



Knowledge, Attitudes, and Behavior of Larva Monitoring Interpreter (*Jumantik*) Cadre as Efforts to Prevent Dengue Cases

Tjitrowati Dja'afar, Dedi Mahyudin Syam*^{ORCID}, Andi Bungawati, Ros Arianty

Department of Sanitation, Poltekkes Kemenkes Palu, Palu, Indonesia

Abstract

Edited by: Sasho Stoleski
Citation: Dja'afar T, Syam DM, Bungawati A, Arianty R. Knowledge, Attitudes, and Behavior of Larva Monitoring Interpreter (*Jumantik*) Cadre as Efforts to Prevent Dengue Cases. Open Access Maced J Med Sci. 2022 Feb 22; 10(E):278-282. https://doi.org/10.3889/oamjms.2022.8453
Keywords: Knowledge; Attitude; Behavior; Cadre; Larva Monitoring Interpreter (*Jumantik*); DHF
***Correspondence:** Dedi Mahyudin Syam, Department of Sanitation, Poltekkes Kemenkes Palu, Palu, Indonesia. E-mail: dmahyudin21@gmail.com
Received: 30-Dec-2021
Revised: 23-Jan-2022
Accepted: 12-Feb-2022
Copyright: © 2022 Tjitrowati Dja'afar, Dedi Mahyudin Syam, Andi Bungawati, Ros Arianty
Funding: This research did not receive any financial support
Competing Interests: The authors have declared that no competing interests exist
Open Access: This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0)

BACKGROUND: Efforts to prevent and control dengue hemorrhagic fever (DHF) in Palu City are still inadequate. The lack of community participation in the implementation of 3M (1) drain the water reservoir; (2) closing water reservoirs; and (3) Bury used goods causes the density of *Aedes aegypti* larvae to be high.

AIM: The aim of the study was to analyze the knowledge, attitudes, and behavior of larva monitoring interpreters before and after being given health education in reducing dengue cases.

METHODS: This type of research is a quasi-experimental, with one group pre- and post-test design, carried out in Palu City, Central Sulawesi Province and Pasang Kayu Regency, West Sulawesi Province. The sample size is 98 *Jumantik* cadres. The interview study instrument used a set of previously validated and tested questionnaires. Informed consent was taken from all respondents and confidentiality was guaranteed throughout the study. Data were analyzed using SPSS with paired t-test dependent.

RESULTS: Knowledge about ways to prevent DHF increased the highest from the pre-test (20.10) post-test (51.77) which means that it increased by 32.3% $p = 0.000$, the smallest increase in knowledge about the spread of DHF was the pre-test value (12.9) and post-test (14.2) means an increase of 1.3% $p = 0.003$. The attitude that increased the most was the effort to control DHF with a pre-test value (9.4) and post-test (48.2%) increased by 38.8% $p = 0.000$, while the smallest increase was the attitude of responsibility for controlling DHF with a pre-test value. Test (53.32) and post-test (53.50) increased by 0.18% $p = 0.737$. The behavior with the highest increase in value was about larval control with a pre-test score (4.75) and post-test (37.78) means an increase of 33.0% $p = 0.000$, while the smallest increase is the behavior of draining the water tank with the pre-test (26.87) and post-test (35.83) increasing 8.96% $p = 0.002$.

CONCLUSION: Health education through counseling methods is effective in increasing the knowledge, attitudes, and behavior of *Jumantik* Cadres in preventing dengue fever in Palu City, Central Sulawesi and Pasangkayu Regency, West Sulawesi.

Introduction

Fever dengue still is the problem of health public primary in the whole area of the tropical and sub-tropical in the world [1]. Dengue hemorrhagic fever (DHF) is one of the infectious diseases and a major public health problem in Indonesia. DHF is a disease caused by the dengue virus belonging to the Arthropod-Borne virus and genus *Flavivirus*. According to the WHO data, Asia Pacific bear 75% of the burden of dengue in the world between 2004–2010, while Indonesia reported as the second country with the largest dengue cases among the 30 countries endemic region [2]. Dengue fever (DB) is a viral infection that is transmitted through the bite of *Aedes aegypti* and *Aedes albopictus* mosquitoes [3], [4]. Data from around the world show that Asia ranks first in the number of DHF sufferers each year. Meanwhile, starting from 1968 until 2009, the World Health Organization (WHO) notes state of Indonesia as the country with the highest dengue cases in Southeast Asia [5].

