

Evaluating the coverage of bucket chlorination, hygiene promotion, and hygiene kit distribution in response to a hepatitis E outbreak in Am Timan, Chad

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Introduction

Since September, 2016, MSF has been responding to a hepatitis E virus (HEV) outbreak in Am Timan, Chad (population≈50,000). As of March 2017, there have been over 1100 cases of acute jaundice syndrome (AJS). We implemented bucket chlorination of water collection containers at all private wells (n=72) and rehabilitated two automatic chlorination systems serving the town. Outreach workers conducted hygiene sensitization during visits to all households and water collection points, and distributed hygiene kits to approximately 10 000 households. We conducted a cross-sectional study to evaluate the coverage and use of these interventions.

Methods

A random sample of 395 households was drawn from a list of all households in the city. Over 8 days, investigators interviewed adult women at each household who said they were responsible for the drinking water supply, about the household's main water source, water storage habits, and understanding of hygiene messages. Investigators measured free residual chlorine (FRC) in household containers using hand-held chlorine pool testers. We calculated medians (for continuous variables), frequencies, proportions, and 95%CI.

Ethics

This research fulfilled the exemption criteria set by the MSF ERB for a posteriori analyses of routinely collected clinical data and thus did not require MSF ERB review. It was conducted with permission from Sidney Wong, Operational Centre Amsterdam, MSF.

Results

392 households (median 7 people, range 1-33) completed the survey. Water came from private wells in 269 households (69%), in-home taps in 141 (36%), and the river in 13 (3%). Most households accepted chlorination in their last water retrieval (n=384, 98%, 95%CI 96-99). 390 households (99%, 95%CI 98-99) received kits. Most households (n=388, 99%, 95%CI 97-99) had heard about preventing jaundice through multiple sources: health promoters at water points (45%), outreach worker home visits (90%), radio (56%), and mosque (35%). Median FRC was 0.1mg/L (range 0.1-3.0), and 167 households (42.6%, 95%CI 38-48) had safe FRC (≥0.2mg/L). Factors associated with higher likelihood of having safe FRC using regression modeling were time <18 hours since last water collection and storage of new water in previously empty containers (no mixing).

Conclusion

We achieved high coverage for acceptance of chlorine, hygiene messaging, and hygiene kit ownership. The overall median FRC value in stored drinking water was lower than expected but safe in several subgroups, indicating the need for alternative chlorination approaches and focused messaging during an outbreak response, particularly when water is obtained from mixed sources and diluted into larger containers. In the absence of prospective follow up of households affected by HEV we cannot evaluate the impact of these interventions on case numbers. As of March 2017, the epidemic curve did not suggest a reduction of AJS cases consistent with interruption of viral propagation, however there has likewise been no significant increase.

Conflicts of interest

None declared