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Current Prevalence Status of Urinary Schistosomiasis among Children in Lokpanta Community, Abia State, Nigeria

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ABSTRACT

Schistosoma haematobium infections continue to be a significant public health problem in much of Africa. A survey was carried out to determine the current prevalence of urinary schistosomiasis among primary school age children resident in Lokpanta, an area with long history of sustained quarry mining and prevalence of schistosomiasis. The study involved 265 children whose ages ranged from 5 to 15 years (129 females and 136 males) randomly selected from various homes in Lokpanta community of Umuchieze, Abia State of Nigeria. Urine specimens collected from subjects were analysed for presence of eggs of *S. haematobium*using sedimentation technique. Of the 265 children whose urine specimens were examined, 38 (14.34%) suffered from urinary schistosomiasis. The prevalence of urinary schistosomiasis was found to be higher in males 25 (18.38%) than in females 13(10.08%). However, this difference was not statistically significant (P>0.05). Prevalence of urinary schistosomiasis was higher among children aged11 to 15 years old 30(22.22%) than their counterparts in age groups 5 to 10 years 8(6.15%). There was significant difference (P<0.05) between urinary schistosomiasis and age of the subjects. Prevalence among children whose mothers were farmers 21(19.27%), traders 12(12.63%), entrepreneurs 3(8.82%) and civil servants2(7.41%) did not differ significantly (P>0.05). Prevalence of urinary schistosomiasis is this study was independent of the occupational status of the children's mother. This study has shown that there is a drop in prevalence of urinary schistosomiasis among primary school age children in Lokanta community of Umuchieze clan, Abia State. Provision of clean portable water, which could reduce or stop unnecessary human contact with cercarial infested water, could as well further reduce or completely eradicate the prevalence of the disease in the study area.

Keywords: Urinary schistosomiasis, Water contact, Urine, Prevalence, Children.

INTRODUCTION

Schistosomiasis is an infection caused by parasitic trematode worms or blood flukes of certain species of the genus *Schistosoma.* The most common and important species that infect humans are *Schistosoma haematobium, S. mansoni,* and *S. japonicum* (Pappas, 1999). The parasites have no vectors, but their life cycle requires certain fresh-water snails as intermediate hosts (Sturock, 2001). The different species of *Schistosoma*have different types of snails serving as their intermediate hosts (Leder and Weller, 2009: Sturrock, 2001). Two major forms of human schistosomiasis are the sub-types of urogenital schistosomiasis, caused by *S. haematobium.*

Urinary schistosomiasis is a significant public health problem in much of Africa (WHO, 2010), second only to malaria among parasitic disease. The disease is often chronic and can causes pain, secondary infections (Argemi*et al.,* 2009), kidney damage and even cancer (Khurana*et al.,* 2005). Inflammation of the genital due to *S. haematobium*may lead propagation of HIV (Kallestrup*et al.,* 2006: Leutscher*et al.,* 2008). In urinary schistosomiasis, the adults *S. haematobium* are found in the vesicular veins surrounding the urinary tract, especially the bladder, of the infected persons, where copulation takes place. The

released eggs traverse the urinary tract wall and migrate into the lumen of the urinary bladder and ureters, causing blood in urine, painful or difficult urination, urethral obstruction and kidney damage from obstruction of urine. As the eggs penetrate the urinary system, they can find their way to the female genital region and form granulomas in the uterus, fallopian tube, and ovaries. The terminally spined eggs are eliminated from the host into the water supply with micturition (Pappas, 1999). Urinary schistosomiasis usually causes blood loss resulting in anaemia in children and pregnant women as well as low birth weight of new born babies (Friedman *et al*., 2007). Urinary schistosomiasis is due to immunologic reactions to *S. haematobium* eggs trapped in tissues of the infected individuals.

Transmission of urinary schistosomiasis causative agents occurs in stagnant or slow-moving fresh water in which susceptible snail species live. *S. haematobium* has no vector but requires certain fresh water snail species from the genus "*Bulinus"* as intermediate hosts (Sturrock, 2001). The free-swimming infective larval cercariae of the parasite, released by the infected snails, burrow into the human skin when in contact with cecariae infested water supplies in which infected *Bulinus* snails live. The main cause of urinary schistosomiasis is urinating by infected individuals into water supplies. Urinary schistosomiasis is contacted through wading in *S. Haematobium* cercariae-infested water. Transmission rates to populations that have frequent exposure to water are especially high. Children and adolescents are infected most often and are infected most heavily. Globally, *S. haematobium* infections are at peak in individuals aged 10-19 years (Mwanakasale*et al*., 2009). Morbidity and mortality in infected population are high with school age children (Uneke and Egede, 2009).

In Nigeria, the incidence and prevalence of urinary schistosomiasis among children and the attendant consequences have long been established. Among the studies that reported this fact are those of Ejezie, (1981); Istifanus*et al*., (1990); Larotski, (1991); Nduka*et al*., (1995); Ukpai and Ezeike, (2002); Nduka*et al*., (2006); Odu*et al*., (2010) and Olalubi and Olukunle, (2013). In recent years, there has been a drop in the prevalence of schistosomiasis in some areas of the country and an increase in others. This present study was carried out to determine the current prevalence rate of *S. haematobium* infections among primary school age children in Lokpanta, an endemic community of Abia State, Nigeria.

