INTENSITY OF BLOOD IN URINE (URINARY SCHISTOSOMIASIS) AMONG SCHOOL CHILDREN IN OSUN STATE

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Abstract
Urinary schistosomiasis (blood in urine) among school children was investigated in Eko-Ende, Oore and Oba-Ile, Osun State, Nigeria. The research determined the intensity of urinary schistosomiasis among school children. Mid-day urine samples were collected from the children and examined for Schistosoma haematobium eggs. One Way Analysis of Variance (ANOVA) was used to test for differences in the intensity of the infection. The overall arithmetic mean intensity of infection was 93.3± 206.2 eggs / 10ml urine. This study concluded that there was high intensity of urinary schistosomiasis in the study area hence there is need for urgent intervention.

Key words: *Intensity, Urinary Schistosomiasis, School Children*

Introduction

Schistosomes are trematodes that live in the blood, they are parasitic flukes of medical importance which belong to the subclass digenea. They are unsegmented and cylindrical, these flukes have no body cavity, possess two suckers, the oral and the ventral suckers by which they attach to their host .Their digestive system consists of a mouth and an oesophagus which divides to form intestinal caeca (Monica, 2000).In some species, the caeca are branched with no anus .The excretory system is composed of excretory cells referred to as flame cells, collecting tubules and an excretory pore.

Schistosomes have separate sexes unlike other trematodes which are hermaphroditic. The female lay eggs with characteristic spine which is used for species identification. For eggs to develop, they must reach water where they will infect appropriate fresh water snail.

Schistosomiasis (also known as bilhaziasis) is a water based infection caused by trematode parasites of the genus, Schistosoma. Aquatic snails of different species serve as intermediate hosts of different species of the parasites. Infection with *Schistosoma mansoni*, *S. haematobium, S. japonicum* and in a few cases *S. intercalatum* causes illness in human (Monica, 1998). While *S. bovis, S. mattheei, and S. mekongi* are of zoonotic species (natural parasites of animals) but occasionally reported in man (Noble and Glem, 1982). Schistosomiasis was first discovered in Egpty in 1852 by a German doctor known as Theodor Bilhaz who recovered *Schistosoma haematobium* eggs in the bladder of a dead man during an autopsy.

Schistosoma mansoni and *S. japonicum* are found in the veins of large and small intestine respectively where they cause intestine schistosomiasis, while *S. haematobium* is found in the veins of the urinary bladder among other places. The intermediate snail host for *S. mansoni* is *Biomphalaria*, while *Bulinus species* is the intermediate host for *S. haematobium, S. intercalatum*; *Oncomelania* snail species are the intermediate hosts of *S. japonicum* (Okpala *et. al,* 2004).

The transmission of schistosomiasis takes place only in fresh water bodies harbouring appropriate snail intermediate hosts. Transmission is enhanced by human-water in such water bodies. Schistosomiasis is one of the most important neglected tropical diseases with a near global spread. Over 200million people in 74 countries are infected while more than 600millions are at the risk of infection worldwide, (Okpala *et. al,* 2004) *Schistosoma haematobium* is endemic in 52t African and eastern Mediterranean countries including Nigeria, (Adeyeba and Ojeaga, 2003).

In Nigeria, urinary schistosomiasis known to have existed from time immemorial and might have been brought to the country by migrating Fulani people when they traveled westwards from the Nile Basin (Cowper, 1972). The early record of urinary schistosomiasis in Nigeria is that of a German explorer who, in 1881 published the occurrence of endemic haematuria in Borunu Province, (Cowper, 1972).

It is assumed that the rapid establishment of water related projects for hydroelectric power generation / irrigation such a dams and reservoirs and flood control have altered the distribution and greatly increased the prevalence of S. haematobium infection in Nigeria, Osun State inclusive (Adewumi *et al.,* 1994; Monica, 2000).

Although, urinary schistosomiasis is endemic in Nigeria it is usually a neglected common parasitic disease of childhood (Adewumi *et al.,* 1991; Bello and Edunjobi, 1992).

It is wide spread in the country and causes severe debilitating illness in millions of people (WHO, 1993).

