

THE 5<sup>th</sup> INTERNATIONAL CONFERENCE ON HEALTH POLYTECHNICS OF  
SURABAYA (ICOHPS)

2<sup>nd</sup> *International Conference of Environmental Health (ICoEH)*

**The Role of Students and Teachers in the Era of the Covid-19 Pandemic  
in Prevention of Dengue Hemorrhagic Fever (DHF) in Jambi City,  
Indonesia**

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**ABSTRACT**

Students who act as surveillance can carry out activities to identify the presence of mosquito nests, with an understanding of this surveillance, students will become preventive actors and understand the movement 3M (Menguras, Menutup, Mengubur) and able to apply it in the home environment in particular and the school environment in general. Mosquito control is carried out by several methods, one of which is Pemberantasan Sarang Nyamuk (PSN). Research design using observational analytic with cross sectional study approach. The population in this study is Junior High Schools participating in the healthy school competition in Jambi City in 2020, for the sample used is the total population, namely 5 Junior High Schools. The implementation of a survey of breeding sites is carried out by observing, both the type and condition of the presence or absence of larvae in the water reservoir. Based on research that has been carried out, mosquito breeding sites in Junior High Schools in Jambi City have a varied number of containers. The number of water reservoirs inspected in 5 junior high schools was 138 containers. The breeding places for mosquitoes according to the type of container that are positive for larvae are bathtubs, buckets, trash cans and used cans. The most common breeding place for mosquitoes is the bathtub. All cleaning staff in each school recycle used goods, and in carrying out the eradication of mosquito nests through activities to drain water reservoirs at least once a week will suppress or reduce the presence of mosquito larvae.

**Keywords:** Dengue, *Aedes Aegypti*, Junior High School, PSN 3M Plus

**BACKGROUND**

Dengue hemorrhagic fever is a disease that can cause disturbances and outbreaks of this disease are caused by the dengue virus (A, 2014). The World Health Organization (WHO) states that dengue fever has become a threat in several countries and causes 390 million infections per year in the world (Pramadani, Hadi and Satrija, 2020). In 2015 the Incidence Rate (IR) of Dengue Hemorrhagic Fever (DHF) in Indonesia was 50.75 per 100,000 population with a Case Fatality Rate (CFR) of 0.83% in 2015 which then increased in 2016 to 78.85 per 100,000 population with a CFR of 0.78%. In 2017 the IR of DHF in Indonesia was 22.55 per 100,000 population with a CFR of 0.75%. Almost all

