PREVALENCE OF *Schistosoma haematobium* INFECTION AMONG PRIMARY SCHOOL CHILDREN IN SOME SELECTED COMMUNITIES WITHIN DUTSIN-MA LOCAL GOVERNMENT AREA OF KATSINA STATE

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Abstract: A study was conducted on the prevalence of S*chistosoma haematobium* infection among primary school children in some selected communities within Dutsin-ma Local Government Area of Katsina State. A wet mount preparation technique was employed to determine the prevalence of *S. haematobium* egg in urine. Questionnaires were administered to children to collect information on socio-demographic data and water contact activities. A total number of two hundred and twenty five (225) urine samples were examined for *S. haematobium* ova, and of all the samples examined 109(48.4%) were found infected. Male had high prevalence occurrence of ova compare to that of females. High rate of infection was observed in age group 6-9 (22.2%) out of 50 samples examined followed by those aged 10-12 with (20.9%) out of 47 samples examined. The study shows that there is no significant difference (p>0.05) between infection and the study area, sex, age and occurrence of ova. However, there was significant difference (p<0.05) between the infection and the parental occupation. Though there is a high prevalence of *S. haematobium* in the study area, but periodic control measures should be taken to reduce or completely eradicate the disease.

Keywords: Children, communities, examine, primary, Schistosomiasis and urine

Introduction

Schistosomiasis is caused by several different S*chistosoma species*, each requiring a different approach to treatment and control. The species are *S. haematobium* and *S. mansoni*. The *S. haematobium* species cause urinary schistosomiasis and its intermediate host species are Bulinus and Physopsis Africanus snails, while *S. mansoni* causes intestinal schistosomiasis and its intermediate host species are the Biomphalaria Pfeifferi snails. The incubation period of these organisms is about 4 – 6 weeks after contamination and the reservoir host is man (Chin, 2000).

Human schistosomiasis or bilharzias is a chronic parasitic disease causing morbidity and mortality with over 200 million people infected worldwide (Payne *et al.*, 2013). It is estimated that 93% of human schistosomiasis occur in Sub Saharan Africa and that Nigeria being the first country that has the highest burden of schistosomiasis in the region, and that the United Republic of Tanzania been the second (Mazigo *et al.*, 2012). The parasite (*S. haematobium*) is found in the venous plexus draining the urinary bladder of humans. Urinary and intestinal Schistosomiasis becomes a major public health problem and was rated second to malaria in terms of human infection (Payne *et al.*, 2013) (do as earlier indicated).

Approximately, two-thirds of the schistosomiasis cases are caused by *S. haematobium*. Possible consequences of *S. haematobium* infection include haematuria, dysuria, egg granulomatous lesions in the bladder, kidney failure, and the disease if untreated it can pose a great risk to urinary bladder cancer. Other health impacts associated with the disease are risk of anaemia, stunted growth to children and impairment of cognitive development in infected individuals (Ishii *et al.*, 2003).

Schistosomiasis is an important cause of disease in many parts of the world, most commonly in places with poor sanitation, the condition especially affects children between the ages of 6 and 17 years old as they are most often in contact with water, because they swim and fish, collect water and walk through infected water to and from school (Chitsulo *et al*., 2000).

It has been previously reported that *S. haematobium* is distributed throughout Africa. There is risk of infection in freshwater in sub-Saharan Africa–including the great lakes and rivers as well as smaller water bodies. Schistosomiasis is prevalent in tropical and sub-tropical areas, especially in poor communities without access to safe drinking water and adequate sanitation (McCullough, 2000).

Generally, the main factors that may influence the prevalence of schistosomiasis include low level of literacy, poverty, sub-standard hygienic practices, and inadequate public health infrastructure especially in rural communities, therefore, there is even an increased risk of higher prevalence of the infection due to global warming and increased populations (Champo, 2009). A previous study has shown that the most affected group are the school children; however, everybody else is at greater risk of contracting the disease if in contact with infested water (Champo, 2009).

