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Survey of *Aedes Sp*. Larvae Density in Water Storage Containers in Pinang Merah Subdistrict, Jambi City

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ABSTRACT

Jambi City, as the capital of Jambi Province, has seen rapid development of new residential areas. However, not all areas are served by the municipal water supply (PDAM), leading to the storage of water outside homes. The presence of vacant land has further contributed to the proliferation of mosquitoes, and the expansion of residential areas is suspected to increase cases of dengue fever (DHF). This situation is favorable for Aedes aegypti mosquitoes, which thrive near clean water sources. This study is a descriptive survey using a cross-sectional method to describe the density level of Aedes sp. larvae. The research was conducted from October to December 2023 in Pinang Merah Subdistrict, Jambi City, and larval identification was carried out in the Environmental Health Department Laboratory of the Jambi Health Polytechnic (Poltekkes Kemenkes Jambi). Water storage containers found to contain larvae included metal drums, plastic drums, and cement-coated ponds, with a prevalence of 33.3%. The presence of larvae outside homes is closely related to breeding sites that collect rainwater, which then become larval habitats. From the analysis, a House Index (HI) of 25% and a Larvae-Free Index of 75% were obtained. The study concludes that the density of Aedes sp. larvae in water storage containers in Pinang Merah Subdistrict is at a moderate level.

Keywords: Larvae density, *Aedes aegypty*, *Aedes albopictus*

INTRODUCTION

The epidemiological cycle of Dengue Hemorrhagic Fever (DHF) cases worldwide has changed rapidly. Over the past three decades, globally, DHF has seen an increase in both the number of cases and the emergence of new disease occurrences. WHO estimates approximately 390 million Dengue infections annually, with 96 million of these showing clinical manifestations of Dengue infection. The number of DHF cases has risen from 2.2 million cases in 2010 to 3.2 million cases in 2015. About 500,000 people suffering from DHF are hospitalized annually, with the majority (90%) being children under five years old, and 2.5% of these cases result in death.

In Indonesia, DHF is a significant public health problem, with the number of cases steadily increasing. According to the 2021–2030 NTDs Roadmap, dengue is among the 20 diseases targeted for prevention and control. The goal is to reduce the Case Fatality Rate (CFR) from 0.80% in 2020 to 0% by 2030. However, in 2022, Indonesia's CFR for DHF reached 0.90%, with 34.33% of targeted areas affected (Tansil, Rampengan, and Wilar, 2021). In Jambi Province in 2022, 1,381 DHF cases and 9 deaths were reported, marking a significant increase from 357 cases and 5 deaths in 2021. The incidence rate (IR) of DHF per 100,000 people in Jambi City was 48.1 (Provincial Health Office of Jambi, 2022).

The presence of uninhabited houses in residential areas has the potential to become breeding grounds for *Aedes* mosquitoes. The increasing DHF cases may be influenced by the expansion of residential areas. This situation is favorable for *Aedes aegypti* mosquitoes, as they are domestic mosquitoes that thrive in close proximity to human settlements (Sulidah, Damayanti, and Paridah, 2021).

The Aedes mosquito breeds in water storage containers, including stagnant water accumulated in containers or reservoirs. Recently, *Aedes* mosquitoes have shown behavioral changes, adapting to breeding in polluted water, such as in drains or water mixed with oil (Fahri et al., 2013). Poorly managed water storage facilities increase the number of potential mosquito breeding grounds, which may raise the *Aedes* larvae population and accelerate DHF transmission if not addressed promptly and according to the concept of PSN (Mosquito Nest Eradication) (Rahayu and Siwiendrayanti, 2019).

Mosquitoes are not only found in residential areas but also in public places, such as discarded tires at repair shops,

which collect rainwater and become breeding grounds during the rainy season. Breeding grounds in public areas significantly increase the potential presence of *Aedes* larvae and DHF transmission (Dewi and Sukendra, 2018; Sumampouw, 2020).

Based on observations from April to September 2023, it was found that residential areas in the Pinang Merah Subdistrict are at high risk for accelerating DHF transmission. Female *Aedes* mosquitoes have an average flight range of 40–100 meters, enabling them to enter other homes and residential areas within a 100-meter radius and breed there (Astuti and Lustiyati, 2018; Apriyani and Yulianus, 2022).

