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PREVALENCE OF AMOEBIASIS AMONG CHILDREN OF UNGWAN GIRKU AND SABON LAYI DISTRICTS OF NASARAWA

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ABSTRACT

This study assessed the extent of spread of Entamoeba histolytica Infection among Children of Ungwan Girku and Sabon Layi Districts in Nasarawa town, Nasarawa State, Nigeria. Eighty(80) stool samples were obtained and examined microscopically for the presence of cyst(s) and/or trophozoite(s) of the parasite. The overall prevalence among children of these two areas was 20%. Among children of these localities between the ages of 2-5 years, a prevalence of 12% was obtained. A prevalence of 23.64% was recorded for children aged 6 years and above. A prevalence of 22% was recorded for males and 16.67% for females. Also, a prevalence of 1.82% was recorded for children from households with good sanitary conditions, 60% for children from households with poor sanitary conditions. Also, a prevalence of 37.5% was recorded among children whose households used well water for domestic purposes (cooking and drinking), 2.56% among children whose households used pipe-borne water, and 33.33% among children whose households used borehole water. Chi-square test was used in the analysis of results to determine the association between gender, age, sanitary conditions, sources of water and the infection. The prevalence of the infection was not statistically significant (P>0.05) in relation to gender and age. Conversely, the prevalence of the infection was statistically significant (P< 0.05) in relation to sanitary conditions and the kinds of water the households used for domestic purposes. The aim of this study was to assess the prevalence of amoebiasis in Ugwan Girku and Sabon Layi districts of Nasarawa town with the view to enhancing the prospects for prevention and control.

KEYWORDS: Prevalence, Amoebiasis, children, Entamoeba, Cysts, Nasarawa Town

INTRODUCTION

Entamoeba histolytica (E. histolytica) is a pathogenic protozoan parasite which causes amoebiasis. It is motile and reproduces most often asexually by binary fission. E. histolytica is aerobic, although may live under anaerobic condition in environments such as the human intestine or the rumen of animals (Braga, 1990). Amoebiasis is an invasive protozoal infection caused by E. histolytica. This is localized in the large intestine but can spread to other visceral organs such as the liver, pleura, lungs, pericardium, spleen, the skin, brain and genito-urinary tract (WHO, 1997). Several protozoan species of the genus Entamoeba such as: E. coil, E. dispar, E. moshkovskii, E. hartmanni and E. polecki, infect humans (Mehmet and Petri, 2003). But, E. histolytica has been documented as the only pathogenic species (WHO, 1997). WHO (1997), reported that amoebiasis is the only human aggregasive protozoal disease that affects the human bowel and is considered as the 2nd or 3rd leading cause of death amongst parasitic diseases, surpassed only by malaria and schistosomiasis (Gatti et al., 2002). Amoebiasis occurs worldwide with approximately 50million people infected annually causing close to 100,000 deaths (WHO, 1997). Amoebiasis is said to be more common in area with poor sanitation and nutrition, particularly in the tropics (Gatti et at., 2002). Morbidity and mortality occurs in Africa, Asia,Central and South America (Petri and Singh, 1999). The prevalence and presentation of symptomatic *E. histolytica* infection varies geographically (Weinke et al., 1988). In the developed countries, infections occur primarily among travellers to endemic regions where most waters are natural and hence are subject to being contaminated by the microorganism since it is found everywhere (Hung, 2005).

Significance of the study

This study was designed to provide further baseline information on the prevalence index with a view to creating adequate awareness about amoebiasis and hence improve the prospects for prevention and control.

Limitations of the Study

This study encountered the challenge of non-compliance as most patients were not forthcoming with information and demographic data. Again the inability of sum children to collect stool samples properly into stool containers was another limitation.

MATERIALS AND METHODS

Study Area

This study covered children in two local communities in Nasarawa town. Nasarawa is a town in Nasarawa state in the northern part of Nigeria (FRN, 2009). It has an area of 5,704Km2 with a population of 189, 835 at the 2006 census (FRN, 2009). It is approximately 67km from Abuja, the Federal Capital Territory, about 37km from Keffi Local Government Area, and approximately 92km from Lafia, the Nasarawa State Capital. The town is located between latitude 8° 21'58"N of the equator and longitude 7° 5' 58"E of the Greenwich meridian (FRN, 2009).

Study Population

This study was community- based. Participants were children of Ungwan Girku and Sabon Layi districts in Nasarawa town . Inhabitants of these localities comprises of civil servants, artisans, and traders. Demographic information about each participant was obtained by oral interview. Such information included sex and age; while information on the households' sanitary conditions and their source (s) of water for domestic purposes were obtained by surveying the households. All information gathered were treated with utmost confidentiality.

Sample Collection

Before the commencement of this study, informed consents were obtained from parents /guardians of the children or from the children directly where applicable. Clean, dry containers were given to the children or their parents and instructed on how to collect the samples.