Primary school children are particularly vulnerable to schistosomiasis because of their habit of playing, swimming and fishing in water bodies, where they may contact the infection. The prominence of infection is attributed to poor environmental sanitation and inadequate access to safe tap water among others; these conditions lead to continued exposure to the infective stages of parasite and thus high rates of re-infection (Chitsulo *et al.*, 2000).

However, Schistosomiasis is a global public health concern which requires the participation of everyone in order to mitigate its effects. Above all, it's necessary for healthcare providers and other stake holders to cross their fingers to try and eliminate the problem. Thus the parasites *S. haematobium* have been studied in various part of the country, but very little done in Katsina State, particularly Dutsin-ma Local Government; as a study area. Therefore, this study was aimed to determine the prevalence of *S. haematobium* among primary school children in some selected areas within Dutsin-ma local government communities.

Materials and Methods

Study area

This study was carried out in four provinces in Dutsin-ma (L.G) area Katsina state, north-western Nigeria. This area is located between latitude of 12°21ꞌ16.13"N and a longitude of 7°21ꞌ51.55"E, respectively. These provinces were expected to be endemic for schistosomiasis.

Study population

A total number of two hundred and twenty five (225) samples was used for this study which is determined using sample size determination formula as describe by (Edward, 2000) at 95% confidence and a previous prevalence of 17.8% for *S. haematobium* is used as reported by (Houmsou, 2013).

Study design

To obtain the desirable population, cross sectional sampling technique was used therefore, 4 primary schools were selected from the area. In each school 56 children aged 6-15 years were engaged in study. Then in the school, those pupils aged 6-15 years who were available were involved in the study based on the questionnaire developed and were requested to bring their urine for laboratory analysis and the samples were taken immediately to the Umaru Musa Yar'adua University Microbiology Laboratory for further analysis.

Sample analysis

Laboratory work was conducted at Microbiology Department of Umaru Musa Yar'adua University, Katsina. After a single terminal urine sample was collected from each participant. Ten millilitres of each of the well-mixed urine samples was poured into a centrifuge tube used specifically for counting cells or parasites in urine and the samples centrifuged at 500-1,000 rpm for 3 min.

The supernatant was discarded, but about 0.6 ml of residual urine was retained at the bottom of tube. Then the deposits were placed onto a clean grease free slide and cover with cover slip and examine microscopically for ova (egg) of schistosomiasis under 10× Magnification.

Finally, the number obtained was multiplied by 12 to determine the total number of ova present in a 10 ml urine sample. And any sample that contained less than 50 ova/10ml was considered as an indication of a mild infection; however, if the figure was equal to or more than 50 ova/10ml, (geometric mean intensity). Identification of the eggs is by seeing a terminal spine of the *S. heamatobium* as one of it feature (Cheesbrough, 2009).

Ethical consideration

Approval for this study was obtained from the Dutsin-ma Local Government Educational Council Authority, the Authorities of the various schools and the pupils used for the study. The approval was on the agreement that participant's ambiguity must be maintained, and that every finding would be treated with maximum privacy and for the purpose of this study only.

Data analysis

The data obtained were analysed using percentages (%) and χ^2–test where $p<0.05$ was considered significant, using graph pad prism statistical software version 5.02.

Results and Discussion

The Table 1 represented the overall prevalence of the disease, **where** (48.44%) was found to be positive i.e. infected and (51.6%) was found to be negative i.e. non- infected.

The Table 2 represented the prevalence based on the schools attended, where Makera primary school was found to have high prevalence with 14.2% positive with 10.7% negative, followed by Garhi primary school with 13.8% positive and 11.1% negative. The least was found among Na'alhaji primary school with 8.9% and 16.4% in both positive and negative respectively.

However, statistically, the Table 2 showed that there is no significant difference between the rate of infection and the schools attended (p-value is 0.07) which is relatively ≥ 0.05.

