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Community Willingness to Participate in A Mosquito Breeding Site Eradication Program: A Study in Bandung, West Java, Indonesia

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ABSTRACT

Despite many efforts to prevent dengue, vector control still promising specially through integrated vector management. This effort requires community participation. Therefore, it is crucial to understand the factors that are associated with the willingness of communities in high prevalence areas to participate in mosquito breeding eradication program. This study explored factors associated with the willingness of community members in Bandung to participate in the mosquito breeding eradication program initiated by Indonesian's government, called One House One Larvae Monitor. A community-based cross-sectional study was carried randomly at sub-district level in Bandung from January-November 2018. Interviews using a set of validated questionnaires were conducted to collect data on demography, socioeconomic status, knowledge, attitude and practice regarding implementation of the program. Among 210 participants, the proportion of low-to-middle knowledge, attitude, and practice (KAP) index is more prevalent. Yet, for attaining high-score on KAP, there are three main predictors observed; by being female, at least had attend undergraduate level of education, and being an entrepreneur. A good score in the attitude section does not necessarily translate to good score in the practice section. The results reflect the need for better tools for changing the behavior of society, and it should not be limited to enhancement of society's knowledge.

Keywords *: KAP index; Bandung; mosquito control program; community participation*

INTRODUCTION

Dengue virus infection is one of the most important vector-borne disease in the world (Huntington MK, Allison J, 2016). Bhatt *et al*. estimated about 390 million DENV infections occurring each year, of which 96 million were seemingly evident (Bhatt et al., 2013). [In Indonesia, the first dengue reports in Jakarta and Surabaya were in 1968. Since then, it has been expanding in incidence and geography, and is likely hyperendemic nationwide (Suwandono et al., 2006)); (Karyanti et al., 2014), including Bandung (Respati & Ardini Raksanagara, Henni Djuhaeni, 2017). The disease results in loss of productivity, school absenteeism, and aggravation of poverty, high costs for health care and a burden on public health services (Elsinga et al., 2017).

As neither effective medication nor vaccines are available for DENV, vector control remains pivotal (Matthews, Dobson, Nkot, Wiles, & Birchmore, 2009). Vector control is crucial to reduce the burden of the disease. Vector control has a long-standing, proven record of preventing, reducing and eliminating vector-borne diseases (Townson et al., 2005). This strategy has been developed into chemical, biological, and physical controls (DeRoeck, Deen, & Clemens, 2003).

In implementation of vector-borne disease control, the term community participation has been broadly interpreted. Community-based vector control projects have been described as having both active and passive components (Ralph T. Bryan, Fanor Balderrama, Robert J. Tonn, 1994). National policy for vector control program is conducted by a combination of malathion fogging, temephos larviciding and source reduction.

The mass fogging is carried out during an epidemic under the supervision of Health Officers. The focal fogging is applied in an area within a radius of 100 m from DHF case happened. This is carried out by volunteers under the supervision of health workers. Mass larviciding during an epidemic and in highly endemic areas is considered as the complementary measure. The source reduction is conducted by community participation. Mass fogging have been expensive in terms of the chemicals and equipment used. They consume much time and labor if used as the primary methods of prevention, not to mention that it caused mosquito resistance problem (Soedarmo, 1994).

More priority should be given to the source reduction through community participation in order to prevent DENV [11]. Unfortunately, it remains challenging to achieve community participation in this program, as previous study showed the lack of community participation in Bandung City (Lia Faridah, Titik Respati, Sunarjati Sudigdoadi, 2017). As crucial as it is, community participation in vector control for dengue remains a neglected topic in scientific literature (Elsinga et al., 2017). This strategy is driven by many social, economic and psychological factors, which need to be addressed for forging and implementing the effective health policy (Gunn et al., 2018), (Glanz & Bishop, 2010), (World Health Organization, 2012)). In Indonesia, several strategies have been done to strengthen community participation including a new program called "one house one larvae monitor". There is a gap on factors that influence the engagement of community participation to implement the new program. This study intends to know the knowledge, attitude and practice of community participants in implementing new strategy in Bandung City.

METHODS

Sampling locations

This is a cross-sectional survey on communities and volunteers at 16 villages in Bandung City who had always supported government's programs. The sixteen villages were chosen with stratified random sampling based on 4 parameters: dengue incidence, population density, altitude and socio-economic condition.

