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# PREVALENCE OF URINARY SCHISTOSOMIASIS AMONG SCHOOL CHILDREN OF SOWRA ELMAHDIA BOYS AND ROFEIDA GIRLS IN KOSTI, WHITE NILE STATE, SUDAN

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***Abstract:*** *The parasitic disease Schistosomiasis often known as bilharzia, affects humans and other vertebrates in tropical and subtropical regions. In term of socioeconomic and public health significance, it is one of the most widespread diseases and is only surpassed by malaria. The purpose of the study was to ascertain the prevalence of urinary schistosomiasis among school children. This cross-sectional study was conducted at Sowra Elmahdia boys and Rofeida girls' schools in Kosti district White Nile State, Sudan, from September to December 2018. The data were collected using structured questionnaires. The study revealed that the prevalence among children was found to be (3.2%). However, among girls (3.6%) was found greater than boys (2.9%). Among total respondents more than eight tens (82.4%) of them were the age group (11-14) years old and all the infected cases were that age group (11-14) and the mean age of the respondents was 12±1.6 years according to sex boys and girls were 48% and 52% respectively. The main sources of water were tap water (50.5%). The study revealed those who get water by donkey cart had high infection rate (57.14%) of the cases. The study revealed that urinary schistosomiasis infection is high among girls than boys, and those who get water by donkey cart had highest prevalence rate. Provision of community with adequate safe water and proper sanitation is recommended.*

***Keywords:*** *Prevalence, Urinary Schistosomiasis, School Children, Public Health, Sudan*

## Introduction

A class of internal parasites known as trematoda of the genus Schistosoma are the source of the water-based chronic parasitic disease known as schistosomiasis. According to the World Health Organization (WHO), schistosomiasis is a neglected tropical disease that affects more than 250 million people globally and has a global burden of 1.4 million disability-adjusted life years (DALYs) in 2017.[1] The The illness only the second of all parasitic infections of human. While the World Health Organization (WHO) estimated that that more than 40% of the worldwide disease burden caused by all tropical illnesses, excluding malaria, is caused by schistosomiasis and soil-transmitted helminthes.[2] The disease is acquired from water containing free- swimming larval forms (cercariae) that have developed in snails.[3]

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The most common disease-causing species are Schistosoma Haematobium, Schistosomamansoni and Schistosomajaponicum, while Schistosoma Guineensis, Schistosoma Intercalatum and Schistosoma Mekongi have lower global prevalence. However, among the three major human infecting species of Schistosoma , S. haematobium is one of the predominant species in Africa being endemic in about 53 countries in Africa and the Middle East. The mature Schistosoma parasites reside in the blood vessels of vertebrate hosts, including humans, but a stage of asexual multiplication or development within an intermediate host—a snail—is necessary for this stage of the parasite's life cycle. (Biomphalaria spp. snails for S. mansoni, Bulinus spp. snails for S. haematobium and Oncomelania spp. snails for S. japonicum). The bulk of schistosomiasis-related deaths worldwide are caused by Schistosoma haematobium (urinary schistosomiasis), which is most common in sub-Saharan Africa, where it is thought to impact 112 million people[4]. And if left untreated, it can also eventually result in anemia, starvation, kidney failure, and bladder cancer if untreated. In sub-Saharan Africa, the disease primarily affects young adults and school-aged children[5]. Schistosomiasis in Sudan started as far back as 2600 B.C. It was reported that schistosomiasis had been introduced in the Sudan through political and economic contact with neighboring Egypt. In addition, it was also thought that the thousands of pilgrims from West Africa flowing through the country to and from Mecca played an important part in the transmission of the disease. The disease was first identified in the Sudan in 1904, according to Balfour, who discovered 1740 children with urinarschistosomiasis in Khartoum Primary Schools.

The history of schistosomiasis in Sudan began in 1925 with the opening of the agriculture scheme in the Gezira Province (now Gezira State), where schistosomiasis was practically unknown except for few sporadic cases in the vicinity of the Blue Nile, the history schistosomiasis is well documented for Gezira Scheme (FMOH, 1998). Now 70% of population is at risk of the infection i.e 167 cases every 1000 of population (mahel, et al., 2017) The disease is distribution among states of Sudan: Southern Darfur state 26%, Kassala state15%, Gedarif state 38%, Jazeera state 11.5%, Blue Nile state 36% and White Nile state 14%2. Also the disease is distributed among the localities of White Nile state with the percentages: Jebellein locality 28%, Rabak locality 23%, Alsalam locality 34% and Qetaina locality 69%. (Bilharzia control program, White Nile state, 2012). Number of factors influence the prevalence of the disease in White Niles state and include: Presence of intermediate host, Low streams of Nile River, Abundance of Nile grasses, Deterioration of environmental hygiene and Scarcity of pure water10.

