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Prevalence of Schistosoma Haematobium among Population Aged 1- 25 Years Attending Rasheed Shekoni Specialist Hospital, Dutse, Jigawa State-Nigeria

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Abstract: *A study on the prevalence of urinary Schistosoma was carried out among patients attending Rasheed Shakoni Specialist Hospital, Dutse, Jigawa State, Nigeria. A total of 120 urine samples were collected and examined in the microbiology laboratory of Federal University Dutse, Jigawa State to determine the prevalence of Schistosoma infections. The collected samples were subjected to physical and chemical analyses; samples were centrifuged and microscopic analysis was carried out on the sediment. The result of physical analysis carried out in the urine sample shows that the age group 16-20 and 21-25 has the highest number of positive cases as compared to other age groups each with 5(4.7%) positive samples. Chemical analysis carried out on the urine samples showed that the age group 21-25 years had the largest number of positive cases with 14(11.7%) positive samples as compared to other age groups. Results of the microscopic examination of the urine samples showed the age group of 11-15 years had the highest number of positive cases. Males were more infected than the females with 3.3% and 1.7% positive cases respectively. The infection rate varied according to age groups where 11-15 years age group had higher infection rate of 2.5%, followed by 16-20 and 21-25 years age groups with 1.7% and 0.8% respectively. From the results of this study, it was concluded that Schistosoma haematobium was less prevalent in the study area.*

Keywords: *Prevalence, Schistosoma haematobium, Infection rate, Microscopy.*

I. Introduction

A genus of trematodes, *Schistosoma*, commonly known as the blood flukes, is parasitic flatworms responsible for a highly significant group of infection in humans termed schistosomiasis, bilharziasis or snail fever. Schistosomiasis is a serious human disease in endemic regions of Asia, Africa, and South America (Herbert, 2012). Schistosomiasis is considered by the world health organization as the second most socioeconomically devastating parasitic disease, (after malaria), with hundreds of millions infected worldwide (WHO, 2011). It is estimated that close to 200 million people are infected worldwide, mainly in Africa. It is one of the major public health problems facing developing countries (Schmitt, 2006). The adult worms of the parasite are normally found in the various places around the urinary bladder, the released eggs travel to the wall of the bladder, the bladder becomes calcified, and there is increased pressure on ureters and kidney a condition known as hydronephhrosis (Brown, 1997). There are many species of animal Schistosomes, but five species primarily infect humans and cause schistosomiasis: *Schistosoma haematobium, S. mansoni, S. intercalatum, S. japonicum* and *S. Makongi* (WHO, 2015) with each causing a different clinical presentation of the disease.

Schistosoma haematobium responsible for urinary schistosomiasis is the most prevalent and widespread species in Africa and Middle East. Nigeria is the most endemic country in the world for urinary schistosomiasis with an estimated 101.28 million people being at risk and 25.83 million infected. The disease is normally endemic in rice and sugar cane producing areas as well as fishing communities and others (Okechukwu, 2012). It affects people of all age groups with school children most likely to become infected with this silent destructive disease because it is easily contracted while bathing or swimming in water contaminated with the parasite which is shed from snails and infects by penetrating human skin (Herbert, 2012). Chronic infection can cause substantial morbidity and long term complication as the eggs become trapped in human tissues causing inflammation and fibrosis (Okoronkwo *et al*., 2012). *S. haematobium* is probably endemic in the Northern region, and some areas are marked particularly by heavy infection rates, which include Katsina, Kano, Zaria, Kaduna, Birnin Kebbi and Argungu while Eastern region has low prevalence of the disease. The present study was thus aimed at assessing the prevalence of *Schistosoma haematobium* among population attending Rasheed Shekoni Specialist Hospital, Dutse, Jigawa State, Nigeria.

II. Materials And Methods

Study Area

The present study was conducted at Rasheed Shekoni Specialist Hospital was built by former Military Administrator of Jigawa State, Colonel Rasheed Shekoni (1996-1998). The hospital is situated at Danmasara in Dutse local government area of Jigawa State, Nigeria.

Sample Collection

A group information session was organized for the patients to get their consent after which ten milliliters (10ml) of early-morning mid-stream catch urine sample from the patients (aged 1–25 years) was aseptically collected using a labelled, sterile, wide mouthed, screw-capped plastic urine containers. Sex, age, and other information to identify each patient were recorded as described by Dazo and Bile (1974). One hundred and twenty samples from different patients attending the hospital were collected and the patients were instructed on how to collect their urine sample aseptically. The collected sample was transported to microbiology laboratory of Federal University Dutse for determining the presence of *S. haematobium* ova.

