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Prevalence of intestinal and vector-borne urinary parasites in communities in south-west Nigeria

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Intestinal and urinary helminthes are distributed worldwide, particularly in tropical and sub-tropical areas. More than one billion of the world's population, including atleast 400 million school children are chronically infected with *Ascaris lumbricoides, Trichuris trichiura* and the hookworms[1] while schistosomiasis affects nearly 200 million people in 75 countries. The prevalence of infections and degree of factors predisposing to infection vary from one region to another[2].

Most intestinal nematodes like *Ascaris* and *Trichuris* are acquired by ingestion of infective eggs from soil contaminated with human faeces containing eggs. Hookworm and *Strongyloides stercoralis* infections occur when the infective larvae from the soil penetrate the bare skin, usually of the foot. Man acquires taeniasis by ingestion of raw or inadequately cooked beef or pork containing the infective larvae (cysticerci). The intestinal protozoans are transmitted by ingestion of contaminated water or food containing cysts from faeces of infected persons or by interpersonal contact[3,4]. The urinary parasite, *Schistosoma haematobium,* is an infestation in humans by a parasitic blood worm with fresh water gastropod snails as intermediate host vectors. This study was undertaken to study the presence and prevalence of intestinal and urinary parasites in four communities in south-west Nigeria.

The study was carried out in Idiose, Sasa, Olorisaoko and Ajibode communities in Akinyele Local Government Area (LGA) of Oyo State, south-west Nigeria. The study area is situated in the rainforest belt within longitude 3°55′ East and latitude 7°25′ North. The consent and support of the village heads, who helped in mobilizing and encouraging the villagers to participate in the study was obtained. Only those villagers who consented were eventually included in the study.

On each sampling day, each participant was given two clean labelled specimen bottles for stool and urine. Instructions were given on how to introduce samples into the bottles. The name, age, sex, occupation and specimen number of each participant were recorded on a data collection form. Specimens were preserved in 10% formalin before laboratory examination. In the laboratory, smears of each stool sample were made in 0.9% NaCl and stained with Lugol's iodine solution before it was examined under the microscope for helminth eggs and larvae.

The urine samples were left for some hours to sediment by gravity after which the supernatant was drawn out using a syringe and the sediment stained with Lugol's iodine and examined under the microscope for urinary parasites. Intestinal and urinary parasites ova, cysts and larvae were identified using the guide by Cheesebrough[5].

Data analysis involved frequency and distribution statistics. The results were tested with Pearson's Chi-square to determine variability in the distribution of categorical variables for each study outcome, with an α-level of $p < 0.05$ indicating statistical significance.

Table 1 shows that a total of 123 people were examined for intestinal parasites, 33 (26.8%) males and 90 (73.2%) females. Of the 123 people examined, 64 (52%) were infected with intestinal parasites (*A. lumbricoides*, *T. trichiura*, Hookworm, *S. stercoralis*, *Enterobius vermicularis*), 12 (18.75%) males and 52 (81.25%) females. Most (48.4%) were infected with *A. lumbricoides* followed by 14 (21.8%) with *T. trichiura*. Those in 10–19 yr (60%), 20–29 yr (59.4%) and 0–9 yr (57.1%) age groups were more infected than the other age groups. The difference in infection rate between the age groups was not statistically significant ($\chi^2 = 5.9$, $p > 0.05$). However, a greater percentage (57.8%) of females were infected which is statistically significant ($\chi^2 = 4.5$, $p < 0.05$). The prevalence of parasite types was independent of the different age groups ($\chi^2 = 22.3$, $p > 0.05$) and sex ($\chi^2 = 4.92$, $p > 0.05$).

The highest number of participants from Idiose were infected (65.3%) followed by 50% from Ajibode, 42.9% from Sasa and 39.3% from Olorisaoko. The difference in the prevalence of infection in all areas was however statistically insignificant ($\chi^2 = 6.44$, $p > 0.05$). *Ascaris lumbricoides* was found in all areas and had the highest prevalence followed by *T. trichiura* which was also found in all areas. Hookworm was not found in Sasa, *S. stercoralis* was not found in Olorisaoko and *E. vermicularis* was recorded in Sasa community only.

Table 1. Prevalence of intestinal helminth infections in relation to age and gender of respondents

Age group (yr)		No. examined (%)	No. infected (%)	*A. lumbricoides* (%)	*T. trichiura* (%)	Hookworm (%)	*S. stercoralis* (%)	*E. vermicularis*
0–9	M	18	4 (50)	2 (50)	2 (50)	–	–	–
	F	13	8 (61.5)	4 (50)	–	2 (25)	–	2 (25)
	T	21	12 (57.1)	6 (50)	2 (16.7)	2 (16.7)	–	2 (16.7)
10–19	M	8	3 (37.5)	3 (100)	–	–	–	–
	F	12	9 (75)	3 (33.3)	4 (44.4)	1 (11.1)	1 (11.1)	–
	T	20	12 (60)	6 (50)	4 (33.3)	1 (8.3)	1 (8.3)	–
20–29	M	1	1 (100)	–	–	1 (100)		
	F	31	18 (58.1)	9 (50)	3 (16.7)	3 (16.7)	3 (16.7)	–
	T	32	19 (59.4)	9 (47.3)	3 (15.8)	4 (21.1)	3 (15.8)	–
30–39	M	4	–	–	–	–	–	–
	F	13	8 (61.5)	6 (75)	–	1 (12.5)	1 (12.5)	–
	T	17	8 (47.1)	6 (75)	–	1 (12.5)	1 (12.5)	–
40–49	M	5	2 (40)	–	1 (50)	1 (50)	–	–
	F	14	7 (50)	2 (28.6)	2 (28.6)	1 (14.3)	2 (28.6)	–
	T	19	9 (47.4)	2 (22.2)	3 (33.3)	2 (22.2)	2 (22.2)	–
50–59	M	3	2 (66.7)	–	2 (100)	–	–	–
	F	4	1 (25)	1 (100)	–	–	–	–
	T	7	3 (42.9)	1 (33.3)	2 (66.7)	–	–	–
60+	M	4	–	–	–	–	–	–
	F	3	1 (33.3)	1 (100)	–	–	–	–
	T	7	1 (14.3)	1 (100)	–	–	–	–
Total	M	33	12 (36.4)	5 (41.7)	5 (41.7)	2 (16.7)	–	–
	F	90	52 (57.8)	26 (50)	9 (17.3)	8 (15.4)	7 (13.5)	2 (3.8)
	T	123	64 (52)	31 (48.4)	14 (21.8)	10 (15.6)	7 (10.9)	2 (3.1)

