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Research Article

Evaluation of Urinary Schistosomiasis among Residents in a Community in South-South Nigeria

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Abstract

Schistosomiasis, also known as Bilharziasis or Bilharzia, is a parasitic disease caused by trematodes from the genus Schistosoma. There are four main species that infect humans. *Schistosoma mansoni*, *Schistosoma japonicum*, *Schistosoma mekongi* which causes intestinal schistosomiasis and *Schistosoma haematobium* which causes urinary schistosomiasis. It affects many countries and appears to be endemic in many West African countries. It is most common in the tropical areas of the globe especially the rural areas where only the surface water bodies are the sources of water supply. The total number of samples collected for this study was 110 samples from different age groups. The bulk of the samples collected were majorly from children. Inhabitants within the age range of 5 and 60 years were included in this study, because of their activities which expose them to regular contact with water bodies, while those below the age of 5 and above the age of 60 years were excluded because of their lack of contact with water bodies. From the samples collected from the inhabitants of Oraede-Ole in Esan West Local Government Area Edo State Nigeria, none of the 110 urine samples examined was positive for urinary schistosomiasis, giving a prevalence of urinary Schistosomiasis in the study area of 0%. This was due to some level of personal hygiene, awareness campaigns carried out in the locality and provision of drugs by public health personnel.

Keywords: Urinary; Schistosomiasis; Schistosoma

Introduction

A parasite is a living organism that lives on or inside another living organism called the host and gets nourishment and protection from it without contributing anything in return. The parasite usually causes damage to the host. Examples of parasites include fleas, lice, mites, hookworms, tapeworms, and schistosomes [1]. Parasites are classified based on their interactions with their hosts and on their life cycles [2]. Parasites that live on the outside of the host, either on the skin or the outgrowths of the skin, are called ectoparasites e.g. lice, fleas, and some mites. Those that live inside the host are called endoparasites e.g hookworm, ascaris and schistosomes [3]. *Schistosoma haematobium* is a typical example of an endoparasite [4].

Schistosomiasis, also known as Bilharziosis or Bilharzia, is a parasitic disease caused by trematodes from the genus Schistosoma [5,6]. There are four main species that infect human beings: *Schistosoma mansoni*, *Schistosoma japonicum*, and *Schistosoma mekongi* which causes intestinal schistosomiasis. *Schistosoma haematobium* causes urinary schistosomiasis. It affects many countries and appears to be endemic in many West African countries. It is mostly common in the tropical areas of the globe especially the rural areas where only surface water bodies are the sources of water supply [7]. There is no known reservoir, although there have been reports of zoonotic disease in vervet monkeys, baboons, chimpanzees, sheep, pigs, and Nile rats. These animal hosts are not thought to play a sig-

nificant role in the perpetuation of transmission of schistosomiasis [8]. *Schistosoma haematobium* has no vector. The infective cercariae are free-swimming. There are intermediate hosts, which are snails from the genus Bulinus [9]. Throughout their complex life cycle, these trematodes undergo striking morphological and physiological changes with individual life-stages displaying distinct adaptations both to parasitic life, and also to free-living life that permits movement between definitive-vertebrate and intermediate-snail hosts [10]. Such adaptations include cilia or tails for swimming, secretory glands for host penetration, a tegument and glycocalyx for parasite protection/host immuno-modulation, a gynaecophoric canal for sustained pairing between sexes, muscular suckers for attachment/feeding, and highly organised reproductive systems for efficient fertilization and egg production [11].

The eggs, which can be found in the urine of infected hosts, are 110-170 mm long by 40 - 70 mm wide. They are elongated with a distinctive terminal spine and look like microscopic American footballs with spikes on one end. The shells of the eggs are clear and contain miracidia [12]. This study was carried out to determine the occurrence rate of *Schistosoma haematobium* among the inhabitants of Oraede-Ole in Esan West Local Government Area, Edo State, Nigeria.

