

Management of insecticides for use in disease vector control:

Lessons from six countries in Asia and the Middle East



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RESEARCH ARTICLE

Management of insecticides for use in disease vector control: Lessons from six countries in Asia and the Middle East

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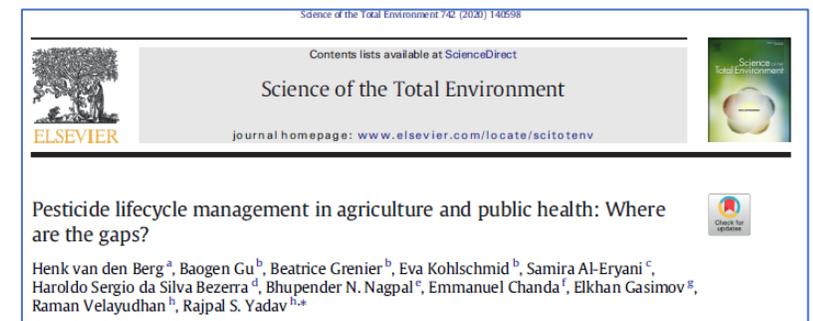


Abstract

Interventions to control the vectors of human diseases, notably malaria, leishmaniasis and dengue, have relied mainly on the action of chemical insecticides. However, concerns have

Background

- Vector control interventions have demonstrated their critical importance for the control and elimination of most vector-borne diseases
- Insecticides are the mainstay for controlling the vectors of malaria, dengue and visceral leishmaniasis
- Proper management of insecticides is critical to reduce risks to human health and the environment, and to delay insecticide resistance
- A recent global survey reported shortcomings in pesticide regulatory, pesticide procurement, application methods, safety measures, pesticide storage, chemical waste disposal, insecticide resistance management
- An in-depth assessment is needed to provide insight into the context of pesticide management (technical, organizational and institutional aspects).



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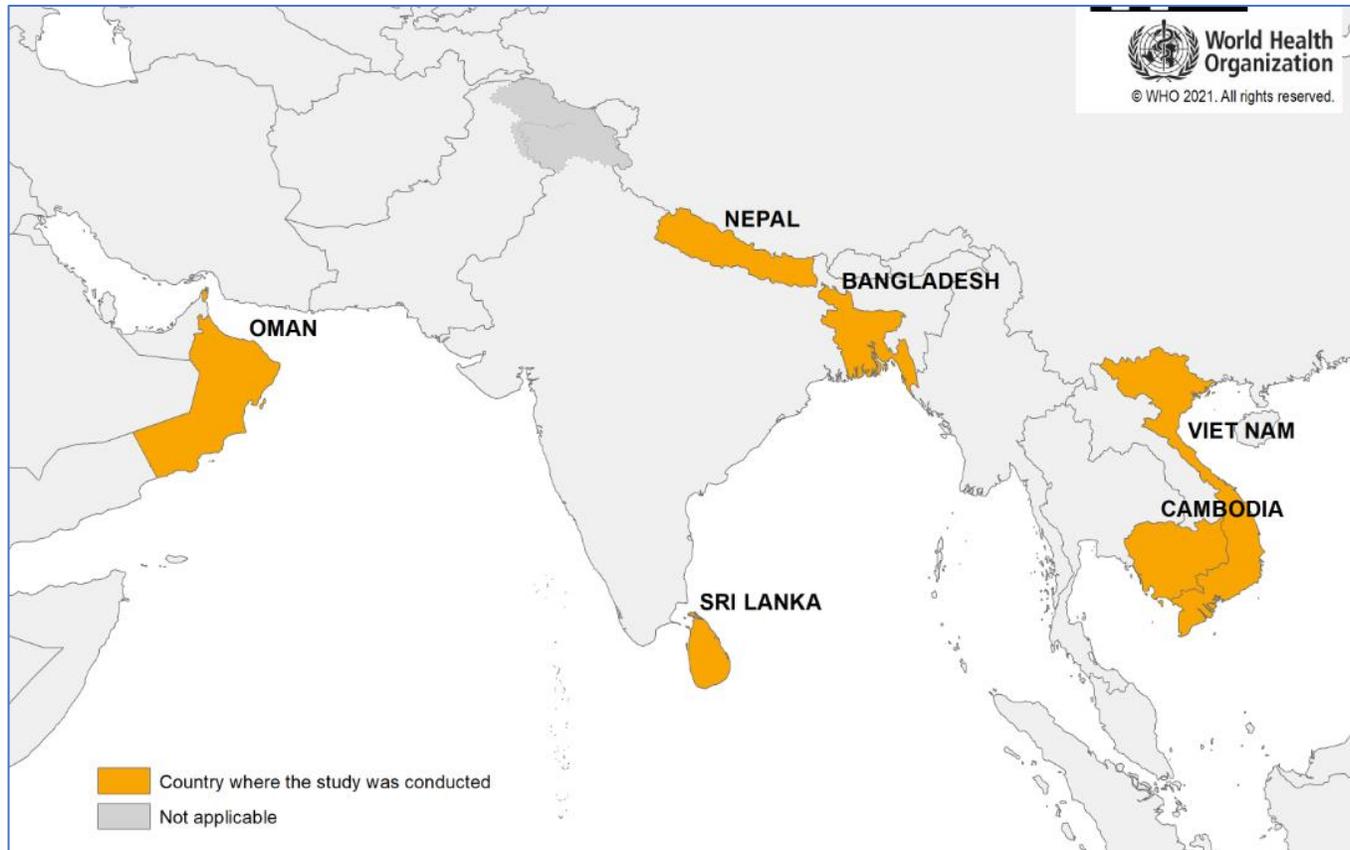
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Pesticide lifecycle management in agriculture and public health: Where are the gaps?

