most types of containers in endemsion and non-endemic regions are bucket container types. This is because the people at the research site still use buckets as daily necessities.

This is in accordance with the research conducted by (Triwahyuni *et al*., 2020)[13] in the Working Area of Puskesmas Way Kandis Bandar Lampung that based on the results of observations, the most types of containers were found in the form of buckets as many as 278 pieces (53.4%) and bird drinking places 84 pieces (16.1%).

Likewise, the research conducted by (Affiandy *et al*., 2019)[14] conducted in the sea port area of Cirebon, West Java that the types of containers found in the perimeter area of the Cirebon sea port successively are bucket 179, WC tub 162, bathtub 58, drum 56, pond 24, aquarium 4 and used tires 3.

Distribution of container locations in endemic and non-endemic areas of DHF in Makassar city

Based on the results found, that the location of the existing container is endemic to 483 materials. Where the most container locations are indoor locations with 422 (91.5%), and the lowest is outdoor locations with 41 (8.5%). Meanwhile, the total number of container locations in non-endemic areas is 531. Where the most container locations are indoor locations with a total of 500 (94.2%) and the lowest is outdoor locations with a total of 31 (5.8%).

The location of containers in the most endemic and non-endemic areas is the location of indoor containers. This is due to the habit of people who like to collect water for their daily needs in indoor locations rather than in outdoor locations.

This is in accordance with the research conducted by (Sohpyana & Ngadino, 2020)[15] in Tales Village, Ngadiluwih District, Kediri Regency, that containers that are located in the house tend to have more Aedes sp mosquitoes, this is in accordance with the living behavior of Aedes sp mosquitoes who prefer to rest in dark, damp and hidden places in the house / building. In accordance with the habits of the behavior of Aedes sp mosquitoes that are more numerous in the house. Aedes sp mosquitoes are very fond of places to rest on hanging objects such as clothes, mosquito nets, curtains, and miscellaneous. In addition, mosquitoes also like dark and damp objects or places in the house. This is due to the habit of people who like to collect water for daily needs in the house that is not closed and so this open place will make adult mosquitoes Aedes sp interested in laying their eggs. People do not have time to drain water reservoirs regularly once a week so these water reservoirs have the potential to be breeding grounds for Aedes sp mosquitoes.

So is the research conducted by (Gafur & Saleh, 2015)[16] in Motu Village, Baras District, North Mamuju Regency, the location of the landfill is more inside the house, namely 138 (60%) than outside the house, which is 92 (40%).

The relationship of container type with the presence of larvae in the endemic and non-endemic areas of DHF in Makassar city

Based on the results of the chi-square statistical test for the endemic area of Tamamaung village with the presence of larvae obtained 0.478 (p>0.05) which means that there is no relationship between the type of container and the presence of *Aedes Sp*.

Meanwhile, the results of the chi-square statistical test for non-endemic areas of the New Malimongan village with the highest larval presence were obtained 0.217 (p>0.05) which means that there is no relationship between the container type and the presence of *Aedes Sp*. larvae.

This is in accordance with the research conducted by (Budiyanto, 2012)[17] conducted in Ogan Momering Ulu district that the results of statistical tests obtained p value = 0.135 meaning that there is no significant difference in proportion between the differences in container types in this case TPA and Non-TPA with the presence of larvae.

This study is different from (Arfan *et al*., 2019),[18] which was carried out in North Pontianak, Pontianak city that the results of statistical tests showed that there was a meaningful relationship between the type of container and the presence of Aedes sp larvae in the Endemic and Non-Endemic areas of DHF.

Likewise, the research carried out (Affiandy *et al*., 2019)[14] conducted in the cirebon area, West Java that the results of statistical tests with chi square showed a meaningful relationship between container types and the presence of Ae larvae. aegypti in the region (p= 0.001).

In this study, in endemic and non-endemic areas, each type of container contains larvae. This is because aedes sp mosquitoes do not choose what types of containers can lay eggs. The type of container found with a positive number of larvae in the Tamamaung area and the Malimongan Baru area is in the bucket container type. This is because the type of bucket container that is most widely used by the public for daily needs.