Efforts by the community to address DHF include epidemiological investigations, fogging, the 3M Plus movement, DHF awareness campaigns, and larvae monitoring by Jumantik cadres and local health center staff. Despite these efforts, DHF cases continue to rise (Kurnia et al., 2023). This increase is partly due to a lack of public behavior supporting DHF prevention measures. The average Larvae-Free Index in 2022 still fell short of the national target, which reflects community behavior in eradicating DHF vectors through Mosquito Nest Eradication activities (Nasifah and Sukendra, 2021; Wu, Wu, and Li, 2022).

A preliminary study conducted in January 2023 on two DHF patients revealed no mosquito breeding sites inside their homes. However, 60% of respondents had potential breeding grounds outside their homes, such as drains and discarded items.

This study aims to survey the density of *Aedes* larvae in Pinang Merah Subdistrict, Jambi City, specifically in water storage containers (TPA), which are among the primary breeding sites for these mosquitoes.

The presence of *Aedes* larvae in an area is an indicator of the *Aedes* mosquito population. Higher larvae density levels correlate with an increased risk of *Aedes* mosquito spread, which is a critical factor in DHF transmission.

RESEARCH METHODS

This study employed an analytic survey design using a cross-sectional method. The research was conducted in the Pinang Merah Subdistrict, Jambi City, from October to December 2023. The population for this research included all houses with outdoor water storage containers (TPA) in the Pinang Merah Subdistrict. The sample consisted of 50 houses.

The selection of the 50 sample houses adhered to the Guidelines for Field Data Collection of Vectors (Mosquitoes) issued by the Research and Development Center for Vector and Reservoir Diseases, Ministry of Health, Republic of Indonesia, in 2017. The specific sample houses were chosen under the guidance of the respective neighborhood heads (RT).

Data analysis in this study was conducted using the chi-square statistical test. The requirements for the chi-square test were that no more than 20% of cells could have an expected value of less than 5 and that there should be no observed value of zero. If these conditions were not met, Fisher's exact test was applied as an alternative.

RESULTS AND DISCUSSION

The results obtained were recorded and analyzed to determine the density of *Aedes* mosquito larvae using larval index calculations, which included the House Index (HI), Container Index (CI), Breteau Index (BI), and Larva-Free Index (ABJ).

The House Index (HI) represents the percentage of houses positive for larvae. The Container Index (CI) indicates the percentage of water storage containers (TPA) positive for larvae. The Breteau Index (BI) measures the percentage of containers positive for larvae relative to the total number of houses inspected. The Larva-Free Index (ABJ) shows the percentage of houses where no larvae were found relative to the total number of houses inspected.

According to the World Health Organization (WHO), a region is considered at high risk of dengue transmission if HI is ≥5%, and at low risk if HI is <5%. A CI of ≥10% indicates high risk, whereas CI ≤10% indicates low risk. For BI, a value of ≥50% is categorized as high risk, while BI <50% is considered low risk. The recommended ABJ value, as established by WHO and adopted as the national standard, is ≥95%.

Larval density, expressed as the Density Figure (DF), is measured on a scale of 1–9. DF is determined by comparing the HI, CI, and BI values with a reference table (Larva Index Table). A DF value of 1 indicates low larval density and a low risk of dengue transmission. A DF value between 2 and 5 indicates moderate larval density and a medium risk of transmission. A DF value greater than 5 represents high larval density and a significant risk of dengue transmission.

Table 1
Larva Index

DF	HI	CI	BI
1	1-3	1-2	1-4
2	4-7	3-5	5-9
3	8-17	6-9	10-19
4	18-28	10-14	20-34
5	29-37	15-20	35-49
6	38-49	21-27	50-74
7	50-59	28-31	75-99
8	60-76	32-40	100-199
9	>77	>41	>200

Larvae identification was carried out in the laboratory using established procedures. Larvae were identified using a light microscope at 10× and 40× magnification, utilizing the *Aedes* larvae key.