Sample Examination

All faecal samples were examined macroscopically: the colours, presence of mucus and/or blood were noted. Microscopic examinations were subsequently done. The semi- formed and formed samples were processed by placing a drop of normal saline on one end of a clean glass slide and a small quantity of the sample was added with an applicator stick. Both were emulsified. Another emulsified mixture of normal saline and stool sample were carried out at the opposite end of the same glass slide. Individual preparations were covered gently with glass cover slips and examined with Xl0 objective of a microscope. The X40 objective was used to identify any observed object/organism of interest under a good contrast of the microscope. Dobell's iodine was added in drops to stain observed cysts for easy identification. The applicator stick was used to carefully transfer watery stool sample onto clean glass slides. The glass slides were covered with cover slips and observed under the microscope. A drop of eosine was added with Pasteur pipette to aid in the identification of motile trophozoites (Iarcia and Bruckner, 1997).

Statistical Analysis

The prevalance of E. histolytica infection was determined from the proportion of infected individuals in the total population under consideration and expressed as a percentage. The chi-square test was employed to determine the relationship between gender, age, sanitary conditions, and the source of water the households were using for domestic purposes (cooking and drinking), with E. histolytica infections. P values of < 0. 05 were considered to be statistically significant.

RESULTS

The study population was made up of 80 children of which 50 (62.5%) were males and 30 (37.5%) were females. On the whole, 16 were found to have been infected with E. histolytica. The prevalence of the infection in this study population was 20%. The gender-related prevalence of E. histolytica infection in the study population was 22% and 16.67% for males and females respectively (Table 1). There was no statistically significant association between gender and the infection (p>O.O5). Similarly, the prevalence of the infection varies with age. It was 12% among children of age 2-5 years and 23.64% among those of age 6 years and above (Table 2). However, the association between the infection and age was not statistically significant (p>0.05). Conversely, the prevalence of the infection varies greatly with the prevailing sanitary conditions of households in the study area. It was 1.82% among households with good sanitary conditions and 60% among households with poor sanitary conditions (Table 3). The association between the infection and sanitary condition was found to be statistically significant (p<O.O5). In the same vein, prevalence of the infection varies with the kind of water the households were using. It was 3 7.5% among households that used well water for domestic purposes (cooking and drinking), 2.56% among households which used pipeborne water, and 33.33% among households that used borehole water. There was a statistically significant association between the infection and the kind of water the households used for domestic purposes (p<O.O5) (Table 4).

Table 1: Prevalence of E. histolylica Infection Among Children of Ungwan Girku and Sabon Layi Districts in Nasarawa town in Relation to Gender.

Gender	No. Examined	No. Positive	Prevalence (%)
Males	50	11	22.00
Females	30	5	16.67
Total	80	16	20.00

$X^2 = 0.224$, df = 1, $p > 0.05$

Table 2: Prevalence of E. histolytica Infection Among Children of Ungwan Girku and Sabon Layi Districts in Nasarawa town in Relation to Age

Age	No. Examined	No.Positive	Prevalence(%)
2-5years	25	3	12.00
6years and above	55	13	23.64
Total	80	16	20.00

$X^2 = 1.011$, df = 1, $p > 0.05$

Table 3: Prevalence of E. histolytica Infection Among Children of Ungwan Girku and Sabon Layi Districts in Nasarawa town in Relation to Sanitary Conditions of Households.

Age	No. Examined	No. Positive	Prevalence (%)
Good	55	1	1.82
Poor	25	15	60.00
Total	80	16	20.00

$X^2 = 21.409$, df = 1, $p > 0.05$

Table 4: Prevalence of E. histolytica Infection Among Children of Ungwan Girku and Sabon Layi Districts in Nasarawa town in Relation to the Kind of Water the Households Used for Domestic Purposes (cooking and drinking)

Source of water	No. Examined	No. Positive	Prevalence (%)
Well	32	12	37.50
Pipe-borne	39	1	2.56
Borehole	9	3	33.33
Total	80	16	20.00

$X^2 = 9.954$, df = 4, $p > 0.05$

DISCUSSION

Microscopy was used for the detection of trophozoite(s) and/ or cyst(s) of *E. histolytica* in this study. Of the 80 stool samples examined, only 16 were found to have harboured the trophozite(s) and/or cyst(s) of the parasite giving an overall prevalence of 20%. None of these children was aware of his/her E. histolytica status. This report also confirms the endemicity of the parasite in Nigeria. The prevalence of infection in this study was higher than that reported by Inabo et al. (2000) who conducted a research to determine the prevalence of E. histolytica/E. dispar and Giardia lamblia in primary school pupils in 5 villages in Kaduna and Zaria, Nigeria. Their results showed that, out of 92 pupils examined, 8.6% were positive for E. histolytica/E. dispar. In contrast, it was much lower than the 80.5% recorded in Ilesa by Ogunlesi et al. (2005). The authors attributed the highest prevalence of amoebiasis to poor sanitary condition of the study area. This is in consonance with a finding in this study where a prevalence of 60% was recorded among children from households with poor sanitary conditions compared with the 1.82% recorded among children from households with good sanitary conditions. In the course of conducting this research, it was observed that, open urination and defaecation is common among inhabitants of these localities. Also, many of the households used pit latrines and other related structures.Among the two age categories highlighted in this study, children within the age bracket of 2-5 years were less infected compared to those within the age bracket of 6 years and above. It was 12% for children aged between 2- 5years and 23.64% for those aged 6 years and above. The reason for this age (6years and above) preponderance is not obvious as the immune system of children in this age bracket ought to have been comparatively developed and their level of education should be sufficient to protect them from the infection. However, the association between age and the infection was not statistically significant (p>O.O5). There was no statistically significant association between gender and the infection in this study although the prevalence was higher among males (22%) than among females (16.67%). The reason for this male preponderance could be explained on the following basis: males are more susceptible than females to infections caused by parasites, fungi, bacteria, and viruses because males generally exhibit reduced immune responses and increased intensity to infection compared to females (Klein, 2000a and b). These differences are usually attributed to: (i)