Sample Processing

Physical Observation

The collected urine samples were both subjected to visual examination carefully to check for any change in colour from that of a normal urine sample collected from a healthy individual which may help in detecting either Macro or micro haematuria in the patient from which the sample was collected.

Chemical Analysis

Collected urine samples were subjected to chemical analysis using a combi-9 test strips to detect what otherwise cannot be detected by visual examination. The test strip chemical analysis is based on the principle of colour change on the test strip from yellow to green brought about by the presence of blood in the urine samples. In the test, the test strip was carefully dipped into each of the urine sample collected, withdrawn immediately and observed for a colour change after 1 minute.

Centrifugation

Urine samples were shaken gently and poured into a clean centrifuge tubes, loaded into the centrifuge till they are perfectly balanced and then centrifuged at 3,000 revolutions per minute (rev/min) for five minutes. The centrifuge was turned off and allowed to stop completely on its own after which the centrifuge tubes were carefully removed. The supernatants were carefully decanted leaving the sediment undisturbed.

Microscopic Analysis

The centrifuge tube was then tapped gently at the bottom to make the sediment more homogenous and then few drops of it was placed onto grease-free glass slide with the aid of a pipette, covered with a cover slip and then examined using X10 and X40 objectives as described by Dazo and Biles (1974).

III. Results

The results of physical analysis carried out in the urine sample showed that the age groups 16-20 and 21-25 years had the highest number of positive cases as compared to other age groups each with 5(4.7%) positive samples. These were followed by age groups 11-15 and 6-10 years each with 4(3.3%) positive cases. However, age group 1-5 years recorded 2(1.7%) positive samples (Table 1). From the results obtained, a total of 20(16.7%) positive cases out of the total 120 urine sample collected was recorded (Table 4)

Table 1: Physical Characteristics of the Urine Samples

Age group (Years)	Positive Samples (%)	Negative Samples (%)	Total(%)
1-5	2 (1.7)	22 (18.3)	24 (20.0)
6-10	4 (3.3)	20 (16.7)	24 (20.0)
11-15	4 (3.3)	20(16.7)	24 (20.0)
16-20	5 (4.2)	19 (15.8)	24 (20.0)
21-25	5 (4.2)	19 (15.8)	24 (20.0)
Total	**20 (16.7)**	**100 (83.3)**	**120 (100)**

The results of chemical analysis carried out on the urine samples showed that the age group of 21-25 years had the highest number of positive cases as compared with other age groups. A total of 9(7.5%) positive samples were recorded from age groups of 1-5, 6-10 and 10-15 years each (Table 2). From the results obtained, a total of 52(43.3%) positive cases out of the total 120 urine sample collected was recorded (Table 4).

Table 2: Chemical Characteristics of the Urine Samples

Age group (Years)	Positive Samples (%)	Negative Samples (%)	Total (%)
1-5	9 (7.5)	15 (12.5)	24 (20.0)
6-10	9 (7.5)	15 (12.5)	24 (20.0)
11-15	9 (7.5)	15 (12.5)	24 (20.0)
16-20	11(9.2)	13 (10.8)	24 (20.0)
21-25	14 (11.7)	10 (8.3)	24 (20.0)
Total	**52 (43.3)**	**68 (56.7)**	**120 (100)**

The results of the microscopic analysis carried out on the urine samples showed that the age group 11-15 years had the highest number of positive cases as compared to other age groups (Table 3). From the results obtained, a total of 6(5.0%) positive cases out of the total 120 urine sample was recorded (Table 4). Males were more infected with 4(3.3%) positive samples out of 70(58.33%) samples while the females recorded 2(1.7%) out of 50(41.7%) samples (Table 5). Statistical analysis of the results showed no significant difference in the prevalence of *S. haematobium* infection between the males and the females.