regions of Indonesia have dengue cases (Tika and Widya, 2019). In 2020 in Indonesia, IR is less than 49/100,000 population from 377 districts/cities with 73.35% cases. Dengue virus is found in tropical and sub-tropical climates around the world, mostly in urban and semi-urban areas (Sarfraz *et al.*, 2014). Until now, DHF in Indonesia is still a major public health problem. The number of DHF sufferers and the area of distribution is increasing along with the increasing mobility and population density. The World Health Organization (WHO) notes that Indonesia is the country with the highest dengue cases in Southeast Asia (Sutarto, 2017). Mosquito *Aedes aegypti* (Linnaeus) mainly breed in man made habitats, this seems simple Preferred type of water is clear water, so reduce as many containers filled with water as possible or will reduce adult mosquitoes *Ae. aegypti* Examples of water containers include used cans, bottles, used tires, drums, basins in roof drains made of zinc, bird drinking containers, and so on. In addition, *Ae. aegypti* also breed and lay their eggs in stagnant water such as gutters, bathtubs in toilets and sewers. (Herdianti, Gemala and Erfina, 2019). Prevention of dengue disease is very dependent on controlling its vector, namely mosquitoes *Ae. aegypti*. Mosquito control can be carried out using several appropriate methods both environmentally, biologically and chemically, one of which is (PSN 3M Plus – DHF) involve pemberantasan sarang nyamuk (PSN), solid waste management, modification of mosquito breeding sites by-products of human activities, and improvement of house design To optimize the community empowerment efforts in PSN DHF, in 2004 WHO introduced a new approach called Communications for Behavioral Impact /COMBI, but some countries in the world such as Asean (Malaysia, Laos, Vietnam), Latin America (Nicaragua, Brazil, Cuba) have implemented this approach with good results (Alvita, Huda and Budi, 2018). Predicting dengue outbreaks can also use data related to entomology, and is driven by artificial intelligence (Raja *et al.*, 2019). Jumantik School Children are school children from various levels of basic education who will be fostered and trained as juru pemantau jentik (Jumantik) at school. Formation and implementation Jumantik-PSN School Children are intended to participate in supporting government programs in an effort to pemberantasan sarang nyamuk (PSN) transmission of dengue hemorrhagic fever as well as one of the efforts to develop PHBS from an early age (Jafar *et al.*, 2019). Healthy schools are a requirement in supporting effective learning, with healthy schools the learning process can be carried out effectively. If the school does not implement a healthy school, this is a denial of *convention on the rights of the child* 1989 which states that the human right of every child to obtain a good degree of health and adequate food, especially nutritious food because obtaining nutritious food should be a top priority, Healthy schools include several dimensions of assessment, namely physical health, social and psychological health. This means that the concept of a healthy school refers to the definition of health from the World Health Organization (WHO) which describes health broadly as a state (status) of complete physical, mental (spiritual) and social health, and not just a state free from disease, disability and weakness. School residents are expected to have three healthy dimensions, namely: medical, social and psychological dimensions that can be classified as normal health status. Ideally, the three dimensions of health must be present together to support the teaching and learning process in schools at various levels (Hijang, 2010). To realize and support the Healthy School program, the City Government held a Jambi City Healthy School competition. According to the Decree of the Minister of Health Number 1429 of 2006, the requirement to become a healthy school is that the school must meet all the requirements contained in the regulation, one of which is that the school environment must be free of mosquito larvae by doing Pemberantasan Sarang Nyamuk (PSN) with movement 3M (Menguras, Menutup, dan Mengubur) or recycle used goods that can hold water regularly once a week.

## RESEARCH METHODS

Research design using analytical observational approach *cross sectional study* This study aims to determine the difference after conducting a healthy school assessment on prevention DHF, with *cross sectional* then the risk factors for this and the outcome (results) are known at the same time. The population in the study was Junior High Schools participating in the healthy school competition in Jambi City in 2020 while the sample was a total population of 5 Junior High Schools. The survey of breeding sites was carried out by observing, both the type and condition of the presence or absence of larvae in the water reservoir.

## RESULTS AND DISCUSSION

The results of a survey conducted in 5 schools during the COVID-19 pandemic, the following results were obtained:

**Table 1. Distribution of Students, Teachers and Number of Toilets**

School	Student	Teacher	Toilet
Junior High School A	408	26	14
Junior High School B	1.074	63	22
Junior High School C	663	50	13
Junior High School D	780	55	13
Junior High School E	1.152	33	22
Total	4.077	227	84

During the pandemic where learning is carried out learning from home through online/distance learning so that students do not come to school and toilets are not used, from the data above, the more students, the more toilets in school, with the ratio between students and toilets being 1:48 students.

**Tabel 2. The Presence of Mosquito Larvae**

School	Container Type	Container Total	Number of Larva Positive Containers
Junior High School A	Bathtub	10	4
	Bucket	5	1
	Trash Can	18	1
	Cansused	2	1
Junior High School B	Bathtub	4	1
	Bucket	18	7
	Hydroponic Pipe	1	1
	Cansused	9	2
	Tiresused	9	7
Junior High School C	Bathtub	13	4
	Planpot	1	1

Junior High School D	Bathtub	5	2
	Bucket	8	2
Junior High School E	Bathtub	15	2
	Bucket	7	2
	Trash Can	7	5
	Tiresused	6	2

Based on research that has been carried out, mosquito breeding sites in Junior High Schools in Jambi City have a varied number of containers. The number of water reservoirs inspected was 138 containers. The school still predominantly uses buckets as a water reservoir in the bathroom. The breeding places for mosquitoes according to the type of container that were positive for larvae were checked in the form of bathtubs, buckets, trash cans, used cans, plant pipes/pots and used tires. The most common breeding place for mosquito larvae is the bathtub, in line with Triana's research (2021) that the number of positive larvae is in the bathtub (Triana *et al.*, 2021). Junior High School B of Jambi City is the school with the highest number of containers is 41 containers and is also the school with the most mosquito larvae is 18 positive containers.

