Review of Multicentre Project to Control DHF Vectors by Community Participation in WHO, SEARO

Jun Akiyama

Former WHO Regional Entomologist, WHO/SEARO, New Delhi, India

Dengue haemorrhagic fever (DHF) has been a leading cause of hospitalization and death among children in many South-East Asian countries for over two decades. DHF continues to persist in Indonesia, Myanmar and Thailand where it is prevalent in endemic

<table>
<thead>
<tr>
<th>Country</th>
<th>Incidence rate per 100 000 population</th>
<th>Number of deaths</th>
<th>Fatality rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>8.3</td>
<td>460</td>
<td>3.39</td>
</tr>
<tr>
<td></td>
<td>9.9</td>
<td>600</td>
<td>3.65</td>
</tr>
<tr>
<td></td>
<td>13.4</td>
<td>1 039</td>
<td>4.56</td>
</tr>
<tr>
<td></td>
<td>27.4</td>
<td>1 527</td>
<td>3.20</td>
</tr>
<tr>
<td></td>
<td>5.8</td>
<td>464</td>
<td>4.50</td>
</tr>
<tr>
<td></td>
<td>7.1</td>
<td>458</td>
<td>3.51</td>
</tr>
<tr>
<td>Myanmar</td>
<td>7.1</td>
<td>134</td>
<td>5.03</td>
</tr>
<tr>
<td></td>
<td>5.6</td>
<td>111</td>
<td>5.06</td>
</tr>
<tr>
<td></td>
<td>18.6</td>
<td>222</td>
<td>3.04</td>
</tr>
<tr>
<td></td>
<td>3.0</td>
<td>65</td>
<td>5.50</td>
</tr>
<tr>
<td></td>
<td>3.0</td>
<td>62</td>
<td>5.18</td>
</tr>
<tr>
<td></td>
<td>12.5</td>
<td>178</td>
<td>3.42</td>
</tr>
<tr>
<td>Thailand</td>
<td>154.9</td>
<td>452</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>52.0</td>
<td>236</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td>325.1</td>
<td>1 007</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>49.4</td>
<td>188</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>124.8</td>
<td>280</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td>204.4</td>
<td>422</td>
<td>0.37</td>
</tr>
</tbody>
</table>

form (Table 1) and the control of its vector *Aedes aegypti* remains a challenge. Sporadic cases of DHF have also been reported from India, the Maldives and Sri Lanka.

In view of the delay in developing suitable dengue vaccines, there is an urgent need to establish effective community participation on a continuing basis for the control of DF/DHF vectors in the countries of the South-East Asian Region.

Community participation in DHF prevention through vector control is not entirely new in the Region. Various pilot projects have been attempted in Indonesia, Myanmar and Thailand. However, past experience indicates the following:

- "People know but they don't do"
- "People may do, but not for long"
- "People want to do but feel they don't have the time or resource (money)"

In most cases, one can get significant reduction in vector density (from 60 to 95 per cent) with fairly high rates of participation for at least one season. However, even if a programme is successful in the first year, in the following ones, interest may wane and resurgence of DHF may take place. The main problem is to sustain community participation. Certainly, community participation is not an easy task and if we have not achieved it or sustained it we know why.

- It requires an awakened and activated community.
- It requires a new understanding of the community and an awareness of their capabilities to change etc.

The most urgent problem to solve is how to create awareness and motivate the community to support activities.

There is a definite need for research. Interdisciplinary research is needed to study the variables affecting community participation, approach involving entomology, socio-anthropology, KAP (knowledge, attitude and practice) surveys and epidemiological studies.

A multicentre project to control DHF vectors with community participation, sponsored by the Regional Office (WHO/SEARO) was carried out in Indonesia and Thailand during 1988–1989. The project was initiated with the objective of identifying the type of control activities that are best suited to community participation and which are focused on source reduction of the vector in the context of the local situation and to identify the follow-up mechanisms to ensure the continuation of community participation.

The information derived from the study may be summarized as follows:

**INDONESIA**

The study has been conducted in Pekalongan Municipality, Central Java province, since July 1988. The city is located on the north coast of Java with a population of 130 000 (population density 17.5 per sq km). Phase I of the study was completed by June 1989.

---

1: Abstract from the report of Dr. Thomas Suroso, Principal Investigator, Chief, Arbovirus Diseases, Directorate General of CDC, Ministry of Health, Jakarta.
Baseline data on DHF vectors and socio-behavioural aspects of the community were studied. Larval surveys conducted found that *Aedes aegypti* were spread widely in the city. Premise indices for houses, schools and other public facilities were 25.6, 38.6 and 19.2 per cent respectively.

