MOLECULAR DETECTION OF ENTAMOEBA SPECIES AND FACTORS ASSOCIATED WITH INFECTION AMONG DIARRHOEAL PATIENTS ATTENDING MERU TEACHING AND REFERRAL HOSPITAL, KENYA

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DECLARATION

I declare this thesis as my original work and has never been presented for a degree or award in another University.

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ABSTRACT

Entamoeba histolytica which is a protozoa, cause amoebiasis. Being similar to *Entamoeba dispar* and *Entamoeba moshkovskii,* it varies in biochemical and gene structure. The inability of microscopy to differentiate pathogenic *Entamoeba* spp has led to misuse of drugs contributing to the development of drug resistance and increased treatment cost. Molecular differentiation using Polymerase Chain Reaction (PCR) has aided the detection of pathogenic and less/nonpathogenic *Entamoeba* species. This study therefore determined the prevalence and factors associated with the *Entamoeba* complex (*E. histolytica, E. dispar* and *E. moshkovskii*) infection among 400 patients attending Meru Teaching and Referral Hospital (MTRH) presenting with diarrhea between January 2018 to April 2018. The presence of *Entamoeba* complex in stool samples were assessed using microscopy and 16S rRNA gene multiplex PCR. Statistical analyses were performed by STATA v 13 (StataCorp LP, College Station, TX, USA). The test performance was determined using sensitivity, specificity, predictive values and kappa statistics. The prevalence of *Entamoeba* cysts/trophozoites was 33 (n= 400; 8.3%) by microscopy while 29 (n=400; 7.3%) *Entamoeba histolytica* were detected by PCR. Using the PCR as the gold standard, the sensitivity of microscopy was 29/29 (100%; 95% CI 88.1% - 100%) with a specificity 367/371 (98.9%; 95% CI 97.3 % - 99.7%). In the final multivariate model, factors significantly associated with increased risk for *Entamoeba* infection included patients who obtained drinking water from water vendors (adjusted odd ration aOR = 5.1, 95% CI = 1.5 – 17.7; $p < 0.009$), those with no access to covered toilets or pit latrines (aOR = 294.8, 95% CI = 16.6 – 539; $p < 0.0001$), patients who had diarrhea more than 14 days (aOR = 11.9, 95% CI = 4.1 – 33.7; $p < 0.001$) and those patients who had bloody stool (uOR = 6.4, 95% CI = 1.2 – 32.9; $p < 0.026$) or watery (uOR = 5.7, 95% CI = 1.5– 21.8; $p < 0.01$). Patients who disposed of their sluice waste water into sewage system (aOR = 0.2, 95% CI = 0.03 – 0.9; $p < 0.036$) and those who washed hands with soap or sanitizers (aOR = 0.08, 95% CI = 0.024 – 0.3; $p < 0.0001$) were associated with lower *Entamoeba* infection. In conclusion, it is recommended that patient presenting with diarrhoea should be tested for *Entamoeba histolytica* to improve treatment and control of disease. *Entamoeba* infection is still responsible for diarrhea especially among children in Meru County. PCR is a useful tool compared to microscopy for accurate diagnosis prior to treatment. Patients hygienic and sanitary practices and clinical presentation such as having bloody and watery diarrhea are key factors for *Entamoeba* infection. Continuous monitoring of patient presenting with diarrhea for *Entamoeba* infection would improve treatment outcomes. Although the cost of PCR might be prohibitive in Kenya, for accurate management of *Entamoeba* infection the use of PCR to differentiate *Entamoeba* species is encouraged.