DHF cases reported in 2019 were 138,127 cases. This number increased compared to 2018 of 65,602 cases. Deaths due to DHF in 2019 also increased compared to 2018 from 467 to 919 deaths. Illness and death can be described using the incidence rate (IR) indicator per 100,000 population, 2018 IR 24.75, and 2019 IR 51.48. Cases of DHF in the Central Sulawesi Province in 2019 showed an IR of 63.75/100,000 people died or a *Case Fatality Rate* of 0.87% [6]. Efforts to prevent and control DHF in Palu City are still inadequate, from the results of a survey that has been carried out by officers, it shows that community participation in the Eradication of Mosquito Nests Pemberantasan Sarang Nyamuk (PSN), especially in closing, draining and burying (3M) activities, is still lacking. Based on available data, the implementation of 3M in Palu City is closing 5.2% inside the house, and 2.8% outside the house, draining 58% doing it inside the house and 20.7% outside the house, and burying 1.7% doing inside the house and 0.3% outside the house. The lack of community participation in the implementation of 3M causes the density of *A. aegypti*

larvae to be high (81.1%). The effort made by the Palu City Health Office to reduce the incidence of DHF is the implementation of focus fogging. The implementation of focus fogging from January to December 2007 has been carried out in Palu City as many as 79 times and spread across four sub-districts throughout Palu City, but did not give satisfactory results on the incidence of DHF [7].

According to Kamil (2010), knowledge can be increased through training. The basic concept of the training is to provide knowledge material about dengue disease and dengue-transmitting mosquitoes and provide information and motivation so that later good behavior can be created so that they are able to carry out PSN DHF [8]. According to Lawrence and Marshall. Green, there are three behavioral determinants for a person, namely, predisposing factors (predisposing factors), enabling factors (supporting factors) and reinforcing factors (pushing factors). Predisposing factors include knowledge, attitudes, beliefs, values, and perceptions, regarding the motivation of a person or group to act. Enabling factors include the skills and resources necessary to perform health behaviors and other variables included in the supporting factors include cost, distance, and availability of transportation. Reinforcing factors include attitudes and behaviors of health workers, community leaders, religious leaders, parents, or other officers who constitute the reference group of people's behavior [9]. Jumantik was a trained local community member as a form of movement or active participation of tackling the dengue disease [10].

The purpose of the study was to analyze the knowledge, attitudes, and behavior of larva monitoring interpreters (Jumanatik) before and after being given health education in reducing dengue cases.

Methods

This type of research is a *quasi-experimental*, with *one group pre- and post-test design*. This research was conducted in Palu City, Central Sulawesi Province and Pasang Kayu Regency, West Sulawesi Province. Implementation time is May–September 2021. The population in this study is larva monitoring interpreter (Jumantik) in the city of Palu, Central Sulawesi Province and Pasang Kayu Regency, Mamuju Province. The sampling technique was *purposive*, while the calculation of the sample size in this study was carried out based on the calculation of the sample size according to Lemeshow *et al*, (1997) [11], the sample size was 98 Jumantik people.

Study instrument to facilitate the interview, a set of previously validated and tested questionnaires was used. Informed consent was taken from all respondents and confidentiality was guaranteed

throughout the study. Each individual was given a total score based on the variables expressed in the number (percentage) for data on age, gender, education, occupation. Data were analyzed using SPSS 16 with paired t-test dependent.