Entomological monitoring consisted of weekly ovitrap survey, while bi-weekly larval and adult surveys were carried out in 16 out of 22 kelurahans in Pekalongan. A similarity on the fluctuations of ovitrap indices and the landing/biting densities was observed during one year period of surveys. Two KAP surveys with an interval of six months were conducted. These surveys were supplemented by a socio-anthropology study carried out by an anthropologist staying with the community for two months. The important information obtained from the above KAP and socio-anthropology studies was as follows:

1. Most people were familiar with the words of "demam berdarah" (DHF); however they had only superficial knowledge about DHF. Various types of *Aedes aegypti* breeding sites and the process of disease transmission were not fully understood.
2. Majority of the people considered that source reduction of *Aedes aegypti* breeding sites was the best method to prevent the disease. However some of them perceived that insecticide fogging as the method of choice for preventing this disease. They considered that government should be responsible for DHF prevention and control.
3. People's concept of clean water was that any water without solved soil particles. Large water reservoirs such as water containers for bathing and toilet purpose were rather neglected for cleaning. Water reservoirs cleaning activities used to be carried out any member of the family whoever have a spare time to do it and didn't necessarily by women only.
4. The facts that the number of water reservoirs was only 2–3 per house and mostly of small sizes, and most people had access to wells or piped water supply. Therefore, regular emptying and refilling of water containers would be feasible.
5. Most people also understood that covering water containers with lids was one of the methods to prevent DHF. Plastic lids were prefered for covering water jars.
6. Most people mentioned the importance of occasional simultaneous community action to clean up all possible breeding sites of *Aedes aegypti* from their own premises. They accepted regular home visits for larval inspections. They even considered that these visits were important because 'people generally forget easily'. They considered that cadres were the right persons for carrying out these inspections. Prior notice was considered important to most people; this might be related to the 'feeling of embarrassment' of the people when their houses were found not clean.
7. Most people did not agree to the idea of a levy or a fine on individuals whose water reservoirs were found to be infested by larvae.
8. Communication channels available to the community were mass media (radio and TV programme), social organizations mainly PKK (family welfare movement),
religious organizations and schools.

(9) Regarding DHF health education to school children, the school teachers have the opinion that an extra-curriculum programme is considered as an extra-burden (additional work).

(10) Information on DHF to the community were commonly conducted in a non-communicative way and not easily understood.

(11) The low socio-economic groups had less access to information on DHF through mass media.

(12) Paternalism practices was common to some people in Pekalongan. Therefore, formal as well as informal leaders played a great influence to the people, both in term of perceiving knowledge/new idea or in taking community action.

**THAILAND**

Phase 1 of the project was carried out in Lamplaimat district of Buriram province from June 1988 to March 1989. The population of Lamplaimat district is 125,556 living in clustered dwellings, mostly in rural areas. Cases are reported for both rural and municipal areas. Figures on confirmed cases have been reported since 1978 with typical patterns of 4–5 year intervals, case rates fluctuating from 50 per 1000 in 1978 to 400/100,000 in 1988. Mortality has decreased with improved case management, although it is still unsatisfactory. At highest risk are children under 15 years of age.

The main vector is *Aedes aegypti*. The relation between the vector and population is highly unstable because of changing movements of migrant workers and of the rapid changes in water sources occurring with the expansion of rural water supplies. The entomological study indicates that the main breeding sites are domestic and public water jars and not the non-essential containers.

Based on the KAP survey and in-depth interviews, the researchers arrived at the following conclusions:

**Knowledge of DHF**

Several aspects of basic knowledge were asked to 624 householders. The majority (97.3%) correctly recognized the susceptible age that risks to the disease and the vector that transmits DHF (*Aedes* mosquito). Important signs of the disease symptoms were correctly mentioned (73.7%). When respondents were asked about mosquito’s habits, 79.3% of them believed that *Aedes* mosquito feeds on daytime and 88.3% responded that the vector breeds in water-holding containers in the house. It is concluded that most of them know primary level of knowledge of disease. Differences in knowledge about DHF disease among different levels of income was not significant. It is noted that the main source of knowledge come from health personnel (52%) and others-verbal communication (41%), radio (7%).

---

1: Abstract from the report of Dr. Somporn Preuksaraj, Principal Investigator, Director, Division of Communicable Diseases, Department of CDC, Ministry of Public Health, Bangkok.
Perception of DHF

Perceived susceptibility of DHF
- Big chance to contact DHF: -82.4%
- No chance: -15.9%

Perceived threatening of DHF
- DHF causes to death: -98.1%
- No death: -1.9%

Perceived seriousness of DHF
- Serious: -42.8%
- Not serious: -35.6%
- Not sure: -21.6%

Perceived controllability
- Use temephos/jar cover: -50.9%
- Garbage disposal: -16.1%
- Request fogging: -7.7%

Perception variables are also analyzed in relation to socio-economic factor (income). There is slightly significant relationship in perceived controllability of DHF. It is found that population with higher economic status prefer to use temephos in water containers. On the contrary, the population with lower and moderate income turn to gain benefit from source reduction. Mosquito control by adulticide spraying is not well accepted from all groups.

