Intestinal parasitic infections among patients attending a Tertiary Health Institution in Northeastern Nigeria

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ABSTRACT

A study on human intestinal parasitic infections among patients attending University of Maiduguri Teaching Hospital, Nigeria, was conducted from the period of March, 2013 to May, 2013. The study was carried out to determine the prevalence of intestinal parasites among patients during the aforementioned time period. 200 stool samples of patients divided into 112 males and 88 females were examined using the formol-ether concentration method. The overall prevalence rate of the various parasitic infections was 17.5%, with 57% of infection among males and 43% among females. Difference in sex in relation to rate of infection was not statistically significant (X^2 = 0.72, P>0.01). Entamoeba histolytica recorded the highest prevalence rate of 40%, followed by Hookworm infection (17%); Giardia lamblia (14.3%); Ascaris lumbricoides (11.4%); Hymenolepis nana (8.5%); Enterobius vermicularis (2.9%); Strongyloides starcoralis (2.9%) and Dicrocoelium dendriticum (2.9%). Proper waste disposal and water treatment before consumption is advocated as a means of preventing exposure to these parasitic infections. The results further support public education on good personal hygiene and the dangers of open defeacation in fields and water ways.

Keywords: Intestinal parasites, parasitic prevalence, Nigeria.

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INTRODUCTION

It is estimated that as much as 60% of the world's population is infected with intestinal parasites, which play a role in morbidity due to intestinal infections (Kang *et al.* 1998). Intestinal parasites are widely prevalent in developing countries, probably due to poor sanitation and inadequate personal hygiene. Most of these parasites are encountered in tropical areas where they could be described as endemic, causing enormous and grave pathological effects. The commonest parasitic infections reported globally are *Ascaris* (20%), *Hookworm* (18%), *Trichuris trichiura* (10%) and *Entamoeba histolytica* (10%) (WHO, 1987). The prevalence of infections and degree of factors predisposing to infection vary from one region to another (Ndifon, 1991).

Intestinal parasitic infections had long been recognized as an important health problem especially among Nigerian children (Graitcher and Gentry, 1998), thus the need for this study. Other studies had also indicated a correlation between intensity of infection with *hookworm* and with *Ascaris lumbricoides* and iron-deficiency anaemia and intestinal obstruction (CDC, 2009). However, only few reports have been made on the prevalence of intestinal parasites of humans in Maiduguri (Biu and Adam, 2004). This study was attempted to provide an improved data on the various intestinal parasites among patients attending a tertiary health institution in Maiduguri metropolis.

MATERIALS AND METHOD

Study area

Maiduguri, a city located in the northeastern part of Nigeria, lies within latitude 11.15 ºN and longitude 30.05 ºE in the sudano-sahelian savanna zone with a dense population that are mostly crop farmers, fishermen, herdsmen and traders (Udo 1978). It is a city that has poor standards of sanitation and people of the area are used to bad hygiene and sanitary practices which include open defeacation along waterways, improper refuse disposal and poor sewage drainage network.

Study population

The research was conducted between March 2013 and May 2013 at the University of Maiduguri Teaching Hospital, Nigeria. A total of 200 patients consisting of 112 males and 88 females were used in this study. The age of the study patients range from 1 to 70 years (mean ± standard deviation = 25.8 ± 15.5). The consent of the patients was sought verbally before specimen collection. Ethical clearance for the study was obtained from the management of the University of Maiduguri Teaching Hospital, Nigeria.

Sample collection and processing

Stool specimens were collected using clean specimen bottles labeled with personal data which include name, age and sex of the patients.

The general appearance of the stool specimen (macroscopy) was observed. The colour and consistency of the stool specimen, presence of blood, mucus and or pus, presence of adult worms or their proglottids were noted.

The specimens were processed using the formol-ether concentration method as described by Cheesbrough (2009). One gram of each stool specimen was emulsified in 7ml of 10% buffered formalin into a centrifuge tube. The mixture was strained using a wire sieve and the filtrate poured into a test-tube to which 3ml of ether was added and mixed for 15 seconds. The formol-ether emulsion was then centrifuged at 1500 rpm for 1 minute. The fatty plug was then loosened and the centrifuge tube inverted for the supernatant to be decanted off, allowing a few drops of the deposit to remain. This was well mixed and a drop was placed on a clean grease-free glass slide. A drop of lugol's iodine was added to aid in the diagnosis by enhancing the clarity of cysts. The slide was covered using a cover-slip and examined under ×40 objective lens of the light microscope.

Data collected from the stool study was analyzed using chi-square to determine whether a relationship exists between two or more factors (Graph Pad Instat Software, 1998).

RESULTS

Intestinal parasites were recovered in 35 (17.5%) of the 200 samples processed (Table 1). Age distribution of the prevalence of infection did not show a definite pattern but the rate was highest among patients in the third decade of life (37%) and least among patients aged 61 years and above (2.9%) (Table 2). The observed difference in prevalence between the sexes was not statistically significant (X^2 = 0.72, P>0.01), but the infection is higher among males (57%) than females (43%) (Table 3).