The survey conducted on 50 houses in the Pinang Merah Subdistrict revealed that some houses were positive

for larvae, originating from different types of water storage containers (TPA). Table 2 shows that out of the 50 houses inspected, 10 houses were positive for larvae, and 40 houses showed no larvae in their TPAs. Based on this data, the House Index (HI) was calculated to be 25%. Compared to the values in Table 1, this corresponds to a Density Figure (DF) of 4. Additionally, Table 2 shows the Larva-Free Index (ABJ) value of 75%. Table 3 shows that among the three types of TPAs inspected, metal drums, plastic drums, and plastered cement pools had an average positive larvae rate of 33.3%.

Table 2
Number of Houses Positive for Larvae

House	Number	Percentage
+	10	25 (HI)
-	40	75 (ABJ)
Total	50	100

Table 3
Types of TPAs Inspected and Positive Larvae

Type	Inspected (n)	(+) Number	Percentage
Metal Drum	3	2	33.3
Plastic Drum	5	2	33.3
Plastered cement pool	2	2	33.3
Total	10	6	100

Table 4
Types of Mosquito Larvae

Type of Mosquito Larvae	Number	Percentage
Aedes aegypti	25	33.3
Aedes albopictus	20	26.6
Other mosquitos	30	40
Total	75	100

Table 4 shows that Aedes aegypti was more prevalent in RT 07. Pinang Merah Subdistrict. with 33.3%. while Aedes albopictus accounted for 26.6%. Other species. such as Anopheles and Culex larvae. were also found.

Table 5
Types of TPAs Inspected and Types of Larvae

Type of TPA	Inspected (n)	(+) Number	Type of Larvae
Drum metal	3	2	*Aedes albopictus*
Drum plastic	5	2	*Aedes Albopictus*
Kolam plaster semen	2	2	*Aedes aegypty*
Total	10	6	

Table 5 indicates that the water storage containers made from drums and cement plaster contained Aedes aegypti and Aedes albopictus larvae.

There is a relationship between the habit of collecting rainwater around the house and the occurrence of Dengue Hemorrhagic Fever (DHF). Respondents who were found to have larvae in containers around their homes also had mosquitoes flying around and larvae present in the water storage containers. This indicates that the cleaning of these containers is infrequent. allowing the mosquito's biological cycle to progress well. This study is in line with research that found a significant relationship between the 3M Plus behavior and the occurrence of DHF (Periatama. Muji Lestari. and Wasthu Prasida. 2022). The presence of larvae influences the density of larvae. Containers that contain larvae have the potential to develop into adult mosquitoes. The Container Index (CI) provides information about the proportion of containers containing more than one adult mosquito. The presence of larvae is closely related to the type. location. and number of containers in the house. This study is also consistent with research by Noviyani Dwi Raharjanti and Eram Tunggul Pawenang. which found a significant relationship between the number of containers and the presence of *Aedes* larvae (Zulfikar et al.. 2023; Raharjanti & Pawenang. 2018).

The presence of larvae outside the house is closely linked to breeding places outside the house and the collection of rainwater. which then becomes a breeding ground for larvae. *Aedes* mosquito eggs can survive for several months. meaning they can hatch even after a long period (Wang et al.. 2020; Susilowati and Cahyati. 2021).

The results of this study show a significant relationship between cleaning water storage containers once a week and the occurrence of DHF (p=0.004). Cleaning the water storage containers once a week is a preventive action to stop the breeding of DHF vectors. This study aligns with research by Habibie et al.. 2023; Yuliana et al.. 2022; Sanyaolu. 2017. To reduce larvae breeding. one of the measures is to clean water storage containers regularly. such as cleaning bathtubs. buckets. and other containers. Other efforts include tightly closing containers like buckets. jars. and bathtubs. burying used items that may collect water and contain larvae. such as used cans. bottles. and tires. Reducing potential breeding sites. such as bottles/used items and tires. follows the 3R principle (Reduce. Reuse. and Recover).

The 3M Plus efforts can be applied both individually and within the household environment. such as cleaning containers at least once a week and spreading abate powder when larvae are found around the water storage containers. In addition. to prevent mosquito larvae density. 3M Plus efforts should be carried out not only in DHF endemic areas but also in non-endemic areas to control larvae density and presence (Vindo Galaresa. Al Kasanah. and Fitriami. 2023; Suryani. Yasin. and Kartikasari. 2021; Anggraini S. 2018).

