

# Factors associated with vector control for onchocerciasis control in sub-Saharan Africa: A systematic review

Elakpa Daniel, Kagura Juliana, Mall Sumaya, Ibisomi Latifat, Chirwa Tobias

## Background

Onchocercal disease is a neglected tropical disease and the second most common infectious cause of blindness worldwide, after trachoma. Alternative control strategies, such as local vector control, are needed to complement the mass administration of ivermectin.

## Objective

To examine the factors associated with the use of vector control for Onchocerciasis in Sub-Saharan Africa.

## Methods

A systematic search was conducted across Cochrane, PubMed, Web of Science, and Scopus databases to identify pertinent literature on factors associated with the utilization of vector control in sub-Saharan Africa. The search encompassed observational and experimental studies published in peer-reviewed journals between January 2000 and March 2023. To ensure the quality of the included studies, two independent reviewers performed rigorous assessments using the JBI critical appraisal checklist. Subsequently, a thematic analysis approach was employed to synthesize the evidence.

## Results

Our search identified 343 studies; however, we included only 19 studies in this review and found several factors influencing blackfly vector control programs. Programmatic factors include intervention duration and effectiveness, implementation challenges, resource availability, and larvicide application practices. Vector-related factors include blackfly susceptibility to larvicides, species variation, and genetic mechanisms of resistance. Environmental factors such as rainfall patterns, river size, and the presence of dams affect blackfly breeding sites. Human-related factors encompassed community knowledge and engagement, commitment to sustainability, and human activities that impacted breeding habitats. Overall, the quality of the included studies was high.

## Conclusion

This systematic review emphasizes the importance of considering multiple factors in the design and implementation of effective blackfly vector control programs for onchocerciasis in sub-Saharan Africa. Programmatic challenges, vector biology, environmental factors, and human factors should be considered. Policymakers and public health practitioners should optimize interventions based on these findings. Enhancing resource allocation, addressing implementation challenges, promoting community engagement, and considering environmental factors when planning control strategies. By addressing these factors, the effectiveness and long-term sustainability of onchocerciasis vector control efforts can be improved, ultimately contributing to the elimination of the disease in the region.

**Funding:** TDR, the Special Programme for Research and Training in Tropical Diseases, WHO

**Registration:** CRD42022376792 (Prospero).

**Keywords:** Onchocerciasis, vector control, Sub-saharan Africa.