Table 1: Overall prevalence of *S. haematobium* in the samples examined

Sample examined	Frequency	Percentage (%)
Positive samples	109	48.44
Negative samples	116	51.56
Total	**225**	**100.00**

Table 2: Prevalence base on the study area (schools attended)

School attended	No. Positive	%	No. Negative	%
Gago	26	11.6	30	13.3
Garhi	31	13.8	25	11.1
Makera	32	14.2	24	10.7
Na'alhaji	20	8.9	37	16.4
Total	**109**	**48.44**	**116**	**51.56**

(χ^2= 6.931and d.f = 3, p-value = 0.07)

Table 3: Prevalence in relation to parental occupation

Parental occupation	No. Positive	%	No. Negative	%
Civil servant	15	6.7	43	19.1
Famers	49	21.8	42	18.7
Fisher men	25	11.1	9	4.0
Others	20	8.9	22	9.8
Total	**109**	**48.44**	**116**	**51.56**

(χ^2= 21.48 and d.f= 3, (p= 0.0001))

The Table 3 showed the prevalence in relation to parental occupation to be higher among children of Famers with (21.8%) positive and (18.7%) negative, followed by Fisher men with (11.1%) positive and (4.0%) negative. The least positive infection was seen among the children of civil servant with (11.1%) and (4.0%) positive and negative, respectively.

However, statistically there is significant difference between the rate of infection and the parental occupation of the students examined (p-value= 0.0001) which is significantly ≤ 0.05. The Table 4 represented the prevalence of sex distribution prevalence which was found to be highest among males with (28.4%) and that of female with (20.0%) infection. However, statistically there's no significant difference between the rate of infection and the sex distribution of the samples examined (p-value= 0.51).

Table 4: Sex Distribution of the Samples Examined

Sex	No. Positive	%	No. Negative	%
Male	64	28.44	73	32.44
Female	45	20.00	43	19.11
Total	**109**	**48.44**	**116**	**51.56**

(χ^2= 21.48 = 0.42 and d.f= 1, p= 0.51).)

Table 5: Age distribution of samples examined

Age Distribution	No. Positive	%	No. Negative	%
6-9	50	22.2	56	24.9
10-12	47	20.9	41	18.2
13-15	12	5.3	19	8.4
Total	**109**	**48.44**	**116**	**51.56**

(χ^2= 2.114 and d.f= 2, p= 0.35)

The Table 5 showed the distribution based on age group with high rate of infection among children aged 6-9 years with 22.2% positive, followed by age range of 10-12 with 20.9% positive, and the least was seen among the age group of 13-15 that has 5.3% to be positive.

However, statistically there is no significant difference between the rate of infection and the age distribution of the samples examined (p-value= 0.35).

The Table 6 represented the occurrence of ova with RBC to be prevalent in male children with (28.44%) than in females with (20.0%) whiles (32.4%) and (19.1%) was found for RBC without egg among males and females respectively.
However, statistically there is no significant difference between the rate of infection and the occurrence of RBC's with/or without egg of Schistosoma in the samples examined (p-value= 0.52).

Table 6: Occurrence of RBC's with/without egg of *S. haematobium*

Sex	No. With egg	%	No without egg	%
Male	64	28.44	73	32.4
Female	45	20.0	43	19.1
Total	**109**	**48.44**	**116**	**51.56**

(χ^2= 0.4193 and d.f= 1, p= 0.52)

Table 7: Pupils knowledge on urinary Schistosomiasis

S/N	Response	Frequency	Percentage
1	Yes	136	60.4
2	No	83	36.9
3	No response	6	2.7
4	**Total**	**225**	**100.0**

The Table 7 shows the response of pupils with respect to the disease.
In relation to the student knowledge about the disease, it indicates that (60.4%) of the student participated in the study work was found to be aware of the disease, whiles (36.9%) was found to be un-aware and (2.7%) have no response about the disease at all.

