INTESTINAL PARASITIC INFECTION WITH SPECIAL REFERENCE TO *Entamoeba histolytica* IN TWO LOCAL GOVERNMENT AREAS OF NASARAWA STATE, NIGERIA

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Abstract

The prevalence of human intestinal parasitic infections with special reference to *Entamoeba histolytica* was conducted in Keffi and Karu Local Government Areas of Nasarawa State, Nigeria, with a view to provide information for effective control strategies for parasitic infections in the study-areas. Fresh stool samples were collected randomly from 275 individuals of both sexes aged 1-60 years in the two Local Government Areas. The samples were processed and examined for parasitological evidence of infection using temporary wet mount and formol-ether concentration techniques. A total of 150 individuals (54.55%) were infected with at least one of 5 species of intestinal parasites: *Entamoeba histolytica* (24.73%), hookworm (13.09%), *Entamoeba coli* (9.45%), *Ascaris lumbricoides* (6.55%) and *Schistosoma mansoni* (7.27%). Prevalence of infection was age-specific, highest in the 11-20 year-old-age-group with lowest prevalence in those aged above 50 years (33.46%). There was decrease in infection rate with intestinal parasites with increase in age of volunteered participants, however, prevalence of infection between males and females was similar, males (54.36%) and females (54.76%). There were significant differences in prevalence of infection based on toilet types used by participants ($\chi^2 = 4.49$, $df = 3$, $p < 0.05$). Those participants using water cistern had a prevalence of 44.44%, while pit latrine users recorded a prevalence of 65.74%. There were significant differences in infection prevalence in relation to occupation ($\chi^2 = 8.036$, $df = 5$, $p < 0.05$). Civil servant/farmers recorded (64.86%) while fishermen recorded (22.58%), which was the lowest rate in occupational groups. Observations revealed indiscriminate defecation, urination and throwing of garbage into water bodies around houses, were common practices among the people, as well as eating fruits that were not properly washed. While, domestic animals mingled with human population at certain water points. The provision of regular safe water supply, good health-care services with affordable chemotherapy and introduction of health education will go a long way to control and reduce morbidity in the study areas.

Keywords: intestinal infection, *Entamoeba histolytica*, Keffi Local Government Area, Karu Local Government Area, Nasarawa State, Nigeria.

Introduction

Intestinal infections with parasitic protozoa and helminthes are recognized as one of the most important global public health problems especially in tropical Africa (Oduntan, 1974). Most helminth infections are asymptomatic, or produce only mild symptoms and are therefore often neglected until serious complications appear (Suswan *et al* 1992). Most people infected with *E. histolytica* have no symptoms at all, probably would not even know that they have been infected (Haque *et al* 2006).

Intestinal parasitic infections persist and flourish wherever poverty, inadequate sanitation, insufficient health-care, overcrowding abound (Oyerinde *et al* 1981; WHO, 1993). Socio-economic factors, religion, unconducive environmental conditions constitute compounding factors for the spread of these diseases (Cromptom and Savioli, 1993; WHO, 1996).

In Nigeria, there is difference in transmission, distribution and prevalence of various species of intestinal parasites from one geographical location to the other. This study was carried out to investigate the prevalence of intestinal parasites among humans in Keffi and Karu Local Government Areas of Nasarawa State with a view of providing information for the strategy of controlling intestinal parasitic infection with special reference to *E. histolytica* in these localities.

This study was accepted on 20th January 2011.

Materials and methods

Study area

Karu Local Government Area has an average minimum and maximum temperature of 18°C and 34°C respectively, while Keffi Local Government Area has an average minimum and maximum temperature of 17.9°C and 36°C respectively. The annual rainfall range for Karu is 1,100 mm to 2,500 mm and Keffi records 1,400 mm per annum (Akwa *et al.,* 2008). Karu Local Government Area had a population figure of 500,000 persons, while Keffi Local Government Area recorded a population figure of 92,664 persons (NPC, 2006).

Study population

The 275 volunteered participants sampled for the study, comprised of 149 males and 126 females aged 1-60 years. There was a pre-visit to the village heads by the researchers for permission and briefing on the objectives of the study. The researchers also sought oral consent of parents and guardians. An appropriate date was fixed to discuss and administer questionnaires to volunteered participants. Fresh stool samples were collected from participants randomly in the early hours of the day; at 6.00 am to 9.00 am, and were conveyed to the laboratory for parasitological examination (Walsh, 1982; Lengeler *et al* 1991; WHO, 1999).

