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EDUCATION CAN IMPROVE COMMUNITY PARTICIPATION IN THE CONTROL OF DENGUE HAEMORRHAGIC FEVER IN CICADAS AND BABAKAN PENGHULU VILLAGE, BANDUNG CITY, A CASE OF PARTICIPATION MEASUREMENT USING THE METHOD OF ARNSTEIN

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Abstract

Introduction: *According to the Ministry of Health, cases of dengue haemorrhagic fever (DHF) increased from 2 to 34 provinces during 46 years, hence, Indonesia had not been able to control DHF. While specific drugs and vaccines against DHF virus are not yet available, the only way to control DHF is by controlling the vector. Sustainable Development Goals (SDG's) program on vector borne diseases requires a reduction of mortality by 75% and incidences by 60% in 2030. Vector control in Indonesia is being done through community participation such as draining, closing, and recycling used goods, and activities to avoid mosquito bites known as "3M Plus". There is, therefore, a need to measure the degree of community participation being done so far and the factors that influence it.* ***Methods:*** *Measurement of the level of community participation was carried out using the method of Arnstein (A Ladder of Citizen Participation). The variables used in the measurements were the understanding, the benefits, and the implementation of participation in the 3M Plus program. The research location was chosen based on the mapping of areas with high and low DHF incidence. Samples were determined by the Slovin method, stratified by permanent, semi permanent, and non permanent houses. Data collection were carried out by interviews. Factors that influence community participation are measured by statistical tests, namely multiple linear regression.* ***Result and Discussion:*** *The largest level of community participation is still at the level of manipulation (no participation) with a percentage of 50.5% in Cicadas and 65.6% in Babakan Penghulu; statistical analysis shows that education education had a significant influence in both villages.* ***Conclusion:*** *There has been no actual community participation yet. Therefore, comprehensive education and counseling are needed for the entire community. Considering that breeding places are not only found in settlements, it is necessary to collaborate with other sectors, such as agriculture, environment, fisheries, irrigation, finance, tourism, transportation, urban areas, livestock, forestry, and infrastructure.*

INTRODUCTION

Climate change that has occurred, has become a topic of discussion among the world community, including Indonesia. Climate change is happening to expand mosquito habitat as one of the vectors of disease that spreads the *Congenital Vector Disease* (PBV), including the *Dengue Hemorrhagic Fever* (DHF) disease (1). DHF is caused by a virus, and the vectors are *Aedes aegypti* and *Aedes albopictus* mosquitoes. The presence of *Aedes* mosquitoes is related to the provision of clean water because of the habit of nesting in clean waters, such as water-holding drums, bathtubs, and other water reservoirs, so that the *Aedes* mosquito nests are located in homes and communities.

Ministry of Health Republic Indonesia notes that the number of dengue fever cases has increased in the number of provinces infected with dengue fever, namely 2 out of 25 provinces in 1968 and 34 out of 34 provinces in 2014. This shows that Indonesia has not been able to control the vector of dengue, while there are no drugs and vaccines for dengue disease, so the only way to control DHF is to control the vector. In addition, the *Suistainable Development Goals* (SDGs) program requires a reduction in *Vector Congenital Disease* (PBV) mortality by 75% and its incidence by 60% by 2030 (2). Vector control methods in Indonesia are carried out by draining water reservoirs, closing water reservoirs, and recycling used goods, as well as activities to avoid mosquito bites known as the 3M Plus program through community participation, so measurement is needed as far as community participation has gone. Dengue vector control really requires community participation because the *Aedes* mosquito nest is in the home and community environment.

Community participation in controlling DHF vectors is defined as community participation in 3M Plus activities, including channeling thoughts or aspirations of all DHF vector control activities such as environmental management to eliminate *Aedes aegypti* nests and vector monitoring which can be stated in the larva free rate (ABJ). This is supported by Regulation of Ministry of Health Republic Indonesia No.01.11/MENKES/591/2016 concerning the Implementation of the 3M Plus Mosquito Nest Eradication with *"Satu Rumah Satu Jumantik"* Movement (3). This regulation urges and encourages the community, starting with all Civil Servants in the Ministry of Health, to make efforts to prevent and control dengue and Zika virus through the 3M Plus PSN with the "*Satu Rumah Satu Jumantik"* movement. The purpose of the movement, is to carry out activities to drain, close clean water reservoirs, and recycle used goods that have the potential to become mosquito nests, as well as other plus activities to avoid mosquito bites, and in 1 house there is 1 member the family responsible for the DHF vector control effort.

Therefore, this study was conducted to measure the level of community participation, compare in two different locations based on the incidence of DHF in the city of Bandung, as well as determine the effect of community education and income factors in controlling DHF vectors.

METHOD

In this study, the level of community participation was measured in the control of DHF vectors in Cicadas Village office as the highest incidence of DHF and Babakan Penghulu Village office as the lowest DHF incidence in Bandung. The two regions were chosen based on their incidence, so that a comparison of the level of community participation in controlling DHF vectors in areas with high incidence and areas with low incidence in the city of Bandung based on data from District Health Office of Bandung in 2018. Measurement of community participation in controlling DHF vectors through interviews with the Arnstein method, namely community participation is at community power (citizen participation is citizen power) which has 8 different steps in the Arnstein method can be seen in Table 1 (4). In the Arnstein method the division of cooperation occurs between the community and related parties, such as the community and the government in a particular interest (5).