Results

The characteristics of the respondents are shown in Table 1, there are more women (57.7%) than men (42.3%), the age group 36–40 years the most (21.4%) and 56–60 years the least (2, 82%), the most education is high school (48.0%) and the least is masters (3.1%), and the most occupations as housewives (25.5%) and the least is farmers (9.2%)

Table 1: Characteristics of Jumantik Cadres

Variable	N	%
Gender		
Male	42	42.9
Female	56	57.1
Age (years old)		
20–25	11	11.3
26–30	12	12.3
31–35	17	17.3
36–40	21	21.4
41–45	10	10.2
46–50	12	12.2
51–55	6	6.1
56–60	2	2.1
61–65	7	7.1
Education		
ElementaryEducation	7	7.1
Juniorhighschool	6	6.1
SeniorHighSchool	47	48.0
Diploma	12	12.3
Bachelor	23	23.4
Magister	3	3.1
Work		
Civilservant	16	16.3
Trader	15	15.3
Farmer	9	9.2
Laborer	18	18.4
Fisherman	11	11.2
Housewife	29	29.6
Total	98	%

Table 2 shows the results that the knowledge variable on how to prevent DHF increased with the highest value from the pre-test (20.10) and post-test (51.77) meaning an increase of 32.3%, while the smallest increase was knowledge about the spread of DHF with a pre-test value (12.9) and post-test (14.2) meaning an increase of 1.3%.

Table 3 shows that the attitude variable with the highest increase in value was about efforts to control DHF with a pre-test value (9.4) and post-test (48.2%) meaning an increase of 38.8%, while the smallest increase was the attitude of responsibility for disease management. DHF with a pre-test score (53.32) and post-test (53.50) means an increase of 0.18%. However, before the counseling intervention was carried out, these results showed that many respondents knew about the responsibility for controlling DHF.

Table 4 shows that the behavioral variable with the highest increase in the value of larvae control

Table 2: Average and Percentage of Knowledge of Jumantik Cadres

Knowledge	MeanScore	%	p-value
Causes of dengue disease			
Pre-test	57.10	58.3	0.002
Post-test	59.50	60.7	
Symptoms of DHF sufferers			
Pre-test	57.08	58.2	0.002
Post-test	59.51	60.7	
The impact of the danger of dengue disease			
Pre-test	46.25	47.2	0.010
Post-test	49.31	50.3	
Spread of disease			
Pre-test	12.67	12.9	0.003
Post-test	13.91	14.2	
Uses of Abate			
Pre-test	8.01	8.2	0.000
Post-test	31.11	31.7	
Potential places for dengue transmission			
Pre-test	7.41	7.6	0.000
Post-test	38.36	39.1	
How to prevent dengue			
Pre-test	20.10	20.5	0.000
Post-test	51.7	52.8	
DHF eradicate on health center program			
Pre-test	13.16	13.4	0.000
Post-test	44.00	44.9	

with the pre-test (4.75) and post-test (37.78) means an increase of 33.0%, while the smallest increase is the behavior of draining the water tank with the pre-test value. Test (26.87) and post-test (35.83) means an increase of 8.96%.

Table 3: average and percentage of attitude and behavior of Jumantik Cadres

Attitude	Mean score	%	p-value
Responsibilities of Dengue Fever			
Pre-test	53.32	54.4	0.737
Post-test	53.50	54.6	
DHF prevention efforts			
Pre-test	9.25	9.4	0.000
Post-test	47.23	48.2	
DHF prevention efforts			
Pre-test	21.00	21.4	0.000
Post-test	55.00	56.1	
Hanging clothes			
Pre-test	22.04	22.5	0.000
Post-test	54.63	55.7	
Larva monitoring			
Pre-test	19.53	19.9	0.000
Post-test	55.15	56.3	
The effectiveness of fogging in preventing DHF			
Pre-test	23.93	24.4	0.000
Post-test	53.22	54.3	

Discussion

The results of this study found that counseling to Jumantik Cadres about preventing DHF given to cadres was effective in increasing the knowledge of cadres. Providing information to increase knowledge so that it raises awareness and in the end someone will behave in accordance with that knowledge [12]. All indicators of knowledge variables ranging from how to prevent DHF increased with a pre-test value (20.10) post-test (51.77) an increase of 32.3%, to knowledge about the spread of DHF with a pre-test value of 51.77%. Test (12.9) and post-test (14.2) means an increase of 1.3%, based on the results of the *paired T-test* all showed significant $p = 0.000-0.003$. This shows that the knowledge of the respondents has increased after receiving the counseling

intervention. This is in line with the research of Sugiono in Sukoharjo Regency, Sustin *et al.* in Surabaya and Azhar *et al.* in Malang City [13], [14], [15].