## Methods and materials

This cross-sectional study was conducted at Sowra Elmahdia boys and Rofeida girls schools in Kosti district White Nile State, Sudan, from September to December in 2018. The study population of this study was students of the two schools. The sampling technique was an individual student and simple random sampling method was used.

## Sample Size determination

The sample calculated using the following formula:

$$N = \frac{Z^2 \chi PQ}{D^2}$$

Where:
N = Sample Size

Z = the value of the standard normal variable corresponding to its % level of significance (1.96).
P = Expected prevalence (10 %).
Q = 1 – P (0.9).
D = marginal error (0.04)

$$N = \frac{(1.96)^2 \times (0.1) \times (0.9)}{(0.04)^2} = 216$$

Collection of Urine Samples

Urine samples used for this study were collected from 216 children in Kosti town from 10:00 am to 2:00 pm between November and December 2018. The specimens consist of single terminal urine of 10 ml, after exercise to pass more number of eggs. Children were given cleaned bottles and instructed on how to provide urine for the study. The specimens were labeled, placed in cold ice parked box then taken to laboratory for analysis. The questionnaire used in this study was pre-tested before the data collection in another hospital. The data were collected using a semi-structured questionnaire by face-to-face interview. Verbal inform consent was taken before starting the data collection. After collecting data, all interviewed questionnaires were checked for completeness, correctness, and internal consistency to exclude missing or inconsistent data, and those were discarded. Corrected data was entered into Statistical Package for Social Sciences (SPSS) statistical software version 20 for the analysis.

Laboratory Examination

The sedimentation method was used by centrifugation of 10 ml of the urine sample at 5000rpm for 5 minutes. These sediment was examined microscopically using x 40 objective to identify Schistosoma haematobium ova which is characterized by the presence of terminal spine. Eggs were counted and record as eggs/10ml of urine.

Data collection and measurement

The research instrument used in this study was a self-administered questionnaire. Data were collected through self-administered pre-tested structured questionnaires which were delivered to the students. The questionnaire covered includes information about socio demographic characteristics, water contact, history of infection and treatment of Schistosoma haematobium.

Data Analysis

Data were analyzed by using Statistical Package for Social Science (SPSS) version 20.0. Descriptive statistical analysis was performed to calculate the frequencies and percentages. The descriptive analysis of data was presented as tables and charts.

Ethical Issues

Before the start of the study permission was obtained from the research ethical committee of faculty of Health Science, el-imam el-mahdi University. Permission was obtained from authority of a selected schools. Written informed consent was taken from respondents.

Results

Demographic distribution of the participants

Table 1 showed that the mean age of the respondents was 12±1.6 years and the majority (82.4%) of the respondents were in the age group 11-14 years old, followed by 7-10 years (14.4%). More than half (52%) of the respondents were girls and the rest 48% were boys. According to the number of cases, 7 students were infected with urinary Schistosomiasis infection and the prevalence rate were 3.2% in which boys had rate 3 (2.9%) compared to 4 (3.6%) among girls.

Table 1: Demographic distribution of the participants

| Variable | Frequency | Percentage | Infected | Percentage |
|---|---|---|---|---|
| Age | | | | |
| 7-10 | 31 | 14.4 | 0 | 0 |
| 11-14 | 178 | 82.4 | 7 | 3.2 |
| 15-18 | 7 | 3.2 | 0 | 0 |
| mean±SD | 12±1.6 | | | |
| Sex | | | | |
| Male | 104 | 48 | 3 | 2.9 |
| Female | 112 | 52 | 4 | 3.6 |

The positive and negative rate of infection according to water source

Table 2 showed that the rate of Schistosoma haematobium infection among children whose families get water by donkey cart (from river) is (57.14%) of the infected children.

Table 2: The positive and negative rate of infection according to water source

| Water source | NO of samples | No infected with S.H | % |
|---|---|---|---|
| Donkey cart | 102 | 4 | 1.9 |
| Tap water | 109 | 2 | 0.9 |
| Other source | 5 | 1 | 0.5 |

Knowledge of students about the signs and symptoms of the disease

Table 4 showed the knowledge of students for the signs and symptoms of schistosomiasis whereas 34 (16%) of the students know that bloody urine (haematuria) is the main sign of the disease, 4 (2%) blood in stool, 12 (5.5%) diarrhea, where the rest 166 (77%) answered other signs.