M—Males; F—Females; T—Total.

Table 2. Prevalence of *Schistosoma haematobium* according to age group and gender

Age group (yr)	No. examined (%)		No. infected (%)		Total (%)	
	Male	Female	Male	Female	Examined	Infected
0–9	16 (26.7)	23 (16.6)	3 (18.8)	–	39 (19.7)	3 (7.7)
10–19	13 (21.7)	21 (15.2)	4 (30.8)	4 (19)	34 (17.2)	8 (23.5)
20–29	5 (8.3)	43 (31.2)	4 (80)	18 (41.9)	48 (24.2)	22 (45.8)
30–39	6 (10)	22 (15.9)	3 (50)	3 (13.6)	28 (14.1)	6 (21.4)
40–49	10 (16.7)	17 (12.3)	4 (40)	1 (5.9)	27 (13.6)	5 (18.5)
50–59	6 (10)	5 (3.6)	2 (33.3)	–	11 (5.6)	2 (18.2)
60 +	4 (6.7)	7 (5.1)	–	–	11 (5.6)	0
Total	60 (100)	138 (100)	20 (33.3)	26 (18.8)	198 (100)	46 (23.2)

Students (62.9%) were mostly infected followed by food vendors (50%). *E. vermicularis* was found in students only (9.1%). A total of 198 study participants' urine samples were examined [60 (30.3%) males and 138 (69.7%) females]. A total of 46 (23.2%) were infected with *S. haematobium* with a higher prevalence in males (33.3%) than in females (18.8%). Males and females of age group (20–29 yr) showed the highest prevalence, (80%) and (41.9%), respectively. Difference in infection rate in the different age groups and sex was statistically significant ($\chi^2 = 15.2$, $p < 0.05$) (Table 2). More study participants (30.2%) from Olorisaoko were infected with *S. haematobium* followed by 25.8% from Sasa, 17.6% from Ajibode and 16.3% from Idiose. More farmers (45.5%) were infected followed by food vendors (25%) and then traders/hawkers (24%).

The results of this study show the presence and high prevalence of intestinal helminth infections in the study areas. Factors predisposing to infections include poor sanitary conditions, inadequate water supply, unhealthy cultural practices and ignorance. Most of the people included in the study had no toilet facilities and so defecated in nearby bushes. So also children playing in dirty or filthy environment, playing and swimming in natural water bodies, geophagus habit of children and involvement of women in subsistence agriculture are habits that facilitate the transmission of the parasites[6,7].

The presence of five species of intestinal parasites in this study area suggests that the prevailing environmental conditions support the transmission of a wide range of parasites. *Ascaris lumbricoides,* Hookworm and *T. trichiura* were the commonest intestinal parasites in the study area. This observation is in accordance with findings by Nwosu[8] which showed that the triad of Hookworms/*Ascaris*/*Trichuris* is common throughout most parts of Nigeria. The relatively higher frequency of *Ascaris* recorded in this study agrees with other findings[1,9]. This might be attributable to the high biotic potential of the worm and the ability of the eggs to withstand adverse conditions in the soil[10].

The highest infection rate recorded among students could be attributed to the fact that school children normally play in or around defecation sites and most of the schools lack proper toilet facilities. *E. vermicularis* occured only in age group 0–19 yr and prevalence in the study area is significant because it flourishes in the temperate zone where "probably every child has been infected not once, but many times in childhood"[10]. The mode of transmission of the parasite, which is mainly through infected fingers after scratching the peri-anal region, is a habit found mostly in young people.

The vectors of *S. haematobium*, planorbid snails, *Bulinus* spp are found in natural bodies of water used for drinking, domestic purposes and recreation by the communities. The higher prevalence of schistosomiasis among males (33.3%) compared to females (18.8%) in this study can be attributed to the fact that males in the area are more frequently exposed to infected water bodies, where they usually play, swim, bathe or wash. Akogun & Badaki[11] reported similar findings and attributed it to the fact that males have fewer restrictions than females.

This study shows that urinary and intestinal parasites are still being actively transmitted in Ibadan. These intestinal parasites might cause severe conditions like dysentery, dehydration, haemorrhage, anaemia, appendicitis, which sometimes lead to death. Ascariasis interferes with protein digestion in children and in combination with hookworm infection or other intestinal parasites could cause, accompany or accentuate kwashiorkor. *Schistosoma haematobium* causes dysuria, increased frequency of micturition and haematuria (urine with blood) conditions which can eventually lead to kidney failure if untreated. The parasites' eggs can cause a substantial damage to the liver, intestines, bladder and kidney and cause death in some cases[12].

It is of vital importance that national control programmes are put in place. There is need for provision of basic social amenities in rural communities. Communities should also be adequately enlightened on the need for good personal hygiene and a clean environment.

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