Theoretically, it is explained that PSN DHF should be carried out routinely by involving the whole community including Jumantik and the head of RT [16]. The results show that the knowledge pre-test scores between Jumantik Cadres are different. This could be due to differences in information between cadres obtained before the training. This difference is in accordance with the theory which states that information can affect a person's knowledge [17], [18], [19]. For the prevention of DB, it is hoped that the community will always be given increased knowledge [20], [21]. The results showed that from the Jumantik attitude assessment indicators, there was one indicator that did not significantly change the attitude value, namely, the attitude of responsibility for controlling DHF with $p = 0.737$. While the other indicators all experienced significant changes in attitude values ranging from indicators of efforts to control dengue disease to the effectiveness of using fogging to prevent dengue with $p = 0.000$. The improvement in the quality of this positive attitude indicates that the extension worker has succeeded in communicating with the respondent. Considering that attitude is a person's closed response to a particular stimulus or object that involves the opinion and emotion factor concerned [12], [22].

Table 4: Average and percentage of behavior of Jumantik Cadres

Behavior	Mean score	%	p-value
Draining Tub of Water			
Pre-test	26.87	27.4	0.002
Post-test	35.83	36.6	
Use of water storage containers			
Pre-test	30.79	31.4	0.000
Post-test	41.20	42.0	
Using Abate			
Pre-test	21.09	21.5	0.000
Post-test	41.20	42.0	
Larva surveillance behavior			
Pre-test	4.75	4.8	0.000
Post-test	37.78	38.6	
Behavior of storing clothes			
Pre-test	4.67	4.8	0.000
Post-test	25.06	25.6	
Use of personal protection against mosquito bites			
Pre-test	11.20	11.4	0.002
Post-test	27.93	28.5	
Waste management behavior			
Pre-test	11.20	11.2	0.002
Post-test	34.47	35.2	

The increase in the attitude of Jumantik Cadres is also supported by the outreach method using leaflet media accompanied by pictures; this is in line with the research conducted by Smith Boonchutima *et al.* in Thailand [23]. The results of the analysis of the attitude value showed that there was a difference in the increase in the attitude value of Jumantik Cadres who were given health education, through the extension method. In the treatment group through the counseling method, the participants listened more and expressed their opinions about health problems related to DB and the prevention of DHF.

This study is in line with the results of research Charuai Suwanbamrung in Kanchanadit district in

the province of Surat Thani, about 651 km South of Bangkok, capital of Thailand, which concluded that to improve knowledge and attitudes essential increase in community health education program [24]. The existence of differences in the level of the attitude shown by the Cadres Jumantik before and after extension is consistent with research Fatmawati against high school students in Surakarta where there are differences in attitudes about sexually transmitted diseases before and after health education intervention [25]. Overall, the results of the study show that the health education carried out can change the attitude of Jumantik Cadres regarding the prevention of DHF. In accordance with Notoatmodjo's opinion, health education can influence and invite other people, both individuals, groups, and communities to carry out healthy lives. Operationally is an activity to provide knowledge, attitudes, and practices of the community in maintaining and improving their own health [12]. A total of seven behavioral assessment indicators, all of which showed an increase in the pre-test and post-test scores. The behavior with the highest increase in the value of larvae control with the pre-test (4.75) and post-test (37.78) means an increase of 33.0% with a significant value of $p = 0.000$, while the smallest increase is the behavior of draining the tub. Water with a pre-test value (26.87) and post-test (35.83) means an increase of 8.96% with a $p = 0.002$.

