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Effect of Vector Control Strategy on Reduction of Dengue Fever Cases on Children of Elementary School

Asriwati¹, Arsunan A. A.², A. Zulkifli Abdullah³, Hasanuddin Ishak³

¹Postgraduate Doctoral Program, Faculty of Public Health, Hasanuddin University, ²Nursing Academy of Baturaja Bone, Bone, South Sulawesi, Indonesia, ³Epidemiologi Department, ¹Epidemiologi Department, Faculty of Public Health, Hasanuddin University, South Sulawesi, Indonesia

ABSTRACT

The dengue epidemic is influenced by the environment by the number of puddles and containers containing the puddle of rain water that became the breeding ground for Aedes aegypti mosquitoes. The larval monitoring activity is useful to increase early awareness of the presence of DHF vectors in the school environment. All the components of the school community and activate the school health program with larva examiner students, in an effort to reduce the cycle of dengue transmissible breeding with empowerment done by increasing knowledge and skills of vector control. This research uses quantitative research with prospective study using experimental quasi design with two group pretest and post test design with inferential causal design. The second stage of entomology evaluation. Data collection was performed by larva monitoring at each school for 6 months. The sample of 108 teachers of the school health business coaches were divided into four groups. Data were analyzed by paired t test and Anova. The free number of larvae was obtained after intervention survey results were highest in group I (88,9), HI (96,3 ) highest group II while CI (43,13) and BL (9,68 ) on group IV. The results of Anova test there are differences in house index, free number of larvae, index container, and breuke index between the research groups. Increased of larva free number can break the life cycle of mosquitoes so that population density and mosquito regeneration will decrease.

Keywords: Dengue, COMBI, Behavior, module

INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is one of the infectious diseases which is still a priority health problem since it often lead to Extraordinary Occurrence and cause death.¹ This disease is caused by dengue virus that is spread by Aedes aegypti mosquito as the main vector. The number of patient and the area of its spreading increasing along with the increasing of mobility and population density.²,³ The increasing number of Dengue Hemorrhagic Fever patients is caused by the unevenness of public awareness on the importance of environmental health in general, especially to keep home, school and surrounding areas free from Aedes aegypti mosquito breeding, in addition, people's habits to hold water longer such as in tubs, jars, drums and others are difficult to remove in a short time.⁴ The cause of the increasing number of cases and the increasing number of infected areas, among others, due to the increasing number of immigration so that the presence of new settlements, traditional water storage that is still maintained by the community and the behavior of the community against the cleaning of mosquito nests that are still lacking.⁵ School-age children are the next generation of the nation that needs supervision and monitoring, especially health issues because health will shape healthy behaviors so that growth and development will greatly affect to create a healthy generation as well. School is a place to learn and play where children spend more time than home.⁶,⁷,⁸

MATERIALS AND METHOD

This study used a prospective study with quasi experimental design with two group pretest and post test design. This means that the researcher wants to compare the purpose of pre-training influence and not training, then the researcher explores the knowledge, attitude and action of the School health program implementing teacher. In the second phase, entomology evaluation was performed. Data collection was performed by larva monitoring at each school for 6 months. The sample of a portion of the population is determined by the extent
of the survey results, as many as 108 teachers of School Health Business development which is divided into
four groups. Instrument data collection in the form of questionnaire. The data were analyzed by using paired t
parametric test using SPSS software.

RESULT AN D DISCUSSION

Knowledge will influence behavior as intermediate
impact and health behavior will influence the increase of
public health indicator as outcome of health education.
Aegypti mosquito control strategy is performed to reduce
morbidity and mortality rate by knowing its breeding
place and break the chain of transmission or life cycle of
Aegypti mosquito through epidemiological observation.
This problematic can be eliminated by trying to apply a
Combi method approach based on local culture. School-
age children are the next generation of the nation that
needs supervision and monitoring, especially health issues
because health will shape healthy behaviors so that growth
and development will greatly affect to create a healthy
generation as well. Good environmental management will
reduce the density of vector causes of dengue.9

