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Gastro-Intestinal Parasites Among Individuals Attending Primary Health Care Centre In Girei And Yola Metropolis, Adamawa State, Nigeria

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Abstract: *Infection with Gastro-intestinal parasites usually linked with poor maternal technology couples low level of health education. The study was designed to determine the prevalence of Gastro-intestinal parasites infection among individuals attending Primary Health Care Centre in Girei and Yola metropolis from the month of June to September, 2015. Prior to the research, ethical clearance was obtained. Parasitological methods employed was formal ether techniques.A total of 162 study subjects were examined for Gastro-intestinal parasites, the overall prevalence is 33(20.4%). Of the sample examined, 6(3.7%) parasite species were identified. S.mansoni and G. lamblia had the highest prevalence of 4.3% respectively while H. nana (1.2%) had the least. Infections were high among males (26.7%) than the female (15.4%) counterpart, age group 11-20 (25.8%) recorded highest infection rate and least 41-50 years (12.5%), viniklang PHC (28.4%) had the highest prevalence than Atiku Abubakar Clinic (12.3%) but was statistically significant within gender, age and location. Subjects with non-formal education (34.3%) and business men (25.0%) recorded high prevalence rate and was statistically significant. High prevalence was among those used well (30.0%) as source of water, prevalence rate was least among those previously used Anti-parasites (14.3%). Therefore, seeking for drugs to treat Gastro-intestinal parasites infection, quality health education and proper personal hygiene would substantially reduce the transmission of these parasitic infections.*
Key Words: *Gastro-intestinal parasites, Anti-parasites, S. mansoni,H. nana,Girei and Yola*

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I. Introduction

Gastro-intestinal parasites are identified as a cause of morbidity and mortality throughout the world particularly in under developed countries (Odu *etal*., 2011a; Odu *etal*., 2013). They are one of the most common infections in humans especially in tropical and sub-tropical countries (Awolaju and Morenikeji, 2009; Odu *etal*., 2013). Intestinal parasitic diseases remain a serious public health problem in many developing countries especially due to fecal contamination of water and food (Jimenez-Gonzalez *etal*., 2009).

The prevalence and distribution of parasitic diseases may differ from one region to another and sometimes within the country itself (de Silva *etal*. 2003). Studies indicated that there are numerous risk factors associated with the high prevalence and intensity of parasitic infection including age, low family income, inadequate sanitation, presence of animals in the house, drink water from rivers and wells, low levels of education among parents, geophagia and poor personal hygiene (Anantaphruti *etal*., 2004; Naish *etal*., 2004). Among these risk factors, sanitation is considered the key factor of intestinal parasitic infections transmission. People in the rural areas and poor socio-economic communities always live with absence or inadequate sanitation. Such situations help intestinal parasitic infections to be easily transmitted vertically and horizontally as well. The absence of proper sanitation has been proved to be the most important risk factor in transmission of intestinal parasitic infections (Rai *etal*., 2000). Moreover, poverty and low level of health education lead to poor personal hygiene. These factors also have a strong impact in the transmission of parasitic infections (Tomono *etal*., 2003; Anantaphruti *etal*. 2004). Poor personal hygiene including eating of unwashed food stuffs, walking and playing outdoors barefooted, do not wash hands before eating and after using the toilet, leaving food uncovered from flies, and geophagia has a crucial role in transmission of intestinal parasitic infections (Rai *etal*., 2000)

From the epidemiological aspect, sewage sludge for its high concentration of cysts of protozoa, or helminth eggs represent a significant epidemiological risk for the spread of endoparasitoses in the environment (Dudlova *etal*., 2015). The present study was designed to determine the prevalence of gastrointestinal parasites within gender, age, educational level, occupation, source of water, anti-parasites and location among individuals attending primary health care in Girei and Yolametropolis.

