

SCHISTOSOMA HAEMATOBIIUM: PREVALENCE AND SOCIO-ECONOMIC FACTORS AMONG STUDENTS IN CAPE COAST GHANA.

OKANLA E.O *, AGBA B.N. AND AWOTUNDE J.O

Department of Biological Sciences, University of Ilorin, Ilorin Nigeria

Prevalence of Schistosoma haematobium infections was assessed among 160 students of Twohofo Holy International School, Cape Coast, Ghana. Overall prevalence was 34.4%, with males and females having prevalence of 32.3% and 35.8% respectively. Age group 6-8 years had 30% while 24.2% were infected in age group 9-11 years. Prevalence was 48% in age group 12-14 years and 50% in age group 15-17 years. Parental occupation had effect on prevalence with children of self employed parents showing significantly higher prevalence than children of salaried employees of government and private companies. Knowledge of the disease was very low among the subjects.

Keywords: Schistosoma haematobium, prevalence, Cape coast, Ghana, students

INTRODUCTION

Schistosomiasis is a disease caused by blood flukes of the family Shistosomatidae. They infect different vertebrates, but three of them in particular cause disease in man. These are *Schistosoma mansoni*, *S. Japonicum* and *S. haematobium* (Adams and Maegraith, 1976). The first two are found in the veins of the large intestine and small intestine respectively while *haematobium* is found in the veins of the bladder. Among other places, *S. haematobium* is found widespread in Africa. Many factors influence the epidemiology of schistosomiasis. Edungbola (1980) reported the relationship between water utilization and schistosomiasis, while Okanla (1991), reported that parental occupation may be a factor in contracting schistosomiasis.

Surveillance for schistosomiasis is very important in establishing endemicity and in the planning of control operations. Many areas of the world are yet unsampled while some have been sampled without making definite data available on the socio-economic factors that have influence on prevalence in such localities. This study was designed to look at a number of parameters including socio-economic contributors to the prevalence of *S. haematobium* infections among the students of

Twohofo Holy International School in Cape Coast, Ghana.

MATERIALS AND METHODS

Study area:

Akotokyir is in the Cape Coast district of the Central Region, Ghana. It is located between latitude 5°30' N and longitude 10 15' and 10 13' W of the Greenwich Meridian. It lies 2.2 km from University of Cape Coast. The vegetation is mainly Savannah. The Kakum river flows through the area. This attracts activities such as bathing, swimming, laundry and other activities. Information obtained from the Regional Health office indicated that urinary schistosomiasis is prevalent in the area, but useful data were not available.

Pre-sampling formalities

A total of 160 pupils comprising 68 males and 92 females were involved in the study. They included students in Basic I to Basic 6 (i.e. Primary I to Primary 6) of the Basic Educational System as it is known in Ghana. Weeks before sampling started, a letter was sent to the Head teacher of the School to give him an idea of what the study was about and to seek his cooperation. Students were given letters of consent to be signed by their parents as only those who obtained

parental consent were included in the study. On the day before the sampling further notification was made to the Head teacher.

On the day of sampling, the Head teacher had got the students ready and a brief explanation was made to the students to let them know what schistosomiasis is and to instruct them on how to obtain the samples correctly.

Collection of samples.

All samples were collected between 12.00 noon and 2.00 p.m. (Mahmoud, 1987). Urine samples were collected in graduated plastic bottles, Subjects were told to empty their bladder completely into the bottle and put on the lid tight. As the students arrived one by one each was given a serial number. This was immediately pasted on the corresponding sample also.

Collection of other data.

The weight in kilograms and height in centimetres was obtained for each subject. Information on age, parental occupation and residence history (i.e. whether subject lived in Akotokyir or elsewhere) were also obtained. Further information was obtained on whether subjects had any knowledge of the disease, and on the subject's history of water contact.

