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THE DESCRIPTION OF LARVA FREE INDEX AS COMBI (COMMUNICATION FOR BEHAVIORAL IMPACT) DENGUE HEMORRHAGIC FEVER PREVENTION INDICATOR

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Abstract

Dengue hemorrhagic fever (DHF) has a high incidence rate, especially in the tropical and subtropical area. Various efforts have been made as an attempt to empower the community in PSN-dengue program, but has not yet reached the optimal result. COMBI (Communication for Behavioral Impact) is a dynamic team working to formulate and deliver the message, materials, and appropriate communication media for community problems found by way of a mutually agreed settlement of the problem.Quantitative research was done by cross sectional method to check the water storage containers inside the houses of the respondents. The number of the respondents were 990 male (38.1%), 1612 female (61.9%). Three (0.1%) respondents were aged <17 years, 249 (9.6%) were 17-25 years old, 526 (20.2%) were 26-35 years old, 706 (27.1%) were 36-45 years old, 602 (23.1%) were 46-55 years old, 348 (13.4%) were 56-65 years old, 173 (6.7%) were >65 years old. Most dominant level of education and employment statuses were 1107 (42.5%) high school and 858 (32.9%) were housewives. The average numbers of Larva Free Index in Sleman Regency, Bantul Regency and Yogyakarta municipality were - 75.8%; 70.9%; and 77.3% respectively. The average CI in Yogyakarta municipality was 7.05%, Sleman Regency was 9.68%, and Bantul Regency was 20.86%. The average HI in Yogyakarta municipality was 22.7%, Sleman Regency was 24.13%, and Bantul Regency was 29.02%. This study suggested that the LFI, CI and HI were not in accordance with the target of the Ministry of Health.

Introduction

Dengue Hemorrhagic Fever (DHF) has a high incidence rate especially in the tropics and subtropics (Achmadi, 2010). Data from WHO (World Health Organization) estimated around 50-100 million dengue fever cases happens each year in nearly half of the world's population, and approximately 75% of cases occurs in Asia Pacific. Dengue hemorrhagic fever is one of the major public health problems in Indonesia. The number of dengue hemorrhagic fever patients and the wide spreading of the disease are increasing linearly with increasing mobility and population density (Achmadi, 2010; Suryanto, 2017).

Various efforts had been made in community empowerment efforts in the PSN-DHF program, but had not achieved optimal results (Vanwambeke, 2016). COMBI (Communication for Behavioral Impact) which was introduced by WHO, is a new method that aims to prevent and control dengue hemorrhagic fever. COMBI approach aims to change the behavior of society, so PSN empowerment can run optimally. COMBI was introduced in Indonesia in 2004. COMBI method had been implemented in several cities in 2007, such as South Jakarta, East Jakarta, Padang, and Yogyakarta (Achmadi, 2010). COMBI is the process of empowering the community, from,

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by, for and with the community, by using appropriate social and cultural communication in place, to influence the environment so as to mobilize the community and enable them to carry out the control of PSN-DBD. The planning of COMBI's implementation consists of 15 steps, which are forming a multidisciplinary planner team, establishing initial behavioral objectives, planning and conducting formative research/survey/research, seeking feedback from formative research, analyzing and setting final behavioral goals, segmenting target audiences, developing strategy, previewing behavior, messages and materials, designing monitoring systems, strengthening staff skills, designing and establishing information governance systems, developing program structures, developing strategic execution plans, budgeting, pilot testing and revising strategic execution plans). COMBI aims to transforming the society from being ignorant to knowing, from knowing to willing, and from willing to being able to prevent Dengue Hemorrhagic Fever. The goal of the community empowerment is when they understand that DHF is a problem for themselves.

The LFI (Larvae Free Index) of 1994-2008 was still below the target even though some places had been given COMBI implementation interventions (Achmadi, 2010). Therefore it is necessary to evaluate the implementation of COMBI with parameters LFI, CI, and HI as one indicator of the success of mosquito nest eradication in Yogyakarta Special Region.