Table 3: Microscopic Characteristics of the Urine Samples

Age group (Years)	Positive Samples (%)	Negative Samples (%)	Total (%)
1-5	0 (0.0)	24 (20.0)	24 (20.0)
6-10	0 (0.0)	24 (20.0)	24 (20.0)
11-15	3 (2.5)	21 (17.5)	24 (20.0)
16-20	2 (1.7)	22 (18.3)	24 (20.0)
21-25	1 (0.8)	23 (19.2)	24 (20.0)
Total	**6 (5.0)**	**114 (95.0)**	**120 (100)**

Table 4: Overall Occurrence of Positive Urine Samples

Parameter	No. Positive (%)		Total	Percentage Occurrence
	Males	Females		
Physical	14 (11.7)	6 (5.0)	20.0	16.7
Chemical	29 (24.2)	23 (19.2)	52.0	43.3
Microscopy	4 (3.3)	2 (1.7)	6.0	5.0
Total	**47(39.2)**	**31 (25.8)**	**79**	**65.8**

IV. Discussion

Different prevalence rates for the urinary schistosomiasis using physical, chemical and microscopic (sedimentation) methods were observed in this study (i.e., 16.7%, 43.3% and 5.0% respectively). According to the classification of the WHO (1985), prevalence rates greater than 25.0% are moderate while those below are low. The visual observation for haematuria and the chemical method gave different results. The physical observation for haematuria revealed a prevalence of 16.7%while the chemical analysis gave prevalence of 43.3%. According to Mafe (2009), chemical and physical methods are very suitable for mass screening of urinary schistosomiasis being very fast, producing immediate results and can be used to detect all infected persons who are at risk of urinogenital disease not only schistosomiasis and thus are quite useful in epidemiological studies. The age groups of 21-25 and 16-20 years had the highest prevalence of haematuria each with 4.2%; the age group 20-25 years had the highest prevalence based on chemical analysis (11.7%). Mafe (2009) also shows that the two tests are influenced by different factors not only urinary schistosomiasis. Moral (2015) reported that many things affected urine colour, including fluid balance, diet, medicines and different diseases apart from *S. haematobium*. Urine is normally clear, but bacteria, blood, crystal, mucus, sperm and others can make urine look red or cloudy in colour (Mordi, 2007).

On the other hand, the presence of schistosome eggs in the urine samples after centrifugation and sedimentation revealed only 5.0% of positive cases. This could be due to presence of light infections if any where eggs may be very difficult to detect as pointed out by Garcia and Bruckner (2013). This is an indication however that the preventive measures are achieving good result. High prevalence among the age groups 11-15 years could probably be attributed to the reason of Ugbomoko *et al.* (2007) that children in this age group are more adventurous and are therefore more likely to have regular contact with water bodies followed by age groups 16-20 and 21-25 with the prevalence of 2(1.7%) and 1(0.8%) respectively. Poor waste/sewage disposal system, unhygienic condition in the community and active participation of pupils in water contact activities like swimming or professional activities such as rice cultivation and irrigation affect the prevalence (Feheesbrough, 2013). Availability of these ecological conditions is necessary for the breeding of the snail that allows for higher density of snails, which serve as an intermediate host for this parasite (Anosike *et al.,* 2012). The conditions might explain the differences in the prevalence of *S.haematobium* among the patients as their sources of water supply and waste management differ.

The prevalence of 4(3.3%) was found in males as against 2(1.7%) in females. This difference has been reported in various prevalence of the disease in Nigeria (Ofoezie *et al*., 2013). This is because most young boys engage in swimming, bathing and fishing while most young girls are retained at home for house errands and cooking, this may likely explain the difference. Infection with *S. haematobium* among different age groups shows that children from 11 years and above have the high prevalence than those in the age group below 11 years. This finding is similar to the work of Kabatereine *et al*. (2013) who reported that the child's risk of infection increases peaking between the age of 11 and 20. However, the observation agree with what was reported by several earlier researchers (Pugh, 1979; Pugh *et al*., 1980; Bassey, 1988; Taylor and Makura, 1984; Mu'azu, 2008; Ahmad *et al.*, 2014; Bichi *et al*., 2003 and Abubakar *et al*., 2015) who reported similar pattern of Schistosome infections, which had peak among teenagers who participated fully in water contact activities in contaminated water as was observed in this study.

V. Conclusion and Recommendations

From the results obtained in the present study, only 6 out of 120 samples examined were found to be positive for *Schistosoma* eggs indicating the low prevalence of the disease and the snail vectors, though present were not harbouring the infective stage of the parasite (cercariae). From this study, it is therefore concluded that the disease, schistosomiasis is less prevalent in the study area. Although the disease, schistosomiasis is less prevalent among the population observed, it is however recommended that further research be carried out even in neighbouring areas and effort be taken to avoid further spread of the disease through diagnosing and treating infected individuals, Periodic survey of water bodies for snail intermediate hosts and if detected should be eradicated. Construction of adequate toilet facilities, and educating communities on the importance of proper waste disposal as well as Provision of portable water by government for domestic use and regular screening and treatment of vulnerable groups such as fishermen, irrigation workers and communities with high prevalence.

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