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Prevalence of urogenital schistosomiasis among primary school pupils in Obowo local government area, Imo state Nigeria

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Abstract
To determine the prevalence of Urogenital Schistosomiasis a study was conducted among Primary School Children in Obowo Local Government Area of Imo State. Three primary school comprising of two hundred (200) pupils that were randomly selected for the study, 107 males and 93 were females. Urine sample was collected and analyzed in the laboratory using urine analysis. The prevalence of *Schistosoma haematobium* in the area was (16.0%); out of which (24.30%) cases were recorded for males and (17.2%) was recorded for females. The highest prevalent rate of *Schistosoma haematobium* infection was observed in age bracket 13-15years (28.12%), whereas 7-9 years had the lowest prevalent rate of (8.92%). The result shows that high infection rate was noticed within 10-15 years age group and decreased thereafter. Prevalence in relation to Parental occupation showed that pupils whose parents were farmers 24.64% were more infected than others while the least infected pupils whose parents are civil servant 16.00%. Statistical analysis indicated a significance difference between the schools and ages (P<0.05) and insignificant differences between sex and pupils parent occupation in the study area. The overall result of this study recorded the presence of urinary Schistosomiasis in the study area. It is therefore recommended that Schistosomiasis Control Program in the state should be geared towards creating awareness in the people, treatment of infected host, elimination of snail intermediate host, provision of toilet facilities in schools in order to reduce the infection rate.

Keywords: Prevalence, *Schistosoma haematobium*, primary school, prevalence

Introduction
Urogenital Schistosomiasis is generally a disease of public health importance. Its effects are more felt in the rural areas of the tropics where the population use natural fresh water or domestic water supply and agricultural production [1]. Urogenital schistosomiasis is caused by the digenetic trematode *Schistosoma haematobium* whose intermediate hosts are fresh water snails of the *Bulinus* species. These snails release the infective stage (cercariae) of the parasite into fresh water bodies where they penetrate into human skin during body contact with infested water [2]. It is also called Bilharzia, christened after the German pathologist, Theodore Bilharzia, who first identified the parasite in Egypt in 1851 [3].

This disease has been reported in 44 African countries [3] and it is endemic in Nigeria, with school children accounting for about 80% of the infected population [4]. The incidence of urogenital schistosomiasis in Nigeria has been firmly established in several areas. The infection is discontinuous, while the prevalence rates vary widely [5, 6]. High prevalence levels have been reported in communities close to Rift valley lake and lower River Basins in Ethiopia [7]. Fenwick [8] shows that the high level of water bodies contamination with human excrement (due to inadequate waste disposal facilities and rural habits) pose serious public health problems with regards to the transmission of schistosomiasis.

Transmission of schistosomiasis is linked with water development projects such as dams for irrigation systems and fish-farming [9, 10]. This disease is spread through contact with water in which snail habours [11, 12]. The intermediate hosts of the parasite and the human host form an association within which the parasite reproduces and is disseminated [13]. As a result of these there is low level of resistance and intensive water contact when playing and swimming. According to Nwele *et al.* [12] and Okpala *et al.* [14] children within age 10 and 15 years are the most heavily infected. Population increase help to spread the disease and it occurs mainly in peri-urban areas in endemic areas [15, 16].

This situation is particularly important since this socio-economic parameter differs greatly from place to place in response to variations in transmission dynamics. Okolie *et al.* [17] reported that in most parts of the world, mortality due to disease is about 0.44 per 100,000 persons. In post-mortem study in West Africa [1], observed *Schistosoma haematobium* had been the cause of death of 2.10% of the autopsies while in South America 10% of the patients with *Schistosoma mansoni* died of the disease within six years. The study was aimed at assessing the status of urogenital schistosomiasis among primary school pupil in Obowo Local Government Area.

