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Indonesian Journal of
Tropical and Infectious Disease

Vol. 10 No. 2 May–August 2022

Original Article

Knowledge and Attitudes of Dengue Virus Infection Transmission and Its Relationship with Eradication Action Program in Surabaya, Indonesia

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Received: June 9th, 2022; Revised: June 23rd, 2022; Accepted: July 4th, 2022

ABSTRACT

Dengue virus infection is caused by a dengue virus transmitted through mosquito bites from species Aedes albopictus and Aedes aegypti. The Ministry of Health takes action to reduce the prevalence of DHF by regulating the management of PSN 3M Plus. This study aimed to determine the knowledge, attitude, and compliance with the management of PSN 3M Plus strategies of those living in Surabaya. A cross-sectional population-based google form questionnaire was conducted in January 2022 for four weeks (January 3, 2022, to January 29, 2022). Based on the bivariate analysis, gender and age of respondents were no relationship between compliance with the PSN 3M Plus (p-value >0.05). The results also showed no relationship between education and adherence to PSN 3M Plus (p-value > 0.05). However, based on previous studies, people with higher education showed better compliance. Public knowledge and attitude about the dengue virus and its transmission process can be increased by developing, modifying, and intervening in the people controlling dengue virus infection. Most people of Surabaya believe that dengue prevention is the complete responsibility of every people. Based on the bivariate analysis, the characteristics of respondents had no relationship with the PSN 3M Plus compliance (p-value > 0.05). Knowledge and attitudes of the Surabaya people toward PSN 3M Plus are still good. However, the characteristics of the respondents did not significantly affect their knowledge and attitudes

Keywords: *attitude; dengue virus infection; knowledge; prevention; Surabaya.*

ABSTRAK

Infeksi virus dengue merupakan penyakit yang disebabkan oleh virus dengue yang ditularkan melalui gigitan nyamuk Aedes aegypti dan Aedes albopictus. Kementerian Kesehatan melakukan tindakan untuk menurunkan prevalensi DBD dengan mengatur pengelolaan PSN 3M Plus. Penelitian ini bertujuan untuk menganalisis korelasi antara pengetahuan dan kebiasaan terhadap kepatuhan manajemen strategi PSN 3M Plus pada masyarakat yang berdomisili di Surabaya. Kuesioner google form berbasis populasi cross-sectional dilakukan pada Januari 2022, 4 minggu (3 Jan 2022 hingga 29 Jan 2022). Berdasarkan analisis bivariat, jenis kelamin dan usia responden tidak ada hubungan antara kepatuhan mengikuti PSN 3M Plus (p-value >0,05). Hasil analisis statistik juga menunjukkan bahwa tidak ada hubungan antara pendidikan dengan kepatuhan terhadap PSN 3M Plus (p-value >0,05). Hasil penelitian sebelumnya menunjukkan bahwa orang-orang dengan pendidikan lebih tinggi menunjukkan kepatuhan yang lebih baik, karenan pendidikan merupakan aspek penting dari pengendalian infeksi virus dengue. Pengetahuan dan sikap masyarakat tentang virus dengue dan proses penularannya dapat ditingkatkan dengan mengembangkan, memodifikasi dan mengintervensi masyarakat

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yang mengendalikan infeksi virus dengue. Sebagian besar masyarakat Surabaya percaya bahwa pencegahan DBD adalah tanggung jawab penuh setiap orang. Berdasarkan analisis bivariat, karakteristik responden tidak memiliki hubungan dengan kepatuhan masyarakat dalam menjalankan PSN 3M Plus (p-value > 0.05). Pengetahuan dan sikap masyarakat Surabaya terhadap PSN 3M Plus masih baik. Meskipun karakteristik responden tidak berpengarus signifkan terhadap pengetahuan dan kepatuhan.

Kata kunci: *infeksi virus dengue; pencegahan; pengetahuan; sikap; Surabaya*

How to Cite: Juliasih, N. J., Sucipto, T. H., Sari. R. M., Nuha, Z., Soegijanto, S. Knowledge and Attitudes of Dengue Virus Infection Transmission and Its Relationship with Eradication Action Program in Surabaya, Indonesia. Indonesian Journal of Tropical and Infectious Disease. 10(2). 137–143. Aug. 2022.