MATERIALS AND METHODS

Study Area

The study was undertaken at Lopanta in Umuchieze, a rural community in Abia State of Nigeria with long history of quarry mining (Rock blasting), abandoned water-filled quarry pits and prevalence of *S. haematobium*. Umuchieze lies between latitudes $5^0 04'$ and $6^0 03'$ North and longitude $7^0 10'$ and $7^0 35'$ East (Igbozuruke, 1986). The area has all the characteristics of a typical tropical climate with distinct rainy and dry seasons. Several water-filled quarry pits abandoned by the Quarry Mining (Rock Blasting) companies are found in very close proximate to the inhabitations.

Ethical Clearance and Informed Consent

This study was approved by the Council of Chiefs of the study community and parents consented to allow their children participate during a town-hall meeting.

Study population

The study population was children aged 5 to 15 years who were residents of the study community.

Collection of sample

Urine specimens were collected from randomly selected children of consented parents. The specimens were collected in 50ml screw capped wide mouthed sterile containers. Oral questionnaire was administered to the

subjects to obtaininformation relating to age, sex and occupation of mothers. Collection was done in designated centres.

Urinalysis

The urine specimens obtained were tested in the laboratory for haematuria using a chemical strip (Medi-Test Cambi 9) as described by King, (2001). The specimens with presence of blood were taken as positive results.

Microscopy

All the collected urine specimens were examined in the laboratory for the presence of *Schistosoma* ova using sedimentation technique as described by Cheesbrough, (2009). The procedure involved centrifuging 10ml of each urine specimen at 3,000 revolutions per minute (rpm) for 5minutes to sediment the parasite eggs. At the end of centrifugation, the supernatant was discarded and the sediment transferred onto a clean and grease-free slide, covered with a clean cover slip and viewed under dissecting microscope, using X_{10} objective to focus and X_{100} to examine.

Identification of parasite eggs

The specimens with the characteristic distinct terminal spine eggs were considered as positive while absence of the eggs taken as negative for *S. haematobium.*

Analysis of results

Chi-square (X^2) test was employed to establish any relationship between prevalence of urinary schistosomiasis and sex, age and occupational status of subject's mother. Significance was fixed at $p<0.05$.

RESULTS

A total of 265 children aged 5-15 years consisting of 129(48.68%) females and 136(51.32%) males who were residents of the study community were examined for prevalence of urinary schistosomiasis. Of the 265, 38(14.34%) were infected and had blood stains in their urine (haematuria). Table 1 shows the prevalence of urinary schistosomiasis in relation to sex of the subjects. It showed that prevalence of *S. haematobium* was higher in males (18.38%) than females (10.08%). However, this difference was statistically not significant ($p<0.05$).

Table 1: Prevalence of urinary schistosomiasis in relational to sex of subjects

Sex	No. tested	No. infected	Prevalence rate (%)
Females	129(48.68%)	13	10.08
males	136(51.32%)	25	18.38
Total	265(100.00%)	38	14.34

There was no relationship between *S. haematobium* infection n and sex of the subjects ($p<0.05$).

Table 2 shows the prevalence of urinary schistosomiasis in relation to age of the subjects. It showed that the prevalence of urinary schistosomiasis was higher among children ages 11 to 15 years old (22.22%) than their counterparts in age group 5 to 10 years old (6.15%). There was significant difference ($p<0.05$) between urinary schistosomiasis and age of subject.

Table 2: Prevalence of urinary schistosomiasis in relational to age of subjects

Age (years)	No. tested	No. infected	Prevalence rate (%)
≤ 10	130(49.06%)	8	60.15
> 10	135(50.94%)	30	22.22

Relationship existed between prevalence of *S. haematobium* infection n adage of the subjects ($p<0.05$).

Table 3 shows that prevalence of urinary schistosomiasis in relation to occupational status of subjects' mother. It showed that children whose mothers were farmers had the highest urinary schistosomiasis prevalence rate (19.27%), followed by traders' children (12.63%). Children of entrepreneurs and public servants had lest infection (8.82% and 7.41%) respectively. However, there was no significant difference between prevalence of urinary schistosomiasis and occupation of subjects' mother.

Table 3: Prevalence of urinary schistosomiasis in relational to occupational status of subjects' mother

Occupation	No. tested	No. infected	Prevalence rate (%)
Farming	109	21	19.27
Trading	95	12	12.63
Entrepreneurship	34	3	8.82
Public Service	27	2	7.41

Prevalence of urinary schistosomiasis was independent of occupational of subjects' mother ($p<0.05$)

DISCUSSION

Abandoned water-filled quarry pits abound in close proximity with the study community, Lokpanta in Umuchieze clan of Umunneochi Local Government Area of Abia State, Nigeria. The quarry pit ponds are potential habitats for the intermediate snail host of *S. haematobium* (Nwaugo, 1998), the urinaryschistosomiasis causative microorganism. The ponds provide water resources for various activities by adults and children living in the study community. Such activities, which include bathing, swimming, fetching water for domestic use, etc., bring children into contact with cercariae-infected quarry pit water and predispose them to *S. haematobium* infections (Nduka*et al*., 1995).