II. Materials And Methods

Study Area

The study was conducted in two locations (Atiku Abubakar Clinicand Viniklang Primary Health Center [PHC], Yola Metropolis, Adamawa State, Nigeria. The study areas lie between latitudes 7°and 11° North of the equitor and between longitude11° and 14°E of the GMT. It covers the total area of 1,213.30km^2; the area has a tropical climate, marked by dry and rainy seasons. The rainy season commences around May and ends in the middle or late October, rainfall is characterized by a single maximum with a mean total rainfall of 1113.3mm, August and September being the wettest months with about 25% of the total annual rainfall. The dry season starts in late October and ends in late April (Adebayo and Tukur, 1999). Temperature in Yola can reach 40^{0}C, around April, while minimum temperature could be as low as 18.3^{0}C between December and early January.

Relative humidity in the area is about 26% in the months of January while February is the lowest; with high relative humidity values of 58, 69, 79, 79, 77 and 66 respectively, could be recorded during the months of May to October, particularly during the months of July and August as the peak, with about 80% relative humidity (Adebayo and Tukur, 1999). These favours the breeding and spreading of parasitic diseases. The vegetation in Yola and environs is secondary type due to human activities through construction, farming wood gathering for fuel and grazing have altered the natural vegetation (Adamawa State Diary, 1994; Akosim *et al*., 1999). Most indigenes of Yola are civil servants, farmers, fishing, petty traders, poultry and livestock keeping.

Study Design and Population

A total of 162 Individuals attending primary health care were selected at random to participate in the study from the month of June to September, 2015. After informed consent was obtained, questionnaires were administered to collectsubject'ssocio-demographic information.

Stool Sample Collection

A well Labelled sterilized plastic containers were given out to the subjects attending Primary Health Care, they were instructed on how to obtain their stool samples without contamination, also age and sex of the subjects were properly labeled on the universal bottles containing the samples. Specimen containers were collected the following morning from the subjects and the stool samples were preserved in 10% formalin and was taken to the laboratory for analysis.

Parasitological Examination

The method used was formal ether techniques in which parasites were sediment by centrifugal force. The 10% formal ether concentration technique by (WHO, 1991) was closely followed for laboratory examination of stool samples. 0.5gm of faecal matter taken in a test tube was dissolved in some amount of normal saline solution which acts as a clearing agent. The solutions were sieved with a strainer to remove large particles. The sieved suspension was collected in a beaker and transferred into centrifuging tube. Centrifuge for 5mins at 3000rpm. A sterile rod was used to loosen the layer of faecal debris from the side of the tube and the formal water was rapidly inverted to discard the ether and faecal debris. The sediments were mixed with the sterile rod and transferred to a slide and cover with a slip. The entire preparations were examined microscopically using x10 objective with the condenser in a closed sufficiently to give good contrast.

Ethical Consideration

Prior to the commencement of the study, Ethical permits and clearance was obtained from Modibbo Adama University of Technology Research Committee and the Director of Primary Health Care Girei and Yola North Local Government Area (LGAs) of Adamawa State. Also, informed consent from individuals attending Primary Health Care Centre was obtained before their enrolment.

Data Analysis

The statistical analysis was done using Statistical Package for Social Science (SPSS) version 22. Association between variables was determined using χ^2 and considered significant at $p<0.05$.

III. Results

A total of 162 stool samples were examined microscopically for GIPs. Six GIPs were identified in this study and these include 4 helminthes *(Ascaris lumbricoide* (3.7%), *Hymenolepsis nana*(1.2%), *Schistosoma mansoni*(4.3%),Hookworm (3.7%)and 2protozoans (*Entamoeba histolytica*(3.1%), *Gardia lamblia*(4.3%). Out of 142 stool samples examined, 33(20.4%) were positive for at least one GIPs.

In Table 1, GIP infections were high among the male 19(26.7%) than the female 14(15.4%) counterparts (p>0.05).Also GIPs were higher among the age group 11-20years old25.8% and less among the age group 41-50years with 12.5% (p>0.05). *G. lamblia* species has the highest prevalence rate identified among the age group 1-10years (11.1%). While *H. nana* is the least prevalent with 3.7%.In relation to location, Viniklang PHC had the highest GIPs with prevalence rate of 28.4% with *S. mansoni* recording higher prevalence of 7.4%, Atiku Ababukar Clinic had 12.3% (p<0.05).