Health Behaviours of DHF

There is insufficient knowledge on the part of a large percentage of the population to induce changed behaviour. Current IEH (information and education for health) strategies do not address misconceptions such as that DHF is due to the failure of the immunization programme. Many people still believe that all immunizations can protect all diseases. Parental beliefs about the child's morbidity from DHF is due to vaccination failure. Many residents also expressed fears concerning side-effects of chemical such as an unpredicted illness from temephos dissolved in drinking water.

The acceptance of children sleeping under bed-nets is a major aspect of family practice rendering the disease protection. However, actual observations in the field, children were not found to be widespread of using it. Traditionally, the most of children was seen in the hammock while they were sleeping.

Among the low income group, about 30% of them did not deal with any DHF preventive measures.

Regarding the pattern of care seeking behaviour after being sick from DHF, the choice of initial treatment resort for almost all people in the district is Lamplaimat Hospital. Granted that most of respondents refuses to give self-medication to cure illness for the suspected DHF cases.
About 70% of the population with more motivation, better social sanctions, and health education could be motivated to carry out DHF activities regardless of the income level.

Formal and informal leaders expressed the hope that health information efforts would improve as they felt responsible for the safety of the children. They felt that they needed help in mobilizing the community, including more intersectoral linkages and support from schools as well as hospitals.

The study indicates that several factors may affect community participation in the prevention and control of DHF. These are:

(a) Compared to central Thailand, the level of social cohesion is quite good. Within a single community, different classes indicated by amount of land owned and income levels show little disparity between the landless and the landed. Generally everyone is poor.

(b) As in most of Thailand, women's economic position is relatively high. In the north-east, the youngest daughter resides with parents after marriage. Land is inherited equally. Women, therefore, have economic resources available to them and are key decision-makers in household affairs. Older women are particularly important in such cases as managers of child health.

(c) Leadership in the north-east differs from central Thailand. In this region, the key persons are the village headman and village priests. Informal leaders include wives of headmen, former priests, and school teachers. These, therefore, are the key channels to mobilization of community participation. It is hard to initiate any health activity if there is objection from the headman.

Following are the comments related to the progress reports of the above research project by the Regional Office:

**COMMENTS**

Main breeding sites are often schools, hospitals and private large enterprises, indicating both a lack of awareness and supervision. More attention and effort is needed in keeping schools and its immediate surroundings free of vector mosquitoes.

There is a need for making greater use of appropriate technology. New, simple and efficient tools that can be made at the community level from local materials or by simple skilled labour are urgently needed.

Where various methods of control are possible, the simplest effective measure should be chosen and all people trained in a uniform technique.

There are complaints that many of the health providers use unpopular, difficult or uncommon terms in communicating health problems, including DHF which are not easily understood by the people. Indonesian word for “source reduction” used by the CDC centre was always misinterpreted by listeners as meaning “resting place”; hence people thought that you should get rid of mosquitoes in closets.
The image of the adult mosquito which dominates most DHF posters solicited the wrong response—fogging. Other misconceptions included the common view that mosquitoes breed in stagnant waters like malaria vectors so “the appropriate action is to clean up the sewers”.

A major effort should be made to make pediatricians and nurses and other health personnel more involved in prevention and control activities. They constitute an important social change agent group at local level and are currently mainly involved in curative activities. In interviews with patients, it was found that messages given through curative channels about prevention were most often remembered accurately.

The results of the socio-anthropological study indicated the need for new direction in the IEH strategy, from the general to the target-specific approach, which should include fewer, specific messages for target groups, mothers, grandmothers (older people) and health workers. This should remove particular misconceptions which prevent people from undertaking DHF control measures.

ACKNOWLEDGEMENTS

Grateful thanks are extended to the following Principal Investigators and their staff who furnished valuable information on Regional multicentre project to control DHF vectors by community participation in the countries of the Region.

Dr. Thomas Suroso  
Chief  
Arboviral Diseases, Directorate General of CDC  
Ministry of Health, Jakarta  
INDONESIA

Dr. Somporn Preuksaraj  
Director  
Division of Communicable Diseases  
Department of CDC  
Ministry of Public Health, Bangkok  
THAILAND

This project had been initiated and supported by WHO/SEARO; the initial and invaluable help of Dr. Y. H. Bang and Dr. Soon-Young Yoon, formerly of the SEARO staff, is fully acknowledged. Finally, I would like to express my sincere gratitude to Professor Akira Igarashi, Institute of Tropical Medicine, Nagasaki University for his kind invitation and appreciate having been able to participate in the International Symposium on the Current Situation of Dengue Virus Infection and its Control.