Examination of urine samples for eggs of *S. haematobium*

The method of Okanla (1991) was used. All samples were taken to the laboratory immediately and the total volume of urine passed by each subject was recorded. Samples were allowed to settle for 30

mins. The urine in each sample was drawn off with an aspirator leaving the last 10 ml. In the bottle. The content of each bottle was shaken to suspend the sediment and was emptied into a 20 ml. centrifuge tube. The serial number for each sample was carefully transferred so as not to get the samples mixed up. The tubes were centrifuged at 1000 rpm for 5 mm. The top 9 ml. was aspirated off. The sediment was re-suspended in the remaining 1 ml. A Pasteur pipette, which was calibrated to discharge 1 ml. in 20 drops, was used to release 1 drop of the sample unto a microscope slide. A cover slip was placed on it and all haematobium eggs present were counted under the 10x objective of a light microscope. The number of eggs counted in 1 drop was multiplied by 20 to obtain the number in 1 ml., which is also the total eggs passed in the total volume of urine originally obtained. The number in 10 ml. of urine was then calculated. This is important for determination of epidemiological implications.

RESULTS

A total of 160 subjects (68 males and 92 females) were examined. *S. haematobium* was found in males and females alike. A total of 22 males and 33 females were positive. This gave prevalence of 32.3% for the males and 35.8% for the females. Overall prevalence was 34.4% (Table 1).

Prevalence by age showed increase in *S. haematobium* infection with age except in age group 9-11 years which showed a decrease (Table 2).

Table 1.
Prevalence of urinary schistosomiasis among pupils of Twohofo Holy International School.

CLASS	MALES		FEMALES		TOTAL	
	Number Examined	Number (%) Infected	Number Examined	Number (%) Infected	Total No Examined	Total No (%) Infected
BASIC 1	12	7(58.3)*	19	5 (26.3)*	31	12 (38.7)**
BASIC 2	11	3(27.2)*	17	10 (58.8)*	28	13 (46.4)**
BASIC 3	12	1(8.3)*	10	2(20.0)*	22	3(13.6)**
BASIC 4	16	4(25.0)*	16	3(18.7)*	32	7(21.8)**
BASIC 5	12	3(25.0)*	17	7(41.2)*	29	10(34.4)**
BASIC 6	5	4(80.0)*	13	6(46.1)*	18	10(55.5)**
TOTAL	68	22	92	33(35.8)*	160	55(34.4)**

* Percentage of students that were infected; ** Total percentage of infected students.

Table 2.
Prevalence of *S. haematobium* infection by age.

Age Group (Yrs)	Total Examined	Number Infected	% Infected
6-8	40	12	30.0
9-11	62	15	24.2
12-14	56	27	48.2
15-17	2	1	50.0
TOTAL	160	55	34.4

Table 3: Prevalence of *S. haematobium* infection by paternal occupation

	*Blue/White Collar	Other Jobs	Total
NO EXAMINED	89	71	160
MALES	45	35	80
INFECTED FEMALES	5(11.1%)	17(48.6%)	22
INFECTED	44	36	80
INFECTED	15 (34.0%)	18 (50.0%)	33
TOTAL INFECTED	20(22.4%)	35(49.3%)	55(34.4%)

*Upper class/Lower class salaried employees of Government and the private sector.

Table 4: Prevalence of *S. haematobium* infection by maternal occupation

	*Blue/White Collar	Other Jobs	Total
NO EXAMINED	82	78	160
MALES	32	36	68
INFECTED FEMALES	7 (21.8%)	15(41.7%)	22
INFECTED	50	42	92
INFECTED	15 (34.0%)	18 (50.0%)	33
TOTAL INFECTED	20(24.3%)	35(44.8%)	55(34.4%)

*Upper class/Lower class salaried employees of Government and the private sector.

Age group 6-8 years had a prevalence of 30.0%, while age group 9-11 years had 24.2%. Age group 12-14 years had 48.2%. Only 2 subjects were sampled in age group 15-17 years. One of them was infected giving a prevalence of 50.0%.