In relation to educational status (Table 2), study subjects with informal education (34.3%) were more prevalent to GIPsand the least prevalent were tertiary and secondary with13.8% and 13.8% respectively(p<0.05).*S. mansoni* was high among the study subjects that were business men(9.4%) followed by *A. lumbricoides* 8.3% and *G. lamblia* 8.3% wereidentified among the students (Table 2) both had GIPs prevalence rate of 25.0%.Prevalence rate based on occupation, students (25.0%) and business (25.0%) individuals had the same prevalence of gastro-intestinal parasitic infections (p>0.05) as shown in Table 2.

High prevalence of (30.0%)GIPs were identified among those who used well water (30.0%)compared to those who used borehole (19.3%) (p<0.05) whilethose who use Ant-parasites had less prevalence(14.3%) compared to those who do not used Anti-parasites(20.6%). *S. mansoni* is the only GIP species identified among the Anti-parasites users. Those who do not use Anti-parasites were diagnosed with *A. lumbricoides, H. worm,* S. *mansoni, H. nana, E. histolytica* and *G. lamblia* (Table3).

Table 1: Prevalence of Gastr-intestinal Parasites in relation to Gender, Age and Location

Variables	No. Examined	*A.lumbricoides*	H.Worm	*E. histolytica*	*G. lamblia*	*S. mansoni*	*H. nana*	No. (%) Infected
Gender								
Male	71	4 (5.6)	4 (5.6)	2 (2.8)	5 (7.0)	3 (4.2)	1 (1.4)	19(26.7)
Female	91	2 (2.2)	2 (2.2)	3 (3.3)	2 (2.2)	4 (4.4)	1 (1.1)	14(15.4)
Age								
1-10yrs	18	0 (0.0)	0 (0.0)	0 (0.0)	2 (11.1)	0 (0.0)	1 (5.6)	3(16.6)
11-20yrs	31	3 (9.7)	1 (3.2)	1 (3.2)	2 (6.5)	1 (3.2)	0 (0.0)	8(25.8)
21-30yrs	38	2 (5.3)	2 (5.3)	1 (2.6)	0 (0.0)	2 (5.3)	1 (2.6)	8(21.0)
31-40yrs	32	0 (0.0)	1 (3.1)	3 (9.4)	2 (6.2)	2 (6.2)	0 (0.0)	8(25.0)
41-50yrs	24	0 (0.0)	1 (4.2)	0 (0.0)	0 (0.0)	2 (8.3)	0 (0.0)	3(12.5)
51above	19	1 (5.3)	1 (5.3)	0 (0.0)	1 (5.3)	0 (0.0)	0 (0.0)	3(15.8)
Location								
Atiku Abubakar Clinic	81	2 (2.5)	1 (1.2)	2 (2.5)	3 (3.7)	1 (1.2)	1 (1.2)	10(12.3)
Viniklang PHC	81	4 (4.9)	5 (6.2)	3 (3.7)	4 (4.9)	6 (7.4)	1 (1.2)	23(28.4)

Table 2: Prevalence of Gastrointestinal Parasites in Relation to Educational Status and Occupation of the Study Population