Sampling method

Sampling units (households) were allocated proportionally to the sample size. The inclusion criteria for respondents which represented each household were: (1) female, (2) age above 16 years-old, (3) permanent resident in the area, (4) agreed to sign inform consent. The sample size was determined by non-probability sampling (quota sampling) and the calculation was done according to the equation (Joseph R Egger a, Eng Eong Ooi b, David W Kelly c, Mark E Woolhouse d, Clive R Davies a, 2008):

$$n = \frac{Z^2\, p\, (1-p)}{E^2}$$

Where:

n = The sample size

E = Acceptance error of 10%

Z = 1.96 (the standard normal score at the 95% confidence interval)

P = 0.50 (P value of prevalent knowledge regarding mosquito is taken as 50%) (Dhaduk et al., 2013)

The sample size was increased by 10% to allow for any missing or incomplete data that might occurred during the data collection (Sayavong, Chompikul, Wongsawass, & Rattanapan, 2015). Consequently, the required sample size was at least 106 households, minimal 7 houses for each village. Each household was represented by a mother or adult woman who was in charge of their house daily.

Instrument

Validated questionnaires consisted of 49 questions were divided into 4 parts: (1) socio-demographic characteristics (age, gender, education, occupation); (2) knowledge (15 questions); (3) attitude (15 questions); (4) practice (15 questions).

Ethics

This study approved by the ethics committee of Universitas Padjajaran with the ethical clearance registration number 071711.

Data collection

The questionnaire was tested for its validity and reliability by randomly selecting 30 respondents in Bandung. Three research assistants were standardized before collecting data. The interviews were done face to face and it required at least 10 minutes of time to completely fill the questionnaire. Permission for data collection was obtained from Bandung City Government and Bandung Health Institution, under the umbrella of our university's Dengue Project. Inform consent of the participants were taken after explaining the purpose of the study and noting their willingness to share the information. All data were recorded in Microsoft Excel 2007 sheet for further analysis.

Data analysis

The response from questionnaire were transformed into binary array, then each respondent was scored as the sum of its positive answers. Participants who have scored below and equal to first quartile; between first and third quartile; and equal and above third quartile were classified as low, middle, and high-scoring participants, respectively. Each question was assessed for its 95% confidence interval of, and its margin of error, as displayed on the tables below (Table 1-4). Demographic factors were evaluated to see its impact on the odds of having high score, calculated through multivariate logistic regression, performed on R Studio, and rounded to two decimal places.

RESULTS AND DISCUSSION

Demography

This study used 210 participants from across Bandung City, with the age ranged from 20 to 72 years old. The most prevalent ages were between 35-49 years old, while there were only 6.7% participants who were above 65 years old. Female made a large portion of respondents (63.3%). Almost half of the participant had attained at least undergraduate level of education (41.9%), while the least fractions of respondents only received secondary education (3.3%). Interestingly, almost half of the participants were identified as housewives/unemployed (49.1%), followed by employee (25.7%, either as civil servants or in private sector). From the employed ones, only 3.3% (of total respondents) were health workers or related occupation (such as the volunteers in the Indonesian health care system). Only 5.7% of the respondents has been retired, showing that most of our respondents were economically in the productive stage.

Knowledge, attitude, and practice

As shown in **Figure 1,** most of the respondents scored low to middle level on KAP (Knowledge, Attitude and Practice) assessment. It is should be noted that the low, medium, and high indicator are designated to participants who scored less than or equal to1st quartile, between first and third quartile, and equal & higher than third quartile, respectively. Further analysis showed that several predictors could affect the odds of high score with the KAP assessment, as shown in **Table 1.** Being female, having at least undergraduate education, and being an entrepreneur are the main predictors of attaining high score.

Table 1. Survey participant demographic information and its odds ratio for level of knowledge, attitude and practice

Characteristics	% (N=210)	Odds ratio
Sex		
Male	36.7 (77)	-
Female	63.3 (133)	0.91
Age		1.03
20-34	26.7 (56)	-
35-49	43.3 (91)	-
50-64	23.3 (49)	-
65-79	6.7 (14)	-
Education		
Primary	10 (21)	-
Secondary (Middle school)	3.3 (7)	0.65
Tertiary (High school)	28.1 (59)	0.90
Vocational high school	10 (21)	0.24
Diploma	6.7 (14)	-
Undergraduate	41.9 (88)	0.94
Occupation		
Unemployed/housewives	49.1 (103)	1.00
Health workers	3.3 (7)	-
Employee	25.7 (54)	0.34
Entrepreneur	8.1 (17)	4.34
Teacher	8.1 (17)	-
Retired	5.7 (12)	1.56