The supervision behavior of larvae by Jumantik Cadres experienced the highest increase because in the counseling process, more emphasis was placed on larva control activities in their respective homes, because this was the main target to break the chain of transmission of DHF. From the results of the pre-test assessment, only 4.75% showed that before counseling efforts to control larvae by cadres were still lacking, but after counseling the results greatly increased to 37.78%, this was influenced by a strong desire by cadres to prevent transmission of dengue disease in their neighborhood. This is in accordance with Notoatmojo's opinion that a behavior is influenced by the belief that the behavior will bring desired or unwanted results that are normative and motivates to act in accordance with expectations. These normative expectations form subjective norms within the individual. This is determined by past experiences and the experiences of people around and individuals regarding how difficult or easy it is to perform the behavior. Health behavior is largely determined by the presence or absence of health education that has been received [12].

The behavior of draining water tanks by Jumantik Cadres, when viewed from the increase value is only 8.96%, but the pre-test value has reached 26.8% and the post-test reached 35.83%, it shows that the behavior of draining the water tank before receiving counseling has shown a higher value compared to larval control behavior. This is because the Jumantik Cadres already has an understanding of the importance of cleaning the water tank as an effort to develop larvae.

Understanding the importance of cleaning water tanks as an effort to prevent DB, apart from being obtained from health workers, information is also obtained through radio and TV media. This is in accordance with the research of Faisal Shuaib *et al.* in parish Westmoreland, Jamaica [26], [27], [28]. The increased quality of DHF prevention behavior by Jumantik Cadres in both Palu city and Pasangkayu district was caused by the fast understanding when getting counseling materials and supported by the productive age of cadres 31–40 years (38.7%) and higher education levels from senior high school to senior high school masters. This positive condition causes that it is still easy to provide knowledge about the movement to prevent the transmission of dengue disease.

Conclusion

Health education through counseling methods is effective in increasing the knowledge, attitudes, and behavior of Jumantik Cadres in preventing DHF. It is recommended that health workers provide more intensive counseling to Jumantik Cadres and the community in general so that the prevention of dengue transmission can be effective.

Reference

1. World Health Organization. Thresholds for the cost effectiveness of interventions: alternative approaches. *Bull World Health Organ.* 2015;93(2):118-24. <https://doi.org/10.2471/BLT.14.138206> PMID:25883405
2. Pusdatin. Demam Berdarah Dengue. Jakarta: Pusdatin; 2018.
3. Egger JR, Ooi E, Kelly DW, Woolhouse ME, Davies R, Coleman PG. Reconstructing historical changes in the force of infection of dengue fever in Singapore: Implications for surveillance and control. *Bull World Health Organ.* 2008;86(3):187-96. <https://doi.org/10.2471/blt.07.040170> PMID:18368205
4. Guha-sapir D, Schimmer B. Dengue fever: New paradigms for a changing epidemiology. *Emerg Themes Epidemiol.* 2005;2(1):1. <https://doi.org/10.1186/1742-7622-2-1> PMID:15743532
5. Brahim R, Hasnawati, Anggraeni ND, dan Ismandari F. Demam Berdarah Dengue di Indonesia Tahun 1968-2009. *Bul Jendela Epidemiol.* 2010;2:1-14.
6. Kementerian Kesehatan RI. Profil Kesehatan Indonesia 2019. Jakarta; 2020. p. 189-91.
7. Dinas Kesehatan Kota Palu. Profil Kesehatan Kota Palu. Palu: Dinas Kesehatan Kota Palu; 2020.
8. Kamil. Model Pendidikan dan Pelatihan (Konsep dan Aplikasi), Alfabeta, Bandung. Jakarta: Alfabeta; 2010.
9. Green LW, Marshall K. Health Program Planning: An Educational and Ecological Approach. 4th ed. New York : McGraw-Hill; 2005.

