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Studies on Human Intestinal Parasites in Refuse Dumps

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Abstract: This study investagated the data of the prevalence of intestinal parasites of human from September 2007 to July 2008 using faecal samples which were picked from refuse dump sites. A total of 2,050 stool samples picked and examined from five selected popular refuse dump sites in Ado-Ekiti. And *Entamoeba histolytica*, *Giardia lamblia* and *Balantidium coli* were mostly identified. The analysis of the infection shows that *E. histolytica* has a percentage prevalence of 65.5%, followed by *G. lamblia* with 42.5% and *B. coli* having 1.9%. Multiple infections of these parasites were also prevalent. There was a positive correlation (r=0.995, $P<0.05$) between percentage prevalence of infection and home surroundings, waste, sewage disposal facilities and habits. Also, there was a significant difference (t=11.06, $P<0.05$) in the prevalence of infections between location A and B. Probable ways of eliminating/controlling the disease are also highlighted.

Key words: Prevalence, intestinal parasites, transmission, refuse dumps.

1. Introduction

Illiteracy, poverty with associated poor environmental practices which include poor personal hygiene and lapses in Government policies have been implicated in the high prevalence rate of protozoan endoparasitic infections in the various communities [1]. It has become fashionable to talk about how parasitic infections have contributed to the backwardness and under development, evident in developing countries e.g. Nigeria, Kenya and Ghana, which is more common to be infected than not [2].

Infections thrive and persist in communities in need of better housing, potable water, appropriate sanitation methods, access to improved health care, better education and increase in personal earnings [3]. All these are typical to most rural communities and urban slums in developing countries.

Protozoan parasites (e.g., *Entamoeba histolytica*, *Giardia lamblia* and *Balantidium coli*) occurs mainly in the intestinal tracts of the host. This is because the alimentary system of man contain high flora of various bacteria on which these protozoans feed. Infections are spread readily by poor hygienic standards, in adequate or non existent sanitation and climatic conditions which favours the parasitic population [4].

Transmission of the disease(s) is by faecal-oral route usually by poor hygiene during food preparation or by the use of “night soil” (crop fertilization with human waste) as well as by oral-anal sexual practices. Infections is transmitted as a result of the host swallowing mature cysts in contaminated food and drink. Man is the only effective reserviour host [5].Foods handling by infected persons, flies, direct faecal contact are the factors determining the prevalence of the infection in an area. Also, occasional outbreaks result from special circumstances such as leakage of sewage containing cysts into drinking water [6]. Vegetables and fruits eaten raw are a common source of infection, especially in areas where human faeces are used as fertilizers or washing the vegetables in infected water.

In view of the fact that the epidemiology of the infections in various communities in Ekiti State have not been assessed, the study design therefore is to provide quantitative and qualitative information on the

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status of Amoebiasis, Giardiasis and Balantidosis infection in this part of the country. This could also provides base line information on how to eradicate/control the infections.

2. Materials and Methods

The study was carried out in five different refuse dumps named Okela, Okeyinmin, Dallimore, Okeoriomi and Idolofin. Each of the refuse dumps was labeled location A-E. Universal bottles were used to collect the faecal samples from each of the location. After collection, faecal samples were transported to the laboratory of Adetoyin Hospital, Government Reservation Area (GRA) Ado-Ekiti for examination and analysis.

A loop of the faecal sample collected was made and spread on a clean slide with a drop of saline solution, and emulsified on the slide until the smears formed were evenly mixed with the normal saline solution. The slide was covered with a cover slip and examined under the binocular microscope. This preparation was done to all the stool samples collected at the different selected locations. A total of 2,050 samples were collected and examined. Descriptive statistics as well as percentages were employed to analyse results.

3. Results

A total of 2,050 faecal samples were examined in five different refuse dumps. The result of analysis shows that three intestinal parasitic protozoans namely *Entamoeba histolytica*, *Giardia lamblia* and *Balantidium coli* were identified. Of the 2,050 stool samples examined, 1,342 (65.5%) were found to be infected with *E. histolytica*, 872 (42.4%) contained *G. lamblia* and 38 (1.9%) were infected with *B. coli*.

It is evident from Table 1 that the prevalence of *E. histolytica* (67.8%) doubles that of *G. lamblia* (32.2%). Although *E. histolytica* is most prevalent (74.9%), the prevalence of *G. lamblia* (59.8%) is also very high (Table 2). There are low prevalence of *E. histolytica* (43.4%) and *G. lamblia* (25.9%) and *B. coli* 2.4% (Table 3). Table 4 shows that the prevalence of *E. histolytica* is 76.3%, *G. lamblia* 58.1% and *B. coli* is 3.2%. The results obtained in table 5 is similar to that of table 1 where *E. histolytica* had 64.9%, followed by *G. lamblia* 37.3% and the least prevalent of 1.5% was recorded in *B. coli*.

