INCIDENCE OF SCHISTOSOMIASIS IN PRIMARY SCHOOL PUPILS WITH PARTICULAR REFERENCE TO *S. haematobium* IN MAIDUGURI

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ABSTRACT: The total of 744 urine samples were collected within three weeks in the month of September 2004 in sterile universal containers from pupils from 10 different primary schools in Maiduguri Metropolitan Council and were examined microscopically at the UMTH diagnostic Laboratory unit. The overall incidence of S. haematobium was 110(14.5%). 115(15.5%) had haematuria but had no schistosomiasis. The incidence of S. haematobium infections with negative haematuria (no blood in urine) was 21(2.8%). The Maimusari, Shehu Sanda 1 and Maiduguri primary Schools recorded the highest number of schistosomiasis incidences (table i and iii). Incidence according to age was 40(15.0%), higest within the group 12-15 years with total number 267 (table ii). Incidence according to sex was higher in the males (517) than females (227), which were 85 (16.4%) and 25 (11%) positive respectively, and gave a difference of 60 (5.4%). The result of this study agrees with the work of (Robert and Cirillo, 2002). The problems of lack of pure and portable water supply in schools and homes in Maiduguri, makes the Children at high risk of exposure to schistosomiasis and implications of this disease in the children affects socioeconomic development of the country (Nnoruka, 2000). [Researcher. 2010; 2(3):31-36]. (ISSN: 1553-9865).

Key words: incidence, Schistosomiasis, primary shool pupils, Maiduguri

INTRODUCTION

Schistosomiasis is one of the most common infectious diseases in the world and is caused by the schistosoma genus of fluke. The form of schistosomiasis affecting the urinary tract involves *Schistosoma haematobium*. The other forms; S. japonicum, S. mansoni and S. mekongi affect the gastrointestinal tract. Schistosomiasis usually occurs in individuals younger than 30 years, affecting males more than females. The most serious complication of urinary schistosomiasis is the incidence of squamous cells carcinoma of the urinary bladder. Additional complications include urolithiasis, ascending urinary tract infections, urethral and ureteral stricture with subsequent hydronephrosis and renal failure. (Amy, 2002). Schistosomiasis is common worldwide, causing 56% of known cases of calcifications in the bladder known as bladder stone. The disease affects more than 200 million people worldwide 8% of the word population) and as many as 500-600 million people have been exposed to schistosomiasis of all kinds, with the disease more

common in Africa, Asia and South America (Robert Cirillo, 2002)

METHODS

SAMPLE COLLECTION AND HANDLING (URINE)

A letter of introduction was given to the headmasters of the primary schools involved in order to permit collection of urine samples from their pupils. The permissions were granted and pupils were randomly selected with regards to age and sex without bias. Clean and sterile universal urine containers were given to each of these pupils to collect samples of urine batch by batch, and about 15-20mls for the investigation at midday. The essential data of the pupils such as age, sex and name of the school, sample number and time of collection were noted on the containers and laboratory request form with the same information given was accompanied to the laboratory for the investigation not later than two hours as done by Harrisons *et al*, 1987).

The following precautions were taken during collection of samples:

1. The sample numbers serially were carefully recorded to correspond with their names to avoid mixing up the groups.
2. The samples were carefully placed to avoid breakage.
3. All children involved were strictly advised to wash their hands before going back to their classrooms.
4. Urine samples were prevented from faecal contamination and other source of contamination.
5. Urine samples were processed within two hours of its collection.
6. Preservatives were added to the samples, e.g. normal saline to preserve the normal physiology of the eggs/ova.
7. Samples were transported to the laboratory in suitable containers to avoid breakage and leakage of urine.

PARASITOLOGICAL DIAGNOSIS

Urine samples can be examined qualitatively after centrifuging. Eggs are not shed at a steady rate during thy day and quantitative egg counts are useful for determining the degree of infestation and response to therapy. Therefore, 24 hours urine collection may be recommended for microscopy (Amy, 2002).

An increased number of eggs is excreted around midday and microscopic examination of a centrifuged urine specimen collected at this time usually reveals ova in light infections, examination of increased quantities of urine is sometimes required (Harrisons *et al*, 1987).