The negative influence of infection on child growth in developing countries has been extensively documented, (Cole *et al.,* 1977). While under-nutrition has been cited as the common cause for such growth patterns, the influence of infections including urinary schistosomiasis are also considerable (Stepheson *et al.,* 2985). Infection with hookworm and *S. haematobium* can also result in poorer growth rate, Stolzfus *et al.,* (199); Warren et al., (1993) and this may also be a route by which infection leads to impaired performance because under-nutrition, affects cognitive development and educational achievement. (Simeon *et al.*, 1990; Mendez *et al.,* 1999).

A previous study in Kenya provided evidence that relatively heavy infections of *S. haematobium* can cause urinary iron loss which, if it persists, is great enough to provide iron deficiency anaemia and can also reduce physical fitness of children. The disease affects human health in several ways such as causing uropathy, urinary bladder cancer, haematuria leading to anaemia which reduces the quality of nutrients being absorbed by the body system, thereby affecting the nutritional status of the infected individual. Although the relationships between various types of infection and nutritional status and physical growth in populations have been evaluated, the impact of *S. haematobium* infection populations have been evaluated, however, impact of *S. haematobium* infection on the nutritional status and growth of school age children should be considered.

Methodology

Study Area and Sample Size

This study was carried out in Oba-Ile (Olorunda L.G.A.), Eko-Ende and Oore Ifelodun Local Government Areas all in Osun-State, Nigeria.

The climate of the area is typically tropical rainforest, marked by two main seasons, rainy season of about eight months which starts in April and terminates in October, and dry season of about four months for Nov. to March. The vegetation is that of a typical rainforest, characterized by dense masses of grasses along the river banks. Bamboo trees, oil palm trees were found in abundance.

Four schools were selected (on the basis of their proximity to the water bodies) for the study, one each from Oba-Ile and Oore and two from Eko-Ende. These are Oba Ile primary school, Oore community High School, Eko Ende High School, and St. Andrews Primary School, Eko-Ende. Mid-day urine samples were collected from the four hundred and thirty randomly selected individuals and examined for the presence and number of *Schistosoma haematobium eggs* in urine, using sedimentation by gravity method. One way analysis of variance (ANOVA) was used to test for differences in intensity of the infection.

Sample Size Determination: A minimum sample size for this study was calculated using the formula: $N = Z^2 pq/d^2$ (Araoye, 2004)

Where:

- N= The desired sample size
- Z= The standard normal deviation, usually set at 1.96, which corresponds to 95% confidence level.
- P= The proportion in the target population estimate to have particular characteristics.
- q= 1.0 – P
- d= degree of accuracy desired, usually set at 0.05

This study took into consideration the (d) to be 5% (0.05) and the prevalence rate of 50%. The minimum sample size came out to be 384, therefore the sample size of 430 used for this study is a representative of the population of the study area.

Results and Discussion

Out of the 430 children examined in four schools, 311 (72.3%) were positive for *Schistosoma haematobium* eggs.

Table 1: Prevalence and Intensity of infection by school

Schools	No. Examined	No. Infected	Prevalence (%)	Arithmetic Mean intensity Egg/10ml/urine)	Standard deviation	Range	
						Min	Max
Oba Primary	80	45	56.3	30.5	68.3	0.0	400.0
Eko-Ende High	220	180	81.8	133.0	238.7	0.0	1620.0
Oore High	62	25	40.3	7401	238.4	0.0	1620.0
EkoEnde Primary	68	61	89.7	56.0	130.4	0.0	1620.0
Total	430	311	72.3	93.3	206.2	0.0	1620.0

F= 6.35, df=3, P-value=0.000

Unlike prevalence, intensity of infection was heaviest in Eko-Ende High School (133.0 eggs/10ml urine) and lowest in Oba Primary School (30.5 eggs/10ml urine).

The difference was highly significant (p<0.001).

Table 2: Prevalence and Intensity of Infection by Age

Age Group (years)	**No. Examined**	**No. Infected**	**Prevalence (%)**	**Arithmetic Mean intensity Egg/10ml/urine)**	**Standard deviation**	**Range**	
						Min	**Max**
<11	55	37	67.3	45.5	88.0	0.0	400.0
11-13	102	82	80.4	89.9	207.1	0.0	1250.0
14-16	176	138	78.4	81.0	140.2	0.0	914.0
≥17	97	54	55.7	146.1	316.6	0.0	1620.0
Total	430	311	72.3	93.3	206.2	0.0	1620.0

F= 3.38, df =3, P-value = 0.02

Age group ≥ 17 (146.1/10ml urine sample) has the highest intensity. The lowest 45.5 egg/10ml urine was found in age range 8-10. P-value is

<0.005 the mean difference between the various age groups is significant at 0.5 level.