Monthly variations in the level of infections in January, February and March. June and July, showed the highest level of infections (11.4%) while October and November showed the least prevalence of 8.2%.

There was a significant difference ($t=11.06$, $P<0.05$) in the prevalence of infections between locations A and B. Also, there was a positive correlation ($r=0.995$, $P<0.05$) between percentage prevalence of infection and home surroundings, waste, sewage disposal facilities and habits.

4. Discussion

This study reveals a high prevalence of intestinal protozoan parasites of man in Ado-Ekiti. The relatively high prevalence of infections may be due to poor sanitary conditions, lack of safe water supply and health facilities in the area. The environment was constantly contaminated with human and animal excreta, and other municipal solid wastes. People defecated indiscriminately or dump excrements along paths, around houses, on open fields, at refuse dumps on rough mountainous terrains and along drainage channels. This is similar with the report of Gundiri and Okwuosa [3]. The situation has not changed much as there has been little success in the introduction of toilet facilities into every houses in Nigeria [2].

Children in the sampled areas walk around bare-footed and pigs were observed dispensing human excreta, and with other animals they co-mingle with the people within the environment. Many houses lack lavatory and the drainage systems are not functioning effectively and often blocked by refuse which tends to widespread dispersal of cysts of these parasites especially during the rainy season. These factors exposed the people especially children to high

Table 1 Occurrence of intestinal parasites in Location A (OKELA).

		E. histolytica		*G. lamblia*		*B. coli*		Total
Sampling time	No. of samples	No. of parasites	Infected (%)	No. of parasites	Infected (%)	No. of parasites	Infected (%)	
Sept. 07	40	30	75.0	8	20.0	-	0.0	38
Oct. 07	40	26	65.0	12	30.0	-	0.0	38
Nov. 07	40	25	62.5	10	25.0	1	2.5	36
Dec. 07	40	26	65.0	14	35.0	-	0.0	40
Jan. 08	40	27	67.5	14	35.0	2	5.0	43
Feb. 08	40	26	65.0	15	37.5	-	0.0	41
Mar. 08	40	29	72.5	16	40.0	1	2.5	46
Apr. 08	40	30	75.0	12	30.0	-	0.0	42
May. 08	40	28	70.0	13	32.5	-	0.0	41
Jun. 08	40	25	62.5	15	37.5	-	0.0	40
Jul. 08	10	6	60.0	3	7.5	-	0.0	9
Total	410	278	67.8	132	32.2	4	1.0	414

Table 2 Occurrence of intestinal parasites in Location B (Okeyinmin).

		E. histolytica		*G. lamblia*		*B. coli*		Total
Sampling time	No. of samples	No. of parasites	Infected (%)	No. of parasites	Infected (%)	No. of parasites	Infected (%)	
Sept. 07	40	32	80.0	20	50.0	1	2.5	53
Oct. 07	40	30	75.0	22	55.0	-	0.0	52
Nov. 07	40	27	67.5	25	62.5	2	5.0	54
Dec. 07	40	32	80.0	24	60.0	1	2.5	57
Jan. 08	40	31	77.5	26	65.0	-	0.0	57
Feb. 08	40	28	70.0	25	62.5	-	0.0	53
Mar. 08	40	30	75.0	22	55.0	-	0.0	52
Apr. 08	40	32	80.0	23	57.5	1	2.5	56
May. 08	40	31	77.5	25	62.5	-	0.0	56
Jun. 08	40	26	65.0	26	65.0	-	0.0	52
Jul. 08	10	8	80.0	7	70.0	-	0.0	15
Total	410	307	74.9	245	59.8	5	1.2	557

Table 3 Occurrence of intestinal parasites in Location C (Dallimore).