A prevalence rate of 14.34% for urinary schistosomiasis was obtained in this study. Nduka*et al*., (1995) had reported a prevalence of 21.63% among school children in the same area. The present rate reveals that incidence and prevalence of *S. haematobium* infections are decreasing in the study area. The relatively low prevalence of the infection could be attributed probably to a high degree of awareness among inhabitants of the study area of the prevalence and effects of the disease. It could also be attributed to high level of restriction to contact with infected water sources imposed on children of the study area by parents. This is because preventing transmission of schistosomiasis is accomplished most effectively by reducing contact withcercariae-infected fresh water (Nduka *et al*., 2006). The prevalence rate recorded in this study is in agreement with the report that in recent years there has been a drop in incidence and prevalenceof schistosomiasis in some areas and an increase in others (WHO, 2010; Nworsi*et al*., 2005).

All the infected children (38/265) had blood stain and *S. haematobium* ova in their urine. This indicate that the subjects were suffering from chronic schistosomiasis during the study period since a common sign from choric infection is based in urine (Mohammed *et al*., 2007). However, blood in urine could be attributed to other sources of haematuria, such as ministration, sickle cell disease, cancer, etc. the possibility of these to have been sources of haematuria is ruled out because the subjects were all children with age range 5 to 15 years.

In this study, prevalence of urinary schistosomiasis was independent o sex. Males and females were equally predisposed to infection. This result agrees with those of Tohon *et al*., (2008) and Olalubi and Olukunle, (2013) but contrasts with those of Mafe *et al*., (2005); Nduka *et al*., (2006) and Uneke and Egede, (2009). His could be attributed to the fact that infection rates may vary with gender-specific activity at all ages (Mwanakasale *et al*., 2009). Children of primary school age generally exhibit almost the same degree of water contact activities which predispose them to infections irrespective of sex. In rural communities, such as Lokpanta, where clean portable water is wanting, female children fetch water for household use and males often play in or near water.

This study showed that children in the age bracket 11 to 15 years were more infected than their counterparts in 5-10years age group. This influence of age on prevalence of urinary schistosomiasis among children in endemic areas conforms with most of known reports in Nigeria (Anigbo and Nwaogu, 1990; Ukpai and Ezeike, 2002; Nduka *et al*., 2006; Uneke and Egede, 2009; Olalubi and Olukunle, 2013). This result showed that age influenced the water contact activities, such as swimming, bathing, cloth washing, fishing, etc., increase as children advance in age resulting in increase in the disease prevalence. At tender ages of children these activities are less resulting in decrease in prevalence of schistosomiasis. The result also agrees with the report of Leader and Weller, (2009) that prevalence of

Schistosoma infection vary with age. According to them, the prevalence and intensity of infection rise with age. Globally, infections peak in individuals aged 10-19 years (Mwanakasale *et al*., 2009). The results of this study agrees with these reports.

In the present study there was so relationship between the disease prevalence and the occupation of mothers of the subjects. The mothers of 41.13% of the study population were farmers, 35.85% were traders, 12.83% and 10.19% were business men and civil servants respectively. Children of the present study age cohort are generally known to nationally be in close association with their mothers than fathers and their activities could be influenced by the presence or/and absence of their mother. This study showed that prevalence of urinary schistosomiasis among the children was independent of occupation of their mother. This could be attributed t the fact that children aged 5 to 15 years are generally actively independent. Their water contact activities are independent of mothers' occupation. This is because in the absence of clean portable water, young girls typically fetch waster for domestic use and young boys often play or swim in water thereby exposing themselves to infection, irrespective of presence, absence, or occupation of mothers.

CONCLUSION

The present study has shown that urinary schistosomiasis is still prevalent among children in Lokpanta community, Umunneochi Local Government Area, Abia State, Nigeria, and a major cause of morbidity in children. The data obtained from this study provides information on current status of *Schistosoma haematobium* infections among primary school age children in Lokpanta, a schistosomiasis endemic community in Umuchieze clan, Umunneochi Local Government Area, Abia State, Nigeria. The findings of this study have shown that incidence and prevalence of *S. haematobium* infections are decreasing in the study area. Despite the low prevalence of urinary schistosomiasis in this study, it is necessary to sustain control measures in the study area because the possibility that the present level obtained in this study could trigger off exponentially is not impossible. Therefore, there is also a need for improvement of sanitation practices in Lokpanta community, Umunneochi Local Government Area, Abia State, Nigeria, by providing clean water for household use to give people of the community an alternative to making contact with water that harbours *S. haematobium* infective larvae as well as by providing modern sewage systems to give the people an alternative to urinating in places where *S. haematobium* eggs can rereleased to fresh water containing snails (intermediate hosts).

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