Materials and Methods

Study area

The study was carried out in (3) three primary schools in Obowo Local Government Area of Imo State, South East, Nigeria. The geographical coordinates of the area is Latitude $5^{0}10^{1}$N-$5^{0}5^{1}$N and Longitude $6^{0}35^{1}$ E-$7^{0}28^{1}$ E. It has an area of 198 km^2 and the vegetation characteristics are tropical rain forest. It experiences a moderate rainfall, with an annual rainfall of 1500mm and average minimum temperature of 20 ˚C. It has two distinct seasons; wet and dry season. The major occupation of the people is farming which is done at subsistence level. Also they produce good quantity of vegetable, palm oil, kernel, broom (local ones) and baskets. Some of the people also embraced small scale trading and fishing. The major occupation of the people is farming, which is done at subsistence level. Some people also embrace small scale trading and fishing. The villages where the pupils reside have in common land crossed by many streams. In addition, each of the villages has at least one pond which serves as water for domestic use. These ponds are seasonal in the sense that in the area exist quarry pits filled with water, natural pools, road ditches, stagnant water pools, cassava farms

Ethical Clearance

Ethical clearance and permission was obtained from the Post Graduate Research Board of Zoology Department of Imo State University, Owerri, Nigeria. Consent was sought and obtained from the authorities of Obowo L.G.A, followed by mobilization of the school children through their Headmistress

Sample Collection/Microscopy

Midstream urine was collected from a total of 200 pupils randomly selected from 3 schools under study. The samples were collected in clean plastic container between the hours of 10.00 am and 12.00 pm. This timing was critical since the eggs were voided between 10.00 am and 12.00 pm. The plastic containers were properly labeled according to name, sex, age, school, laboratory number. The specimen was preserved using ice block to prevent the ova of *Schistosoma haematobium* from hatching during transportation to the laboratory. All the collected urine specimens were observed for visible haematuria (i.e. blood in urine), and then was transported to the laboratory for analysis within two hours of collection. Microscopic examination of the urine samples was performed at the Laboratory of Animal and Environmental Biology, Imo State University, Each urine sample was thoroughly mixed after which 10mls was centrifuged at 300 revolutions per minute (rpm) for 3 minutes. The supernatant was decanted, the deposited were examined under a light microscope using 10X and 40X objectives. Urine samples containing egg(s) of *Schistosoma haematobium* (terminal spine ova) and without eggs were recorded [18].

Analysis of data

Chi-square (x^2) analysis was used for the statistical testing of differences among schools, age classes.

Results

Out of 200 pupils examined, 32(16.0%) had *Schistosoma haematobium* ova in their urine. The overall prevalence showed that pupils from Umuariam Central School had the highest prevalence (21.05%) followed by Dikenodinma Central School pupils (20.20%) while Avutu Community School pupils had the least prevalence (9.76%). There was a significant variation between the schools (p<0.05) (Table 1). Sex related prevalence of urogenital schistosomiasis was shows that of the 200 pupils from the three schools, 107were male while 93 were female. Of the males, 21 (19.62%) had urogenital schistosomiasis while 11 (11.82%) females were infected (Table 2). Age related prevalence of urogenital schistosomiasis amongst the pupils shows that the highest prevalence (28.12%) was recorded amongst the 13-15 age groups, followed by 10-12 age groups with the prevalence (17.85%), while the least prevalence (8.92%) was recorded amongst the 7-9 (Table 3). Prevalence of urogenital schistosomiasis in relation topupils' parental occupation. The study showed that urogenital schistosomiasis is highly prevalence among pupils whose parents are farmers (24.64%). House wife (21.4), others (Drivers, traders etc.) (18.00%) and civil servant (16.00%) had the least prevalence (Table 4).

Table 1: Overall Prevalence of Urogenital Schistosomiasis

Schools	No Examined	No Infected%	Not Infected%
Dikenodinma Central Sch	70	20 (20.20)	79 (79.79)
Community Sch Avutu	70	8 (9.76)	74 (90.24)
Umuariam Central Sch	60	4 (21.05)	15 (78.94)
Total	200	32 (16.0)	168 (84)

Table 2: Prevalence of Urogenital Schistosomiasis in relation to sex

Sex	No Examined	No Infected%	Not Infected
Male	107	21 (19.62)	86 (80.37)
Female	93	11 (11.82)	82 (88.17)
Total	200	32 (16.0)	168 (84)

Table 3: Prevalence of Urogenital Schistosomiasis in relation to Age

Ages	No Examined	No Infected%	Not Infected%
4-6	28	3 (10.71)	25 (89.28)
7-9	56	5 (8.92)	51 (91.07)
10-12	84	15(17.85)	69 (82.14)
13-15	32	9 (28.12)	23 (71.87)

