



Short Communication

Prevalence of intestinal protozoa in communities along the Lake Victoria region of Uganda



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SUMMARY

The objective of this study was to assess water-borne parasite point prevalence in communities in close proximity to Lake Victoria in Uganda prior to the implementation of a clean water intervention, and to investigate possible associations of water source and latrine access with protozoan prevalence. Utilizing a rapid antigen test, parasite prevalence for *Giardia lamblia* and *Entamoeba histolytica/dispar* was determined from stool samples of individuals living in six Ugandan communities. Stool sample test results were stratified by the independent variables of gender, age, community, water source (improved or lake), and presence of a latrine. The impact of the independent variables on parasite prevalence was investigated with bivariable and multivariable analyses. The prevalence of *Giardia* (12%) was influenced by age and community of residence. The prevalence of *Entamoeba* (10%) did not significantly vary by the independent variables. The prevalence of intestinal protozoan parasites is significant in Ugandan communities bordering Lake Victoria. Interventions to continue to improve water sources remain a high priority. Rapid antigen testing is likely to be useful in the monitoring of water-borne parasite prevalence.

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1. Introduction

Establishing the extent to which intestinal protozoal infections are present in communities is essential for prioritizing public health interventions.^{1,2} In this study, the baseline prevalence of *Giardia intestinalis* and *Entamoeba histolytica/dispar* was assessed in individuals in six Ugandan communities near Lake Victoria. Approval for this study was obtained from the Uganda National Council for Science and Technology, Uganda President's Office, and the Institutional Review Board for Water Missions International (WMI) and the Medical University of South Carolina.

2. Methods

This study was performed in February 2011 prior to the implementation of a clean water project. Parasite prevalence for *Giardia intestinalis* and *Entamoeba histolytica/dispar* was determined from stool samples using the highly sensitive and specific rapid antigen test, Triage Micro Parasite Panel (Alere Triage[®] Micro

Parasite Panel, Waltham, Massachusetts).³ Stool sample test results were stratified by the independent variables of gender, age, community, water source (improved or lake), and presence of a latrine. The impact of the independent variables on parasite prevalence was investigated with bivariable and multivariable analyses. Variables included in the multivariable model were gender, age, latrine type, water source, proximity of the household to the lake, and a community level random effect. Results are reported as percent prevalence and 95% confidence intervals (CI).

3. Results

A total of 695 individuals were sampled, ranging in age from 3 to 76 years. Of the 695 stool specimens tested, 84 were *Giardia*-positive (12%, 95% CI 10–14%). A trend towards a higher prevalence was seen in males (15%, 95% CI 11–19%) than females (11%, 95% CI 7–13%) (Table 1). A consistent drop in prevalence was observed in older age groups, ranging from 26% in the youngest to 3% in the eldest. The multivariable model demonstrated that age and the community of residence influenced the prevalence of *Giardia*.

Overall, 68 individuals tested positive for *Entamoeba* (10%, 95% CI 8–12%). Males had a slightly lower prevalence (8%, 95% CI 5–11%) compared to females (11%, 95% CI 8–15%) (Table 1). In

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Table 1
Parasite prevalence

	Total	Giardia-positive	Prevalence % (95% CI)	Entamoeba-positive	Prevalence % (95% CI)
All	695	84	12 (10–14)	68	10 (8–12)
Gender					
Male	306	45	15 (11–19)	24	8 (5–11)
Female	389	39	10 (7–13)	44	11 (8–15)
Age group, ^a years					
≤5	99	26	26 (18–36)	11	11 (6–19)
6–10	149	35	23 (17–31)	9	6 (3–11)
11–14	90	10	11 (5–19)	10	11 (5–19)
15–17	26	2	8 (1–25)	2	8 (1–25)
18–29	113	6	5 (2–11)	12	11 (6–18)
≥30	218	5	3 (1–5)	25	11 (8–16)
Community					
A	120	19	16 (10–24)	13	11 (5–18)
B	118	12	10 (5–17)	15	13 (7–20)
C	111	13	12 (6–19)	12	11 (6–18)
D	103	8	8 (3–15)	5	5 (2–11)
E	116	11	10 (5–16)	10	9 (4–15)
F	127	21	17 (11–24)	13	10 (6–17)
Latrine					
Private	508	55	11 (8–14)	47	9 (7–12)
Shared	27	5	19 (6–38)	1	(0–19)
None	150	23	15 (10–22)	16	11 (6–17)
Use lake water					
Yes	69	4	6 (2–14)	7	10 (3–17)
No	612	77	13 (10–15)	58	10 (7–12)
Closest water source					
Lake	440	52	12 (9–15)	40	9 (6–12)
Improved source	255	32	13 (8–17)	28	11 (7–15)
Occupation ^a					
Business	61	1	2 (0–5)	8	13 (5–22)
Farming	187	7	4 (1–6)	22	12 (7–16)
Fishing	55	0	0 (0)	5	9 (1–17)
Minor/student	362	74	20 (16–25)	31	9 (6–11)
Other	30	2	7 (0–16)	2	7 (0–16)

^a Significant difference among groups for Giardia prevalence at $p < 0.05$.

contrast to the Giardia findings, Entamoeba prevalence remained constant across the age spectrum and did not vary significantly by the independent variables.

4. Conclusions

The prevalence of intestinal protozoan parasites is significant in Ugandan communities bordering Lake Victoria. As efforts to enhance access to improved water and sanitation continue globally, it is imperative to monitor intestinal protozoan prevalence over time and understand the impacts of diverse geographical and community elements on these efforts. The use of rapid testing for parasite presence improves the availability of objective monitoring⁴ and should be further investigated as a standard outcome measurement for water and sanitation interventions.

Conflict of interest: No conflict of interest to declare.

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