

CHALLENGES IN HOUSING/HYGIENE INTERVENTIONS IN THE PREVENTION/CONTROL OF VECTOR-BORNE DISEASES

AN EVIDENCE BRIEF FOR POLICY MAKERS AT INTERNATIONAL/NATIONAL LEVEL



ABSTRACT

The effectiveness in the design and implementation of vector-borne disease interventions is a major challenge. This note present the results of a systematic review of 44 articles focused on housing and hygiene interventions for vector-borne disease control found that effectiveness and sustainability are difficult to evaluate. There continues to be numerous vertical standardized programs designed around a single activity whilst their evaluations are often incomplete and focus on entomological indices. Multifaceted community-based interventions with in-depth evaluations are promising but require resource investment. It is important to report negative results and challenges to learn and to improve future research, programs, and policies. This note concludes with proposals for recommendations.

HIGHLIGHTS

ABOUT EVALUATION

- Few epidemiological and population-based indicators are used.
- Too much focus on entomological outcomes and less on qualitative, process and sustainability analysis.
- Failures in intervention implementation and absence/negative impact are less highlighted.

ABOUT INTERVENTION

- Community and implementors are not involved enough in the design and implementation.
- Social participation is heterogeneous and shaped by historical and present-day community dynamics.

INTRODUCTION

Over half the human population is currently at risk of vector-borne infections, but the burden is borne most heavily by the world's poorest communities and countries. These diseases also exacerbate poverty by preventing people from working and supporting themselves and their family, causing further hardship and impeding economic development. Therefore, prevention and control of vector-borne diseases (VBD) is not only a health matter but is also essential to the advancement of socio-economic conditions of LMICs.

Due to the short-lived success of previous vector eradication campaigns, there was a transition from eradication to control in intervention strategies. Unfortunately, vector populations continue to expand and have become increasingly resistant to insecticides. Thus, there is a critical need to learn from the challenges and failures from previous attempts to identify effective and sustainable measures to reduce the burden of VBDs in the absence of vaccine and treatment options.

APPROACH

We searched major health databases for articles published between 2000 and 2016 with a final 44 articles included in our review. Latin and Central America, the Caribbean, and Asia were predominantly under study ($n=31$), while Africa, Oceania and Europe together represented only five studies. The vast majority of the studies (93%) were focused on mosquitoes with 70% of studies based on *Ae. aegypti* and VBDs transmitted by *Ae. aegypti* (studies were on dengue or chikungunya as no data on Zika were retrieved due to the timing of this review).

RESULTS

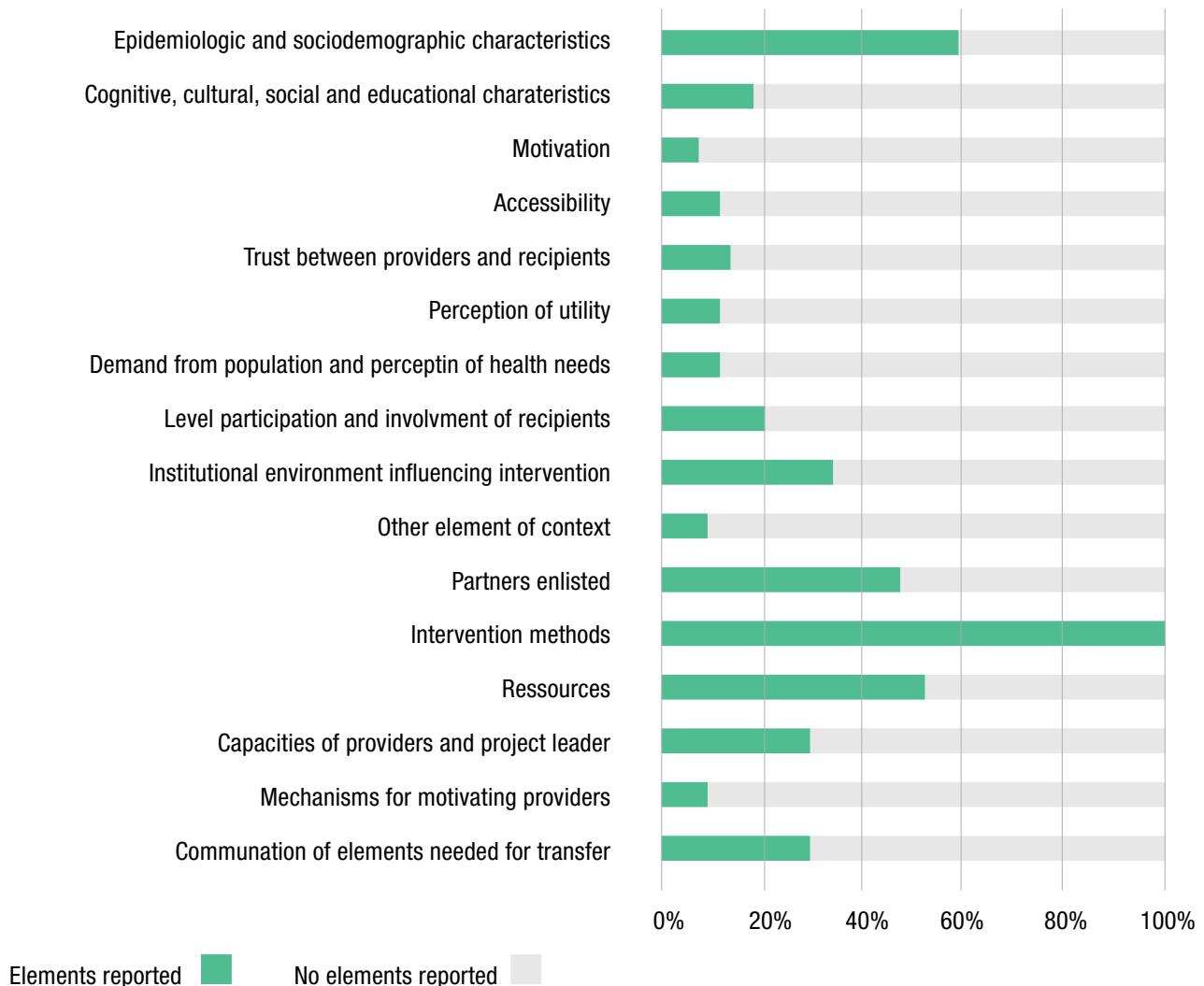
Most of the studies measured their impact using entomological indicators with only 25% of the studies using human morbidity indicators. Almost all of the studies (95%) reported at least one positive indicator of intervention effectiveness.