10. Kementerian Kesehatan RI. Petunjuk Teknis Implementasi PSN 3M-Plus dengan Gerakan 1 Rumah 1 Jumantik. Jakarta: Kementerian Kesehatan RI; 2016.
11. Lameshow S, Hosmer DW, Klar J, Lwanga S. Besar Sampel Dalam Penelitian Kesehatan. Jogjakarta: Gadjahmada University Press; 1997.
12. Notoatmodjo S. Promosi Kesehatan dan Ilmu Perilaku. Jakarta: PT Rineka Cipta; 2010.
13. Sugiono. Pengaruh pelatihan pencegahan Demam Berdarah Dengue Terhadap Tingkat Pengetahuan dan Sikap Siswa Di SDN Wirogunan I Kartasuro Kabupaten Sukoharjo; 2012.
14. Sustin F, Andajani SA. The training of wiggler monitoring of primary school teacher and studentin surabaya to improve eradication of dengue hemorrhagic fever. *Folio Med Indones.* 2021;48(1):28-31.
15. Azhar NH, Zuhriyah L. Pemberdayaan Siswa Pemantau Jentik dengan Metode Manga Zone sebagai Salah satu Pencegahan Kasus demam Berdarah dengue Di Daerah kelurahan Sawo Jajar Kota Malang. *FKUB.* 2015;2(1):8-15.
16. Kemenkes RI. Petunjuk Teknis Pemberantasan Sarang Nyamuk (PSN) oleh Juru Pemantau Jentik (jumantik). Jakarta: Kementerian Kesehatan RI; 2012.
17. Budiman AR. Pengetahuan dan Sikap Dalam Penelitian Kesehatan. Jakarta: Salemba Medika; 2013.
18. Kazaaura M. Knowledge, attitude and practices about dengue fever among adults living in Pwani Region, Tanzania in 2019. *Afr Health Sci.* 2020;20(4):1601-9. <https://doi.org/10.4314/ahs.v20i4.12>
PMid:34394220
19. Zulkifli A, Sidin AI, Nasrah N, Rahmah S, Fitri AU. Strengthening community-based surveillance cadre activeness through interpersonal communication and module development in Barru district. *Open Access Maced J Med Sci.* 2021;9:187-91.
20. Harapan H, Rajamoorthy Y, Anwar S, Bustamam A, Radiansyah A, Angraini P, *et al.* Knowledge, attitude, and practice regarding dengue virus infection among inhabitants of Aceh, Indonesia: A cross-sectional study. *BMC Infect Dis.* 2018;18(1):96. <https://doi.org/10.1186/s12879-018-3006-z>
PMid:29486714
21. Mian N. Knowledge, attitude and practices regarding dengue fever in people of Lahore. *Med Forum Mon.* 2012;23(5):13-8.
22. Azwar S. Sikap Manusia Teori dan Pengukurannya. Yogyakarta: Pustaka Pelajar; 2011.
23. Boonchutima S, Kachentawa K, Limpavithayakul M. Longitudinal study of Thai people media exposure, knowledge, and behavior on dengue fever prevention and control. *J Infect Public Health.* 2017;10(6):836-41. <https://doi.org/10.1016/j.jiph.2017.01.016>
PMid:28285970
24. Suwanbamrung C, Saengsuwan B, Sangmanee T. Knowledge, attitudes, and practices towards dengue prevention among primary school children with and without experience of previous dengue infection in southern Thailand. *One Health.* 2021;13:100275. <https://doi.org/10.1016/j.onehlt.2021.100275>
PMid:34159247
25. Fatmawati. Pengaruh Pendidikan Kesehatan tentang Penyakit Menular Seksual terhadap Perubahan Pengetahuan dan Sikap Siswa SMAN 8 Surakarta. Surakarta: Fak Kesehat Masyarakat, Surakarta; 2010.
26. Shuaib F, Todd D, Campbell-Stennett D, Ehiri J, Pauline E. Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica. *West Indian Med J.* 2010;59(2):139-46.
PMid:21132094
27. Srinivasa S, Harish S, Patel RA, Bhavya G. Knowledge, attitude and practice regarding dengue infection among parents of children hospitalized for dengue fever. *Int J Contemp Pediatr.* 2018;22(1):893-7.
28. Nalongsack S, Yoshida Y, Morita S, Sosouphanh JS. Knowledge, attitude and practice regarding dengue among people in Pakse, Laos. *Nagoya J Med Sci.* 2009;71(1-2):29-37.
PMid:19358473