**Tabel 3. Frequency Distribution of Knowledge Level of Cleaning Officers in School**

Preventive Practice	Frequency (N)	Percentage (%)
High Knowledge	4	80
Low Knowledge	1	20

Each school has 1 janitor, the knowledge of the janitor in the school plays a role in the implementation of the cleanliness of the school environment and efforts to prevent dengue during the pandemic COVID-19. Places for breeding larvae that are often found in schools during the pandemic are bathtubs, buckets, flower pots, trash cans and unused used items, if they are not managed properly or lack of 3M Plus DHF activities. Mosquito life cycle based on the development of *Ae. Aegypti* starting from eggs, pupae and adult larvae, the influence of larval growth is the temperature that is suitable for larval breeding, the optimal temperature is 28°C (Boleu, Janis and Mangimbulude, 2019)(Tusting, 2014)(Zapletal *et al.*, 2018), during the pandemic, students mostly carried out learning from home and so many school toilets were not used and then became a medium for breeding larvae and officers considered toilets not to be used so that the cleanliness of the water was neglected, toilets that are not clean have a higher risk of larvae development (Sulastri, Cahyati and Sudana, 2021). In the results of research that has been carried out at SMP City Jambi, it is known that 3M activities carried out include draining, draining is an effort to eradicate Dengue Hemorrhagic Fever (DHF), the most important of which is an effort to eradicate mosquito larvae transmitted in their breeding places by doing 3M, one of which is drain the water reservoir at least once a week by brushing the walls of the water reservoir properly and correctly. Based on research conducted in the five schools in carrying out draining water reservoirs, it has not run optimally.

**Table 4. Teacher role of UKS (Unit Kesehatan Sekolah) In the Prevention of DHF in Jambi City**

Teacher role of UKS (Unit Kesehatan Sekolah)	School Total	Percentage (%)
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Carry out draining the tub in the toilet 1 time at least a week	5	100
Close the water reservoir tightly	5	100
Recycling used goods	5	100

The results of the observation were obtained that the teacher UKS (Unit Kesehatan Sekolah) role in preventing the development of larvae. The role of the principal can be influential in overseeing the prevention of DHF in schools, by conducting and assigning cleaning staff. During the Covid 19 pandemic, students of juru pemantau jentik (jumantik) which have been established today are only focused on carrying out lessons and are not allowed to conduct activities in schools. Until the larval inspection activity by the students is not carried out, for that hygiene and 3M be the duty of the school janitor.

**Table 5. Distribution of the Frequency of DHF Transmission Prevention Practices by Officers**

Preventive Practice	Frequency (N)	Percentage (%)
High Knowledge	5	100
Low Knowledge	0	0

Percentage of schools that carry out drainage in each water reservoir, namely SMP Negeri A Jambi City (79%), SMP Negeri B Jambi City (46%), SMP Negeri C Jambi City (86%), SMP Negeri D Jambi City (71%), SMP Negeri E Jambi City (54%). Draining without brushing and using soap does not remove the eggs that stick to the walls of the water reservoir. The implementation of draining and brushing water reservoirs at SMP Negeri A Jambi City, SMP Negeri D and SMP Negeri E is less effective, this is evidenced by the presence of sediment at the bottom of the surface of the water tank. Water reservoirs that are not regularly brushed when draining will become a breeding ground for mosquitoes. Development from egg stage to adult mosquito occurs in 3-4 days.