INTRODUCTION

Dengue virus infection is a mosquito-borne infectious disease with more than 100 tropical and subtropical countries globally reported endemic.[1] It was transmitted through the bites of *Aedes aegypti* and *Aedes albopictus* mosquitoes which have previously been infected by Dengue virus from dengue sufferers. According to the World Health Organization, the estimated annual fatality rate was 2.5%, among individuals with severe dengue, with complications like hemorrhagic fever and fluid accumulation. Dengue infection is prevalent in Southeast Asia because of its primary vector, *Aedes aegypti* mosquitos.[2] Dengue infection was commonly reported among children and teenagers, but the prevalence among older age groups also increased in recent decades.[3,4]

In Indonesia, Dengue Hemorrhagic Fever (DHF) cases in 2020 with 108,303 cases.[5] The incidence of Dengue virus infection is caused, among others, due to high mobility, population density, environmental conditions, and the community's behaviour.[6] Cases of dengue virus infection in East Java Province in 2020 were 8,567 cases.[7] Surabaya City is one of the cities in east java with the highest number of dengue virus infection cases in all work areas, with 73 cases.[5] The Ministry of Health issued a policy with the number PM.01.11/MENKES/591/2016 to reduce dengue prevalence by regulating the management with Eradication Action Program (PSN 3M Plus). The movement of the program consists of draining the water storage, closing the landfill, and reusing used items that have the potential for mosquito breeding, plus sprinkling larvicides, using mosquito repellent, keeping larvae eating fish in the landfill, planting mosquito repellent, and others. According to the Ministry of Health (2019), the one house and one larva hunter effectively prevent dengue fever.[8]

The other effective strategy is that the authorities need to ensure that local people have decent knowledge about vector control and follow the recommendations. The only method for controlling the dengue virus infection is vector control, as no specific treatment or vaccine is available.[9–12] Knowledge and behaviour greatly influence the dynamics of the Aedes mosquito population, which in turn affects dengue virus transmission. Therefore, vector control is critical, with knowledge and fundamental aspects of infection control and prevention of dengue virus. Presently, the recommended control effort is the eradication of mosquito breeding nests. However, the local people need to have a sufficient understanding of the routes of dengue virus transmission, as their behaviour plays a vital role in limiting dengue disease transmission.[13] This study aimed to determine the knowledge, attitude, and compliance with the management of PSN 3M Plus strategies of those living in Surabaya. Study findings of this research are expected to help policymakers develop strategies for more effective prevention and control of dengue virus infection and increase community participation in dengue prevention programs.

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MATERIALS AND METHODS

Ethics statement

This study was approved by the Lembaga Penelitian dan Pengabdian Kepada Masyarakat Universitas Airlangga with approval number 24-934/UN3.14/PPd/2013.

Study design and study population

A cross-sectional population-based google form questionnaire was conducted in January 2022 for four weeks (January 3, 2022, to January 29, 2022). The population in this study was residents with Surabaya ID cards concerning their age, gender, profession, monthly income, and education. This study used a random sampling method. The data processing techniques in this study were editing, coding, entry, cleaning, and saving.

Statistical Analysis

The statistical test used is chi-square using $\alpha = 0.05$ with SPSS software.

RESULTS AND DISCUSSION

Dengue Virus Infection in Surabaya

The first dengue outbreak in Surabaya was reported in Surabaya in 1968.[14] Since then, the incidence of dengue has been increasing, with several outbreaks occurring in 1973, 1988, 1988, 2007, and 2010.[15] Even though dengue is a big problem in Surabaya, Indonesia, the incidence of dengue virus infection in Surabaya has decreased over the last five years, as shown in Figure 1.