Methods

The research was conducted by cross sectional quantitative method to the respondents with cluster random sampling technique in Yogyakarta Special Region, covering Sleman, Bantul, and Yogyakarta Municipality.

The data collected from larvae were carried out on 2604 respondents in 13 sub-districts taken by accidental sampling, including Mlati sub-district, Gamping sub-district, Kalasan sub-district, Godean sub-district, Piyungan sub-district, Kasihan sub-district, Sewon sub-district, Banguntapan sub-district (of the Bantul Regency), and Tegalrejo Sub-district, Wirobrajan Sub-District, Gondokusuman Sub-District, Mantrijeron Sub-District, Umbulharjo Sub-district, in Kotamadya Yogyakarta, in 2015.

Observation of the presence of larvae assisted by local area *Jumantik (Juru Monitoring Jentik)*. Evaluation of larva presence is done by observing water containers inside the respondent's house according to Technical Guidance of Eradicating Mosquitoes of Dengue Hemorrhagic Fever. Among others, places or vessels that can be a breeding ground for *Aedes aegypti* mosquitoes were examined (eyesight only) to know the presence of larvae. Examination of large water reservoirs such as tubs, jars, drums, and other water reservoirs, if at first sight any larvae was not found, wait approximately ½ - 1 minute to ensure that larvae did not exist. Examination of small breeding places such as flower vases, potted plants, bottles with turbid water, often required the water in the shelter to be moved elsewhere. Examination of larvae in a dark place or turbid waters used a flashlight.

Demographic data of respondents including gender, age, education level, income, and information media are presented in the form of descriptive statistic (percentage, and the calculation of larvae was done by calculating the LFI (larvae free index) which is the comparison of number of houses that have no larvae compared to the number the overall houses under study, multiplied by 100% .The target of LFI from the Government is over 95%.

Results and Discussion

Characteristics of respondents showed the number of female respondents was (61.9%) more dominant than male (38.1%). Respondents were mostly 36-45 years old with 27.1%, with a dominant education level of high school (42.5%). The most dominant occupation was housewife by 858 (32.9%).

There was a significant relationship between knowledge and the behavior of eradicating dengue mosquito nest in Karangjati Village, where the behavior of mosquito eradication was good if the knowledge was also good. There was a positive relationship between education level and health level. One explanation that can be put forward is that with a good level of education, a healthy lifestyle will improve, due to increased knowledge about health behavior and health outcomes. There was a positive relationship between knowledge,

behavior, and practice with significance of p <0.001. Work was not statistically related to community behavior in PSN-DBD (p = 0.260). Community behavior among the unemployed were better (63%) in PSN when compared to the working community (51.9%) (Hardayati, 2011). This is similar to that of Wong et al., 2015 which suggested that dengue prevention practices in a group of people with skilled job were poorer than the unemployed group (Wong, 2015). This might be caused by the respondents encountered in the study were mostly housewives who were not working and had more time at home and were responsible for house hygiene, and PSN may be included. On the other hand, working people may have less time in implementing DHF prevention (Wong, 2015).

Table 1. Respondent characteristics

Characteristic	N (%)
Gender	
Male	990 (38.1)
Female	1612 (61.9)
Age (year)	
<17	3 (0.1)
17-25	249 (9.6)
26-35	526 (20.2)
36-45	706 (27.1)
46-55	602 (23.1)
56-65	348 (13.4)
>65	173 (6.7)
Educational Background	
N/A	44 (1.7)
Elementary	401 (15.4)
Junior High	447 (17.2)
Senior High	1107 (42.5)
Diploma	191 (7.3)
Undergraduate	366 (14.1)
Postgraduate	45 (1.7)
Employment	
Labor	411 (15.8)
Farmer	81 (3.1)
Entrepreneur	489 (18.8)
Private labor	325 (12.5)
Civil servant	131 (5.0)
Pensioner	101(3.9)
Housewife	858 (32.9)
Others	206 (7.9)

Source: Primary data 2015

The larvae free index of Sleman, Bantul and Municipality of Yogyakarta did not achieve the target according to the Ministry of Health (more than 95%). This showed that vector control and PSN-DHF had not been successful. Community hygiene behavior was also related to PSN-DHF activities. Most communities rely on the role of health workers in mosquito vector control. The role of society is more dominant in the prevention of DHF. The condition is influenced by the level of public awareness of the behavior of clean living is still low (Parida, 2012).