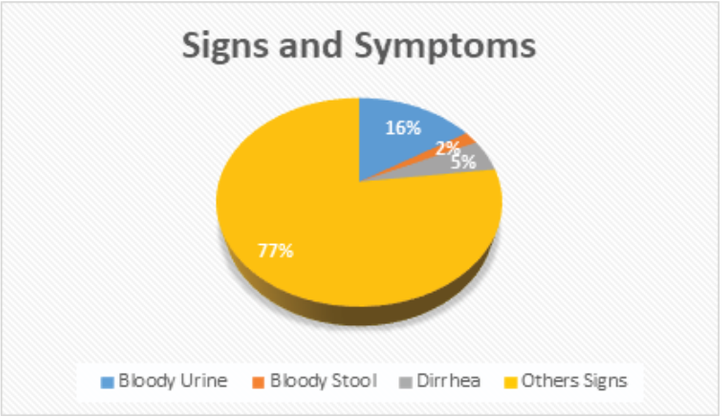


Figure 1: Knowledge of students about the signs and symptoms of the disease

The knowledge of students about the mode of transmission

Table 5 showed the knowledge of students about the mode of transmission of schistosomiasis whereas 49 (22.7%) said the entering of contaminated water is the mode of transmission, and 20 (9.3%) drinking contaminated water.

Table 3: The knowledge of students about the mode of transmission

| Mode of transmission | Frequency | % |
|---|---|---|
| Drinking contaminated water | 49 | 22.7 |
| Entering contaminated water | 20 | 9.3 |
| Other routes | 147 | 68 |
| Total | 216 | |

The knowledge of students about the causative agent

Figure 2 showed the knowledge of students about the causative agent of the schistosomiasis in thawra elmahdia boys and rofaida girls, kosti, (2018), whereas 20 (9%) of the students know that the causative agent is parasite.

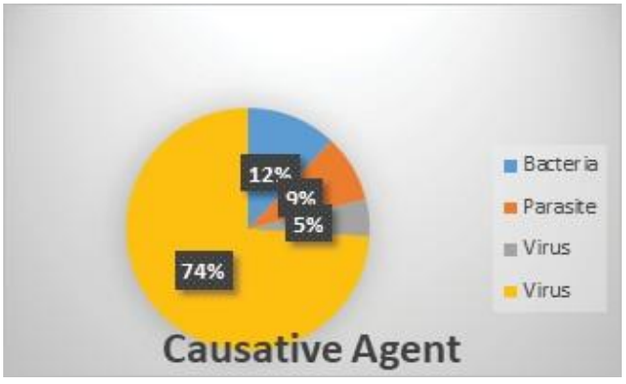


Figure 2: Causative Agent

## Discussion

In this study both schools the study showed that all the infected cases were the children of the age group 11-14 years this finding agrees with previous observation[8]. In relation to gender, the prevalence was high among school girls (3.6%) than boys (2.9%), this finding opposes with previous observations 8 in relation to the gender the prevalence was high among the male pupils (58%) than the female (42%), although males are more involved in activities that have to do with water bodies). In relation to the source of drinking water the study showed that most infections were among children whose families get water by donkey cart "from river" (57.14%) which agrees with previous observation 8 those who get water supply by donkey cart had high infection rate (31.1%).
The knowledge of students of symptoms of infection was found to be (16%) blood in urine, (2%) blood in stool, (5.5%) diarrhea, that agrees with the study (Urinary tract schistosomiasis is characterized by blood in the urine, pain or difficulty urinating, and frequent urination and are associated with S. haematobium. The knowledge of students to the mode of transmission of schistosomiasis infection was found (22.7%) by entering in the water contaminated with snails, this agrees with WHO[9] they found that the transmission occurs when parasite eggs in human excreta hatch into miracidium upon contact with fresh water. The knowledge of students for the causative agent of schistosomiasis infection was 9.3% by answering the causative agent is parasite, compared to research[10] at tawella school where 17.6% of the students answered the causative agent is parasite.

## Conclusion and Recommendations

The study identified that the prevalence of schistosomiasis was 3.2%. All infected cases were the children of the age group (11-14). Those who get water supply by donkey cart had high infection rate (57.14%). The prevalence was high among the female pupils (3.6%) than the males (2.9%). Based on the finding of this study, it is recommended that control program should work on health education, about how people to pass urine away from any source of water. Also, provision of community with adequate safe water and proper sanitation. Moreover, encouragement of the research and studies in this field and early diagnosis and treatment of schistosomiasis infection.

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