Table 1. Level of Community Participation Based on Arnstein's Concept

Level	Category
Level 1	Manipulation
Level 2	Therapy
Level 3	Informing
Level 4	Consultation
Level 5	Placation
Level 6	Partnership
Level 7	Delegated Power
Level 8	Citizen Control

Source : Arnstein SR. A ladder of Citizen Participation. J American Planning Association. 1969;35(4):216-224

Table 1 showed that the level of community participation based on the Arnstein method, when seen from the highest to the lowest level namely; citizen control, delegated power, partnership, placation, consultation, informing, theraphy, and manipulation. Therefore, the use of the Arnstein method will find out the level of community participation that has been carried out to control the DHF vector in Cicadas and Babakan Penghulu sub-district.

The parameters used to determine the level of

community participation in the Arnstein method, namely knowledge, benefits, and implementation of 3M Plus activities can be seen in Table 2.

Health knowledge possessed by someone influences in carrying out DHF prevention activities, so that relevant knowledge will encourage the community to carry out DHF prevention activities (6). Counseling and training provided will make the community aware of the benefits of controlling DHF activities, thereby affecting the desirability of DHF control activities (7). Implementation of activities was a community action in controlling the DHF vector, actions taken are related to knowledge and benefits. Having knowledge and knowing the benefits of DHF control activities would influence community actions in carrying out DHF control activities (8).

Table 2. Measuring Differences in Community Participation Rates in DHF Vector Control

Level	Knowledge	Benefit	Practice	Additional
Citizen Control	know	know	Own initiative	Plan, carry out to supervise yourself
Delegated Power	know	know	Own initiative	Plan your own with the help of relevant parties
Partnership	know	know	Own initiative	The division of roles is the same as related parties
Placation	know	know	Volunteer	Opinions and suggestions are taken into consideration
Consultation	know	know	Volunteer	There are no guarantees of opinions and suggestions made
Informing	Don't know	know	Volunteer	Not able to issue opinions and suggestions
Theraphy	Don't know	know	Forced	-
Manipulation	Don't know	Don't know	Forced	-

The following wa an explanation of each parameter used at each level of Arnstein's community participation:

At level 8 is Citizen Control, as the highest level of participation, people already have knowledge related to DHF and know the benefits of 3M Plus causing them to carry out DHF vector control activities on your own initiative. At this level, the community has played an active role in planning, implementing, and supervising DHF vector control activities themselves. So that people have a way to control DHF according to their conditions and needs (9).

At level 7 is Delegated Power, people already have knowledge related to DHF and know the benefits of 3M Plus, so they carry out the DHF vector control activities on their own initiative. At this level, the community has planned a DHF vector control activity and in its activities are still assisted by related parties.

At level 6 is Partnership, the community already has knowledge related to dengue fever and knows the benefits of 3M Plus, so they carry out the DHF vector control activities on their own initiative. At this level, the community already has a division of tasks with the owners of power that has been mutually agreed upon.

At level 5 is Placation, people already have knowledge related to DHF and know the benefits of 3M Plus, so they do activities voluntarily. At this level, the community could issue their suggestions and opinions, and their proposals are considered.

At level 4 was Consultation, the community already has knowledge related to DHF and knows the benefits of 3M Plus, so they do activities voluntarily. The community can issue their suggestions and opinions, but there is no guarantee that their proposals will be implemented.

At level 3 is Informing, the community does not have knowledge of DHF, but the community already knows the benefits of 3M Plus. The community has carried out voluntary DBD vector control activities.

At level 2 is Theraphy, people do not have knowledge related to DHF, but the community already knows the benefits of 3M Plus. The community was forced to carry out dengue vector control activities.

At Level 1 Manipulation is the lowest level of community participation in the Arnstein concept. The community does not have knowledge related to DHF disease and does not know the benefits of 3M Plus, so the community conducts DHF control activities by being forced or not doing DHF vector control activities.

The total samples was determined by the Slovin method and the sampling technique used is stratified sampling or stratified sampling based on the quality of permanent, semi-permanent, and non-permanent houses, which will differ in the level of clean water supply and sanitation. Determination of the sample with the Slovin formula at the two study sites is as follows (10):

$$n = \frac{N}{1+N.e^2}$$

Explanation

n = sample / Tota respondents

N = number of population

e = Percentage of errors that can be tolerated.