However. there is no significant relationship between the habit of burying/recycling used items and the occurrence of DHF (p=0.87). This study is consistent with research by Moreira et al. (2020). which showed a p-value of 0.616. meaning there is no relationship between the behavior of burying used items and DHF occurrence. Burying used items refers to the behavior of burying items that may collect rainwater. such as used bottles. cans. and others (Wang et al.. 2023; Rahman et al.. 2022; Syarifuddin and Samosir. 2022; Moreira. Setyobudi. and Ndun. 2020). Observations indicate that people in the study area dispose of their waste. including used items. in trash bins. which are collected by cleaning staff every three days.

Based on a survey conducted on 100 houses in the Paal Dua Village. 12 houses were found to have mosquito larvae. while 88 houses did not contain larvae. According to Karwur et al.. the density of *Aedes sp.* larvae found in the waste disposal sites (TPA) was 133 larvae. resulting in a House Index (HI) of 12% and a Larvae-Free Index (ABJ) of 88%. According to WHO guidelines. a HI value of ≥5% indicates that the area is considered at high risk for the transmission of Dengue Hemorrhagic Fever (DHF). However. the ABJ value in this study is below the WHO recommendation of ≥95%. meaning the area is still at risk for DHF transmission. The study also found 117 TPAs among the 100 houses surveyed. with 12 positive TPAs. giving a Container Index (CI) of 10.25% and a Breteau Index (BI) of 12%. According to WHO guidelines. a CI value of ≥10% indicates that the area has a high risk of DHF transmission. Based on the BI value of <50%. the risk for DHF transmission in this area is considered low. The HI. CI. and BI values were then used to determine the Density Figure (DF). or the level of mosquito larvae density. When compared to the values in Table 1. the DF value falls within the 3-4 scale. indicating that the density of *Aedes* larvae in the TPAs in Paal Dua Village is at a medium level. and the risk of DHF transmission in this area is also medium.

This study also found that the TPA with the highest percentage of larvae was the drum. with 66.67%. This aligns with the findings of Irayanti et al.. who conducted a survey on larvae in the Pelabuhan KKP Class II Tarakan. where drums were also found to have the highest percentage of larvae. This is because drums are typically not used for storing drinking or clean water. making them rarely cleaned and at high risk for becoming mosquito breeding sites. Additionally. the drums examined in this study had rougher surfaces compared to the other TPAs. which made them harder to clean. These rough surfaces are conducive to the growth of algae and have low light reflection. making the water temperature ideal for *Aedes* mosquito breeding.

Aedes mosquitoes prefer rough surfaces. as the female mosquito can easily position herself while laying eggs. placing them on the water's surface. In some of the surveyed houses. particularly those with positive larvae. dense vegetation and trees were found. which blocked sunlight from entering the house. Poor ventilation in some houses also contributed to less sunlight entering. further worsening the conditions. Additionally. the darker color of the drums is favored by *Aedes* mosquitoes. which thrive in high humidity and are photophobic. These dark and hidden conditions provide a safe and quiet environment for the mosquitoes during egg-laying. leading to a higher number of eggs and larvae.

The study also found that molds and buckets had the lowest percentage of larvae. at 7.14% and 7.93%. respectively. This is because most of the molds and buckets examined had smoother surfaces. which *Aedes* mosquitoes do not prefer for breeding. Furthermore. smooth surfaces are less conducive to the growth of microorganisms that serve as food for mosquito larvae.

Based on the identification results. two types of larvae were found: *Aedes aegypti* larvae at 58.33% and *Aedes albopictus* larvae at 41.67%. These findings are similar to the research conducted by Tampi et al. in Teep Village. Amurang Barat. where two types of *Aedes* larvae were found: *Aedes aegypti* at 57.14% and *Aedes albopictus* at 42.85%. This similarity is due to the fact that both Paal Dua and Teep are residential areas with significant areas of dense vegetation. where *Aedes albopictus* tends to prefer breeding sites outside the house. around trees or gardens.

The higher percentage of *Aedes aegypti* larvae compared to *Aedes albopictus* can be attributed to the fact that the survey focused on human-made TPAs. such as bathtubs. toilets. buckets. molds. and drums. which are favored by *Aedes aegypti* mosquitoes for breeding.

