Environment and Health links: Investigation of Coliform Occurrences in Drinking Water in Akonolinga, Cameroon

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INTRODUCTION

Water greatly impacts community health by affecting ¾ of its activities. Unsuitable drinking water and poor sanitation lead to water-related diseases. These diseases embody infections transmitted either directly through pathogens-infested water or by vectors closely associated with the environment. The World Health Organization (WHO) attributes 23% of all deaths to the environment. Water-related diseases represent $^{2}/_{3}$ of all diseases in Cameroon and causes 50% of death. The Akonolinga community, located in the Nyong-and-Mfoumou Division, Centre Region, Cameroon, is a forest-savannah transitional zone with a plateau landscape and a bi-modal equatorial climate. Cattle rearing, crop farming, mining and waste disposal probably pollute water sources. Calling for One Health investigations of sustainable solutions.

OBJECTIVE

The present study investigates the *Escherichia Coli* and total Coliform occurrences in drinking water of households to reinforce the interconnectedness of the environment and health through community engagement and risk communication.

MATERIALS AND METHODS

The study was conducted in 6 villages and 3 hamlets boarding River Nyong. This river greatly affects farmers, shepherds and household livelihoods; revealing One health issues, ideal for the One Health Water Africa (OHWA) field school. The field school was conducted by a consortium of 04 institutions: the University of Buea, the University of Douala and the French Institute for Sustainable Development (Cameroon) and the University of Corsica Pascal Paoli (France). A total of 134 households was investigated for microbial load of *E. coli* and total Coliform. Two water samples were tested at the source and at the house. Water sources used were spring, borehole, dug well and surface water. Two types of water tests were performed: short term faecal contamination (via detection of Escherichia coli (E. coli) and total Coliform) and long term faecal contamination (via semi quantification of nitrites and nitrates). Standard protocols with respect to sample collection, storage, testing, incubation, and measurement were adhered to Aquagenx 2018. Between 13th to 20th November 2022, we conducted a cross-sectional study to assess health, water and sanitation conditions (Figure 1).

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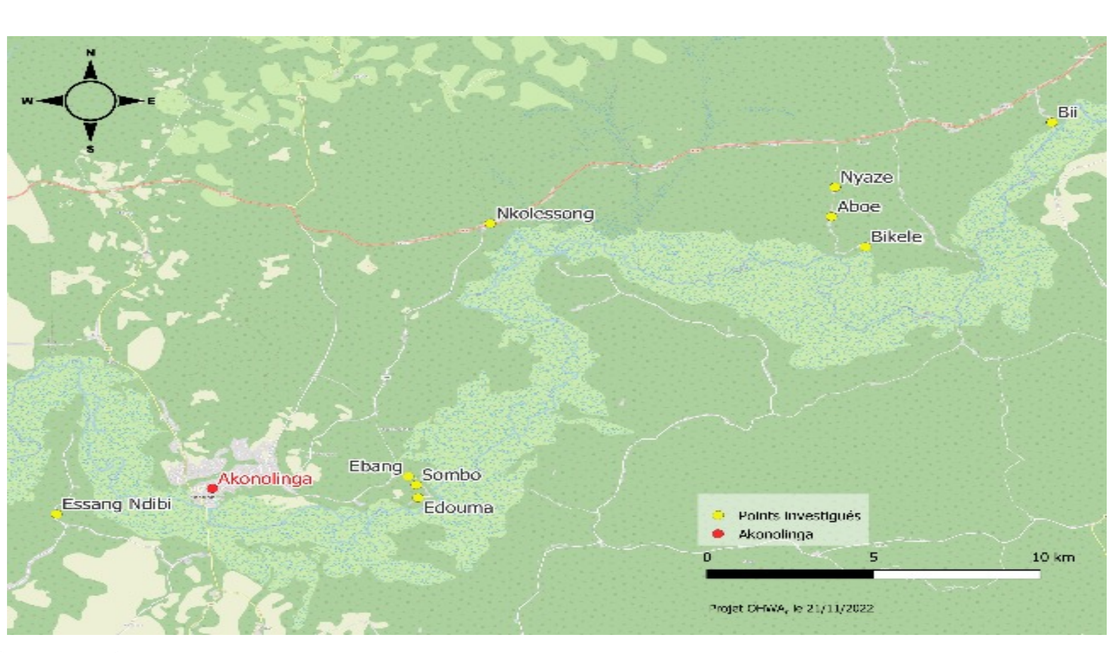

Figure 1: Map showing selected study sites along the Nyong river

RESULTS

Overall, the main source of drinking water was spring water (41%; n=55) followed by borehole (27%; n=36). Twenty-one percent (n=28) collected drinking water from dug well. About 122 (91%) water samples analyzed for presence/absence Coliforms/*E.coli* and 77% (n=95) were evenly contaminated. Further analyses on water contamination routes reveal that 63% were positive Coliforms/*E. Coli.* Comparing the source with and stored water in houses, stored water had high Coliforms/*E. Coli.* These findings reveal low level of proper hygienic conditions for water manipulations. The innovative participatory method is highly appreciated as it fosters community engagement and risk communication in the design, selection, adoption and dissemination of water purification methods and reduction of water borne diseases.