The relationship between container locations and the presence of larvae in endemic and non-endemic dengue areas in Makassar city

Based on the results of chi-square statistical tests for endemic areas in Tamamaung subdistrict, the location with the highest larval presence was obtained 0.000 (p<0.05), which means that there is a relationship between the container location and the presence of Aedes sp larvae. The presence of more larvae in the house is likely due to the habit of people who like to collect water, especially in the dry season.

This is in accordance with the research conducted (Sulistyorini *et al*., 2016)[19] in Banranagsiang village and bojongkerta village in Bogor city that the results of statistical tests showed that there was a relationship between the location and the presence of mosquito larvae found in the container, namely p = 0.030 in Baranangsiang.

This is also in line with the research conducted by (Gafur & Saleh, 2015)[16] in North Mamuju district, from the results of statistical tests, a value of p = 0.000 was obtained, which means that the location of the water reservoir greatly affects the presence of larvae.

Meanwhile, based on the results of chi-square statistical tests for non-endemic areas of the location with the highest larval presence obtained 0.631 (p>0.05) which means that there is no relationship between the container location and the presence of Aedes sp larvae.

These results correspond to the research conducted (Budiyanto, 2012)[17] in schools in Baturaja Timur District, statistical test results were obtained with a p value = 0.237, meaning that there was no significant difference in proportion between the difference in the location of containers (inside and outside the building) and the presence of larvae.

Container Index (CI) density in endemic and non-endemic regions

Another indicator that can be used to measure the level of risk of dengue transmission is the larvae density figure. The parameter used to measure the density of the larvae is Container index (CI).

The CI value describes the number of containers that are positive compared to the total number of containers inspected. CI values can be used as a comparison tool in the evaluation of vector control programs but do not play a very important role from the epidemiological side.[20]

According to WHO, the density of Aedes aegypti larvae can be assessed using a *density figure* (DF), namely by looking at the *Container Index* (CI), *House Index* (HI) and *Breteau Index* (BI).[21]

Based on the table above, density figure values in Endemic (Tamamaung, Pampang, and Kalukuang) and non-Endemic (North Banana, Malibongan Baru, and Rappojawa) areas obtained the DF value is 2 to 5. This means that all the areas studied have moderate Aedes sp larvae. So, it cannot be analyzed bivariate test (all regions are included in the low category).

This is in accordance with the research conducted (Suharno Zen, M.Sc, 2015)[22] in Metro Village, Central Metro District, Lampung Metro city, based on this study, the density of container index (CI) was 13.2%. Where the density figure (DF) has a value of 4 or is categorized as medium. The meaning of this medium word is that the level of risk of dengue transmission in Metro Villages is still within tolerance limits, not urgent or high limits.

This is also in line with the research conducted by (Narmala *et al*., 2019)[23] Tegalrejo Hamlet and Krajan Kidul Nanggungan Pacitan Hamlet, that Based on the value of the container index (CI), the CI in Tegalrejo Hamlet (5.3%) is lower than Krajan Kidul Hamlet (8.9%). Furthermore, the Breteau Index (BI) value in Tegalrejo Hamlet (21%) is lower than Krajan Kidul Hamlet (35%). The CI of the two hamlets is less than 10% and BI is less than 50%, so they are included in the low category.

Based on the results conducted by researchers in endemic and non-endemic areas in Makassar city, the container index (CI) density value is the highest in the Tamamaung area which shows that this area has the most potential for dengue transmission, while the lowest in the North Banana area which shows low dengue infection. However, the spread of dengue hemorrhagic fever (DHF) remains.

CONCLUSION

The container type is not related to the level of larval density (CI) in the Makassar City area with a value of $p = 0.541$ ($p>0.05$). This means that the container type of aedes sp larval density in Makassar City is not related to the larval density level (CI), the container material is not related to the larval density level (CI) in the Makassar City area with a $p = 0.158$ ($p>0.05$) value. This means that the container material from the density of aedes sp larvae in Makassar City is not related to the level of larval density (CI). The location of the container is related to the level of larval density (CI) in the Makassar City area with a value of $p = 0.046$ ($p<0.05$). This means that indoor locations are more likely to be preferred by aedes sp mosquitoes than outdoors. There is no relationship between endemism and larval density. All six regions fall into the moderate category.

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