

# An assessment of the Risk Factors Associated with Cryptosporidiosis in Rural Malawi

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Table 1. Results of microscopy tests for presence of *Cryptosporidium* sp.

mZN	AP	IF	Total
16 (64%)	19 (76%)	13 (52%)	25

## Results

Multivariate logistic regression of questionnaire data revealed an increased risk of cryptosporidiosis associated with ownership of pigs (OR 7.2, 95%CI 1.9 – 27.5,  $p = 0.004$ ), presence of diarrhoea in the household (OR 8.8, 95%CI 1.8 – 53.4,  $p = 0.008$ ), bathing in the river (OR 76.7, 95%CI 1.1 – 23.8,  $p = 0.037$ ) and no education within the household (OR 3.6, 95%CI 1.1 – 11.8,  $p = 0.038$ ). One family member of a case was found to be excreting *Cryptosporidium* oocysts. The statistical strength of the results was affected by the small sample size.

Oocysts were not isolated from domesticated animals ( $n = 205$ ) or water samples ( $n = 128$ ). Bacteriological results for water at both source and household level revealed the presence of *E. coli* indicating the potential for faecal contamination. Five types of drinking water source, representing 28 separate supply points, were used by respondents in the study, namely boreholes ( $n = 17$ ), unprotected shallow wells ( $n=2$ ), gravity tap systems ( $n=6$ ), and rivers ( $n = 2$ ).

100% of unprotected supplies and 23.5% were contaminated with *E. coli*. Of those collecting from clean water sources, 76% of households had water contaminated with *E. coli* within households' storage containers. 75% of guardians' hands were contaminated with *E. coli* at the time of interview (Table 2)



## Conclusions

Despite the limitations of the community based case control study, qualitative, quantitative and observational data collected have provided insight into rural life in Malawi, and identified major risk factors for diarrhoeal disease transmission, including *Cryptosporidium*. Statistical associations are limited by the small sample size and exclusion of malnutrition as a variable. However, when used in conjunction with microbiological data and findings of previous studies, trends which require further investigation become evident. Risks were identified for all reported routes of *Cryptosporidium* transmission.

## Reference

Morse *et al.*, (2007). *Epi. Infect.* Online January 2007

A community based case control study was conducted in Chikwawa, Malawi, within a rural population over a 23 month period, to identify risk factors associated with cryptosporidiosis in under fives.

## Methodology

96 home interviews were conducted in 24 communities (cases  $n = 24$ ; unmatched controls  $n = 72$ ). Qualitative and quantitative data were collected from all case and control households using the same tools. A total of 61 risk factors were investigated within a questionnaire, assessing their socio economic background, symptoms, treatments and symptomatic contacts, housing standards, water use, personal hygiene practices, sanitation, food, and animal contacts. Samples of human and animal stools, hand surfaces and water from both the household and source were collected and examined for the presence of *Cryptosporidium* oocysts.

Modified Ziehl-Neelsen (mZN), auramine phenol (AP) and immunofluorescence (IF) were used to determine the presence of *Cryptosporidium* oocysts in stools (Table 1) (Morse *et al.*, 2007). 100 ml water samples were examined using IDEXX Colilert® to assess the presence/absence of *E. coli*. One litre water samples were concentrated to 2 ml by repeated centrifugation and oocysts concentrated by immuno magnetic separation (DYNABEADS™, UK) and detected by IF. Hands were washed in sterile water and 100 ml of the wash water examined using IDEXX Colilert® to assess the presence/absence of *E. coli*.

Data entry was completed and analysed using SPSS 13.0

Table 2. Microbiological quality of guardians hands at the time of interview by case and control

Respondent	Microbiological Result of Hand Swab	
	Coliforms only	<i>E. coli</i> and coliforms
Case ( $n = 24$ )	4.2%	95.8%
Control ( $n = 72$ )	31.9%	68.1%
Total ( $n = 96$ )	25.0%	75.0%