Schistosoma haematobium eggs are commonly found in the urine of infected individuals when examined microscopically after the centrifugation within 2-4 minutes at 2000 rpm and then the sediments are examined under 10X and 40X objectives of the light Microscope (Gradwohls, 1980).

DETAILS OF THE PROCEDURE EMPLOYED

Due to lack of materials in the study area, the following methods were employed for the study as done by (Gradwohls, 1980 and Harrisons, 1987).

MICROSCOPIC EXAMMINATION OF THE URINE DEPOSITES

During the investigation in the Laboratory, the following steps were followed:

1. Centrifugation of the sample- the centrifuge tubes were labeled well with the sample numbers and to each, an equal volume of urine samples were transferred into it and well balanced. The tubes were placed in the centrifuge buckets and the centrifuge lid was firmly closed. The centrifugation and timing were set to ten thousand revolutions per minute (10,000 rpm) for five minutes.
2. Microscopic Examination- after the centrifugation, the tubes was removed from the centrifuge machine and the supernatants were discarded, leaving only the deposits at the

bottom of the tubes. Unto a clean grease-free slide, a drop of the detached deposit was dropped and covered with a cover slip gently without the formation of air bubbles. The slide was then mounted on the microscope stage and examined with X10 and X40 objective lenses. The preparation was then magnified and viewed for the presence of *S. haematobium* ova. All the findings were recorded carefully.

DETECTION OF HAEMATURIA BY URINALYSIS

During the Laboratory investigation, the following steps were followed as done by (Nnoruka, 2000 and Lynne and David, 1993).

Urinalysis was done with reagent strip meditest combi-9 manufactured by Machery-Nagel. The manufacture's test instructions were strictly followed to detect haematuria and proteinuria in the urine sample.

1. The strip was gently removed from its container and there was a directional arrow marked on the strip.
2. The strip was dipped into the urine sample and allowed to get wet.
3. The strip was read by comparing with the standard on the back of the container within 2 minutes and was reported.

IDENTIFICATION OF OVA AND ADULT WORM

The adult worm's surface is a tegument containing syncytium of cells. The male worm's body, which is flattened behind the ventral sucker, looks cylindrical as it curves to form the gynaecophoral canal to clasp the female worm. The female worm is long, slender and cylindrical in cross-section. Male worms possess the oral sucker and ventral sucker. Male and female worms are mostly seen attached. The ova are seen as golden yellowish, elliptical and with terminal spine (Lynne and David, 1993)

RESULTS AND OBSERVATIONS

The results of this investigation have shown that out of 744, the total number of population of pupils examined from ten (10) primary schools in Maiduguri Metropolis, the overall number of infection incidence of urinary schistosomiasis/haematuria was 110(14.8%) and positive *S. haematobium* was 115(15.55) respectively.

Table I (a) shows the incidence of *Schistosoma haematobium* and haematuria in urine samples of the pupils. The incidence of *S. haematobium*/haematuria was recoeded higher in Shehu sanda primary school (1), with the total population of 70 and 15 (20%) followed by Ngomari Primary school (2) with the total population of 63 and 10(15.9%) respectively. The incidence of haematuria alone with no schistosoma was recorded higher in Kings private school, and shehu sanda 1 primary school and Ngomari primary school (2) and maduganari primary school, followed by Maimusari primary school with the total population of 60, 70, 63, 75 and 105 and positive haematuria of 16(26.7%) 15(21.4%), and 13(20.6%), and 15(20%), and 20(19%) respectively.

Table I (b) shows the incidence of *S. haematobium* infections with negative haematuria (no blood in urine), in Ngomari primary school (1), Shehu Sanda primary school (1), and Shehu Sanda primary school (2) with the total population of 50, 70 and 100, which gives the incidence of 5(10.0%), 5(7.1%), and 7(7.0%) respectively.

Table ii shows incidence of urinary schistosomiasis according to age groups. Number percentage (%) of incidence of *S. haematobium* was higher among age group 12-15 years, with the total population of 267 examined and 40(15%) positives, when compared to the age group of 4-7 and 8-11 years; with total population of 198 and 279, and 29(14.6%) and 41(14.7%) positive respectively. The difference though, was not statistically significant ($p>0.05$).