1. Overview of research location: This study
was conducted in 28 districts in Bone District
as a potential area for breeding Aedes aegypti
mosquitoes. Dengue disease caused by dengue
virus with the main vector of Aedes aegypti
and Aedes albopictus mosquitoes, is a disease that
becomes one of the main handling priorities.
Number of Dengue Fever incidents nationally
fluctuates from year to year. This happens because
Aedes mosquitoes breed in clear clogs and are not in
direct contact with soil. The usual breeding places
around the housing are flower vases, pools/bathtubs
even in refrigerators’ disposal. While outside the home commonly found place Aedes
aegypti larvae in empty cans, used tires, plastics,
used ponds and others.10

2. Knowledge

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Pre</th>
<th>Post 1</th>
<th>Post 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modification module</td>
<td>8.4</td>
<td>12.96***</td>
<td>14.81***</td>
</tr>
<tr>
<td>Conventional module</td>
<td>8.3</td>
<td>11.93***</td>
<td>14.15***</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Pre</th>
<th>Post 1</th>
<th>Post 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training + modification training</td>
<td>42.15</td>
<td>46.63***</td>
<td>49.67***</td>
</tr>
<tr>
<td>Training + conventional module</td>
<td>42.93</td>
<td>46.04***</td>
<td>48.33***</td>
</tr>
<tr>
<td>Modification module</td>
<td>42.89</td>
<td>45.41***</td>
<td>47.44***</td>
</tr>
<tr>
<td>Conventional module</td>
<td>42.63</td>
<td>44.67***</td>
<td>46.59***</td>
</tr>
</tbody>
</table>

*p<0.05  **p<0.01  ***p<0.001

The results of study showed that all respondents
had increased knowledge compared to the
initial measurement. This suggests that
modification module interventions can improve
the knowledge of health school implementing
teachers, there is a difference in knowledge at
the start of measurements with second, and third
measurements. Judging from characteristics of
respondents, respondents 1 and group 3 with
a relative undergraduate education compared
to other groups, so that it can have an effect on
improving the overall knowledge. In addition, this
group has long been exposed to information about
the control of Dengue Vectors.

This result is in line with research by Saurab et al11
stating that one’s education plays an important
role in increasing the knowledge acceptance and
awareness related to behavioral change to improve
its health status.

3. Attitude: Attitude is a reaction or response that is
still closed from someone to a stimulus or object.
It can be concluded that the manifestation of the
attitude cannot be directly seen, but can only be
interpreted first. Attitude is not yet an action or
activity, but it is a predisposition to the action of
a behavior. Explain that attitude has main
components, namely: Belief, ideas and concepts
of an object, Emotional life or evaluation of an
object, tend to act. The function of attitude is open
reaction or activity, but it is predisposing behavior
(action) or closed reaction.

Table 2: Change of respondent attitude score before
and after intervention

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Pre</th>
<th>Post 1</th>
<th>Post 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training + modification training</td>
<td>42.15</td>
<td>46.63***</td>
<td>49.67***</td>
</tr>
<tr>
<td>Training + conventional module</td>
<td>42.93</td>
<td>46.04***</td>
<td>48.33***</td>
</tr>
<tr>
<td>Modification module</td>
<td>42.89</td>
<td>45.41***</td>
<td>47.44***</td>
</tr>
<tr>
<td>Conventional module</td>
<td>42.63</td>
<td>44.67***</td>
<td>46.59***</td>
</tr>
</tbody>
</table>

*p<0.05  **p<0.01  ***p<0.001
Table 2 shows that all attitudinal attitudes increased significantly in second measurement (post test II) both in the training group both with modification module and conventional module without training.

Bivariate analysis was done to get the result of the analysis of the influence of each research variable in both groups, the intervention group as the treatment group and the non-intervention group as the control group.

The results showed that there was an influence on the improvement of attitude of the UKS implementing teachers on the eradication of dengue mosquitoes in both the intervention group and the non-intervention group, but the improvement of the attitude of the UKS implementing teachers in the intervention group was higher than in the non-intervention group. The results also showed that after the intervention of training with modification module, there was a significant difference in the improvement of teacher knowledge ($p = 0.002$).

Influence of Intervention of existing guidance module on improving teacher attitude health school implementation eradication of dengue fever is evident. This shows that training not only improves knowledge, but also makes teachers understandable. Hence, it will give birth to an attitude, attitudes encourage the birth of behavior to take action in eradicating DHF mosquitoes. Action will become an individual habit if done continuously. This is in accordance with the opinion Notoatmodjo which states the third evaluation level is the application, the ability to use the material that has been studied in real situations or conditions. This study is in line with that delivered by Dwijatomo, which states that attitudes gained through experience will have a direct impact on subsequent behavior.