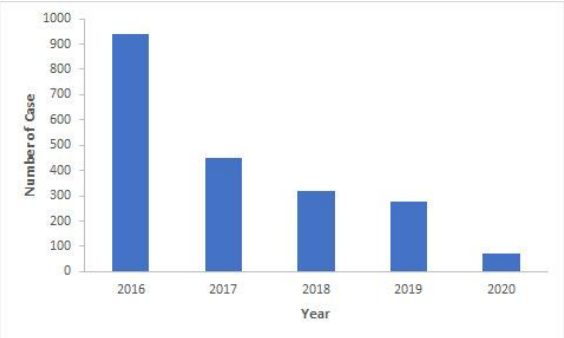

Figure 1. Dengue Virus Infection Cases in Surabaya[5,7,16–19]

Demographic Characteristics of the Respondents in Surabaya

Respondents in this study came from 5 territories of the city of Surabaya (Table 1). The total respondent in this study was 60, with the characteristic of respondents shown in Table 2.

Table 1. Total of Respondent

Territory	Total Respondent (%)
East Surabaya	33.3
North Surabaya	13.3
Central Surabaya	5
South Surabaya	26.7
West Surabaya	21.7

Table 2. The Characteristic of Respondent

Characteristic	Study Site Total (%)
Sex	
Male	11 (18.3)
Female	49 (81.7)
Age (y.o)	
19-32	35 (58.3)
33-45	10 (16.7)
46-60	15 (25.0)
Profession	
Work	34 (56.7)
Doesn't	36 (43.3)
Education	
Senior High School/equal	22 (36.7)
Bachelor/Diploma	34 (56.7)
Master	4 (6.7)
Monthly income	
<Rp. 1.000.000	19 (31.7)
Rp. 1.000.000 – Rp. 2.500.000	10 (16.7)
Rp. 2.500.000 – Rp. 4.000.000	15 (25.0)
Rp. 4.000.000 – Rp. 5.000.000	7 (11.7)
>Rp. 5.000.000	9 (15.0)
Respondent's dengue virus infection history	
Yes	3 (5.0)
Not yet	57 (95.0)
Family history of dengue virus infection	
Yes	8 (13.3)
Not yet	52 (86,7)

Knowledge of the Surabaya City People Regarding Dengue and Its Transmission

The respondent's knowledge in Surabaya about dengue virus infection like symptoms, vector transmission, and prevention was high (Table 3).

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Table 3. Respondent's Knowledge

Characteristic	Category	Knowledge			Total
		Low	Medium	High	
Sex	Male	0	0	11	49
	Female	0	3	46	11
	Total	**0**	**3**	**57**	**60**
Age (y.o)	< 30	0	1	26	27
	30-40	0	2	11	13
	40-50	0	0	9	9
	>50	0	0	11	11
	Total	**0**	**3**	**57**	**60**
Profession	Work	0	2	32	34
	Does not work	0	1	25	26
	Total	**0**	**3**	**57**	**60**
Monthly income	< Rp. 1.000.000	0	0	19	19
	Rp. 1000.000 – Rp. 2.500.000	0	3	7	10
	Rp. 2.500.000- Rp. 4.000.000	0	0	15	15
	Rp. 4.000.000-Rp. 5.000.000	0	0	7	7
	< Rp. 5.000.000	0	0	9	9
	Total	**0**	**3**	**57**	**60**
Respondent's dengue virus infection history	Yes	0	0	3	3
	Not yet	0	3	54	57
	Total	**0**	**3**	**57**	**60**
Family history of dengue virus infection	Yes	0	0	8	8
	Not yet	0	3	49	52
	Total	**0**	**3**	**57**	**60**

The Attitude of the Surabaya City People Regarding Dengue Virus Infection

The respondents' knowledge about dengue virus infection is high, and their compliance with PSN 3 M Plus recommendations was far from satisfactory. Non-compliance can be explained by the respondent's attitude (Table 4).