CONCLUSION

The conclusion of this study is to provide an overview of the density level of *Aedes sp.* larvae. The findings show that *Aedes sp.* mosquitoes breed in water storage containers such as metal drums. plastic drums. and plastered cement ponds. where water accumulates. Houses with larvae were those that stored rainwater outside. Additionally. no correlation was found between the habit of burying/recycling used items and the occurrence of DHF. Routine monitoring and the installation of larvae cards without cleaning did not show any relationship with DHF occurrence.

SUGGESTIONS

The suggestions in this study include recommending that individuals maintain a cleaner environment. especially in water storage areas. to prevent the breeding of mosquito larvae and to avoid diseases caused by these larvae.

REFERENCES

Anggraini S (2018) *The Existance Of Larvae And Dengue Fever Incidence In Kedurus Sub-District In Surabaya*. [Crossref]. [Publisher]

Apriyani and Yulianus (2022) 'Kebiasaan Menggantung Pakaian Dan Menguras Kontainer Sebagai Faktor Yang

Berhubungan Dengan Kejadian Demam Berdarah Dengue Di Wilayah Kerja Puskesmas Air Putih Samarinda'. *Jurnal Penelitian Kesehatan Suara Forikes*. 13(1). pp. 225–228. [Crossref]. [Publisher]

Astuti. P. and Lustiyati. E.D. (2018) 'Hubungan Kondisi Lingkungan Fisik Terhadap Tingkat Kepadatan Larva Aedes Sp Di Sekolah Dasar Wilayah Kecamatan Kasihan. Bantul. Di Yogyakarta'. [Crossref]. [Publisher]

Dewi. A.A.K. and Sukendra. D.M. (2018) 'Maya Index Dan Karakteristik Lingkungan Area Rumah Dengan Kejadian Demam Berdarah Dengue'. *HIGEIA (Journal of Public Health Research and Development)*. 2(4). pp. 531–542. [Crossref]. [Publisher]

Dinas Kesehatan provinsi jambi (2022) 'Profil Kesehatan Tahun 2022'. [Publisher]

Fahri. S. *et al.* (2013) 'Molecular Surveillance Of Dengue In Semarang. Indonesia Revealed The Circulation Of An Old Genotype Of Dengue Virus Serotype-1'. *Plos Neglected Tropical Diseases*. 7(8). [Crossref]. [Publisher]

Habibie. M.M.. Mutiara. H. and Berawi. K. (2023) 'Hubungan Perilaku 3m Plus Dengan Kejadian Demam Berdarah Dengue'. [Publisher]

Kurnia. R. *et al.* (2023) 'Status Resistensi Nyamuk Aedes Albopictus Terhadap Insektisida Sipermetrin Di Pelabuhan Meral Kabupaten Karimun Provinsi Kepulauan Riau Tahun 2022'. *JUMANTIK (Jurnal Ilmiah Penelitian Kesehatan)*. 8(1). p. 53. [Crossref]. [Publisher]

moreira. Z. da costa. Setyobudi. A. and ndun. helga jillvera nathalia (2020) 'The Correlation between 3M+ Behavior and The Incidence of Dengue Hemorrhagic Fever in Kupang City'. *Journal of Community Health*. 2(1). pp. 34–43. [Crossref]. [Publisher]

Periatama. S.. Muji Lestari. R. and Wasthu Prasida. D. (2022) 'Hubungan Perilaku 3m Plus Dengan Kejadian Demam Berdarah Dengue (Dbd) 3m Plus Behavior With Event Dengue Hemorrhagicfever (DHF)'. *jurnal surya medika*. 7(2). pp. 77–81. [Crossref]. [Publisher]

Raharjanti. N.D. and Pawenang. E.T. (2018) 'Keberadaan Jentik Aedes aegypti di Kelurahan Karangjati'. *HIGEIA (Journal of Public Health Research and Development)*. 2(4). pp. 599–611. [Crossref]. [Publisher]

Rahayu. I. and Siwiendrayanti. A. (2019) 'Studi Komparatif Faktor Lingkungan DBD Antara Daerah Dengan Incidence Rate Meningkat Dan Menurun'. [Crossref]. [Publisher]