### 4. Practice:

#### Table 3: Change of respondent’s practice score before and after intervention

<table>
<thead>
<tr>
<th>Practice</th>
<th>Pre</th>
<th>Post 1</th>
<th>Post 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training + modification module</td>
<td>5.67</td>
<td>9.78***</td>
<td>10***</td>
</tr>
<tr>
<td>Training + conventional module</td>
<td>5.41</td>
<td>8.44***</td>
<td>9.67***</td>
</tr>
<tr>
<td>modification module</td>
<td>5.33</td>
<td>7.93***</td>
<td>8.48***</td>
</tr>
<tr>
<td>conventional module</td>
<td>5.37</td>
<td>7.56***</td>
<td>8.26***</td>
</tr>
</tbody>
</table>

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 3 shows that all attitudinal attitudes increased significantly in the second measurement (post test II) both in the training group both with modification module and conventional module without training.

Table 4 shows that there is an effect on the improvement of the action of the health school implementing teachers on the eradication of dengue mosquitoes in the treatment group, when compared before the intervention after intervention ($p <0.05$). The non-intervention group did not experience increased knowledge ($p>0.05$), but the increase in knowledge in the intervention group (mean difference = 0.30) compared to the non-intervention group decreased (mean difference = 0.07).

### 5. Numerical Density Rate

a. House Index and larvae free number

#### Table 4: Density measurement results based on house index and larva free numbers

<table>
<thead>
<tr>
<th>Mouth Density</th>
<th>School</th>
<th>positive school larva</th>
<th>HI</th>
<th>Larva Free Number (100-HI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training + modification module</td>
<td>27</td>
<td>3</td>
<td>11,1</td>
<td>88,9</td>
</tr>
<tr>
<td>Training + existing guidance module</td>
<td>27</td>
<td>26</td>
<td>96,3</td>
<td>3,7</td>
</tr>
<tr>
<td>Modification module</td>
<td>27</td>
<td>15</td>
<td>55,6</td>
<td>44,4</td>
</tr>
<tr>
<td>Existing guidance module</td>
<td>27</td>
<td>24</td>
<td>88,9</td>
<td>11,1</td>
</tr>
<tr>
<td>P</td>
<td>0,000</td>
<td>0,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4 shows that the index house number is lowest in training and modification module HI (11.1), so the highest larva free rate is also in larva free number (88.9), the highest index house number in group II was HI (96.3). The result of Anova test showed that there was difference of house index and larva free number between research (p<0.05).

b. Container index

Table 5: Distribution of larva density based on container type

<table>
<thead>
<tr>
<th>Containers</th>
<th>Training + modification module</th>
<th>Training + existing guidance module</th>
<th>Modification module</th>
<th>Existing guidance module</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>+</td>
<td>CI</td>
<td>n</td>
</tr>
<tr>
<td>Bathtub</td>
<td>21</td>
<td>0</td>
<td>0.0</td>
<td>26</td>
</tr>
<tr>
<td>Dispenser</td>
<td>22</td>
<td>0</td>
<td>0.0</td>
<td>24</td>
</tr>
<tr>
<td>Pot</td>
<td>25</td>
<td>0</td>
<td>0.0</td>
<td>15</td>
</tr>
<tr>
<td>Bucket</td>
<td>25</td>
<td>2</td>
<td>8.0</td>
<td>23</td>
</tr>
<tr>
<td>Gutters</td>
<td>14</td>
<td>1</td>
<td>7.1</td>
<td>1</td>
</tr>
<tr>
<td>Barre</td>
<td>14</td>
<td>0</td>
<td>0.0</td>
<td>17</td>
</tr>
<tr>
<td>Drum</td>
<td>8</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
</tr>
<tr>
<td>Tire</td>
<td>13</td>
<td>1</td>
<td>7.7</td>
<td>15</td>
</tr>
<tr>
<td>Cans</td>
<td>17</td>
<td>0</td>
<td>0.0</td>
<td>12</td>
</tr>
<tr>
<td>Trash can</td>
<td>6</td>
<td>0</td>
<td>0.0</td>
<td>6</td>
</tr>
<tr>
<td>Toilet</td>
<td>2</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
</tr>
<tr>
<td>Pool</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>refrigerator</td>
<td>1</td>
<td>1</td>
<td>100.0</td>
<td>0</td>
</tr>
<tr>
<td>Sink</td>
<td>3</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Bottle</td>
<td>6</td>
<td>0</td>
<td>0.0</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 5 shows that the most container types in group I were flowerpot and bucket (25 pieces), group II was bathtub (26), group III was bathtub (23 pieces) and group 4 was bucket (24 pieces). The most positive types of containers in group I and group III were refrigerator gutters (100%), group II was gutter (100%) and group III was used tin (46.7%).