The percentage error rate used was 10%. The quality of the house was used to determine the socioeconomic level, and condition of the water environment, as well as sanitation so it was related to the health status of its inhabitants (11). The number

of respondents in the Village of Cicadas, namely 98 respondents from a total of 4,289 houses. Below was a calculation of the number of respondents in the Cicadas Village office:

$$n = \frac{N}{1+N.e^2}$$

$$n = \frac{4,289}{1+(4,289x(0.1)^2)}$$

$$= 97.7 \sim 98$$

Calculation of sample proportion or stratification was needed to know the number of samples to be taken in each different housing characteristics. The total number of permanent houses in Cicadas Village office was 4,236. The following was the calculation of the proportion of samples for permanent houses in Cicadas Village office:

$$\text{Permanent Houses} = \frac{\text{Total Permanent Houses}}{\text{Total house}}$$

$$\frac{\text{Total Permanent Houses}}{\text{Total house}} \text{ x } 100\%$$

$$= \frac{4,236}{4,289} \text{ x } 100\%$$

$$= 99\% \text{ x } 98 = 97 \text{ Houses}$$

The total number of semi-permanent houses in Cicadas Village office was 40 houses, so the following was a calculation of the proportion of sample of semi-permanent houses in Cicadas Village office:

$$\text{Semi-Permanent Houses} = \frac{\text{Total semi}-\text{permanent houses}}{\text{total house}}$$

$$\frac{\text{Total semi}-\text{permanent houses}}{\text{total house}} \text{ x } 100\%$$

$$= \frac{40}{4,289} \text{x } 100\%$$

$$= 1\% \text{ x } 98 = 1 \text{ Houses}$$

The total number of non-permanent houses in Cicadas Village office is 13, so the sampling for non-permanent houses was 1 house. The number of samples in the Village Babakan Penghulu, namely 92 respondents from a total of 1,111 houses in the Village Babakan Penghulu. The following was the calculation:

$$n = \frac{N}{1+N.e^2}$$

$$n = \frac{1,111}{1+(1,111x(0.1)^2)}$$

$$= 91.7 \sim 92$$

Total permanent houses in Babakan Penghulu Sub-District was 1,111 houses, so that 91 permanent housing samples were obtained for the distribution of interviews. The following is the discussion:

$$\text{Permanent Houses} = \frac{\text{Total permanent houses}}{\text{total houses}}$$

$$\frac{\text{Total permanent houses}}{\text{total houses}} \text{ x } 100\%$$

$$= \frac{1,101}{1,111} \text{x } 100\%$$

$$= 99\% \text{ x } 92 = 91 \text{ Houses}$$

Total semi-permanent houses in the Babakan Penghulu Village office were 9 houses, so 1 sample of semi-permanent houses was obtained. The following was a calculation for the proportion of semi permanent houses in Babakan Penghulu Village office:

$$\text{Semi-Permanent Houses} = \frac{\text{Total semi}-\text{permanent houses}}{\text{total houses}}$$

$$\frac{\text{Total semi}-\text{permanent houses}}{\text{total houses}} \text{ x } 100\%$$

$$= \frac{9}{1,111} \text{x } 100\%$$

$$= 0.81\% \text{ x } 92 = 1 \text{ Houses}$$

Total house impermanent houses in Village office Babakan Penghulu were 1 house, so the sampling of houses for non-permanent houses was 1 house. Statistical tests were conducted to determine the factors that influence community participation. Statistical tests were carried out by means of multiple linear regression with the following formula (10):

$$Y = b_o + b_1X_1 + b_2X_2 + \ldots .. + b_kX_k$$

Explanation

Y = Dependent variable.

b_o, b_1, b_2, ..., b_k = Each of them states the correlation coefficient.

X_1, X_2 ..., X_k = Each of them declares the 1,2th independent variable, ..., k.

Multiple linear regression tests were performed to determine the relationship between the variables affected by the variables that influence. The variables that influence in this study, namely education (X_1) and income (X_2), while the variables affected, namely the level of community participation (Y). The following is an explanation related to the factors that are suspected to influence community participation in controlling the vector of DHF:

A person's education level will affect his participation in a program because the higher a person's level of education, the easier it is to receive or understand information (12). It can be concluded that the lower the level of education of the respondent, the lower the activity in participating because with different educational backgrounds will affect one's ability to work together or engage in an activity with other community members. So it can be said that education will affect the success or failure of the DHF vector control program. It also relates to the health knowledge they have, so the level of education has an influence on health knowledge (13).

The high level of income of a person results in the person having a high level of participation because someone with a low income will be more busy in looking for additional income, so that they do not participate in health socialization activities that result in lack of knowledge about eradicating DHF (14). In addition, people with low incomes are suspected to have poor sanitation facilities and infrastructure resulting in poor environmental hygiene. As is well known that the DHF vector likes to breed in standing water (15).

RESULT

Level of Community Participation in the Village of Cicadas and Babakan Penghulu

The measurement results show that the largest level of community participation in the Cicadas Village office is in the level of manipulation of 50.5% (50 respondents from a total of 99 respondents) and in Babakan Penghulu the largest is also obtained at a manipulation level of 65.6% (61 respondents from a total of 93 respondent); can be seen in Table 3. The level of manipulation states that there is no community participation to carry out the DHF vector control activities.

Table 3. Percentage of Community Participation Rate in Cicadas and Babakan Penghulu Sub-Districts

Level	Sub-District Cicadas		Sub-District Babakan Penghulu	
	n	%	n	%
Manipulation	50	50.5	61	65.6
Informing	42	42.4	21	22.6
Consultation	7	7.1	11	11.8
Total	99	100.0	93	100.0

3M Plus Activities at the Level of Manipulation Participation in Cicadas and Babakan Penghulu Sub-Districts

The biggest 3M Plus activity conducted by respondents in the Cicadas Village office is to drain 46 respondents which can be seen in Figure 1.While the largest 3M Plus activity in Babakan Penghulu Village office is draining 60 respondents which can be seen in Figure 2. Respondents who have carried out 3M Plus activities, at the level of manipulation only did so without knowing the benefits of the activity.

