Multi-modal Aedes aegypti mosquito reduction interventions and dengue fever prevention
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CRD summary
This review assessed the effectiveness of biological, chemical and educational dengue fever prevention programmes on the reduction of entomologic indicators. The authors concluded that little evidence existed to support the efficacy of mosquito abatement programmes owing to poor study designs and lack of congruent entomologic indices. Despite some methodological weaknesses in the review these conclusions appear to be reliable.

Authors' objectives
To assess the effectiveness of biological, chemical and educational dengue fever prevention programmes on the reduction of entomologic indicators.

Searching
PubMed, Science Direct and Cab Direct databases and the search engine Google Scholar were searched from July 2007 to January 2008. Search terms were reported. Reference lists were examined for further studies. Only published English-language studies were included.

Study selection
Studies of vector control programmes that targeted Aedes aegypti and Aedes albopictus mosquitoes with pre/post data that reported larval or adult indices were eligible for inclusion. The most commonly reported entomologic indices reported were Breteau index (BI), House index (HI) and Container index (CI). Educational or behaviour-altering elements were examined in approximately one third of the included studies; biological and chemical interventions (sometimes combined with behavioural elements) were examined in the remainder. The included studies were performed in South and Central American countries, Asia and USA.

Two reviewers selected studies for inclusion and disagreements were resolved by discussion.

Assessment of study quality
The authors did not state that validity was assessed in a systematic way. Some aspects of study quality were discussed within the text.

Data extraction
Entomologic index used, baseline measure and last measure were extracted by two reviewers. Disagreements were resolved by discussion. Mulla's formula was used to calculate percentage reduction between treatment and control. The number of reviewers who performed data extraction was not reported.

Methods of synthesis
The studies were synthesised narratively.

Results of the review
Twenty-one studies were included: two randomised controlled trials (RCTs); three cluster RCTs; 14 non-randomised controlled trials (CTs); and two interrupted time series designs (ITS).

Five studies of behavioural or educational interventions resulted in an average reduction of 41.6% (range 4% to 87.6%). Monitoring duration ranged from 18 weeks to 15 months, where reported.

Five controlled trials of biological interventions resulted in reduction of mosquito larvae with a mean reduction of 96.3% (range 75.1% to 100%). Use of chemical sprays resulted in an average reduction of 27.2% (range 73.8% to 13.9%; one RCT, two cluster RCTs and three CTs). The range of monitoring durations for biological interventions was two months to three years and for chemical interventions was seven days to five months, where reported.
Authors' conclusions
Little evidence existed to support the efficacy of mosquito abatement programmes owing to poor study designs and a lack of congruent entomologic indices.

CRD commentary
The research question was supported by inclusion criteria for intervention, outcomes and study design. Only published English-language studies were included, so there was potential for language and publication biases. Study selection and data extraction were performed in duplicate, which reduced the possibility of reviewer error and bias. Study quality was not assessed formally, although it appeared that most studies were not robust study designs. Narrative synthesis appeared sensible given the heterogeneity between studies; it was unclear whether taking a simple mean reduction of Mulla’s per cent reduction was appropriate.

The authors' conclusions reflected the data presented and despite some methodological weaknesses in the review the conclusions appear to be reliable.

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

Research: The authors stated that cluster randomised controlled trials should be used to eliminate speculation about the casual relationship of the intervention to rates of dengue fever transmission. Serological surveillance should be a necessary component of all dengue interventions. A standard entomological index should be used to aid study comparability. Development of more reliable and valid measures of vector control actions was needed.

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