Table 2. Knowledge of dengue first aid and symptoms

Indicators	n (N=210)	% (95% C.I.)
Knowledge		
Know one of the signs of dengue infection is 2-7 days of fever	203	96.7 (94.2 – 99.1)
Know how to do first aid	196	93.3 (89.9 – 96.7)
Know that people with fever should be given tepid sponging	182	86.7 (82.1 – 91.2)
Know that fever sufferers should wear loose clothes	161	76.7 (70.9 – 82.3)
Know another symptom of dengue infection	147	70 (63.8 – 76.2)
Know when fever sufferers should be taken to a doctor	140	66.7 (60.3 – 73)
Know that people with dengue fever complains heartburn	133	63.3 (56.8 – 69.9)
Know the dose of antipyretic	105	50 (43.2 – 56.8)
Know that fever sufferers should be in a cool room	98	46.7 (39.9 – 53.4)
Know that fever sufferers should drink a lot	98	46.7 (39.9 – 53.4)

Table 3. Attitude towards dengue prevention

Indicators	n (N=210)	% (95% C.I.)
Attitude		
Agree that you are responsible for regularly reporting to health workers	203	96.7 (94.2 – 99.1)
Agree that by planting Lavender flowers can repel mosquitoes	203	96.7 (94.2 – 99.1)
Agree that if there is a dengue epidemic, it must report to health officials, related agencies or local community elements that are authorized	196	93.3 (89.9 – 96.7)
Agree that monitoring mosquito larvae is done once a week	196	93.3 (89.9- 96.7)
Agree that the sowing of Abate powder is carried out two to three months at a rate of 10 grams abate (approximately 1 tablespoon) for 100 L of water	189	90 (85.9 – 94.1)
Agree that giving Abate powder can kill mosquito larvae?	189	90 (85.9 – 94.1)
Agree to the task of checking empty and uninhabited houses to check mosquito larvae	168	80 (74.5 – 85.4)

Table 4. Practice towards dengue prevention

Indicators	n (N=210)	% (95% C.I.)
Practice		
Prevented dengue by draining, closing, recycling, cleaning mosquito breeding sites	203	96.7 (94.2 – 99.1)
Checked for the presence of mosquito larvae in water reservoirs to prevent dengue	203	96.7 (94.2 – 99.1)
Checked the existence of clothes hanging in people's homes and socialized them to residents to avoid hanging clothes	175	83.3 (78.3 – 88.4)
Plant lavender flowers at home	161	76.7 (70.9 – 82.4)
Reported to health workers, related agencies or local community elements who were authorized when there were residents affected by dengue	147	70 (63.8 – 76.2)
Monitored mosquito larvae once a week	147	70 (63.8 – 76.2)
Done fogging to eradicate mosquito nests	112	53.3 (46.6 – 60.1)
Checked the swimming pool and fish pond to be free of mosquito larvae	105	50 (43.2 – 56.8)
Routinely report on monitoring mosquito larvae in your own house and the surrounding environment to health workers	105	50 (43.2 – 56.8)
Sprinkled Abate powder which is done every two to three months at a rate of 10 grams abate (approximately 1 tablespoon) for 100 L of water and socializes it	84	40 (33.4 – 46.6)
Sowed Abate powder to kill mosquito larvae	77	36.7 (30.2 – 43.2)
Used a mosquito net during sleep and socialized it to prevent dengue	70	33.3 (27 – 39.7)
Checked an empty and uninhabited house to check mosquito larvae	70	33.3 (27 – 39.7)
Trained to become a Jumantik cadre	49	23.3 (17.6 – 29.1)

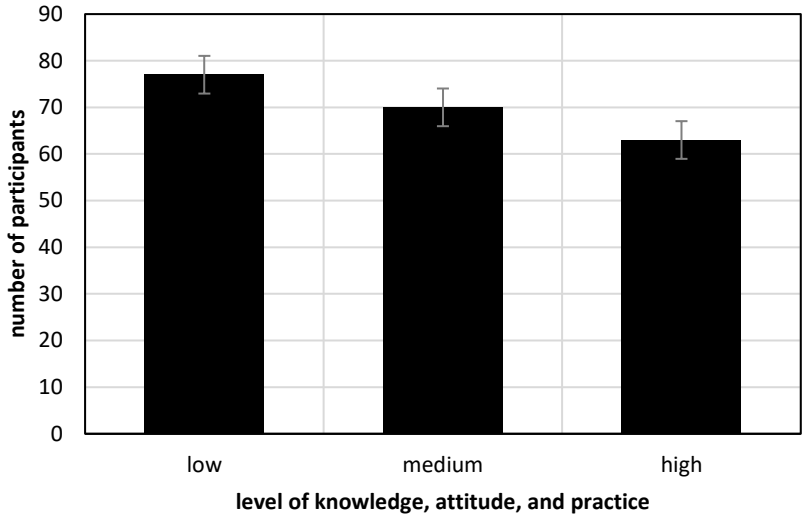

Figure 1: Distribution of knowledge, attitude, and practice level regarding dengue symptoms and first aid. The low, medium, high indicator are designated as participants having score less and equal than 1st quartile, between first and third quartile, and equal and higher than third quartile, respectively.

