

Drowning in the Lake Victoria basin: A systematic review of prevalence, risk factors, and interventions in East Africa

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ADMINISTRATIVE INFORMATION

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 19 June 2025 and was last updated on 19 June 2025.

INTRODUCTION

Review question / Objective With the highest number of drowning fatalities per square kilometer, Lake Victoria, the world's second-largest body of fresh water, represents the most dangerous stretch of water. Despite the high burden of drowning in the region, data on drowning incidence and risk vary. This study aims to assess existing research on drowning risk, policy, and interventions in the Lake Victoria basin to identify key gaps and guide future research and policy recommendations.

Rationale There is a significant body of research on drowning in low-middle-income countries with general knowledge of the demographic and behavioral risk factors and an emerging body of research on this topic specific to Uganda. This systematic review aims to gather the existing research for the Lake Victoria basin and highlight critical gaps in order to direct future research, policy, and interventions in the field.

Condition being studied Drowning Prevention, Lake Victoria, Drowning risk factors, Drowning interventions, East Africa, low- and middle-income countries.

METHODS

Search strategy PubMed, Web of Science, Cochrane, Google Scholar, and EMBASE were searched in the review. Search terms were as follows: fishing communities, Lake Victoria, HIV demographics, Lake Victoria, Uganda drowning, Lake Victoria, Tanzania weather, Lake Victoria world report, drowning rural Uganda, injury injury, Uganda, drowning fishermen, mortality, Kenya drowning, Tanzania climate risk, Lake Victoria, accidents child injury prevention Kenya, fishing community

Tanzania, drowning interventions, fishing communities
 drowning prevention, global drowning prevention plans, risk reduction
 epidemiology of drowning, risk factors, burden of drowning, strategies
 training, occupational boaters, Uganda
 fishing communities, Lake Victoria
 fishermen, Lake Victoria
 drowning prevention, Africa
 drowning, Lake Victoria
 drowning
 drowning, lake fishing communities
 drowning prevention.

Participant or population We reviewed all literature published from January 1, 1999, through June 2, 2025, including peer-reviewed journal articles and governmental, non-governmental, and academic reports and fact sheets. To ensure the capture of all information, we cross-referenced the bibliographies of reviewed articles. The search included English-language articles. No foreign language articles were identified. Literature meeting relevancy and eligibility, shown in Figure 1, were extrapolated into the literature database for analysis. The identification, screening, eligibility assessment, and inclusion of studies were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Intervention Data on geographic scope and setting, community perspectives, and literature type for all included articles were extracted, and articles were analyzed for content to determine emerging themes.

Comparator N/a.

Study designs to be included Observational and experimental studies were included. Case studies were excluded.

Eligibility criteria Inclusion criteria for this systematic review were the following: (1) any peer-reviewed or gray literature with a geographic setting in Uganda, Kenya, or Tanzania evaluating risk factors, prevalence, or policy for drowning, water safety, and fishing; (2) global studies of drowning risk factors, prevalence, or policy with specific discussion of Uganda, Kenya, or Tanzania; and (3) no restriction on race, gender, publication language, or date. Exclusion criteria are as follows: (1) study of drowning exclusively in countries outside the Lake Victoria basin; (2) articles without full text available; and (3) case reports. Data on geographic scope and setting, community

perspectives, and literature type were extracted, and articles were analyzed for content to determine emerging themes.

Information sources PubMed, Web of Science, Cochrane, Google Scholar, and EMBASE were searched in the review. Literature found via Google Scholar was hand-searched. A separate search for each of the search terms was run in Google Scholar. Given the number of results generated, literature was hand-searched and selected based on inclusion and exclusion criteria, forgoing the Excel sorting process conducted for the other databases. Drowning prevention and control was defined as any measure, direct or indirect, by which drowning mortality can be reduced. Both unintentional and intentional drowning were included in the study. We reviewed all literature published from January 1, 1999, through June 2, 2025 including peer-reviewed journal articles and governmental, non-governmental, and academic reports and fact sheets. To ensure the capture of all information, we cross-referenced the bibliographies of reviewed articles. The search included English-language articles. No foreign language articles were identified.

Main outcome(s) We identified 43 studies, including 37 peer-reviewed articles. There were eight global studies, seven multi-country, twenty in Uganda, three in Kenya, and five in Tanzania. 17.9% (n=5) of articles studied local populations, 67.9% (n=19) regional, and 14.3% (n= 4) national populations. 30.2% (n=13) mentioned community knowledge or attitudes. Over half of the studies focused on prevalence (23.2%, n=10) or risk factors (39.5%, n=17), and 13.9% (n=6) on direct interventions.

Data management One reviewer screened all articles based on title and abstract, and two reviewers screened 199 articles for full-text review using Excel, classifying each article as "Add to Database", "Supplemental" - for general information that could be used in the manuscript writing process- "Irrelevant," "Duplicated," or "No Full Text Available." (MS & GG). Duplicates were identified using conditional formatting within Excel to identify articles with the same title, author, and DOI. Articles labeled as "Irrelevant," "Duplicated," or "No Full Text Available" in the screening process did not proceed to final analysis. Discrepancies were discussed and resolved through group consensus.

Quality assessment / Risk of bias analysis MMAT was the quality assessment tool used.

Strategy of data synthesis Geographic scope was defined as, for articles focusing on just one country, whether the study is "local" - one city/town-, regional- several cities/towns-, or national-multiple regions. In addition, each article was tagged as "prevalence," "risk factors," or "policy" to describe the primary focus of the data found in the article. Using the data collected, analysis was done to assess how much research has been published related to prevalence, risk factors, or policy, as well as the amount of data for a certain country and where that data is sourced geographically. Given the heterogeneity in study designs, a descriptive synthesis was conducted across all included studies, stratified by literature type (quantitative, qualitative, and mixed-methods). For qualitative articles, thematic analysis was applied to extract key domains related to community knowledge, attitudes, and intervention priorities.

Subgroup analysis Geographic scope was defined as, for articles focusing on just one country, whether the study is "local" - one city/town-, regional- several cities/towns-, or national-multiple regions. In addition, each article was tagged as "prevalence," "risk factors," or "policy" to describe the primary focus of the data found in the article. Using the data collected, analysis was done to assess how much research has been published related to prevalence, risk factors, or policy, as well as the amount of data for a certain country and where that data is sourced geographically.

Sensitivity analysis N/a.

Language restriction No language limits were applied.

Country(ies) involved United States, Uganda.

Keywords Drowning Prevention, Lake Victoria, Drowning risk factors, Drowning interventions, East Africa, low- and middle-income countries.

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