The highest LFI of the three regencies/ municipalities was found in Yogyakarta Municipality, and the lowest LFI was achieved by Bantul Regency. LFI values that were still far from the target indicated that the risk of the spread of dengue disease is high, and therefore the effort to prevent DHF by empowering the community through the 3M PSN Movement with COMBI approach needs to be improved. The low value of LFI also showed that community members did not understand that DHF is a threat to themselves/the level of awareness of the people is still low, so based on COMBI theory, the residents should understand that DHF is a threat to their health and even their life.

Surveys of *Aedes aegypti* density are important to determine the extent of vector spread and to prioritize areas and seasons for vector control. Another indicator for controlling the spread of vectors is the Container Index (CI). The CI value is obtained from the number of positive containers containing the larva divided by the number of containers examined multiplied by 100%. The average of CI results from the three research areas obtained value of more than 5% so that the potential for breeding of *Aedes aegypti* mosquitoes.

Based on survey results, it is known that Bantul is the region with the most positive number of larvae containers compared to Sleman and Yogyakarta. Based on population

Table 2. Larvae Free Index of Sleman, Bantul and Municipality of Yogyakarta in 2015

Regency	Number of Free Larvae House	LFI (%)
Sleman		
Kalasan	153	76.5
Godean	156	78
Gamping	134	67
Mlati	164	82
Mean of LFI		75.9
Bantul		
Kasihan	170	85
Sewon	149	74.5
Banguntapan	142	71
Piyungan	109	53.4
Mean of LFI		70.98
Yogyakarta		
Tegalrejo	175	87.5
Wirobrajan	119	59.5
Gondokusuman	148	74
Mantrijeron	180	90
Umbulharjo	151	75.5
Mean of LFI		77.3

Source: Primary Data

Table 3. Value Container Index Sleman, Bantul and Kotamadya Yogyakarta in 2015

Regency	Number of Positive Container	Number of Containers Examined	CI (%)
Sleman			
Kalasan	58	652	8.90
Godean	51	399	12.78
Gamping	68	659	9.46
Mlati	36	536	6.72
Mean of CI			9.68
Bantul			
Kasihan	35	322	10.86
Sewon	55	262	20.99
Banguntapan	62	244	25.41
Piyungan	129	271	26.17
Mean of CI			20.86
Yogyakarta			
Tegalrejo	39	297	13.13
Wirobrajan	103	1602	6.43
Gondokusuman	58	1301	4.00
Mantrijeron	20	1272	1.57
Umbulharjo	53	525	10.10
Mean of CI			7.05

Source: Primary Data

Table 4. Value of House Index in Sleman, Bantul dan Kotamadya Yogyakarta in 2015

Regency	Number of Positive Larvae House	HI (%)
Sleman		
Kalasan	47	23.5
Godean	44	22
Gamping	66	33
Mlati	36	18
Mean of HI		24.13
Bantul		
Kasihan	30	15
Sewon	45	25.5
Banguntapan	58	29
Piyungan	95	46.57
Mean of HI		29.02
Yogyakarta		
Tegalrejo	25	12.5
Wirobrajan	81	40.5
Gondokusuman	52	26
Mantrijeron	20	10
Umbulharjo	49	24.5
Mean of HI		22.7

Source: Primary Data

density of Bantul region is not too dense compared to Yogyakarta and Sleman. The results were not in accordance with Yudhastuti research (2005) that densely populated residential areas became a place to breed *Aedes aegypti* mosquito larvae.

The highest positive type of larvae containers were bathtubs and buckets. From several surveys conducted in several cities in Indonesia showed that the highest potential for breeding spots were containers used for daily necessities such as drums, jars, bathtubs, toilet tubs, buckets , and the like (Yudhastuti, 2005).