Collection of stool samples and laboratory examination

A random sampling method was used to select individuals of both sexes from whom 20-40 g of well-formed stools or 4-5 table-spoon full of watery stools were collected in separate and appropriately labelled plastic specimen tubes with push-in caps. The stool samples were preserved in a refrigerator in 10% formalin (Oyerinde, 1999). A structured questionnaire that demanded the individual name, sex, age, methods of stool/waste disposal were administered to participants to be completed. The sample sizes were 143 and 132 for Keffi and Karu respectively. Stool samples were processed using the formol-ether and wet mount techniques and examined under the microscope for intestinal helminth and protozoan parasites (Allen and Ridley, 1970; Cheesbrough, 1991).

Statistical analysis

Data were analyzed using *chi*-square.

Results

Of the combined 143 and 132 stool samples from Keffi and Karu Local Government Areas respectively, 150 (54.55%) were found to contain at least one of the following; *Entamoeba histolytica* (24.73%), *Entamoeba coli* (9.45%), ova of *Ascaris lumbricoides* (6.55%), hookworm (13.09%) and *Schistosoma mansoni* (7.27%). The different intestinal parasite encountered in individuals are shown in Table 1; Karu Local Government Area recorded a prevalence of 55.30% higher than prevalence from Keffi (53.85%). *E. histolytica* had the highest prevalence (24.73%) while *A. lumbricoides* recorded the least (6.55%).

Table 2 shows that prevalence of infection between males (54.56%) and females (54.76%) were similar. Prevalence of infection was age-dependent, highest in those aged 11-20 years (71.43%) and lowest in those above 50 years (38.46%). There was a decline in prevalence of infection with increase in age.

Prevalence of single species' infection was 37.74%, while 18.91% of examined participants had double species' infections. Single species' infections were higher in the age-group 11-20 years (40.48%) as well as with double species' infection (30.95%).

Table 3, shows that the prevalence of infection was highest in individuals using pit latrines (65.74%) and lowest in those using water cistern (44.44%). Statistically, there was significant differences in prevalence of infection in relation to toilet types ($\chi^2 = 4.49$, $df = 3$, $p<0.05$).

Table 4, shows that civil servants/farmers recorded the highest prevalence of infection (64.86%), while fishermen recorded the least prevalence of infection 22.58%. Statistically, there was significant difference in the infection rate based on occupation ($\chi^2 = 8.036$, $df = 5$, $p<0.05$).

Table 1: Prevalence of intestinal parasitic infections in Keffi and Karu Local Government Areas.

Parasites isolated	Keffi	Karu	Total
	Number (%) infected		
Protozoan			
Entamoeba histolytica	33 (23.08)	35 (26.52)	68 (24.73)
Entamoeba coli	14 (9.79)	12 (9.09)	26 (9.45)
Gardia lamblia	0 (0.0)	0 (0.0)	0 (0.0)
Helminthes			
Hookworms	20 (13.99)	16 (12.12)	36 (13.09)
Ascaris lumbricoides	10 (6.99)	8 (6.06)	18 (6.55)
Schistosoma mansoni	0 (0.0)	2 (1.52)	2 (7.27)
Total	**77 (53.85)**	**73 (55.30)**	**150 (54.55)**

Table 2: Age and sex profiles of prevalence of infection in Keffi and Karu Local Government Areas. (Types of infection in relation to gender.)

	Male			Female			Total		
Age group (yrs.)	**No.**	**Single Inf.**	**Double Inf.**	**No.**	**Single Inf.**	**Double Inf.**	**No.**	**Single Inf. (%)**	**Double Inf. (%)**
1-10	32	12	7	29	10	8	61	36.07	24.59
11-20	49	22	16	35	12	10	84	40.48	30.95
21-30	45	10	4	33	16	2	78	33.33	7.69
31-40	9	3	1	15	4	2	24	29.17	12.50
41-50	6	4	-	9	2	-	15	40.0	0.0
51-60	8	2	-	5	1	2	13	23.07	15.38
Total	**149**	**53**	**28**	**126**	**45**	**24**	**275**	**37.74**	**18.91**

Table 3: Prevalence of infection in relation to toilet facilities used by participants in Keffi and Karu Local Government Areas.

	Keffi		Karu		Total	
Toilet Type	**No.**	**No. Infected (%)**	**No.**	**No. Infected (%)**	**No.**	**No. Infected (%)**
Water cistern	63	28(44.44)	0	0(0.0)	63	28(44.44)
Pit latrine	30	15(50.0)	78	56(71.79)	108	71(65.74)
Bush	29	11(37.93)	31	20(64.52)	60	31(57.67)
All types	21	9(42.86)	23	11(47.83)	44	20(45.45)
Total	**143**	**63(44.66)**	**132**	**87(65.91)**	**275**	**150(54.55)**

Table 4: Prevalence of infection by occupation in Keffi and Karu Local Government Areas.