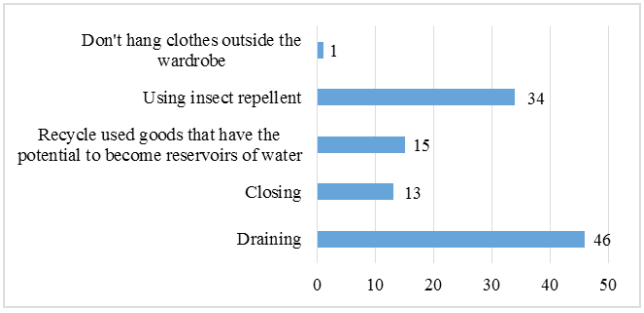

Figure 1. 3M Plus Activity at Cicadas Village at Manipulation Level

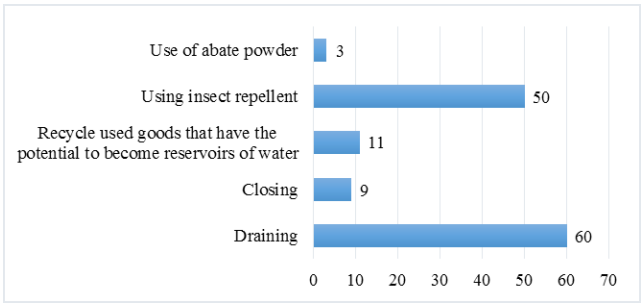

Figure 2. 3M Plus Activity at Babakan Penghulu Sub-District at Manipulation Level

3M Plus Activities at the Level of Information Participation in Cicadas and Babakan Penghulu

The largest 3M Plus activity undertaken by respondents in the Cicadas Village office is draining 42 respondents which can be seen in Figure 3. While the largest 3M Plus activity conducted by respondents in Babakan Penghulu Village office is draining as many as 20 respondents which can be seen in Figure 4. At this level the community already know the benefits of 3M Plus activities.

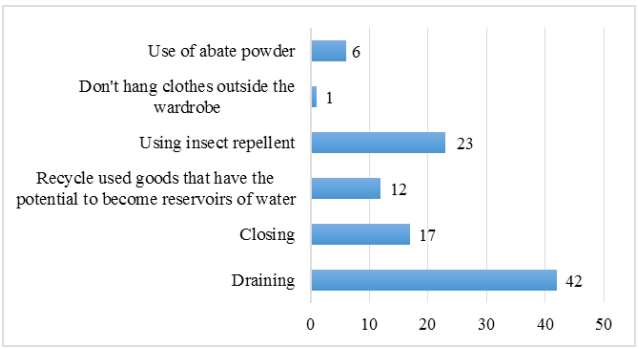

Figure 3. 3M Plus Activity at Cicadas Village at Informing Level

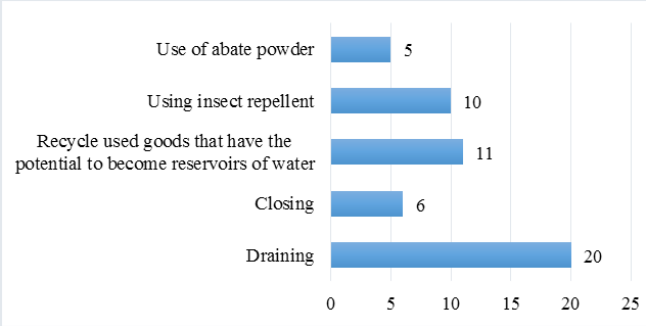

Figure 4. 3M Plus Activity at Babakan Penghulu Village at Informing Level

3M Plus activities at the Consultation Participation Level in Cicadas and Babakan Penghulu Sub-Districts

The biggest 3M Plus activity conducted by respondents in the Cicadas Village office is to drain as many as 6 respondents which can be seen in Figure 5. While the largest 3M Plus activity conducted by respondents in Babakan Penghulu Village office is to recycle used goods as many as 11 respondents which can be seen in Figure 6. In at this level the community already knows the benefits and knowledge of 3M Plus activities.

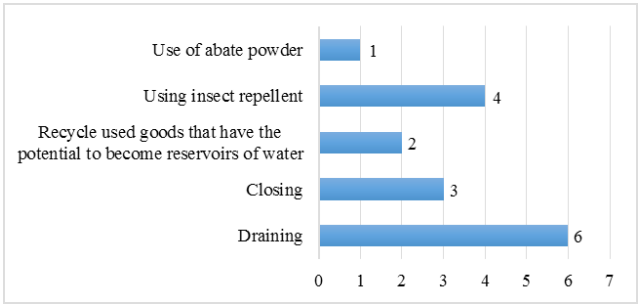

Figure 5. 3M Plus Activities in Cicadas Village at the Consultation Level

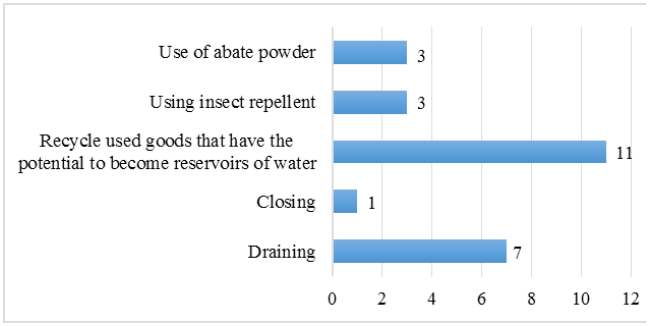

Figure 6. 3M Plus Activities at the Babakan Penghulu Village at the Consultation Level