Table 8: Health practice with respect to Schistosomiasis infection within the study area

Question	Pupils response	Frequency	%
Have you ever urinated bloody urine?	Yes	91	40.4
	No	134	59.6
Total		**225**	**100**
Did you receive any medication?	Yes	64	28.4
	No	161	71.6
Total		**225**	**100**

The Table 8 showed that (40.44%) of the student pass bloody urine whiles (59.6%) did not pass bloody urine. However, (28.4%) of the student receives treatment/medication in one health center or another whereas (71.6%) receives no any treatment at all.
A prevalence of (48.44%) of *S. haematobium* was observed in this study which was higher compare to the (0.33%) as previously reported by Houmsou *et al.* (2013) and Okpala among pupils in Apata and Laranto areas in Jos. Similarly, Akinboye *et al*. (2011) reported (5.5%) of urinary Schistosomiasis among secondary school's students in Ibadan which was also lower than the finding of this study. The high prevalence observed in the study area could be probably attributed to the increase in water contact activities which could have resulted from the lack of alternative source of water and other recreational site such as playground. The high prevalence might be an indication of low level of awareness about the disease in the study area.
However, among the schools participated in the study, Makera primary school was found to be more prevalent than the other schools with (14.2%) positive (Table 3).
Based on parental occupations, statistically this research showed that there is significant difference between the parental occupations (p-value= 0.001). Farmers children were found to be more prevalent with (21.8%) than fisher men children with (11.1%) possibly because farmers use to involve their children in contact with the source of infection such as fetching water from contaminated canals and dams. This is contrary to the findings of Houmsou *et al.* (2013) who reported the children of fisher men were found to be higher than the farmers among pupils of Shelleng town, Adamawa state Nigeria.
Regarding the pattern of water body contact activities in relation to the prevalence of sex distribution, it was observed in the present study that male makes more frequent contact than their females counterpart as such were found to be more infected (28.4%) than females 20.0% (Table 4). This finding correlate with the findings of Sam-Wobo *et al.* (2017) that reported 73% of male which is higher than that of female with 66.7% infected with Schistosomiasis among school-aged children in the study conducted from Ogun state Nigeria. This could be attributed largely to the diverse outdoor activities engaged by males which exposed them to cercariae infected water. However, statistically this research shows there is no significant difference (p-value= 0.52) among the gender (Table 4). This is an indication that all ages are equally expose to water bodies as contact with the stream by primary school children remain unabated throughout that age.
The high prevalence that was also found in those children aged 6-9 with (22.2%) as seen in (Table 5) is an indication that urinary schistosomiasis occurs in early life through exposure to contaminated water bodies by school children since it is difficult or impossible to prevent children in this area from visiting the streams for various activities such as bathing, and washing. This agrees to the findings of Sam-Wobo *et al*. (2011) and Sam-Wobo *et al*. (2017) who reported in their studies that schistosomiasis occur among school aged children and teenagers.
Furthermore, the water body contact and rate of infection is directly proportional to the age group. The lower the age group; the more the water body contact and thus increase the rate of infection as shown in Table 5 of our finding.
With respect to the occurrence of haematuria with egg of *S. haematobium*, our finding indicates no significant different (p-value =0.52) between the rate of schistosomiasis and presence of haematuria (Table 6). However, this is contrary to the recent finding of Sam-Wobo *et al*. (2017) from their research conducted among school aged children among some selected communities at Abeokuta North of Ogun state South western part of Nigeria. In their study, they reported the significant relation between the presence of blood in the urine and infection with *S. haematobium*.
Nevertheless, our finding shows that (40.4%) of children were found to pass bloody urine (hematuria) which is a characteristic symptom of urinary schistosomiasis in an endemic community. More so, only (28.4%) received medication or treatment for the disease from the study area (Table 8).

Conclusion

The finding of our research showed a high prevalence of *S. haematobium* infection among the children within the study area, and a reasonable number of children involved in the study are passing bloody urine which is a characteristic feature of the disease. Furthermore, majority of the children participated in the study did not receive any medication or treatment for the infection at all. We therefore, recommend a constant need for proper disposal of urine and faces, sanitation and hygienic practices as well as reduce the contact with any water bodies in the communities should be adapted.

Conflict of Interest

The authors declare no conflict of interest.

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