Table iii shows the distribution of the incidence of urinary schistosomiasis among primary school pupils according to sexes. The total male

population, 517, recorded the higher incidence of 25(11.0%) respectively which gives a difference of 60(5%), which was statistically significant ($p<0.05$).

TABLE 1 (a): INCIDENCE OF *S. haematobium* AND HAEMATURIA IN PUPILS ACCORDING TO SCHOOLS IN THE STUDY AREA.

S/NO	NAMES OF PRIMARY SCHOOL	NO. OF PUPILS EXAMINED	NO. OF PUPILS WITH HAEMATURIA	NO.OF PUPILS WITH HAEMATURIA AND *S. haematobium*
1	Maimusari primary school	105	20(19%)	15(14.3%)
2	Kings private school.	60	16(26.7%)	3(5.0%)
3	Shehu sanda 1 primary school.	70	15(21.4%)	15(21.4%)
4	Shehu sanda 2 primary school.	100	10(10%)	10(10%)
5	Godiya model primary school.	80	5(6.3%)	3(3.8%)
6	High Learning primary school.	86	5(5.8%)	5(5.8%)
7	Ngomari 1 primary school.	50	7(14%)	7(14%)
8	Ngomar 2 primary school.	63	13(20.6%)	10(15.9%)
9	Maduganari primary school	75	15(21%)	15(20%)
10	Every Day care primary school	55	9(16.4%)	6(10.9%)
	TOTAL	744	115(15.5%)	89(12.0%)

TABLE 1 (b): INCIDENCE OF URINARY SCHISTOSOMIASIS IN NEGATIVE HAEMATURIA ACCORDING TO SCHOOLS IN THE STUDY AREA.

S/NO	NAMES OF PRIMARY SCHOOLS	NO. OF PUPILS EXAMINED	NO. OF PUPILS WITHOUT HAEMATURIA	NO. OF PUPILS WITH *S. haematobium* WITHOUT HAEMATURIA
1	Maimusari primary school	105	85(81.0%)	0(0.0%)
2	Kings private school.	60	44(73.3%)	0(0.0%)
3	Shehu sanda 1 primary school.	70	55(78.6%)	5(7.1%)
4	Shehu sanda 2 primary school.	100	90(90.0%)	7(7.0%)
5	Godiya model primary school.	80	75(93.7%)	0(0.0%)
6	High Learning primary school.	86	81(94.2%)	3(3.5%)
7	Ngomari 1 primary school.	50	43(86.0%)	5(10.0%)
8	Ngomar 2 primary school.	63	50(79.4%)	0(0.0%)
9	Maduganari primary school	75	60(80.0%)	1(1.4%)
10	Every Day care primary school	55	46(83.6%)	0(0.0%)
	TOTAL	744	629(84.5%)	21(2.8%)

TABLE 2: INCIDENCE OF URINARY SCHISTOSOMIASIS ACCORDING TO AGE AMONG THE PRIMARY SCHOOL PUPILS

AGE GROUP	NO OF PUPILS EXAMINED	POSITIVE FOR *S. haematobium*
4-7 YEARS	198	29(14.6%)
8-11 YEARS	279	41(14.7%)
12-15 YEARS	267	40(15.0%)
TOTAL	744	110(14.8%)

TABLE 3: DISTRIBUTION OF THE INCIDENCE OF URINARY SCHISTOSOMIASIS AMONG PRIMARY SCHOOL PUPILS ACCORDING TO SEX.

		NO. OF PUPILS EXAMINED		POSITIVE FOR *S. haematobium*	
S/NO	NAMES OF PRIMARY SCHOOLS	MALE	FEMALE	MALE	FEMALE
1	Maimusari primary school	70	35	13(18.6%)	2(5.7%)
2	Kings private school.	43	17	3(7.0%)	0(0.0%)
3	Shehu sanda 1 primary school.	48	22	16(33.3%)	4(18.2%)
4	Shehu sanda 2 primary school.	80	20	13(16.0%)	4(20.0%)
5	Godiya model primary school.	62	18	2(3.2%)	1(5.6%)
6	High Learning primary school.	71	15	5(7.0%)	3(20.0%)
7	Ngomari 1 primary school.	31	19	8(25.8%)	4(21.1%)
8	Ngomar 2 primary school.	36	27	9(25.0%)	1(3.7%)
9	Maduganari primary school	45	30	11(24.4%)	5(16.7%)
10	Every Day care primary school	31	24	5(16.1%)	1(4.2%)
	TOTAL	517	227	85(16.4%)	25(11.0%)

