Assessing the Microbiological Quality and Association with Diarrhoeal Disease of Packaged Sachet Water in Freetown Street Markets: A Research Protocol

I, b, r, a, h, i, m, S, e, s, a, y, ,, S, a, m, u, e, l, B, ., W, i, l, l, i, a, m, s, ,, M, a, r, i, a, m, a, K, a, m, a, r, a

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Abstract

Packaged sachet water is a major drinking water source in urban African settings such as Freetown, Sierra Leone. Its microbiological quality in informal street markets is not routinely monitored. Consumption of contaminated water is a key risk factor for diarrhoeal diseases, which remain a leading cause of morbidity. This protocol describes a study to assess the microbiological safety of sachet water sold in Freetown's street markets and to investigate its association with reported diarrhoeal disease. The primary objectives are to determine the prevalence of faecal indicator bacteria in market-sold sachet water and to evaluate the relationship between its consumption and self-reported diarrhoeal episodes among consumers. A cross-sectional study will be conducted. A stratified random sample of sachet water will be collected from vendors across major street markets in Freetown. Samples will be analysed for Escherichia coli and total coliforms using membrane filtration. Concurrently, a structured questionnaire will be administered to a sample of consumers to gather data on water consumption patterns and recent diarrhoeal disease incidence. Data will be analysed using descriptive statistics and logistic regression. As this is a research protocol, no empirical findings are presented. The study is designed to generate data on the proportion of sachet water samples exceeding World Health Organisation guideline values for faecal contamination and to quantify any association between

consumption and diarrhoeal disease risk. The anticipated results will provide evidence on the safety of a critical urban water source. This will clarify whether assumptions about the quality of market-sold sachet water in this setting are justified. Findings will be used to formulate evidence-based recommendations for regulatory authorities regarding the monitoring and quality control of sachet water production and vending. Public health messaging may also be developed based on the outcomes. sachet water, microbiological quality, diarrhoeal disease, Escherichia coli, street markets, Freetown, Sierra Leone. This study will contribute empirical data on a widely consumed but under-regulated water source. It aims to inform public health policy and regulatory practice to improve water safety and reduce waterborne disease in urban Sierra Leone.