Variables	No. Examined	*A.lumbricoides*	H.Worm	*E. histolytica*	*G. lamblia*	*S. mansoni*	*H. nana*	No. (%) infected
Educational status								
Primary	40	3 (7.5)	0 (0.0)	1 (1.2)	2 (5.0)	1 (2.5)	2 (5.0)	9(22.5)
Secondary	58	1 (1.7)	1 (1.7)	3 (5.2)	1 (1.7)	2 (3.4)	0 (0.0)	8(13.8)
Non formal	35	1 (2.9)	5 (14.3)	1 (2.9)	2 (5.7)	3 (8.6)	0 (0.0)	12(34.3)
Tertiary	29	1 (3.4)	0 (0.0)	0(0.0)	2 (6.9)	1(3.4)	0 (0.0)	4(13.8)
Occupation								
Students	12	1 (8.3)	0 (0.0)	0 (0.0)	1 (8.3)	0 (0.0)	1 (8.3)	3(25.0)
Farmers	30	2 (6.7)	0 (0.0)	0 (0.0)	1 (3.3)	1 (3.3)	1 (3.3)	5(16.6)
Civil Servants	26	1 (3.8)	2 (7.7)	0 (0.0)	1 (3.8)	2 (7.7)	0 (0.0)	6(23.1)
Business	32	2 (6.2)	2 (6.2)	1 (3.1)	0 (0.0)	3 (9.4)	0 (0.0)	8(25.0)
Others	62	0 (0.0)	2 (3.2)	4 (6.5)	4 (6.5)	1 (1.6)	0 (0.0)	11(17.7)

Table 3: Prevalence of Gastro-intestinal Parasites in relation to source of drinking Water and use of Anti-parasites

Variables	No. Examined	*A. lumbricoides*	*H. Worm*	*E. histolytica*	*G. lamblia*	*S. mansoni*	*H. nana*	No. (%)infected
Source of water								
Well	20	2 (10.0)	0 (0.0)	1(5.0)	2 (10.0)	1 (5.0)	0 (0.0)	6(30.0)
Borehole	142	4 (2.8)	6 (4.2)	4 (2.8)	5 (3.5)	6 (4.2)	2 (1.4)	27(19.3)
Anti-parasitic								
Yes	7	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1(14.3)	0 (0.0)	1(14.3)
No	155	6 (3.9)	6 (3.9)	5 (3.2)	7 (4.5)	6 (3.9)	2 (1.3)	32(20.6)

IV. Discussion

A total of 33 (20.3%) subjects had GIP infections in this study, which was lower compared to the findings of Okolie *etal*. (2008) they reported a prevalence value of 75% among patients with appendicitis in Oguta, Imo State, Nigeria. Chukwuma *etal*. (2009) in their study on the prevalence of parasitic geohelminth infection among primary school children in Ebenebe Town, Anambra State, reported a prevalence value of 53.6% in soil and 87.7% in stool. Jimenez-Gonzalez *etal*. (2009) reported a value of 34.0% among inhabitants of a rural community in Mexico. Odu *etal*. (2011a) reported an overall prevalence of 30.7% among school children in rural and urban communities in Rivers State, Nigeria.

The differences in the prevalence of this present study and the previous could be due to environmental, socio-economic and cultural-behavior of the people, as these factors are the key determinant for parasitic diseases transmission. The prevalence and distribution of parasitic diseases may differ from one region to another and sometimes within the country itself (de Silva *etal*. 2003). Poor personal hygiene including eating of unwashed food stuffs, walking and playing outdoors barefooted, lack of wash hands before eating and after using the toilet, leaving food uncovered from flies, and geophagia has a crucial role in transmission of intestinal parasitic infections (Rai *etal*., 2000).

The prevalence of GIPs by gender showed significant difference ($p<0.05$). Males recorded high prevalence of 26.7% and females had 15.4%. This could be as a result of males' habit of walking barefooted either in the house or on the farms, fishing, cutting grasses for livestock or swimming. Okonko *etal*. (2009) reported that gastro-intestinal parasitic infections from 2002 to 2004 were significantly higher in males than females. Alli *etal*. (2011b) reported a significant relationship between intestinal parasites among palm wine drinkers and sex, males were found to be positive to all the parasites encountered, whereas no femaleswere positive.This study differs fromAgbolade *etal*. (2004) said that helminthic infections were not sex dependent,Saathof *etal*. (2004) they report in KwaZulu-Natal/South Africa and Tohon *etal*. (2008) in Nigeria opined that parasitic infections were not sex dependent. Also, Nkengazong *et al*. (2009) reported differences in prevalence values of parasites between the sexes in Kotto Barombi and in Marumba II were not statistically significant. However, infection to both intestinal helminth and protozoa depend largely onone's daily activities, being exposed to contaminated water, poor personal hygiene and sanitation.