Overview of the Last Education of the Respondents in the Villages of Cicadas and Babakan Penhulu

The most recent education in the community in Cicadas is 57% of high schools, while in Babakan Penghulu Village office is 34% junior high school. Education consists of two research areas; elementary school, junior high, high school, Diploma (D3), Bachelor degree (S1), and the Magister Education Program (S2) which can be seen in Table 4.

Table 4. Education of Respondents in Cicadas and Babakan Penghulu Sub-Districts

Educational Stage	Sub-District Cicadas		Sub-District Babakan Penghulu	
	n	%	n	%
Elementary School (SD)	4	4	27	29
Junior High School (SMP)	21	21	32	34
Seenior High School (SMA)	56	57	25	27
Diploma (D3)	7	7	-	-
Bachelor Degree (S1)	10	10	9	10
Magister (S2)	1	1	-	-
Total	99	100	93	100

When viewed the level of education in the two research areas is divided into basic education (elementary and junior high), secondary education (high school), and higher education (D3, S1, and S2). Educational factors significantly influence community participation in controlling DHF vectors in both study areas.

Percentage of Monthly Income of Respondents in Cicadas and Babakan Penghulu Sub-Districts

The biggest monthly income for the people in the Cicadas Village office is a number <Rp 3,339,580 about 58%, then Rp 3,339,580 - Rp 5,000,000 about 30%, and > Rp.3,339,580 by 12%. In the Village of Babakan Penghulu, by the amount <Rp 3,339,580 about 74%, then Rp 3.339.580-Rp 5.000.000 about 16%, dan > IDR 3,339,580 at 10%. The level of income is based on the UMR of the City of Bandung in 2019.

Results of Multiple Linear Regression Statistics Tests

Statistical tests were conducted to see the significant influence of education and income on community participation in controlling DHF vectors. Table 6 shows that education has a significant effect on participation in both regions, because the P value is less than 0.05 (α = 5%), namely in the Cicadas Village office

Table 5. Effects of Education and Income in Cicadas and Babakan Penghulu Sub-Districts

	Cicadas Sub-Districts						Babakan Penghulu Sub-Districts					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.7513	0.1436	5.2327	9.8E-07	0.4663	1.0363	0.5381	0.0784	6.8646	0.0000	0.3824	0.6938
X Variable 1	0.3199	0.0787	4.0667	9.8E-05	0.1637	0.4760	0.5936	0.0755	7.8648	0.0000	0.4437	0.7436
X Variable 2	0.0818	0.0736	1.1120	2.7E-01	-0.0643	0.2280	-0.0506	0.0773	-0.6547	0.5143	-0.2041	0.1029

**Note: X_1 = Education dan X_2 = Income*

of $9.8x10^{-5}$ and in the Babakan Penghulu Village office of 0.0000.

The multiple linear regression equation in the Cicadas Village office, $Y = 0.7513 + 0.3199X_1 + 0.0818X_2$ and the multiple linear regression equation in the Babakan Penghulu Village office, $Y = 0.5381 + 0.5936X_1 - 0.0506X_2$.

DISCUSSION

Community participation is community involvement; in this case controlling the dengue mosquito nest. Community participation in this matter, wherever it is absolutely necessary, given that many mosquito nests in settlements and most adult mosquitoes rest in the house. The high incidence of DHF can also be caused by poor sanitation and the presence of mosquito larvae in water reservoirs. Water storage that does not have a lid or is not drained at least once a week, as well as a trash can to accommodate from daily activities that are usually placed in front of the house with an open condition associated with the presence of mosquito larvae (16). Unused and scattered items in the home environment in the rainy season will become a den for mosquitoes, such as old tires or bottles (17).

In addition, in Indonesia, given the inadequate supply of clean water and sanitation. Access to clean water is still in the range of 70-75% and sanitation is still 50-60% (18), so people still have to collect clean water at home. Also the waste system is still very inadequate, only 50% of the garbage is currently being transported. In addition, what is transported is still dumped openly / opendumping, so that there is a lot of puddle of clean water when it rains and *Aedes albopictus* likes to nest outside the home (19). Thus, the home environment is at risk of becoming a den of *Aedes* mosquitoes, as long as clean water does not meet the quantity of household needs, so people have a place to collect / supply clean water in their respective homes. This is because *Aedes aegypti* also likes to breed in places that are not exposed to sunlight (20).

Measurement of the level of participation needs to be measured, to reveal the level of knowledge, benefits, and implementation of participation that can be done with the Arnstein method. On the basis of the measurement results can be known, the problem of participation that has been running, so that it can be planned improvements needed. Table 4 shows the results of measurements of the level of community participation in the two study areas as a whole. The results of measurements of the level of community participation in both regions show that community participation is at the same level, namely at the level of manipulation, informing, and consultation. People who have done one or more activities from 3M Plus and meet the knowledge parameters, as well as the benefits of these activities can be said that he has participated. 3M Plus activities based on the RI Ministry of Health program can be seen in Table 6 (3).

