RESEARCH SNAPSHOT

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Reducing the spread of cholera

Preventing transmission of cholera remains an important priority in many countries and humanitarian settings. This study tested and evaluated commonly used interventions for reducing cholera's spread.

Testing commonly used interventions

There are several interventions recommended to prevent interhousehold transmission of cholera when an outbreak occurs. Two are at the household level: household spraying, where a response team sprays surfaces in cholera patients' houses with chlorine, and household disinfection kits (HDKs) which are distributed (sometimes with training) and contain cleaning materials for household members living with cholera patients to complete disinfection themselves. Additionally, bucket chlorination (where workers stationed at water sources manually add chlorine solution to recipients' water containers during collection) is a common community-based intervention.

This study team undertook lab-based research at Tufts and field evaluations in Bangladesh, Democratic Republic of Congo, Haiti, Mozambique, and Nigeria. They generated evidence and practical recommendations on both bucket chlorination and household spraying; however, no HDK intervention could be found to evaluate in the field, suggesting that field implementation practices may be falling behind global recommendations.

Bucket chlorination station in the Democratic Republic of Congo. Credit: Gabrielle String.

Background

Many low-and-middle-income countries still experience cholera outbreaks. Access to water and sanitation supplies can reduce the likelihood, but this access is often reduced or compromised in humanitarian emergencies. Community- and household-level water, sanitation, and hygiene (WASH) interventions are key to reducing cholera transmission in these circumstances. Common interventions deployed by humanitarian actors focus on the water supply; water treatments (including household treatments and bucket chlorination), sanitation options (latrines) and promotion of handwashing and environmental hygiene. The effectiveness of interventions varies; little evidence is available on those evaluated by Tufts. The Global Task Force for Cholera Control (GTFCC) WASH Working Group has called for more evidence on cholera response interventions to inform policy and practice.

How the research was conducted

In the lab, the team tested efficacy of treating water and spraying/wiping surfaces with chlorine, for *Vibrio cholerae* inactivation following global disinfection guidelines. In the field, they evaluated effectiveness of real household disinfection and bucket chlorination interventions by surveying beneficiaries, interviewing program staff, and testing water quality and household surfaces.

Key findings

- Lab research showed that household spraying is most efficacious using 0.2% chlorine sprayed on all surfaces, or wiped on most non-heavily soiled surfaces, and a 2.0% concentration on contaminated porous surfaces. Surfaces must be visibly wetted to achieve disinfection.
- Bucket chlorination can be efficacious at inactivating *V. cholerae* bacteria and providing residual chlorine when dosage is determined by a jar test using all three commonly used chlorine types (HTH, NaDCC, NaOCl).
- However, effectiveness for both interventions varied in the field, depending on how they were implemented in each context.
- Responders in the field were not familiar with HDKs, preferring household spraying. Therefore, a field evaluation of HDKs was not conducted.

Implications for humanitarian practitioners and policymakers

- To ensure bucket chlorination effectiveness matches efficacy, it is recommended to conduct more frequent dosing (jar) tests, regularly monitor chlorine residual at the household level, and safely store chlorine solutions away from heat and sun.
- It is recommended to conduct regular monitoring in bucket chlorination programs, including:
  - Assurance testing of chlorine solution concentration.
  - Chlorine residual at the household level.
- To make household spraying most effective, spraying agents should: disinfect surfaces systematically until wet using 0.2/2.0% chlorine solution, including kitchen spaces, patients' beds, and latrines; arrive at households quickly; and concurrently deploy hygiene promotion activities.
- The fact no HDK intervention could be found for evaluation emphasizes the gap between the current international-level policy and the realities of cholera response programs.
- There is a need for greater attention to the dissemination of new evidence and training of responders and affected populations regarding methods to prevent cholera transmission.

Household spraying in Haiti. Credit: Karin Gallandat.

Recommendations for future research

Current research on cholera is focused on helping countries write National Cholera Control Plans (NCPs), that are reviewed and certified by an independent committee of the GTFCC. Included in the NCPs are sections on WASH planning. The study team is working with GTFCC to develop guidance for specific WASH interventions (including spraying, disinfection kits, and bucket chlorination). Additionally, further research is recommended on surface recontamination; evaluations of HDKs in real programs; and health impacts of household disinfection. Follow-on research of household water safe storage in water treatment is also needed.

About the study team

This research was led by Principal Investigator Daniele Lantagne, Tufts University. Researchers were Gabrielle String, Karin Gallandat, and Camille Heylen, Tufts University. Partners were AIDES and Solidarités International, IFRC, and MSF.

Keywords

Cholera, water and sanitation, WASH, household spraying, household disinfection kits, bucket chlorination

Articles and further reading

https://www.elrha.org/project/establishing-evidence-common-underresearched-wash-cholera-interventions/

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http://www.elrha.org/programme/research-for-health-in-humanitarian-crises/