Infections with GIPs affect all age group but most common among the young ones, as seen high prevalence rate among age group 11-20 years (25%) and least among age group 41-50 years (12.5%), this showed a significant difference ($p<0.05$). The high prevalence among the age group 11-20years old could be they are more active and intense, walking barefooted, playing football, swimming,drinking contaminated water and eating contaminated food, lack of personal hygiene and/or lack of knowledge on the transmission of intestinal parasitic infections. However, the least prevalence among age group 41-50 years might be as results of developed immune system, less contact with contaminated soil or water, improved personal hygiene and environmental sanitation. Although, Odo *et al.* (2013) report that, prevalence of intestinal parasites was not age dependent

The prevalence of gastro-intestinal parasites was high among the individuals attending Viniklang PHC(28.4%) ($p<0.05$) compared with Atiku Abubakar Clinic (12.3%). The most prevalent parasite species identified was at Viniklang PHC*S. mansoni*(7.4%) followed by Hookworm (6.2%) and the least was*H. nana* (1.2%).This could be due to exposure potentials of individuals living in and around Viniklang vicinity. Viniklang is a slum settlement along the River Benue bank in which people are expose to parasites through activities such as farming, fishing, swimming, cutting grasses for livestock, rearing animals and/or washing clothes. Most prevalent species identified in Atiku Abubakar Clinic samples was *G. lamblia* 3.7% and the least was*A. lumbricoides* and *E. histolytica* 2.5% and 2.5% respectively. The high prevalence of *G. lamblia* in this location could be due to lack of good personal hygiene, poor toilet facilities, lack of public health enlightenment or lack of good sanitation leading to poor environmental condition which is the most determinant factor for parasitic infections.

Low level of education is one of strong factors that associated with the transmission of GIPs as seen

among study subjects (Table 2) with informal education (41.4%) which could be as a result of low standard of living and ignorance of simple health promotion practices that favour the distribution of helminths and other parasitic diseases. Prevalence rate reduced significantly among educated subject especially those that attained tertiary education (11.4%) as they may have better standard of living where personal hygiene is maintain among others and nature of the environment they live may contribute to this low prevalence. Poverty and low level of health education lead to poor personal hygiene.

The prevalence of GIPs based on occupation (Table 2) of the subjects indicates that students and business men recorded high prevalence of 25.0% respectively, and farmers have the least prevalence The least prevalent were farmers 16.7%.The least prevalence among farmer might be that, they received intervention measures such as albendazole, prazanquently.Poverty and low level of health education lead to poor personal hygiene. These factors also have a strong impact in the transmission of parasitic infections (Tomono *etal*., 2003; Anantaphruti *etal*., 2004). WHO (1981) reported that intestinal parasitic infections are prevalent where poverty prevails, where sanitation is inadequate or non-existent and where more health awareness and care are needed. All these factors are present in most developing countries, particularly in rural communities.

Table 3 showed the prevalence relation GIPs in relation to sources of drinking water and use of anti-parasites. Those whose sources of water from well (30.0%) have the highest prevalence than those uses borehole (19.3%). This might be due to the fact that, well usually left open and may be prompt to infection and contaminated with falling objects, dust and equipment used to draw the water from the well, thus such water are not usually treated or boiled before drinking. The absence of clean water increases and encourage increased transmission of helminths disease (Topley and Wilsons, 1998) and other parasitic protozoa. The use of anti-parasites either anti-helminths and protozoa plays a significant role in reducing GIPs prevalence. Those who previously uses anti-parasites (14.3) had least prevalence than those do not use any anti-parasites (20.6%). This implies that those aware of GIPs infection and previously seek for medication to either reduce the transmission of parasites as they conscious or aware of the nature of environment.

V. Conclusion

Prevalence of GIPs is determined by one's habitation, level of education and sources of drinking water. Seeking for drugs to treat GIPs infection, quality health education and proper personal hygiene would substantially reduce the transmission of these parasitic infections.

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