Table 4: Prevalence rate in relation to parental occupation

Occupation	No Examined	No Infected (%)	Not Infected (%)
Civil Servant	30	4 (13.33)	26 (86.66)
Farmer/Traders	69	14 (20.28)	55 (79.71)
Housewife	45	8 (17.77)	37 (82.22)
Artisans	56	6 (10.77)	50 (89.28)
Total	200	32 (16.00)	168 (84.00)

Discussion

The result of this investigation on the prevalence of Urogenital Schistosomiasis among primary school pupils in Obowo Local Government Area, of Imo State, South East of Nigeria, showed that the infection is endemic in this part of

Imo State. A prevalence rate of 16.0% was recorded, similar to reports of Anyanwu [19] in some foci of Obowo in Imo State. High prevalence rates have also been reported by other researchers such as Agi *et al.,* [20] who observed prevalence rate of 52.7%, 49.5% and 40% respectively in some foci. The difference in prevalence rates could therefore be attributed the differing areas of study. However, the degree of inter school disparity in infection is considerable. This disparity is attributable to variations in sex related prevalence of urogenital schistosomiasis infection which was also determined (Table 2). Both sexes seem to be equally susceptible. In this study, the prevalence of infection was higher among the male pupils (19.62%) than in female pupils (11.82%), however, no statistically significant difference in the prevalence of infection between both sexes. They near complete absence of a good pipe borne water and almost total dependence on infected water bodies might have contributed to the level of infection. Invariably, this may be an indication that both male and female pupils are equally exposed to infection through water contacts. The result of this study is consistent with Biu *et al.,* [21] and Ugbomako *et al*., [22].

Previous studies have also reported higher prevalence among male pupils than among their female counterparts [23-25]. The intensity of infection was also higher among male pupils; this is suggestive that male pupils carry a greater worm burden than the females. But the Bello *et al.,* [25] explains this by reporting that the marked difference in the infection rates among males and females for schistosomiasis is related to water contact behavioral pattern, this could be attributed to the fact male visited the dam more often and had along exposure through playing than their female counterparts who visited the dam to fetch water only. Anosike *et al.,* [26] observed similar trends in Muslim communities in Bauchi State. On the contrary Idris *et al.,* [27] and Anyanwu, [19] reported a sex related prevalence which was higher in females than in males. Chisulo *et al.,* [28] observed that the role of collecting water for domestic use and the part they play in agricultural production, make females more exposed to the infective sources. The high prevalence (28.12%) among the age group 13-15 years followed by (17.85%) of the 10-12 years age group. This is similar to the findings of Abdullahi *et al.,* [29] where age group 9-12 and 11-15 had the highest prevalence rate of 20% and50.0%. Subjects of this age group are very adventurous and were seen to engage activities which necessitate more contact with water, because they are more matured to engage in activities such as fishing, swimming and irrigation than those of the lower age. It also agrees with the finding of Darkul *et al.,* [30] who reported the highest prevalence 65.8% among the age group 10-14years in Lankaku –Namu district, Quan'an-Pan LGA Plateau State. Sarkinfada *et al*., [31] in his work had the highest prevalence rate of 57.4% in age group 10-14 in Danjarima community, Kumbotso LGA Kano State.

Parental occupation indicated that pupils whose parents are farmers/Tradsers had a higher prevalence rate (20.28%) followed by house wives (17.77%). Anosike *et al.,* [26] from their study in Ebonyi state Nigeria, stated that the high prevalence of infection among farmers could also be attributed to higher frequency of contact with infective agent. This occupational imperative such that most of them in this village spend long periods working in water logged areas. The additional washing of their bodies in the nearby streams and pools at a time corresponding to the period of peak cercarial emission by snail, Ezenwaka, [32] increases their risk of infection. Insignificant variation in this study area could be attributed to exposing their skin to water containing infective cercariae or by ingesting water that contains infective cercariae.

Conclusion

Based on the findings of this study, which showed that urogenital schistosomiasis is endemic in the study area and the infection depends on sex, age and parental occupation, it is hereby recommended that schistosomiasis control program in the state should be embarked upon to educate the populace on risk factors that predispose one to urogenital schistosomiasis, and the need for proper sewage disposal, the state government should provide toilet facilities at certain junctions in the area, schools and in the market found within the area, and also pipe borne water to rural areas to reduce the observed rate of infection with *Schistosoma haematobium* in the study area.

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