		E. histolytica		*G. lamblia*		*B. coli*		Total
Sampling time	No. of samples	No. of parasites	Infected (%)	No. of parasites	Infected (%)	No. of parasites	Infected (%)	
Sept. 07	40	17	42.5	10	25.0	-	0.0	27
Oct. 07	40	21	52.5	11	27.5	1	2.5	33
Nov. 07	40	12	30.0	8	20.0	-	0.0	20
Dec. 07	40	23	57.5	12	30.0	1	2.5	36
Jan. 08	40	12	30.0	5	12.5	1	2.5	18
Feb. 08	40	23	57.5	14	35.0	-	0.0	37
Mar. 08	40	15	37.5	6	15.0	3	7.5	24
Apr. 08	40	11	27.5	16	40.0	-	0.0	27
May. 08	40	25	62.5	9	22.5	2	5.0	36
Jun. 08	40	15	37.5	10	25.0	2	5.0	27
Jul. 08	10	4	40.0	5	12.5	-	0.0	9
Total	410	178	43.4	106	25.9	10	2.4	294

Table 4 Occurrence of intestinal parasites in Location D (Okeoriomi).

		E. histolytica		*G. lamblia*		*B. coli*		Total
Sampling time	No. of samples	No. of parasites	Infected (%)	No. of parasites	Infected (%)	No. of parasites	Infected (%)	
Sept. 07	40	28	70.0	28	70.0	2	5.0	58
Oct. 07	40	32	80.0	19	47.5	1	2.5	52
Nov. 07	40	26	65.0	25	62.5	-	0.0	51
Dec. 07	40	28	70.0	30	75.0	3	7.5	61
Jan. 08	40	34	85.0	22	55.0	-	0.0	56
Feb. 08	40	29	72.5	17	42.0	2	5.0	48
Mar. 08	40	30	75.0	21	52.5	-	0.0	51
Apr. 08	40	27	67.5	18	45.0	1	2.5	46
May. 08	40	35	87.5	22	55.0	-	0.0	57
Jun. 08	40	36	90.0	30	75.0	3	7.5	69
Jul. 08	10	8	80.0	6	60.0	1	2.5	15
Total	410	313	76.3	238	58.1	13	3.2	564

Table 5 Occurrence of intestinal parasites in Location E (Idolofin).

		E. histolytica		*G. lamblia*		*B. coli*		Total
Sampling time	No. of samples	No. of parasites	Infected (%)	No. of parasites	Infected (%)	No. of parasites	Infected (%)	
Sept. 07	40	27	67.5	18	45.0	1	2.5	46
Oct. 07	40	23	57.5	13	32.5	-	0.0	36
Nov. 07	40	21	52.5	15	37.5	-	0.0	36
Dec. 07	40	29	72.5	12	30.0	2	5.0	43
Jan. 08	40	25	62.5	14	35.0	-	0.0	39
Feb. 08	40	24	60.0	16	40.0	-	0.0	40
Mar. 08	40	26	65.0	15	37.5	1	2.5	42
Apr. 08	40	24	60.0	13	32.5	-	0.0	37
May. 08	40	29	72.5	17	42.5	1	2.5	47
Jun. 08	40	32	80.0	14	35.0	1	2.5	47
Jul. 08	10	6	60.0	6	60.0	-	0.0	12
Total	410	266	64.9	153	37.3	6	1.5	425

infection rate [7]. It was also observed that children spent most of their leisure time playing and hunting for rats on these refuse dump sites providing time for prolonged contact with infective cysts of the parasites. Faecal samples collected from play grounds, markets, motor parks and residential areas revealed that 96.0% of the samples contained cysts and ova of intestinal parasites [8].

In Ado-Ekiti, Schools (Primary and Secondary) are located very close to some of the refuse dumps, such that at break time, pupils and students were seen parading the refuse dumps playing and picking one thing or the others hence increased the incidence of infection. During the period of conducting this research, poor parents were seen visiting these refuse dumps to pick vegetables and pepper which inevitably contained infective cysts and eggs of endoparasites. Higher prevalence of endoparasitic infections have been reported in children whose parents are unemployed or petty traders compared to children of professionals [9].

Some cultural practices favour the spread of infections in these areas for instance the use of water for cleaning after defaecation, communal feeding from a common bowl in open street yard and exposure of meals to flies and domestic animals which may contaminate food with cysts accounted for a high prevalence of intestinal parasitic infections [9]. It was also observed that men usually gather according to age-groups at strategic joints to chat or play “Ayo” while others drink locally made beer and palm wine in which cysts of parasites may have been introduced through hands, water, utensils and flies. Drinking is set in an open calabash while chatting goes on, flies therefore patch on the calabash and its contents contaminating the drink [3].

Multiple infections have been recorded as fairly common with the most ubiquitous combination of *E. histolytica, G. lamblia and B. coli*. In some regions, people with multiple infections are more common than those with either no infection or single infection [10]. The parasitological survey of parasitic protozoan infections in these selected areas implies that the prevalence of the infections is high enough to necessitate need to urgently set up effective control measures.

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