The presence of containers plays an important role in the density of *Aedes* larvae, as the more containers present will make more crowded mosquito density and will become more populous of *Aedes* mosquitoes (Raude, 2012). The more densely populated the *Aedes* mosquitoes, the higher the risk of dengue virus infection with faster spreading time therefore resulting in the number of cases of dengue fever to rapidly increase which eventually resulted in the outbreak of dengue disease (Sitio, 2008).

Value House Index (HI) is one of the indicators for the spread of DHF vectors, namely *Aedes aegypti* mosquitoes. HI obtained from the number of positive houses where larvae were found divided by the number of houses examined multiplied by 100%. Researchers examined 200 houses in each sub-district presented in Table 4.

Based on the survey results, it is known that the average HI of the three regions is more than 20%. The HI indicator for the risk of dengue hemorrhagic outbreaks based on theory is ≥10%. Pan American Health Organization established 3 (three) levels of risk of dengue transmission, with low risk is achieved by HI <0.1%, medium risk is if HI value is 0.1% -5%, high risk is if HI> 5%. Therefore, the three research areas were categorized as high risk for breeding and spreading of Aedes aegypti mosquitoes.

Bantul Regency is the region with the highest HI value of 29.02% (Table 4). This is in line with the results of CI Bantul region which also showed the highest value (Table 3). This caused the potential spread of DHF vectors in Bantul region to be the highest among the cities

of Yogyakarta and Sleman. The three areas should be aware of the spread of DHF vectors, caused by HI and CI values well above the government-set indicator.

The discovery of many larvae in the houses showed that the PHBS culture (Clean and Healthy Behavior) in the society still needs to be improved. Mosquito is a vector of diseases that can fly to various areas with a maximum distance of 100 meters, unless carried by the wind. This caused the risk of spreading vectors from one home to another, increasing the risk of DHF outbreaks.

The eradication of vectors is still the best choice to reduce the number of people with DHF. The vector eradication strategy principally is the same as the general strategy advocated by WHO by making adjustments on the ecology of disease vectors in Indonesia. The strategy consists of individual protection, vector eradication in outbreaks and vector eradication for epidemic prevention, and prevention of the spread of DHF (Sitio, 2008).

Implementation of mosquito nest eradication is an important action to break the chain of DHF mosquito spreading. This is supported by Hasan (2007) study which stated that the habit of doing PSN was related to the incidence of DHF, individuals who did not implement 3M were at risk of 5.85 fold greater (95% CI: 2.86-11.99) for dengue than individuals who did implement the 2M or 3M.

Control of DHF through PSN is possible only through community movements, which is impossible without increased knowledge and behavioral changes. The success of several countries controlling DHF was accomplished by continuously changing societal behavior with the COMBI method. Through routine monthly meetings to create a DHF control activity plan can sharply decrease the CI, HI, and BI (Hasan, 2007).

Based on the results of this study it is known that the value of free numbers of larvae, CI and HI still had not reached the standard set to reduce the incidence of DHF, so it can be stated that the implementation of COMBI especially for Bantul, Yogyakarta and Sleman has not reached the expected target in the control of DHF vector. The growth of public awareness as well as the active involvement of all sectors in PSN is very important to control the vector of dengue mosquitoes.

Conclusion

The results of this study indicated that the value of LFI in Yogyakarta province had not met the target of Ministry of Health (target> 95%), with 75.9% in Sleman Regency, 70.98% in Bantul Regency and 77.3% Municipality of Yogyakarta. The average CI (target <5%) in Yogyakarta Municipality was 7.05%, Sleman Regency was 9.68%, and in Bantul regency was 20.86%. The average HI (target <5%) in Yogyakarta Municipality was 22.7%, Sleman Regency was 24.13% and Bantul Regency was 29.02% .CI and HI were not in accordance with the targets set by the Ministry of Health Republic of Indonesia, so that vector control in the Special Region of Yogyakarta was not successful.

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