Table 6: Measurement Result of larva density based on index container and breteau index

<table>
<thead>
<tr>
<th>Density of larvae</th>
<th>Number of container</th>
<th>Container Positive</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training + modification module</td>
<td>177</td>
<td>5</td>
<td>2.8</td>
</tr>
<tr>
<td>Training + Existing guidance module</td>
<td>165</td>
<td>56</td>
<td>33.9</td>
</tr>
<tr>
<td>Modification module</td>
<td>159</td>
<td>32</td>
<td>20.1</td>
</tr>
</tbody>
</table>

Contd...

<table>
<thead>
<tr>
<th>Existing guidance module</th>
<th>151</th>
<th>69</th>
<th>45.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>density of larvae</th>
<th>Container Positive</th>
<th>BI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training + modification module</td>
<td>5</td>
<td>0.05</td>
</tr>
<tr>
<td>Training + Existing guidance module</td>
<td>56</td>
<td>0.56</td>
</tr>
<tr>
<td>modification module</td>
<td>32</td>
<td>0.32</td>
</tr>
<tr>
<td>Existing guidance module</td>
<td>69</td>
<td>0.69</td>
</tr>
<tr>
<td>P</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

The highest Container value of index in group existing guidance module was 45.7 and the lowest in group Training and modification module was 2.8. The result of Anova test showed that there was difference of index container between research group (p<0.05).
Table also shows that breteau index is lowest in group training and modification module, so the highest number of larvae free also in group I, and highest in group intervention existing guidance module. The result of Anova test showed that there was difference of breteau index between study group (p <0.05).

The result of the research showed that the house index was the lowest in the group training and modification module intervention (11.1), so the highest larva free rate was also in group I (88.9), the highest index house number in group II was 88.9. The result of Anova test showed that there was difference of house index and larva free number between research group (p <0.05).

The most container types in group I was flowerpot and bucket (25 pieces), in group II was bathtub (26 pieces), group III was bathtub (23 pieces) and group IV was bucket (24 pieces). The most positive types of containers in group I and group III were refrigerator gutters (100%), group II was gutter (100%) and group III was used tin (46.7%).

The highest Container value of index in group IV was 45.7 and the lowest in group I was 2.8. Anova assay results showed that there was a difference of index container between the study groups (p <0.05).

Breteau index is the lowest number in group I, so the highest number of larvae free also in group I, and highest in group IV. The result of Anova test showed that there was difference of breteau index between study group (p <0.05).

Implementation of all community members of the school and activate the larva examiner health business program student as an effort to reduce the cycle of dengue transmitting reproduction by empowerment which is done by increasing the knowledge and skills of vector control. This is in line with the research conducted by Chanuai Suwannbamrung,11 suggests that community and community leaders can lower the entomology vector indicator of Dengue Hemorrhagic Fever that is house index (HI), container index (CI) and breteau index (BI) and build sustainability program.

The dengue epidemic is influenced by the environment with the number of puddles and containers containing the puddle of rainwater that became the breeding ground for Aedes aegypti mosquitoes.12-14

**CONCLUSION**

There is influence of information delivery with modification module approach to change of knowledge, attitude, and behavior of DHF vector control. The highest effectiveness of knowledge, attitude, and behavior improvement in the group receiving training and modification module compared to training with existing guidance module.

**Ethical Clearance:** Taken from university committee

**Source of Funding:** Author their selves

**Conflict of Interest:** None

**REFERENCES**


