What do community-based dengue control programmes achieve: a systematic review of published evaluations

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CRD summary
This review found that although there was evidence that community-based control programmes alone or in combination with other control activities could enhance the effectiveness of dengue control programmes, the evidence is weak. The authors' cautious conclusions are likely to be reliable.

Authors' objectives
To evaluate evidence for the effectiveness of community-based interventions in reducing vector populations for dengue control.

Searching
MEDLINE, EMBASE, the Cochrane Database of Systematic Reviews and the World Health Organization's library database (WHOLIS) were searched from inception to March 2005; the search terms were provided. Reference lists from identified publications were checked for additional studies. The searches were restricted to publications in English, Spanish and German. Conference papers were excluded.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs), controlled clinical trials (CCTs), controlled before-and-after trials (CBATs) and interrupted time series (ITS) were eligible for inclusion.

Specific interventions included in the review
Studies of community-based dengue control interventions, defined as any intervention in which at least one component targeted the whole community (e.g. educational meetings, involvement of local leaders), were eligible for inclusion. In addition, the aim of the included studies had to be to reduce the incidence of dengue disease or infestation of the community with Aedes mosquitoes. Publications reporting interventions which had no community participation were excluded. Community interventions included in the review were use of educational meetings, involvement of local opinion leaders, involvement of national institutions, use of educational mass media, surveys and educational outreach visits. The interventions were either exclusively community based, or combined with chemical larvicides or Mesocyclops. The control interventions included non-specific public sanitation programmes, no intervention or insecticides alone, or were not specified.

Participants included in the review
Inclusion criteria were not specified in terms of the participants. The participants included in the review were inhabitants of various municipalities, peri-urban areas and villages ranging in size. Target groups included the elderly, children, women in charge of cleaning washbasins/drum, health committees, teachers, women's union, household inhabitants (mostly housewives), health care personnel, community organisations and government officers. The studies were carried out in the Americas and Asia.

Outcomes assessed in the review
Inclusion criteria were not specified in terms of the outcomes, other than that studies had to provide comparisons between the intervention and non-intervention settings. The outcomes assessed in the review included measurements at baseline and end point of the House Index, Breteau index, container index and dengue incidence. In addition, positive containers per household, knowledge, attitudes and practice were measured. The duration of follow-up ranged from 6 to more than 12 months.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

**Assessment of study quality**
Two reviewers independently assessed the validity of the included studies by assigning a score from 0 to 8 (8 indicated the highest quality) based on study design and reporting quality. The assessment of study design encompassed both the type of control group (scores: RCT=3, CCT=2, CBAT=1, ITS=0), and duration of observation period (score 1 for >12 months and 0 for <12 months). The assessment of reporting quality took into account the description of effect estimates (reported=1, not reported=0), confidence intervals and deviation measures (reported=1, not reported=0) and p-values (reported=1, not reported=0), as well as the discussion of potential confounders (discussed=1, not discussed=0).

**Data extraction**
The data were extracted into tables. The authors did not state how many reviewers performed the data extraction.

**Methods of synthesis**
How were the studies combined?
The studies were combined in a narrative. Each study was described in the text and additional descriptive information was tabulated.

How were differences between studies investigated?
Differences between the studies were discussed in the text.

**Results of the review**
Eleven studies (total number of participants unclear) were included in the review: 2 RCTs, 6 CBATs and 3 ITS. The number of people targeted by the community interventions ranged from 500 to 100,000, where reported.

The quality scores ranged from 1 to 7 out of 8. Both RCTs scored 7 points, CBATs scored between 3 and 5 points, and ITS scored between 1 and 2 points. Only 5 studies described confounding.

Efficacy of community-based dengue control (11 studies).
All of the included studies showed a reduction of larval indices, or a reduction in seroconversion or incidence of dengue disease. Both RCTs showed statistically significant effects on the entomological index.

Community-based dengue control only (1 RCT, 3 CBATs, 1 ITS).
The RCT and one of the CBATs found statistically significant differences favouring the intervention (p<0.01). The remaining studies found no statistically significant differences between groups.

Community-based dengue control plus chemical larvicides (1 RCT, 1 ITS).
Both studies, one of which was an RCT, found significant reduction in entomological indices in the intervention group.

Community-use of larvivorous fish and chemical larvicides (1 CBAT, 1 ITS).
Both studies reported reductions in the entomological indices, which favoured the intervention group. However, one did not take into account the confounding factor of a natural decrease being observed in the larval indices, therefore the association between the intervention and the larval indices was unclear.

Community-based dengue control plus Mesocyclops (2 CBATs).
Both studies showed statistically significant effects of the Mesocyclops programmes (reduction of Aedes infestation in one, reduction of dengue incidence in the other).
Authors' conclusions
There was evidence that community-based control programmes alone or in combination with other control activities could enhance the effectiveness of dengue control programmes, but the evidence is weak.

CRD commentary
The review addressed a clear question that was defined in terms of the intervention, study design and outcomes. Several databases were searched, but authors did not search for unpublished material; it is therefore possible that some relevant studies could have been missed and the review may be subject to publication bias. In addition, the restriction to studies published in English, Spanish and German means that the review may be subject to language bias. Validity was assessed using criteria defined by the authors, and methodological limitations in the included studies were discussed in the text of the review. Review methods were poorly reported and the potential for bias in the review should not be ignored. In view of the differences between the studies, the narrative synthesis with studies grouped by intervention category was appropriate. The authors' cautious conclusions appear to reflect the limitations of the evidence presented.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that future research should aim to distinguish which specific components of an intervention strategy (e.g. larvicides, biological control agents), in combination with community participation and/or other partnerships, have the greatest impact on dengue control and are cost-effective. Particular attention should be paid to the issue of sustainability of dengue vector control strategies, which should be maintained and monitored through a variety of stakeholders at an affordable cost.

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