Delving more deeply into the questions of the KAP assessment, there are four questions that significantly have more positive answers than the rest. This include (1) '*Know one of the sign of dengue infection is 2-7 days of fever',* (2) *'Agree that you are responsible for regularly reporting to health workers',* (3) *'Prevented dengue by draining, closing, recycling, cleaning mosquito breeding sites',* and (4) *'Checked the presence of mosquito larvae in water reservoirs to prevent dengue'.* Questions (1) is obtained from Knowledge section, questions (2) from Attitude section, and questions (3) and (4) obtained from Practice section (table 2, 3, 4).

Nevertheless, there are some questions that signify low positive results. Two questions from Knowledge section only answered positively by 46.7%, which is *'Know that fever sufferers should be in a cool room',* and *'Know that fever sufferers should drink a lot'.* Moreover, there are five questions in the Attitude sections that answered positively by less than 50% of the respondents. Those are *'Sprinkled Abate Powder which is done every two or three months at a rate of 10 grams Abate…', 'Sowed Abate powder to kill mosquito larvae', 'Used mosquito net during sleep and socialized it to prevent Dengue', 'Checked an empty and uninhabited house to check mosquito larvae',* and *'Trained to become Jumantik cadre'.* Yet, in the Indicators section, generally there are no low-scoring questions.

This study was carried out to assess the knowledge, attitude, and practice of community participants in Bandung City. There is need to evaluate the gap on factors that influence the engagement of community participation to implement new "One House One Larvae Monitor" program. In short, what is observed from the results is there are certainly low overall score of KAP assessment from study participants (figure 1).

Low overall KAP score obtained from study participants also reflected by other previous studies. In Peri-Urban of Vientiane, the depth of their knowledge on Dengue was still low (Mayxay et al., 2013). Moreover, in semi-urban town in Malaysia, knowledge about Dengue transmission and control also deemed insufficient (Cho Naing, 2011). This shows that there is urgent need to improve the depth of

understanding in society about the Dengue and close the gaps so that people have better collective participation in new programs. 'Good attitude does not translate into good practice' phenomenon is a recurring pattern that emerges in this variety of study.

As shown in this study, there is no low-scoring questions (below 50% positive) in the attitude section, yet there are 4 low-scoring questions in the Practice section. A cross-sectional survey in Kuala Kangsar, Malaysia found that good knowledge does not necessarily lead to good practice (Hairi et al., 2003). A similar study conducted in Aligarh, India, showed typical results too, where society that receptive to the messages and adopted a change of behaviour is expected (Abedi, Khan, Ansari, & Amir, 2011). This shows that there is need for other means in translating and changing the behaviour of society in terms of Dengue programs, where not only knowledge is enhanced.

Main predictors of high indexes in this assessment is by being female, which is shown also in previous studies such as in Cambodia. This reflects on the social role of women in Indonesia as a caretaker, which imply higher odds of knowing and practically doing measures to prevent Dengue directly. The second one is education, where the longer of education duration is correlated to the higher odds of attaining overall higher score of this study KAP assessment. This pattern also found on previous studies where education level is correlated with higher understanding of Dengue (Shuaib, Todd, Campbell-Stennett, Ehiri, & Jolly, 2010), and that family's knowledge positively correlated with dengue prevention program (Hadriyati, A., Marisdayana, R., & Ajizah, 2016), for example the Indonesian 3M Plus program (AWALUDDIN, 2017).

The last predictor for high level of knowledge discovered in this study is by being an entrepreneur. This is one of the unique findings since health workers even does not make it to the top predictor of having high level of Dengue knowledge. This could be resulted from the inadequate sampling problem, which randomly selects large portion of high knowledge entrepreneur, while also include low-knowledge health workers.

CONCLUSION

To conclude, study participants in Bandung generally have low-to-medium knowledge regarding knowledge, attitude, and practice of Dengue prevention. The main predictor of high level of knowledge is by being female, attend undergraduate level of education, and being an entrepreneur. Another major finding is that good score in the attitude section does not necessarily translate to good score in the practice section. This imply a need to increase not only Dengue knowledge of the society, but also its practical behaviour so that the program implemented will have better success.

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