Ecological (sociological in human); and (ii) Physiological, usually hormonal in origin. Ecological factors include differential exposure to pathogens because of sex-specific behaviour or morphology (Zuk and Mckean, 2000). The kind of water the households used for domestic purposes (cooking and drinking) were found to be a risk factor in acquiring E. histolytica infection in this study. 37.50% prevalence was recorded among children from households using well water; 2.56% among children from households using pipe-borne water and 33.33% among children from households using borehole water. There was a statistically significant association between the kind of water the households were using for domestic purposes (cooking and drinking) and the infection (p<O.O5).

CONCLUSION

The relatively high prevalence of 20% reported in this study portrays *E. histolytica* infection as a disease of public health importance and also as being endemic in the study population. This report therefore brings to focus, the importance of maintaining good level of personal and community hygiene, and provision of safe drinking water.

RECOMMENDATIONS

i. Public health awareness programmes should be promoted by government and individuals towards a better understanding of the source and adverse effects of amoebiasis among children.
ii. There should be improvements in sanitary practices and provision of safe drinking water to the populace.
iii. Proper and effective diagnostic techniques such as the use of sensitive and specific methods like the Enzyme-linked Immunosorbent Assay (ELISA) should be encouraged and made available in hospitals and other health care centres.

REFERENCES

Braga, A.E. (1990). Prevalance of Entamoeba histolytica worldwide. *South American Medical Journal*, 72. 669- 672.

Federal Republic of Nigeria (FRN) (2009). Nigeria 2006 Population Census. National Bureau of Statistics. *http://nigeriastat. gov. ng/connections/pop2006.pdf*

Garcia, L. S. and Bruckner, D. A. (1997). Entamoeba histolytica Diagnosis. *Diagnostic Medical Parasitology*, (3rd ed.). ASM press, Washigton,D. C. Pp. 570.

Gatti, S., Swierczyntkii, G.I., Robinson, F., Anselemi, M.and Corraless, J. (2002). Prevalence of Entamoeba histolytica infection. *American Journal of Tropical Medicine and Hygiene*, 67 (1): 123-127.

Hung, C. C. (2005). Invasive amoebiasis as an emerging parasitic diseases. *Internal Medicine*, 34(5):165- 409.

Inabo, H.I, Galadima, M., Ogbadu, L.J. and Okuofu, C.A. (2000). Prevalence of Entamoeba histolytica and Giardia lamblia in primary school pupils in 5 rural villages in Kaduna and Zaria, Nigeria. *The Nigerian Journal of Parasitology*, 21: 61- 67.

Klein, S.L. (2000a). The effects of hormones on sex differences in infection: from genes to behaviour. *Neuroscience and Biobehavioural processes*, 51: 627-638.

Klein, S.L. (2000b). Hormones and mating system affect sex and species difference in immune function among vertebrates. *Behavioural processes*, 51:149-166.

Mehmet, T. and Petri, W.A., Jr. (2003). Laboratory Diagnosis of Amoebiasis. *Clinical Microbiology Reviews*, 16(4): 713 —729.

Ogunlesi, T. A., Okeniyi, J. A. 0., Oyedeyi, 0. A., Osenil S. B. A., Oyelami, 0. A. and Njokonma, 0. E. (2005). Childhood dysentery in Ilesa, Nigeria. The unusual role of Entamoeba histolytica. *The Internet Journal of Tropical Medicine*, 2(2): 1- 4.

Petri, W.A., Jr. and Singh, U. (1999). Diagnosis and Management of Amoebiasis. *Clinical Infectious Diseases*, 29: 1117- 1125.

Weinke, T., Friedrich-Janicke, B. and Wanker, C. (1988). Amoebiasis high-risk groups. *Journal of Infectious Diseases*, 16 (1): 1029.

World Health Organization (WHO) (1997). Amoebiasis: *WHO Weekly Epidemiological Records*, 72: 97- 100.

Zuk, M. and Mckean, K.A. (2000). Sex differences in parasite infectious: Patterns and Processes. *Neuroscience and Behavioural Reviews*, 24: 627-638.