DISCUSSION AND CONCLUSION

The result of this study have shown the overall incidence of *S. haematobium*, out of the total number of 744 pupil studied, was 110 (14.5%), and total number of pupil tested positive haematuria with no schistosomiasis was 115 (15.5%). Also the incidence of *S. haematobium* infection in pupils with negative haematuria gave 21 (2.8%). The incidence was higher in Maimusari primary School, Shehu Sanda primary school 1 and Maduganari primary school (table I and iii). The incidence according to age was higher in age group 12-14 years, with 40 (15.0%) and total number of pupils, 267 (table ii). Also the overall incidence according to sex was higher in males (517) than females (227), which were 85 (16.4%) and 25 (11.0%) respectively. This give a difference of 60 (5.4%). The incidence was higher in Shehu sanda primary school 1 for males with 16 (33.3%) and Ngomari primary school for females with 4 (21.1%). The prevalence of schistosomiasis word wide is estimated to be > 200 million and annual numbers of death ranged from 500,000 to 1 million in Africa, Lebanon, Syria, Iran, The Arabian Peninsula and Malaysia; where it causes urinary schistosomiasis (Patrick *et al*, 1995).

Schistosomiasis affecting the urinary tract is found in the United State; only 400,000 cases were identified in 1995 (Robert and Cirillo, 2002).

The prevalence of urinary schistosomiasis among school children was investigated in a Cross-sectional study. The estimated total prevalence based on microscopic examination of singleurine sample was 47.6%, this was done in Kigogo, Tanzania. Compared with the females, males recorded 54.6% to 40.8% and had in general, higher infection rates. Also, the children aged 10-14 years had higher prevalence and intensities of infection than those in other age groups studied (Taylor and Francis, 2001).

The prevalence of schistosomiasis in Edo State Nigeria which covers all the local government areas in the state. Out of a total of 1517 (22.9%) consisting of 899 (59.3%) male and 618 (40.7%) female, showed infection due to S. haematobium. The prevalence occurred in age group 6-15 years with infection rates ranging between 36.9% and 39.9%. This subsequently decreases with increasing age except in age group 36-40 years (Ugbomoiko, 2000).

The urinary schistosomiasis in May-Belwa local government of Adamawa State, Nigeria, shows that pupils in the age group 11-13 years had the highest

prevalence rate (45.9%) followed by 14-16 years age group (37.5%), than those in age group 8-10 years (23%) and the least prevalence was found in 5-7 years age group (9%) (Dunch and Bristone, 2000). The prevalence of *S. haematobium* in Imo state of Nigeria shows that number of positive cases was higher among females than males in the ratio 108:100 (Nnoruka, 2000).

However, most infected experience few, if any, signs and symptoms and only a small majority develop significant disease (Harrisons *et al*, 1987). Urinary schistosomiasis caused by *S. haematobium* affect 54 countries in Africa and the Eastern Mediterranean. According to W.H.O., global distribution of schistosomiasis has changed in recent years. It has been eradicated from Japan and the Lesser Antilles Island, transmission has been stopped in Tunisia and transmission is very slow in Morocco, Saudi Arabia, Venezuela and Puerto Rico (Palaneandy, 2002). The study group comprises 48 children cured of infection by using prazinquantel, and 117 previously uninfected children in age range of 13-15 years in Edo state of Nigeria (Ugbomoiko, 2000). However, this study agrees with the results of the authors stated above, but infections recorded among age 12-15 years in this study disagrees with the work of Nnoruka, (2000), who reported incidence in Mayo-Belwa local government in Adamawa state, Nigeria with highest prevalence rate (45.9%) in age group 11-13 years.

The problems of lack of portable water supply in schools and homes in Maiduguri puts the children at high risk of exposure to schistosomiasis and the implications of these disease on life,(social, moral and academic reasoning and efficiency of learning in school) in the children as it affects socio-economic development of the country.

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Date of submission 20/03/2010