Table 4. Respondents Attitude

Characteristic	Category	Attitude			Total
		Bad	Medium	Good	
Sex	Male	1	4	6	11
	Female	5	23	21	49
	Total	**6**	**27**	**27**	**60**
Age (y.o)	< 30	4	14	9	27
	30-40	2	7	4	13
	40-50	0	3	6	9
	>50	0	3	8	11
	Total	**6**	**27**	**27**	**60**
Profession	Work	4	15	15	34
	Does not Work	2	12	12	26
	Total	**6**	**27**	**27**	**60**
Monthly income	< Rp. 1.000.000	2	8	9	19
	Rp. 1.000.000- Rp. 2.500.000	1	4	5	10
	Rp. 2.500.000- Rp. 4.000.000	2	6	7	15
	Rp. 4.000.000- Rp. 5.000.000	0	5	2	7
	< Rp. 5.000.000	1	4	4	9
	Total	**6**	**27**	**27**	**60**
Respondent's dengue virus infection history	Yes	1	2	0	3
	Not yet	5	25	27	57
	Total	**6**	**27**	**27**	**60**
Family history of dengue virus infection	Yes	2	2	4	8
	Not yet	4	25	23	52
	Total	**6**	**27**	**27**	**60**
Knowledge	High	5	26	26	57
	Medium	1	1	1	3
	Low	0	0	0	0
	Total	**6**	**27**	**27**	**60**

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Based on the bivariate analysis, gender and age of respondents were no relationship between compliance with the PSN 3M Plus (p-value >0.05). Therefore, every male and female person should be taking action to eradicate the dengue virus infection vector to control the dengue epidemic.

The characteristics of respondents had no relationship with the PSN 3M Plus compliance (p-value > 0.05). The results of previous studies about the PSN 3M Plus stated a relationship between program adherence and profession.[20–22]

Regardless of their characteristics, people have good knowledge and attitude toward DHF prevention. Many programs and information are available and can be easily acquired by people. There are several DHF-related health promotion programs, such as PSN 3M plus. Some are even socialized through television. Therefore PSN 3M Plus are popular in society. Besides that, due to the number of DHF cases in Indonesia, many mosquito repellent products such as insecticide spray, repellent lotion, mosquito coil, and others are easily found.

Public knowledge and attitude about the dengue virus and its transmission process can be increased by developing, modifying, and intervening in the people controlling dengue virus infection. Prevention and control of dengue virus infection is a shared responsibility. For example, routine fogging carried out by the Health Service, this activity only kills adult mosquitoes, so it does not eliminate the risk of transmission of dengue virus infection, especially larvae and eggs. If fogging cannot kill the larvae in water, 3M Plus prevention must still be conducted by the people, such as closing or covering water containers and reservoirs to become mosquito breeding sites potentially.

Most respondents showed good attitudes and habits toward preventing dengue fever outbreaks. They also took action to protect the whole family from dengue fever and mosquito bites by following the recommendation. DHF prevention practices have been implemented, and they believe that knowledge comes from both educational background and experience.

The present study showed that most people surveyed had experienced dengue virus infection. Mosquitoes like to breed in an environment with clean water. Therefore, most people of Surabaya believe that dengue prevention is the complete responsibility of every people. Discipline in enforcing PSN 3M Plus cannot be based on the high education of an individual. Highly educated individuals are usually busy with their work routines, so they cannot focus on the environment around their homes. This study found that respondents from South Surabaya, Sawahan District, one of the endemic areas of DHF in Surabaya, have complied with the PSN 3M Plus policy based on the questionnaires we distributed. The high rate of dengue virus infection in this area is possible because of the poorly maintained settlements and a large number of nomadic residents.

Understanding the spreading pattern of dengue fever and the risk factors associated with transmission in Surabaya is essential to prevent future outbreaks through targeted vector control of dengue virus infection. Furthermore, disseminating appropriate behaviour change communication messages to improve household level environmental modification of destruction of breeding sites around homes, encourage adherence to personal protection, and identification of disease symptoms as successfully applied in many endemic countries.[23–25]

Study Limitations

The limitation of this research study is that author unable to verify the congruence between the respondent's answers with the actions practised in everyday life. However, the strength is that respondents were recruited and information obtained based on criteria in endemic areas. Therefore, the results of this research study are easily applied to the community setting. Furthermore, the study's

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eligibility criteria further strengthen the quality of the findings.

CONCLUSIONS

Respondents have a good level of knowledge and attitude towards dengue prevention efforts. However, the characteristics of the respondents did not significantly affect their knowledge and attitudes. One of the factors that influenced the results was probably the easy access to information related to DHF programs in the community.The results of this study suggest the need for future research regarding Information, education and communication strategies along with current implemented intervention efforts evaluation.

ACKNOWLEDGEMENT

This research was supported by the Centre of Excellence-Institute of Tropical Disease Universitas Airlangga.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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