Materials and Methods

Materials

Materials used in this study include: Microscope, Centrifuge, Microscope slides, Cover slips, Universal bottles, Pasteur pipettes, 10ml test tubes, 10% formal saline, Hand gloves, tagging labels.

Study area

This study was carried out on the inhabitants of Oraede-Ole in Esan West Local Government Area, Edo State Nigeria. Oraede-Ole lies few kilometers away from Ekpoma. There are two rivers in the community called Edokhuo river and Edomujie river, where the inhabitants fish, bath, wash clothes, farm and drink from.

Study population

The study included inhabitants of Oraede-Ole aged 5 to 60 years, who were randomly selected and regularly come into contact with local water bodies. The participants were properly oriented on the relevance of the study before their samples were collected.

Sample size

The total number of samples collected for this study was 110 samples from different aged groups. The bulk of the samples collected were majorly from children.

Inclusion/exclusion criteria

Inhabitants within the age range of 5 and 60 years were included in this study, because they are more active and have regular contact with the water bodies, while those below the age of 5 and above the age of 60 years were excluded from this study because they are less active and have less contact with water bodies.

Sample collection

After proper sensitization and mobilization of the participants, a 20milliliter clean catch, mid-stream urine sample was collected in 50mls capacity sterile wide mouthed leak-proof universal containers by the subjects themselves, who were previously carefully instructed on how to collect the samples. Samples were collected between 11.00am and 2.00pm which is the peak period for shedding of Schistosoma eggs. Each sample collected was inspected for visible hematuria and turbidity. The samples were appropriately labeled with identification numbers and a record book was used to record individual details such as name, sex and occupation.

The samples were placed in a cold box with ice packs immediately after collection or preserved with 10% formal saline. Laboratory analyses were carried out at the Diagnostic Laboratory in College of Medical Sciences, Ambrose Alli University, Ekpoma, Edo State, Nigeria.

Ethical Consideration

Approval for this study was obtained from the Ethical Committee of the Ministry of Health in Esan West Local Government Area, Edo State, Nigeria. Oral informed consent was obtained from parents of the children and Principals of the school visited. Participation by inhabitants was voluntary after obtaining assent. Information collected from participants was maintained with utmost confidentiality as names were not used on any sample but codes.

Laboratory Analysis

Macroscopy

Macroscopic examination of the urine samples was carried out with the naked eyes, checking the appearance and contents of the urine to see if the urine is turbid or bloody.

Microscopy

The sedimentation and centrifugation techniques (WHO, 2002) were employed to analyze the samples. Ten milliliters of urine were taken from the deposit of each specimen bottle after allowing to sediment for about 1 hour and centrifuged for 5 minutes at 3000 revolution per minute. The supernatant was discarded and the final deposit was resuspended and picked with a Pasteur pipette onto a microscope slide. The drop on the slide was covered with a cover slip and examined microscopically using X10 objective lens for focusing and X40 objective lens for viewing the characteristic Schistosoma hematoma ova, which has a terminal spine and oval in shape.

Statistical Analysis

Data obtained was expressed as mean ± SEM and analysis was done Statistical package for Social Scientists (SPSS version 21.0). Values at $p<0.05$ were considered significant in comparison with appropriate control.

Results

From the samples collected from the inhabitants of Oraede-Ole in Esan West Local Government Area Edo State Nigeria, none of the 110 urine samples examined was positive to urinary schistosomiasis caused *Schistosoma haematobium*, giving the prevalence

of urinary Schistosomiasis in the study area as 0%. The highest group examined was among school children, followed by farmers and traders.

Pupils in the age group of 5-10 years had the highest number of samples examined, followed by students in the age group of 11-15 years while adults in the age group of 56-60 years had the least number of samples examined.

The analysis carried out from this study, shows the occurrence of urinary Schistosomiasis in relation to age group in the study area on Table 1. The table showed that no member of all the age groups was infected by the parasite, *Schistosoma haematobium*.

Table 1: Distribution of Schistosoma haematobium in relation to age group.