	Keffi		Karu		Total	
Occupation	**No.**	**No. Inf. (%)**	**No.**	**No. Inf. (%)**	**No.**	**No. Inf. (%)**
Civil servants/Farming	11	9(81.82)	26	15(57.69)	37	24(64.86)
Business Men/Women	10	6(60.0)	39	23(58.97)	49	29(59.18)
Farmers	36	21(58.33)	39	20(51.28)	75	41(54.67)
Cattle rearers	6	4(66.67)	9	5(55.56)	15	9(60.0)
Fishermen	3	2(66.67)	28	5(17.88)	31	7(22.58)
Students	41	26(63.41)	27	14(51.85)	68	40(58.82)
Total	**107**	**68(63.55)**	**168**	**82(48.81)**	**275**	**150(54.55)**

Discussion

The overall prevalence of infection (54.55%) obtained in this study is higher than 49.7% recorded at Tudun-Wada Community of Plateau State (Dabit 1992). The result obtained in this study also relates to the work of Imande (1988) who recorded a prevalence of 49.36% of intestinal parasites in Pankshin Local Government Area of Plateau State. These agreed with the work of Roche and Benito (1999) in the Island of Bioko (Equatorial Guinea) who recorded 5-60% as the prevalence in tropical countries. The high prevalence obtained in this study may be attributed to poor hygiene practices, poverty and ignorance exhibited by the people of the study-areas. Statistically, there was high significant differences in the infection rates of parasites encountered ($\chi^2 = 126.96$, $df = 4$, $p<0.05$). *E. histolytica* had the highest prevalence of infection of 24.73%. Hookworm infection had a prevalence of 13.09%; while Collard (1967) in Katsina Province, Nigeria, recorded a prevalence of 58% for hookworm infection. *A. lumbricoides* had an infection rate of 6.55% in this study while Collard (1967) recorded a prevalence of 1.2% for *A. lumbricoides* in Katsina Province, Nigeria. Nwosu (1981) recorded a prevalence of 36.7% for *A. lumbriocoides*. Obiukwu *et al* (2008) reported (33.6%) while Gilles (1964) in Northern Nigeria recorded (70%) prevalence for *A. lumbricoides*. The *E. coli,* regarded as a non-pathogenic amoeba, was found to be third after hookworm in the ranking of prevalence of infections in these studies, with an infection rate of 9.45% while *S. mansoni* had a prevalence of 2.27%. Onobuogu (1978) recorded the prevalence of 0.3% among school children in Imo and Anambra.

It is pertinent to know that most individuals do not care about good health practices partly due to ignorance and socio-economic factors. Age-group 11-20 years' had highest prevalence (71.43%) of parasitic intestinal infections. This tallied with the findings of Cromptom and Savioli (1993), that the range of those infected with intestinal parasites in schools is 4-20 years. This study and the work of Shuaibu (2005) at Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria, recorded 60.6-66.66% prevalence rates among the age 1-9 years. This could be due to the fact that members of this age-group disregard hygienic rules due to their restive nature at this stage in life. The study noted that there was significant difference in prevalence in relation to toilet types ($\chi^2 = 4.49$, $df = 3$, $p<0.05$). Pit latrines contributed more to transmission than water cistern toilets in the study areas.

This study reveals that civil servants and farmers had the highest infection rate of 64.86% while the least infection rate of 22.58% was recorded amongst fishermen. Shuaibu (2005) also recorded an infection rate of 14.28% among civil servants in Anambra State. Statistically, there was significance difference in the infection rate in relation to occupation ($\chi^2 = 8.036$, $df = 5$, $p<0.05$).

Most civil servants in Nasarawa State practise farming, due to the availability of flat topographical set up and fertile land. Hence they come in contact with soil contaminated with the cysts, ova or larvae of these parasites. Observable attitudes that make the people susceptible to these parasites are drinking of unsafe water, indiscriminate defecation in open space and bushes near residential houses, dumping of refuse, eating fruits like oranges, mangoes and guavas unwashed. Poor sanitary environmental habits and poor drainage system lead to accumulation of dirty water near houses.

Conclusion and recommendation

Most of the intestinal parasites encountered in this study was as a result of ignorance, careless life-styles, and lack of public social amenities. Poor sanitation and poverty enhanced transmission, multiplication and dissemination of these intestinal parasites.

Safe portable water supply should always be accessible to people. Affordable and effective chemotherapy drugs should also be available to the populace. Hitherto, health education should be taught in schools and media from primordial approach.

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