Table 3: Prevalence and Intensity of Infection by Sex

Sex	No. Examined	No. Infected	Prevalence	Arithmetic Mean intensity Egg/10ml/urine)	Standard deviation	Range	
						Min	Max
Male	237	174	73.4	118.2	240.2	0.0	1620.0
Female	193	137	71.0	62.7	149.5	0.0	1250.0
Total	430	311	72.3	93.3	206.2	0.0	1620.0

F= 7.85, df=1, P-value = 0.005

Table 3 shows that males have higher mean intensity 118.2eggs/10ml urine sample compare to females with 62.7eggs/10ml urine sample. The difference was statistically significant, (P<0.05)

Table 4: Prevalence and Intensity of infection by community

Community	No. Examined	No. Infected	Prevalence	Arithmetic Mean intensity Egg/10ml/urine)	Standard deviation	Range	
						Min	Max
Oba-Ile	80	45	56.3	30.5	68.3	0.0	400.0
Eko-Ende	288	241	83.7	114.8	220.3	0.0	1620.0
Oore	62	25	40.3	74.1	238.4	0.0	1600.0
Total	430	311	72.3	93.3	206.2	0.0	1620.0

F=5.67, df=2, P-value = 0.004

Table 4 shows that Eko-Ende has the highest mean egg count, Oba-Ile had the lowest and the difference in the intensity was statistically significant, P<0.05.

Several workers explained this pattern in several ways including the fact that children of this age group are in the adolescent stage of life, when they are hyperactive, curious and tend to exercise their own will by exploring their environment, therefore they involve in several risk activities such as long and unprotected water contract.

Analysis of data shows the mean intensity of infection per 10ml urine sample to be highest in Eko-Ende high school with 138.0 $\pm$ 238.7 and lowest in Oba primary school with 30.5 $\pm$ 68.3. The overall mean intensitSy per 10ml urine is 93.3 $\pm$ 206.2 which is quite high, P<0.001.

The intensity of infection was significantly higher in male (118.2 $\pm$ 240/10ml urine sample) compared to female (62.7 $\pm$ 149.5/10ml urine sample), ($P<0.05$). The intensity of infection across age groups ranged between (45.5 $\pm$ 88) and 146 $\pm$ 316.6. The highest was found in children aged $\geq$ 17. Oladejo and Ofoezie (2006) reported overall mean intensity of infection of 148.6 $\pm$ 378 eggs per 10ml urine (144.2 $\pm$ 389 in Ilie and 156.5 $\pm$ 378 in Oba-Ile).

Oladejo and Ofoezie (2006) reported intensity to be significantly age dependent, increasing from the < 10 years age group to a peak in the 12-13 years bracket before ditching in the older age groups. The results of the infection pattern are clear indications that these communities remain endemic with *Schistosoma haematobium* infection and if efforts are not effectively geared towards its abatement, transmission of the infection will be on the increase and its eradiation in Nigeria will remain a mirage

The different species of *schistosoma* have been shown to be associated with linear growth retardation in children in many developing countries. The implication of this is that there is need to target school children for intervention. If nothing is done to stop the transmission of the infection, the prevalence will increase, intensity will aggrevate resulting into more haematuria which will predispose the children to anaemia, weight loss, inadequate energy supply to the brain causing poor performance in class, this could affect their future and the nation as a whole, all these indicate an urgent need for eradicating schistosomiasis in Nigeria particularly in these communities.

Recommendations

Based on the findings of this study the following recommendations were made.

Schistosomiasis control programme should embark more on health education about the life cycle of the parasite and the means of contacting it should be well communicated especially through the media. Government at all levels should provide pipe borne water to rural areas to reduce the observed rate of infection in the study area. The local governments should embark on mass treatment of the infected children in the communities.

The creation of drug distribution networks for all essential drugs, including anti-helminthes, to the area should be facilitated.

There is a need to review the general epidemiological status of schistosomiasis in Nigeria and its eradication should be addressed aggressively.

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