3M Plus activities are considered the most effective way to prevent the spread of DHF vectors in Indonesia, because 3M Plus activities are directly carried out by the community (21).

Manipulation is the lowest level of participation in the steps of Arnstein's participation which means there is no community participation at all. At this level, the community has no knowledge of DHF and does not know the benefits of 3M Plus activities, and is forced to carry out 3M Plus activities. In Figures 1 and 2 shows that respondents have done 3M Plus activities, but the activities they do are only limited to their habits to clean the house. People who do 3M Plus do not understand mosquito breeding sites and dengue fever.

The level of informing participation is the second highest level in the two research areas, which means that the community has done 3M Plus activities voluntarily, and already knows the benefits of these activities. In Figures 3 and 4 the community has carried out 3M Plus activities, but the community does not yet have knowledge related to DHF because at this level the community only gets information in one direction.

The level of consultation participation was the third largest level in the two study areas. In Figures 5

Table 6. 3M Plus Activity

3M Program (Draining, Closing, and Recycling) 1. Drain the bathtub and water reservoirs which are done at least once a week due to the development of eggs to become mosquitoes need 7-10 days. 2. Covering the water reservoir tightly, this is done so that the place / container cannot be used as a place for mosquitoes to breed. 3. Recycling used items that can hold water, such as bottles, plastics, cans, old tires or disposing of them, so that they cannot be used as a place for mosquitoes to breed.	1.	Conducting a flower vase or drinking container replacement at a bird's nest, at least once a week.
	2.	Conduct cleaning activities of stagnant waterways that can allow mosquitoes to breed.
	3.	Maintaining mosquito larvae eating fish, such as Cuppang fish
	4.	Sowing abate powder in water reservoirs at least 2 months with a dose of 1 gram of abate / 10 liters of water. Another alternative that can be done is the use of altosoid powder in a water reservoir with a dose of 2.5 grams / 100 liters of water
	5.	Using mosquito coils, such as mosquito coils, mosquito bites, and electric.
	6.	Installing wire netting in window holes / vents to reduce mosquito entry into the house.
	7.	Do not hang clothes in the house, because it can be a mosquito rest area..
	8.	It is recommended to install a mosquito net on the bed.
	9.	Utilizing mosquito repellent plants, such as semar bags, lemongrass, geranium, lavender, and others.
	10.	Using mosquito repellent devices, such as ovitrap, larvitrap or mosquito trap.

and Figures 6 the community has carried out 3M Plus activities. The community has been doing voluntary activities because they already know the knowledge of dengue fever and the benefits of 3M Plus activities. In addition, the community has been able to issue opinions and suggestions even though there is no guarantee that the parties will do it.

Participation in the two villages is indeed still very low, although the incidence of DHF is different. What distinguishes is that there are 11, 8% of the people in Babakan Penghulu village office which have a high enough participation level, already at the level of consultation which is likely to be supported by a higher level of education than Cicadas village office, so the incidence of DHF in Babakan Penghulu is lower. This is also supported by statistical tests which state that education has a significant effect in both research areas.

The results of the study revealed that most people still felt compelled and did not fully understand the benefits of implementing 3M Plus. People who do not understand the benefits of dengue vector prevention activities will influence behavior in carrying out 3M Plus activities (22). Improvements in the quality of counseling by showing the losses that occur due to dengue fever, and the mechanism of occurrence of the disease will greatly assist participation. People who do not have knowledge related to DHF disease, the impact of DHF disease, and how to do the prevention of DHF disease will either ignore or not carry out the DHF vector control activities. For example, as in the case of the level of manipulation participation.

Communities in both research areas that did not have knowledge about dengue disease and vector control of DHF were caused by several things, the community claimed that the socialization provided was not detailed, so they did not understand the material provided. Supervision of 3M Plus activities carried out by the community by officers jumantik cadres are not done erratically, sometimes once a month, up to three months or more. In addition, the socialization given by officers was only to community leaders and to Integrated Service Post (Posyandu) activities so that people who did not have status as community leaders and did not have children under five years of age caused them not to attend socialization so that they did not get information related to DHF and vector control DHF or 3M Plus activities.

This explains that the role of health cadres or the government has an influence on the community in raising awareness by providing health education (23). Given the importance of the participation and implementation of 3M Plus, it is necessary to look for ways of counseling that are more effective because counseling is one of the health promotions to inform one's knowledge (24). Counseling can be done with a variety of props about disease, medical costs, especially because they often require blood transfusions because the health information they can will affect the knowledge of dengue vector prevention (25). It is no secret that people are still afraid of being a blood donor, even though DHF often needs blood transfusions. So prevention is better than cure by carrying out 3M Plus perfectly.

At the level of consultation, it can provide suggestions and opinions, but on average, no one wants to give advice and opinions. It's just that, there are some people giving advice to do fogging (routine fogging) for a month 1-2 times. Although fogging does not cause health effects for humans who breathe gas because it has been formulated in such a way that it is

not dangerous, but this method is not the main way to control DHF because it only kills adult mosquitoes (26). Fogging activities are only carried out during an outbreak and Epidemiological Investigation (PE) has been carried out by the Primary health. Therefore, the prevention of DHF through community participation by eliminating and preventing mosquito larvae known as 3M Plus activities is considered the most effective because mosquitoes are in the home and community environment.