Among the parasites recovered, *Entamoeba histolytica* recorded the highest prevalence rate of 40%, followed by *Hookworm* 17%, *Giardia lamblia* 14.3%, *Ascaris lumbricoides* 11.4%, *Hymenolepis nana* 8.5%, *Enterobius vermicularis* 2.9%, *Strongyloides starcoralis* 2.9% and *Dicrocoelium dendriticum* 2.9%.

Table 1: Prevalence of intestinal parasites among 200 patients attending University of Maiduguri Teaching Hospital

Intestinal parasites Isolated	Number of patients Infected (%)
Entamoeba histolytica	14 (7%)
Hookworm ova	6 (3%)
Giardia lamblia	5 (2.5%)
Ascaris lumbricoides	4 (2%)
Hymenolepis nana	3 (1.5%)
Enterobius vermicularis	1 (0.5%)
Strongyloides starcoralis	1 (0.5%)
Dicrocoelium dendriticum	1 (0.5%)
Total	**35 (17.5%)**

Table 2: Prevalence of intestinal parasites among patients in relation to sex

Intestinal parasites	Sex		Total (%)
	Male (%)	Female (%)	
Entamoeba histolytica	7 (20%)	7 (20%)	14 (40%)
Hookworm	3 (8.5%)	3 (8.5%)	6 (17%)
Giardia lamblia	4 (11.4%)	1 (2.9%)	5 (14.3%)
Ascaris lumbricoides	3 (8.5%)	1 (2.9%)	4 (11.4%)
Hymenolepis nana	2 (5.7%)	1 (2.9%)	3 (8.5%)
Enterobius vermicularis	0 (0.0%)	1 (2.9%)	1 (2.9%)
Strongyloides starcoralis	1 (2.9%)	0 (0.0%)	1 (2.9%)
Dicrocoelium dendriticum	0 (0.0%)	1 (2.9%)	1 (2.9%)
Total	**20 (57%)**	**15 (43%)**	**35 (100%)**

DISCUSSION

This study reveals a parasitic prevalence rate of 17.5% among 200 patients attending the University of Maiduguri Teaching Hospital, which were selected at random from the period of May 2013 to June 2013. *Entamoeba histolytica* recorded the highest prevalence rate of 40%; this is in agreement with the findings of Ogbuagu *et al.* (2010).

Table 3: Age distribution of parasitic infection among patients

Age (yrs)	Intestinal parasites							
	Entamoeba histolytica	***Hook worm***	***Giardia lamblia***	***Ascaris lumbricoides***	***Hymenolepis nana***	***Enterobius vermicularis***	***Strongyloides starcoralis***	**Dicrocoelium dendriticum**
1-10	1	1	2	-	1	-	-	-
11-20	3	1	-	2	-	-	1	1
21-30	7	3	2	-	-	1	-	-
31-40	-	1	1	-	2	-	-	-
41-50	-	-	-	1	-	-	-	-
51-60	2	-	-	1	-	-	-	-
61-70	1	-	-	-	-	-	-	-
Total	**14**	**6**	**5**	**4**	**3**	**1**	**1**	**1**

Comparing the distribution of the parasites among patients in relation to age shows that the prevalence rate is highest among patients in the first three decades of life with *Entamoeba histolytica* being the most commonly encountered parasites while *Strongyloides starcoralis*, *Dicrocoelium dendriticum* and *Enterobius vermicularis* recorded the least prevalence in the same age bracket; this concur with the findings of Chandler and Read (1961), Jakubowski and Hoff (1979), Fabiyi (1991), Adeyeba and Akinlabi (2002), that the incidence is more in paediatric age groups and reaches its highest in young adults, but may be related to the factors of poverty, poor personal hygiene and inadequate health services. The relatively high prevalence of protozoan infection observed in this study agree with previous findings in other parts of Northern Nigeria (Okon *et al.* 2003, Biu and Dauda, 2008)

Parasitic infection relative to differences in sex reveals that the infection is higher among males than females, which is also reported by Okon *et al.* (2003). The age specific prevalence rate of *Entamoeba histolytica*, *Giardia lamblia*, and *Hookworm* reflect their mode of transmission. *Entamoeba histolytica* and *Giardia lamblia* are transmitted through the faecal-oral route and are common among patients examined, while the prevalence of *Hookworm* is associated with open defaecation practices in fields. *Hookworm* infestation results from the penetration of the skin by filariform larvae and is seen in age groups that are old enough to walk barefooted in such fields.

CONCLUSION

The overall prevalence of these parasites in this study is a function of unprotected water supply and open defaecation practices by the populace. Open defaecation occur in surrounding fields and the faeces are exposed to scavenging animals and the drying effects of the sun and wind. Animals and wind have been proposed as vehicles of water supply contamination, and of direct infection (Bidinger *et al.* 1981). Improper sewage disposal remains another factor.

To curb the extent of these practices, public education on the dangers of open defaecation practices in fields and waterways as well as bad hygiene practices should be conducted vigorously so as to break the chain of infection with these parasites.

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