Rahman. M.M. *et al.* (2022) 'Knowledge. Attitude. And Practices Towards Dengue Fever Among University Students Of Dhaka City. Bangladesh'. *International Journal of Environmental Research and Public Health*. 19(7). [Crossref]. [Publisher]

Sanyaolu. A. (2017) 'Global Epidemiology of Dengue Hemorrhagic Fever: An Update'. *Journal of Human Virology & Retrovirology*. 5(6). [Crossref]. [Publisher]

Siti Lailatin Nasifah. K. and Mahendrasari Sukendra. D. (2021) 'Kondisi Lingkungan dan Perilaku dengan Kejadian DBD di Wilayah Kerja Puskesmas Kedungmundu'. [Crossref]. [Publisher]

Sulidah. Damayanti. A. and Paridah (2021) 'Perilaku Pencegahan Demam Berdarah Dengue Masyarakat Pesisir'. *Poltekita: Jurnal Ilmu Kesehatan*. 15(1). pp. 63–70. [Crossref]

sumampouw J (2020) 'Epidemiologi Demam Berdarah Dengue di Kabupaten Minahasa Sulawesi Utara'. *Sam Ratulangi Journal of Public Health*. 1(1). pp. 1–8. [Crossref]. [Publisher]

Suryani. I.. Yasin. H. and Kartikasari. P. (2021) 'Pemodelan Jumlah Kasus Demam Berdarah Dengue (Dbd) Di Jawa Tengah Dengan Geographically Weighted Negative Binomial Regression (GWNBR)'. 10(1). pp. 135–148. [Crossref]. [Publisher]

Susilowati. I. and Cahyati. W.H. (2021) 'Kejadian Demam Berdarah Dengue (DBD): Studi Kasus di Wilayah Kerja Puskesmas Wonokarto Article Info'. *IJPHN*. 1(2). pp. 244–254. [Crossref]. [Publisher]

Syarifuddin. S. and Samosir. W. (2022) 'Relationship Between Health Behaviors And Incident Of Dengue Fever And Dhf In Theworking Area Of Singosari Pematang Siantar Health Center'. *medalion journal*. 3(2). [Crossref]. [Publisher]

Tansil. M.G.. Rampengan. N.H. and Wilar. R. (2021) 'Faktor Risiko Terjadinya Kejadian Demam Berdarah Dengue Pada Anak'. *Jurnal Biomedik: JBM*. 13(1). p. 90. [Crossref]. [Publisher]

Vindo Galaresa. A.. Al Kasanah. A. and Fitriami. E. (2023) 'Penyuluhan 3m Plus Sebagai Upaya Pencegahan Demam Berdarah Dengue Pada Warga Kelurahan Tangkerang Timur Pekanbaru'. *Jurnal Pengabdian Masyarakat Global*. 2(1). pp. 14–20. [Crossref]. [Publisher]

Wang. W.H. *et al.* (2020) 'Dengue Hemorrhagic Fever – A Systemic Literature Review Of Current Perspectives On Pathogenesis. Prevention And Control'. *Journal Of Microbiology. Immunology And Infection*. 53(6). pp. 963–978. [Crossref]. [Publisher]

Wang. Y. *et al.* (2023) 'Impact Of Climate Change On Dengue Fever Epidemics In South And Southeast Asian Settings: A Modelling Study'. *Infectious Disease Modelling*. 8(3). pp. 645–655. [Crossref]. [Publisher]

Wu. T.. Wu. Z. and Li. Y.P. (2022) 'Dengue fever and dengue virus in the People's Republic of China'. *Reviews in Medical Virology*. 32(1). [Crossref]. [Publisher]

Yuliana *et al.* (2022) 'Penyuluhan Tentang Demam Berdarah Dan Pencegahannya'. *JURNAL ABDIMAS KESEHATAN TERPADU*. 1(2). [Crossref]. [Publisher]

zulfikar *et al.* (2023) 'the effect of water storeage and humiduty on the incidence of dengue hemorrhagic fever in the work area of the kebayakan health center. sentral aceh regency'. *journal of public health in africa*. 14. [Crossref]. [Publisher]