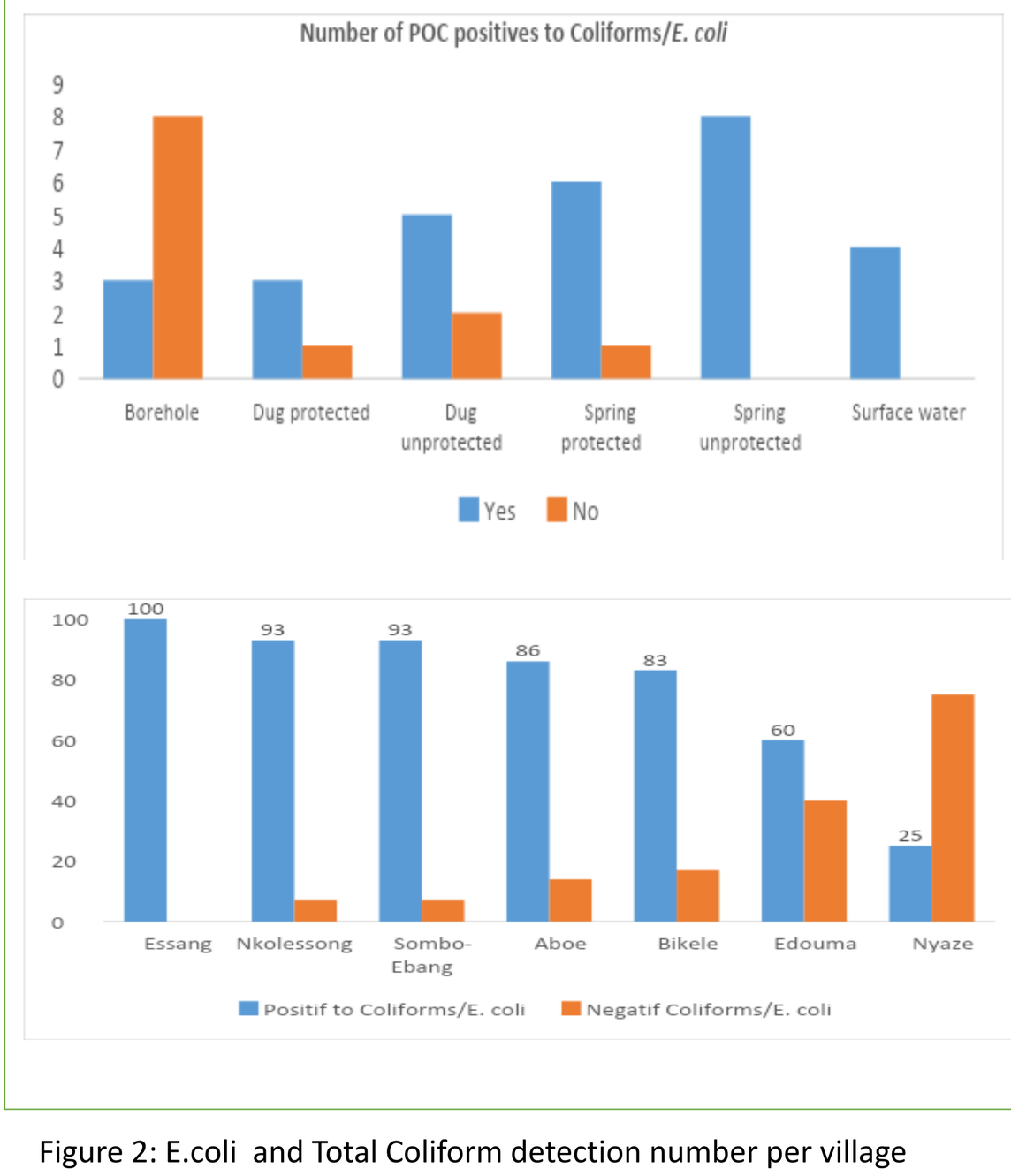

Figure 2: E.coli and Total Coliform detection number per village

CONCLUSIONS

Comparing the source and stored water in homes, stored water had high Coliforms/E. Coli. This enabled to understand different drinking water transmission routes. Even when the source of water is not contaminated, water quality reduces at homes due to improper manipulations. It is recommended to further design, in collaboration with the community, training sessions on proper hygienic practices and water treatment. Policy makers should intensify sensitization on proper treatment of drinking water.

Keywords: Community Engagement, Environment-Health links, River Nyong, Coliforms

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