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- A qualitative situation analysis of insecticide management was conducted in Aug-Dec 2019
- Using 15 quality insecticide management indicators in 31 countries in Asia and the Middle East (2017-18 survey), 6 countries with poorer than average pest. management conditions (40% vs. 52%) were selected
- Meetings with key stakeholders in each country



Country	Vector-borne disease or pest targeted	Cases ^a
Bangladesh	Malaria	10500
	Visceral leishmaniasis	144
	Dengue	90000
	Nuisance mosquitoes	n/a
Cambodia	Malaria	25502
	Dengue	67436
Nepal	Malaria	1065
	Visceral leishmaniasis	169
	Dengue	14000
Sri Lanka	Malaria	1
	Dengue	99120
Oman	Malaria	0
	Dengue	59
	Nuisance mosquitoes	n/a
Vietnam	Malaria	5000
	Dengue, chikungunya	250000

Key results – vector control programs

- Vector control programs (Mal/Den/VL) using different interventions
- Centralized and decentralized programs with varying capacity
- Critical shortcomings in the practices of procurement, application, safety measures, storage and disposal of vector control insecticides
- This has implications for efficiency, effectiveness, safety of vector control and, thus, for the control and elimination of vector-borne diseases
- Comparison between malaria programs and dengue programs provided lessons
- Central-level norms, guidelines and strategies were vital to the quality and safety of insecticide use – these offered direction and control in most malaria programs, but were largely lacking from decentralized dengue programs

Key results – coordination between VC programs

- Dengue programs were operated in a decentralized manner and, consequently
 - lacked coordination through guidelines and standards on best practices
 - had variable practices of procurement, application, safety, disposal, which compromised quality and safety of operations
 - they were better at involving communities/sectors, & securing local financing
- Coordination/collaboration between vector control programs (MAL, DEN, VL) was weak. Entomological capacity concentrated in malaria programs at central level is not benefiting dengue and leishmaniasis.

Key results - coordination

- Non-health sectors have a potential role in vector control, for example, in pesticide management, drainage or irrigation management, waste management or community mobilization
- Potential synergies in sharing entomology labs, expertise and resources not utilized. This compromises the sustainability of entomological capacity
- Lack of inter-program coordination on insecticide resistance management (except in Sri Lanka)
- Institutional mechanisms (e.g., integrated vector management committee) for multi-sectoral action weak or lacking.

Key results - capacity

- A critical shortage of entomological capacity, especially in most dengue and visceral leishmaniasis programs – possibilities for tertiary education on medical entomology were absent or limited
- Different stages of management of insecticide resistance in malaria vectors
- Lack of routine IR monitoring in dengue and VL programs under-valued importance of IRM in five countries (except SL)
- Nuisance mosquitoes were a main target for routine insecticidal application by municipalities in Bangladesh and Oman
- Pesticide regulatory control
 - legislation was in place, but compliance monitoring & enforcement was weak
 - pesticide quality control was a major challenge – did not test full physical-chemical properties and relevant impurities of pesticides
 - national pesticide procurement guideline were absent in most countries
 - centralized procurement for malaria & VL; for dengue decentralized and disorganized

Thanks!

Key recommendations

- To improve the vector control insecticide management, begin by bottom-up situation analysis of organizational/institutional aspects, using a cross-disease approach, and develop appropriate solutions across programs.
- Further international support is needed to assist countries in situation analysis, action planning and development of national guidelines on vector control insecticides and resistance monitoring.
- Need to harmonize with central standards:
 - application methods and safety measures
 - insecticide storage and disposal practices at local levels