Community Mobilization, Behaviour Change and Biological Control in the Prevention and Control of Dengue Fever in Viet Nam

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Abstract

A unique nine-year collaborative programme between Vietnamese and international medical scientists and an aid organization has established an innovative and successful community-based dengue vector control programme in Viet Nam. The use of predacious copepods combined with new water management practices by nine communes in northern and central Viet Nam helped eliminate the main dengue vector mosquito, *Aedes aegypti*. The model was enthusiastically taken up by communities with apparent ease and a high level of acceptability as demonstrated by post-project sustainability and expansion. This paper describes how the use of community health volunteers helped DF/DHF prevention practices within the community and made an essential contribution to *Ae. aegypti* elimination.

Keywords: DF/DHF, community-based, copepods, *Aedes aegypti*, Viet Nam.

Country setting and background

From the first epidemic in 1959, dengue and dengue haemorrhagic fever (DF/DHF) incidence has increased to become a major endemic health problem in Viet Nam with an average of 77,057 recorded cases and 141 deaths per year between 1996 and 2003. The incidence is highest in the Mekong Delta (South) and on the central coast, where the common use of water storage containers has led to high densities of the main dengue vector, *Aedes aegypti*. As in other countries, DF/DHF control in Viet Nam has historically focused on adulticide ULV spraying to kill mosquitoes during epidemics. Used as a reactive
measure, spraying is often too late to reduce epidemic transmission. Other control strategies, such as the use of lids on water containers, use of fish in water tanks and introduction of chemical larvicides into water containers, have been tried but did not prove to be effective or viable over the long-term.

In order to develop and test new, innovative methods of vector control, a unique collaborative effort of Vietnamese and international medical entomologists, health workers and nongovernmental organization development staff was formed during 1995. The resulting programme, which is continuing, was based on identifying key mosquito breeding containers, utilizing local copepod predators of **Ae. aegypti** larvae and supporting dengue prevention practices in each household. Species of **Mesocyclops** copepods that are particularly effective predators of **Ae. aegypti** larvae were found in natural water sources and, through transference or flooding, in up to 70% of drinking water containers in some rural communities. Combining **Mesocyclops** use with social mobilization and behaviour change, the programme subsequently demonstrated an effective and sustainable method for dengue vector control[1-5]. Since the entomological results have been described elsewhere, this paper focuses on the planning, implementation and lessons learnt related to supporting new community practices to prevent dengue.

**Planning innovation for dengue prevention and control**

The multi-disciplinary collaborative team, with members from the National Institute of Hygiene and Epidemiology in Hanoi, the Queensland Institute of Medical Research, the Queensland University of Technology and the international aid organization, the Australian Foundation for the Peoples of Asia and the Pacific, provided both an avenue for trying innovative approaches and the technical expertise to support communities and health authorities to implement it. The programme followed a strategy to establish successful models from which local authorities could later expand. To ensure relevance and effectiveness, vector surveys and KAP surveys of households were used to tailor programme activities to local conditions.

The programme used a structure that combined a bottom-up set of community activities with top-down training, monitoring and support as advocated by Gubler’s review of vertical approaches to dengue vector control[6]. Commune management committees with representatives from local authorities, schools and community members were established which provided the key elements necessary for community empowerment and engagement: information and training on the local dengue risk and control; opportunities for community members to participate in programme decision-making; and accountability measures for activity performance and local expenditures.

KAP surveys of 100 households in each programme commune consistently showed that locals were much more likely to believe and act on health information when it was delivered face-to-face rather than through posters and brochures. As a result, a health volunteer or ‘collaborator’ network was formed in each commune to communicate
directly with households, assess household dengue risk, obtain consent and support DF/DHF preventive behaviours in households.

Implementing the new project

Political will and local leadership

Changing to a preventive approach from emergency response and a curative approach required careful consideration by the Ministry of Health (MOH). Since the dengue problem in Viet Nam was not getting better, the MOH faced implications if the new strategy did not work. The MOH response to encompass both a preventive and emergency capability was to increase the budget considerably.

Secondly, someone in Viet Nam had to take responsibility for the local initiation of the embryonic programme - including the development of community programmes. The selection and training of health professionals down to community volunteers was an essential element to success.

Starting with a WHO-supported proof-of-concept study in 1995, the programme identified local leaders who were able to drive the implementation of three projects that successively expanded the methodology from northern to southern Viet Nam, covering 12 provinces by mid-2004. Refined by experience, the programme's vector control activities fell into four key areas: local breeding and introduction of Mesocyclops into water tanks and ceramic jars; removal of discarded containers through community clean-up campaigns; promoting dengue prevention practices through education campaigns supplemented with face-to-face reinforcement and motivation; and monitoring mosquito populations and household water practices. Education campaigns targeted the dengue-related needs identified by the vector and KAP surveys. Activities, often supported by schools and the Youth, Women's and Farmers' Unions, included open-air community meetings, radio and television broadcasts, loudspeaker announcements, travelling school drama performances, church meetings, a dengue football competition as well as posters, leaflets and billboards.

During their monthly household visits, the collaborators demonstrated and encouraged the adoption of relevant water management practices to prevent Aedes breeding including the maintenance of Mesocyclops in water jars that were being cleaned out, removing discards, using salt in ant-traps and regular emptying of vases.

Two years of on-going encouragement, motivation and monitoring by collaborators helped cement these practices into household habits. Measures used by commune management committees to sustain collaborator house visits beyond the life of the project included: income from project micro-enterprise schemes such as plastics recycling; provision of discounted health care, food and other benefits; integration with other health programmes; and support from national and provincial dengue programmes.

Monitoring and evaluating the new approach

Formative annual evaluations and regular monitoring of project impact were used to measure progress, address issues and adjust activities. Quarterly vector surveys by trained province-level health staff and monthly household visits by health volunteers measured mosquito and Mesocyclops populations and key breeding containers. The first project completed in 2000 achieved
full Ae. aegypti control in five out of six communes. By 2003, the second project had reduced larval populations by 99.6-100% in four communes and, an expansion out of first project communes by local authorities achieved control in 32 out of an additional 37 communes. Collaborators measured the level of adoption of prevention practices through standardized ratings of dengue prevention behaviours in a sample of households during the first project. By the end of the project the proportion of households rated as showing an excellent or good level of dengue prevention practices almost doubled to 94%. Most of the remaining 6% faced severe poverty, had low levels of education or did not feel it was their duty to kill mosquito larvae. During focus group discussions, most participants indicated that the collaborator system and community campaigns were central in supporting them to implement and maintain household dengue vector control. The KAP surveys showed a significant increase in community knowledge of DF/DHF aetiology and transmission.

**Lessons learned**

When used in combination with DF/DHF prevention practices in the community, Mesocyclops can be an easy and effective method of Ae. aegypti control but to achieve community acceptance and maintenance requires several key elements. First, a sound knowledge base about DF/DHF and methods of vector control must be built amongst the community. Second, systems and campaigns to support long-term DF/DHF preventive practices together with the introduction and ongoing use of Mesocyclops must be developed in negotiation with community groups. Success of Mesocyclops adoption and use in Viet Nam has only occurred when dengue vector control activities were introduced at the household level through the collaborator system, which itself required community support. Lastly, political support for an approach that combines bottom-up and top-down strategies is vital.

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