The statistical test shows that education significantly supports community participation in controlling DHF vectors in both regions, while income does not support community participation. The health education of the respondents increased the awareness of respondents in protecting the environment, thereby preventing dengue outbreaks (27).

As seen in the Cicadas Village office, the highest level of education is high school and most community participation is at the level of manipulation as the lowest level of participation. Whereas in Babakan Penghulu Sub-District, the highest education was SMP 34% with the most community participation was the level of manipulation. If seen from the people's reasons for attitudes that do not care about dengue vector control activities due to lack of health information related to dengue they can get. Then there is a relationship between education and community participation in preventing dengue outbreaks. Thus, if the community is given education and health information related to DHF well, clearly, and evenly, the community will understand and have knowledge related to dengue disease that will increase the desire of the community to carry out DHF vector control activities (28).

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CONCLUSION

Based on the results of the analysis and discussion of data that have been carried out in Cicadas and Babakan Penghulu Village office, it can be concluded that in Cicadas Village office and Babakan Penghulu Village office, most respondents have the same level of participation based on the Arnstein concept, namely manipulation as the lowest community participation rate of 50.5% and 65.6%, the other small part is at the level of informing and consultation participation as an intermediate participation level.

The level of participation at the consultation level in the Babakan Penghulu village as much as 11.8% is greater than for Cicadas which only has 7.1%. This is supported by the level of education in Babakan Penghulu which is higher than that of Cicadas. In addition, 50.5% of people in the Cicadas Village office are at the level of manipulation participation, and 42.4% are at the infoming participation rate, and 7.1% of respondents are at the consultation level. This is in accordance with the education level of the Cicadas people who are classified as low, so that they can only participate at a low level. The statistical test supports the influence of education level on community participation significantly, while the level of community income in the Cicadas and Babakan Penghulu Village office does not support community participation in the control of DHF vectors.

Some suggestions that need to be conveyed, is to improve community participation in controlling DHF vectors, more equitable, continuous and more effective counseling is needed and, given the large number of vector nests outside settlements, it is recommended that cooperation between sectors with agriculture, the environment, fisheries, irrigation, finance, tourism, transportation, urban, livestock, forestry, and infrastructure.

REFERENCES

1. Soemirat J. Kesehatan lingkungan. Yogyakarta : Gadjah Mada University Press; 2014.
2. World Health Organization. Global vector control response 2017 - 2030. Switzerland: World Health Organization; 2017.
3. Ministry of Health Republic Indonesia. Regulation of Ministry of Health Republic Indonesia No.01.11/ MENKES/591/2016 about Implementation of Mosquito Nest Eradication 3M Plus with "Satu Rumah Satu Jumantik" Movement. Jakarta: Ministry of Health Republic Indonesia; 2016.
4. Arnstein SR. A ladder of Citizen Participation. *J American Planning Association*. 1969;35(4):216-224. https://doi.org/10.1080/01944366908977225
5. Dewi LS, Tan F, Nazer M. Menapaki Tangga Arnstein dalam Perencanaan Tata Ruang (Studi Kasus Kecamatan Aua Birugo Tigo Baleh Kota Bukit Tinggi). *J Spasial* 2019;6(1):19-26. http://ejournal.stkip-pgri-sumbar.ac.id/index.php/spasial/article/download/3318/pdf
6. Awaluddin A. Korelasi Pengetahuan dan Sikap Keluarga terhadap Tindakan Pencegahan Demam Berdarah Dengue. *J Endurance*. 2017;2(3):263-269. https://doi.org/10.22216/jen.v2i3.2084
7. Trapsilowati W, Agustini M, Setiyaningsih R.

Pelatihan Pengendalian Vektor Demam Berdarah Dengue di Kabupaten Sukoharjo. *Med Penelitian Pengembangan Kesehatan*. 2015;24(3):137-142. https://dx.doi.org/10.22435/mpk.v24i3.3648