Prevalence by paternal occupation is presented in table 3. Among those

whose fathers have white collar/blue collar jobs, 11.1% of the males and 34.0% of the females were infected while in the other jobs group 48.6% of the males and 50.0% of the females were infected. Also, prevalence by maternal occupation has 21.8% of the males and 26.0% of the females infected in the white collar/blue collar group while 41.7% of the males and 47.6% of the females were infected in the other jobs group (Table 4)

Table 5 shows prevalence by residency. Among the 146 subjects who lived in the study area, 51 (were infected while only 4 out of 14 subjects who lived outside of the study area Akotokyir were infected. About 66% of those who were infected had egg output of 50 eggs or more/10ml. of urine. One female had an output of 180 eggs/10ml. of urine.

The relationship between water contact habits of males and females to prevalence showed that among male students 41.2% engaged in swimming activities whereas only 29.3% of females were involved. Also 36.7% of the males and 32.6% of the females actually bathed in the Kakum river. Other activities in the water like washing of dishes and clothes attracted 22.0% and 38.0% of males and females respectively.

Knowledge of the disease was very little, with about 61.2% having no idea of what causes the disease, while 12.5% thought that it was caused by contact with a body of water. Some 15.6% believed that it was caused by drinking of dirty water.

There was no relationship between prevalence and weight to height ratio. Also there was no relationship between sex and prevalence. Relationships however existed between the paternal occupational groups and between the maternal occupational groups using the Chi square test.

For paternal occupational groups,

$$\text{Calculated } \chi^2 = 12.595$$

$$\text{Tabulated } \chi^2 = 3.841$$

For maternal occupational groups,

$$\text{Calculated } \chi^2 = 7.429$$

$$\text{Tabulated } \chi^2 = 3.841$$

Thus we accept alternative hypotheses in both cases.

DISCUSSION

Before the onset of this study information was obtained from the Regional Health Office that *S. haematobium* was prevalent in this area, but recent published data were not available to cover the information obtained in this study. This study has indicated a prevalence of 34.4% among the students of Twohofo Holy International School. This is high. Parental occupation has influence on prevalence, with children of salaried workers exhibiting less prevalence than children of those who do other jobs. This observation agrees with the results obtained by Okanla (1991), in Ilorin, Nigeria. The relationship between schistosomiasis and occupation has long been known (Edungbola, 1980; Fenwick and Jorgensen, 1972). Also contact with water for recreational or other activities has also been associated with infections with schistosomes. (Fenwick and Jorgensen, 1972).

This study utilized the centrifugal sedimentation method to finally determine the number of eggs in 10 ml. of urine (Okanla 1991). This method is very sensitive since it utilizes the total urine passed by the subject. It is however not as fast as the membrane filtration technique which uses a nylon mesh to filter a sample of 10 ml. drawn from the total urine passed by each subject. The membrane method is therefore more frequently used for epidemiological purposes. This study was intended to look at overall prevalence as well as determine the epidemiological significance of the disease. The sedimentation method was therefore preferred.

Single urine samples only were examined in this study, although multiple examinations may reveal slightly higher prevalence. Two thirds of the infected subjects passed more than 50 eggs per 10 ml. of urine, which is considered to be epidemiologically significant. One girl passed 180 eggs/10ml urine. This was very high. *S. haematobium* infections may cause discomfort, but rarely lead to death. However, when intensity of infection is so high mortality may

eventually result (Mahmoud, 1987). Significant difference did not exist in the nutritional status of infected and uninfected subjects. This agreed with the findings of others (Hiatt et al, 1977; Lehman et al. 1976; Hiatt 1976; Cook et al. 1974; Okanla 1991). This study also showed that most of the subjects had no idea of the cause of the disease. Good education is therefore needed in order to increase the general awareness of people in the community.

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