Eradication of mosquito nests through activities to drain water reservoirs by brushing at least once a week will suppress or reduce the presence of *Ae. aegypti*. In connection with Sari's research (2012) which explains the habit of draining water reservoirs more than once a week, it can provide an opportunity for *Ae. Aegypti* develops into adult mosquitoes considering that the growth of eggs into adult mosquitoes ranges from 7-14 days (Sari, 2012). According to Riandi's research (2017), it was found that the results of containers that were drained in the last 1 week were fewer larvae compared to containers that were not drained (Riandi, Hadi and Soviana, 2017). Closing activities, from the research carried out, it was found that several schools did not carry out closing activities for water reservoirs, namely SMP Negeri A Jambi City, SMP Negeri B, SMP Negeri E. This is in line with Maurien's research (2015) with the results of this study stating that there are There is a significant relationship between closing water reservoirs and the incidence of Dengue Hemorrhagic Fever in the working area of Gogagoman Health Center Kotamobagu City with an OR value of 4.3 (95% CI = 1.571-12,187), it can be said that respondents who do not close water reservoirs have a risk of 4, 3 times more likely to suffer from dengue hemorrhagic fever than respondents who closed water reservoirs (Carundeng *et al.*, 2015).

Many schools use water reservoirs in the form of buckets in their bathrooms and all buckets used in the bathroom are not covered. According to a previous study by Sari

(2012) which said the possibility of the water reservoir not being closed was caused by the absence of a lid on the water reservoir used. Closing the water reservoir is considered impractical because it will make it difficult to use the water in the water reservoir. Getting used to being orderly in using water reservoirs by opening and closing them again after use is considered difficult. Buckets that are often not closed tightly provide openings for mosquitoes to enter and cause the room to be darker and more humid. This condition is preferred by female mosquitoes to lay down on their knees than in the open (Azizah, Hermawati and Susanna, 2018).

Based on research conducted in the five schools, several schools have carried out activities in the form of reusing goods that can accommodate water that are well managed, namely SMP Negeri B Jambi City (100%) and SMP Negeri D Jambi City (100%). The school also has a waste bank for collecting used goods in the form of used cans, used bottles, and used tires which can then be used. This is in line with Ardha's research (2019) that 3.3% of schools practice reusing used goods by sorting used drink bottles and glasses and collecting other used goods to be reused (Majida and Pawenang, 2019). Schools recycle used goods into useful items, such as used bottles made into a table, used tires as plant pots, this is also in line with Ardha's research (2019) which states 6.7% of schools practice recycling used goods by utilizing bottles and glasses of used snacks into plant pots (Majida and Pawenang, 2019).

The results of the study, the school is more likely to pay attention to the cleanliness of the front yard of the school, the backyard of the school often goes unnoticed. This can be seen from the discovery of unused used items such as used jars, paint containers, broken glass, used buckets, used tires, bottles and glasses of used snacks found in the backyard of the school with an open area. From the research conducted, at SMP Negeri A Jambi City, SMP Negeri B Jambi City, SMP Negeri C, and SMP Negeri E Jambi City were still found used goods containing water. Without realizing it, these used goods can potentially become a breeding ground for *Ae. aegypti* if filled with water during the rainy season.

From the research conducted, it was found that from the five schools, it was known that the role of UKS teachers in implementing the 3M program was by working on their own and assigning school cleaners to always do 3M. During the Covid 19 pandemic, jumantik students were only focused on studying and were not allowed to carry out 3M activities at school, so the larva inspection activity by jumantik was not carried out. The role of the janitor is to improve the cleanliness of the school environment and run 3M. this is in accordance with previous research that awareness of prevention and control as well as modes of transmission is very necessary (Goweda and Faisal, 2020).

## **CONCLUSION AND RECOMMENDATION**

The role of the janitor is to improve the cleanliness of the school environment and run 3M. Activities aimed at eradicating mosquito nests are driven through activities such as UKS. The schools studied were still dominantly using buckets as water reservoirs in the bathroom. The five junior high schools still have not carried out the activities of draining water reservoirs properly. Some schools do not carry out activities to close water reservoirs is junior high school A Jambi City, junior high school B, junior high school E. There are several schools that carry out activities to reuse goods that can accommodate water which are managed properly, some schools have waste banks to collect items in the form of used cans, used bottles, and used tires which are then partially sale or used.

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