The only two studies reporting null or negative results were single-component interventions.

- In Puerto Rico, an intervention implemented a typical vector intervention based on source reduction of breeding sites and the use of larvicide. They reported no effect on the density of adult mosquitoes resting indoors. Septic tanks, not targeted by the original intervention, significantly contributed to the continuation of dengue virus endemicity.
- In the US, an intervention observed a decrease in the concern for VBDs with no behavioral change associated with breeding site rates following the distribution of educational print materials. This education campaign was insufficient to motivate source reduction efforts, and may have had, inadvertently, the opposite effect. The lack of active community involvement in the campaign and the inability to evaluate whether recipients had actually read the materials were possible explanations for these unexpected results.

The sustainability of interventions remains a critical challenge that was highlighted in several publications. There is little information to understand what vector control interventions work in the long-term and in which contexts, and importantly, why and how. For example, aspects related to the context, implementation and transferability of these interventions were poorly described (Figure 1). Some authors recommended expanding the coordination beyond local authorities, to include other sectors for better sustainability.

Figure 1. Contextual elements essential to intervention implementation and transferability according to the ASTAIRE checklist.



Elements reported No elements reported

Community mobilization shows great potential but as discussed for Brazil, the social participation is often heterogeneous and shaped by historical and present-day community dynamics. For example, in their intervention in Brazil, “social participation was fragile in locations with nonexistent community organizations or in neighbourhoods with either a history of violence or very well off and privileged groups”. Participation and motivation of field staff can also be a challenge as highlighted in Colombia, as the intervention can be perceived as an unnecessary increased workload.

Photo 1: The challenges of sustainability (lack of net maintenance in Brazil)



CONCLUSION

Research is needed on the impact of improved sanitation on VBDs prevention. Mixed (quantitative and qualitative) methods research is a more robust approach given the complexity of interventions and their implementation processes. We need to understand why an intervention may work in a specific context and may not in another and for how long. This review highlighted that publication bias tend to push authors toward discussing only positive results. But we can learn, and sometimes even more, from negative results and the related challenges.

FOR MORE INFORMATION

Complete study report available at

<https://idpjournal.biomedcentral.com/articles/10.1186/s40249-018-0477-5>

RECOMMENDATIONS

FOR EVALUATION

1st

Plan and design a holistic mixed method (quantitative and qualitative) evaluation with multiple indicators to better understand determinants of success and failure, and intervention sustainability.

FOR INTERVENTION

1st

Conduct needs assessments and qualitative surveys before the intervention to understand community preferences, social acceptability, and context.

2nd

Engage the community and field workers in the design of the intervention as soon as possible to ensure future motivation in the activities, successful implementation, impact, and sustainability.

3rd

Adapt the content and the process of the intervention to each local and cultural context

4th

Plan and fund regular participative workshops to learn about the success and failures of the interventions with all stakeholders such as local decision makers, households, and staff.