8. Sari M. Hubungan Perilaku dengan Kepadatan Vektor Demam Berdarah Dengue (DBD) di Kelurahan Kuranji Kecamatan Kuranji Kota Padang. *Human Care Journal*. 2018;3(2):10-18. http://dx.doi.org/10.32883/hcj.v4i1.86
9. Sukesi T, Supriyati S, Satoto T. Pemberdayaan Masyarakat dalam Pengendalian Demam Berdarah Dengue (Literature Review). *J Vektor Penyakit*. 2018;12(2):67-75. https://doi.org/10.22435/vektorp.v12i2.294
10. Soleh AZ. Ilmu Statistika Pendekatan Teoritis dan Aplikatif Disertai Contoh Penggunaan SPSS. Bandung: Rekayasa Sains Bandung; 2005.
11. Tyas F, Kumalawati R. Hubungan Kondisi Sosial Ekonomi dengan Kualitas Rumah Tinggal di Kecamatan Banjarmasin Tengah Kota Banjarmasin. *JPG*. 2018;5(1):12-20. http://dx.doi.org/10.20527/jpg.v5i1.4985
12. Maulana R, Nurini N. Tingkat Partisipasi Masyarakat dalam Pelestarian Kampung Kauman Surakarta. *TATALOKA*. 2019;21(3):473-481. https://doi.org/10.14710/tataloka.21.3.473-481
13. Naftassa Z, Putri T. Hubungan Jenis Kelamin, Tingkat Pendidikan dan Pengetahuan terhadap Kejadian Skabies pada Santri Pondok Pesantren Qotrun Nada Kota Depok. *Biomedika*. 2018;10(2):115-119. https://doi.org/10.23917/biomedika.v10i2.7022
14. Hayana. Hubungan Sosial Ekonomi dan Budaya terhadap Partisipasi Ibu Rumah Tangga dalam Pengelolaan Sampah di Kecamatan Bangkinang. *J Kesehatan Komunitas*. 2015;2(6):294-300. https://doi.org/10.25311/keskom.Vol2.Iss6.92
15. Respati T, Raksanagara A, Djuhaeni H. Model Program Demam Berdarah Dengue, Peran Serta Masyarakat, Serta Sanitasi Dasar di Kota Bandung. *Majalah Kedokteran Bandung*. 2018;50(3):159-166. https://doi.org/10.15395/mkb.v50n3.1239
16. Azam M, Azinar M, Fibriana AI. Analisis Kebutuhan dan Perancangan "Ronda Jentik" Sebagai Model Pemberdayaan Masyarakat dalam Pembarantasan Sarang Nyamuk. *Unnes J Public Health*. 2016;4(4):294-305. https://doi.org/10.15294/ujph.v5i4.12592
17. Kirana K. Pawenang ET. Analisis Spasial Faktor Lingkungan pada Kejadian Demam Berdarah Dengue di Kecamatan Genuk. *Unnes J Public Health*.2017;6(4):226-231.https://doi.org/10.15294/ujph.v6i4.10543
18. Ministry of National Development and Planning. Roadmap of SDGs Indonesia : A Highlight. Jakarta: Ministry of National Development and Planning; 2015.
19. Heriawati D, Umami S, Supardan D, Suhirman. Distribution of *Aedes Albopictus* Mosquitoes in Indonesia. *In*: *2nd International Conference on Islam, Science and Technology*. 2020;408:194-199. https://doi.org/10.2991/assehr.k.200220.035
20. Arfan I. Keberadaan Jentik *Aedes Sp* Berdasarkan Karakteristik Kontainer di Daerah Endemis dan Non Endemis Demam Berdarah Dengue. *J Ilmiah Ilmu Kesehatan*. 2019;5(2):258-266. https://doi.org/10.33485/jiik-wk.v5i2.140
21. Ramadhani F, Yudhastuti R, Widati S. Pelaksanaan PSN 3M Plus untuk Pencegahan Demam Berdarah Dengue (Studi Kasus Masyarakat Desa Kamal). *Gorontalo Journal of Public Health*. 2019;2(2):139-145. https://doi.org/10.32662/gjph.v2i2.584
22. Sinta P. Hubungan Perilaku 3M Plus Masyarakat Dengan Kejadian DBD di Wilayah Kerja Puskesmas Gambirsari Surakarta. *J Ilmiah Kesehatan Media Husada*. 2018;7(2):93-104. https://doi.org/10.33475/jikmh.v7i2.25
23. Endartiwi S. Pengaruh Sikap Kader Kesehatan Terhadap Pengendalian Demam Berdarah Dengue. *J Manajemen Kesehatan Yayasan RS Dr Soetomo*. 2018;4(2):84-97. https://doi.org/10.29241/jmk.v4i2.111
24. Zulaikhah ST, Yusuf I. Pengaruh Penyuluhan terhadap Kepadatan *Aedes aegypti* dalam Pencegahan Demam Berdarah. *J Fakultas Kesehatan Masyarakat*. 2017;12(1):1-7. http://dx.doi.org/10.12928/kesmas.v12i1.6627
25. Ernawati K, Widianti D, Yusnita Y, Batubara L, Jannah F, Rifqaatusa'adah RA. Hubungan Paparan Informasi dengan Pengetahuan Pengendalian Vektor Nyamuk DBD di Desa Koper, Kecamatan Kresek, Kabupaten Tangerang. *YARSI Medical J*. 2020;27(3):144-151. https://doi.org/10.33476/jky.v27i3.1267
26. Pratiwi D, Hargono R. Analisis Tindakan Warga Desa Payaman dalam Mencegah Penyakit DBD. *J PROMKES*. 2018;5(2):181-192. http://dx.doi.org/10.20473/jpk.V5.I2.2017.181-192
27. Sukendra DM, Indrawati F, Hermawati B. Perbedaan Pengetahuan Ibu Terkait Demam Berdarah Dengue dan Praktik Pencegahan dengan Suna Trap. *HIGEIA*. 2017;1(4):143-153. https://journal.unnes.ac.id/sju/index.php/higeia/article/view/17828
28. Sukesi T, Supriyati S, Satoto TBT. Pemberdayaan Masyarakat dalam Pengendalian Demam Berdarah Dengue (Literature Review). *J Vektor Penyakit*. 2018;7(1):67-76. https://doi.org/10.22435/vektorp.v12i2.294