Age group	No. examined	No. infected	% infection
5-10	25	0	0
11-15	21	0	0
16-20	19	0	0
21-25	12	0	0
26-30	8	0	0
31-35	4	0	0
36-40	5	0	0
41-45	7	0	0
46-50	3	0	0
51-55	4	0	0
56-60	2	0	0
Total	110	0	0

The age and sex related infection of the parasite in the study area is shown in Table 2 and neither male nor female was infected by the parasite. Table 3 shows the occurrence of urinary schistosomiasis in relation to occupation of the participants in the area and no member of any occupation was infected.

Table 2: Age and sex related infection rate of Schistosoma haematobium.

Age	Male			Female		
	X	Y	Z	X1	Y1	Z1
1-10	14	0	0	11	0	0
11-15	9	0	0	12	0	0
16-20	8	0	0	11	0	0
21-25	8	0	0	4	0	0
26-30	5	0	0	3	0	0
31-35	1	0	0	3	0	0
36-40	3	0	0	2	0	0
41-45	5	0	0	2	0	0
46-50	2	0	0	1	0	0
51-55	2	0	0	2	0	0
56-60	1	0	0	1	0	0
TOTAL	58	0	0	52	0	0

Note*: Key: X: No. of males examined; Y: No. of males infected; Z: % of males infected; X_1: No. of females examined; Y_1: No. of females infected; Z_1: % of females infected

Table 3: Distribution of *Schistosoma haematobium* in relation to occupatio.

Occupation	No. examined	No. infected	% infection
Pupils/students	65	0	0
Traders	16	0	0
Farmers	21	0	0
Civil servant	8	0	0
Total	110	0	0

Discussion

The global problem of tropical diseases has continued to decline over years with wide spread optimism among those working in the field of public health that tropical diseases including schistosomiasis would soon be a thing of the past. The result of this study showed a 0% occurrence of contrary schistosomiasis caused by *Schistosoma haematobium* in Oraede-Ole of Esan West Local Government Area in Edo State. This occurrence is contrary to the 66.4% and 76.2% reported by Opara, et al. [13] in three contiguous communities in Southwest Nigeria. Noriode et al. [14] obtained 74.4% in Ikpeshi, Akoko Edo LGA and 59.5% in Ogben, Owan East LGA both of Edo State.

Nwachukwu et al. [15] reported a close infection rate of 57.5% among school children in Ibadan, Nigeria. Edungbola et al. (1998) recorded similar infection rate among school children in Babana district, Kwara State, Nigeria.

The result of this study unlike the result of some earlier studies shows that the prevalence of the disease is neither age or sex dependent. The analysis showed that neither sex nor age had any influence on the occurrence of the disease in the study area. Occurrence of Schistosomiasis had no relationship to occupation of the inhabitants in the study area as well.

The non-existence of the disease in the study area could be due to the awareness and observation of adequate hygiene and treatment of the infected individuals with drugs. These practices were observed among the habitants during the cause of this study. Another possible reason could be that the snail (*Bulinus truncatus*) which is the intermediate host of the parasite is absent in the water bodies in the study area, so the water is free om the infective stage (cercarae) of the parasite.

Conclusion

In conclusion, the occurrence of Urinary Schistosomiasis among the inhabitants of Oraede-Ole In in West Local Government Area, Edo State, Nigeria is 0%. This was due some level of personal hygiene, awareness campaigns carried out in the locality and provision of drugs by public health personnel.

Government should also provide pipe borne water to all parts of the country, to discourage inhabitants from visiting the water bodies for domestic purposes. Rivers and streams should be guarded against pollution with human faeces and urine. Finally, occasional screening of the inhabitants should be carried out and if any is

found to be infected, he or she should be treated to avoid the spread of the disease.

Conflict of Interest

The authors declare no conflicts of interest. The authors alone are responsible for the content and the writing of the paper.

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Authors' Contributions

The entire study procedure was conducted with the involvement of all writers.

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