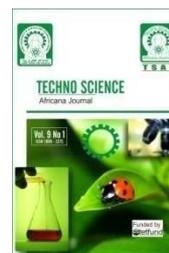




## Techno Science Africana Journal

Journal homepage: [www.technoscienceafricana.com](http://www.technoscienceafricana.com)



### INCIDENCE OF *SCHISTOSOMA HAEMATOBIMUM* INFECTION AMONG PUPILS OF BAGWAI SPECIAL PRIMARY SCHOOL, KANO

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#### ARTICLE INFO

**Keywords:**

*Schistosoma haematobium*  
Pupils Bagwai  
Primary  
School

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#### ABSTRACT

The study was conducted to determine the incidence of *Schistosoma haematobium* infection among pupils of Bagwai special primary school, Kano state. A total of 176 urine samples were collected from pupils and examined for the presence of eggs of *S. haematobium*. Each pupil was interviewed using a questionnaire to obtain information on source of drinking water, age, sex, parent's occupation and water contact activities. Of the total number examined, 93 (52.8%) were found to be positive to *Schistosoma haematobium* infection. The incidence was higher among males 64 (65.3%) than the females 29(37.2%). With respect to age, the highest incidence was recorded in the age group 10–17 years 67(57.8%), statistically age shows no impact on the incidence of *Schistosoma haematobium* infection. Parents occupation plays a significant role as there was difference between pupils from farmers parents 75.0% from 88 samples when compared to non-farmers 37.5% from 88 samples examined. The incidence was more common among pupils that visit Bagwai river 66.7% compared to 38.4% from 90 and 86 samples examined respectively. It is recommended that health education, provision of portable drinking water and creation of more recreational facilities will help to control and reduce the disease incidence.

#### INTRODUCTION

Urinary schistosomiasis is a human disease condition, which is caused by infection of the trematode *Schistosoma haematobium*. The parasite is found in the venous plexus draining the urinary bladder of humans. During infection, the parasites deposit terminal spine eggs which clog the venous plexus, impeding

blood flow. This bursts the veins, allowing blood and eggs to enter the urinary bladder, resulting in the characteristic symptom of blood in urine or haematuria. In sub-Saharan Africa alone it is estimated that 70 million individuals experience haematuria, 32 million with difficulty in urinating (dysuria), 18 million with bladder-wall pathology, and 10 million

with major hydronephrosis from infection caused by *Schistosoma haematobium*. Mortality rate due to non- functioning kidney, (from *S. haematobium*) and haematemesis has been put at 150,000 per year. The above figures imply that urinary schistosomiasis is an important public health problem in sub-Saharan Africa and second to malaria in morbidity. Urinary schistosomiasis is endemic in Nigeria in general. Although there is no current estimate of the disease in the country, past estimates have put the infection at about 25 million people and 101 million at risk of infection (Ekpo *et al.*, 2010). In Kano State, urinary schistosomiasis has been reported in several communities. However, these studies were based on school-age children and adult farmers.

The occurrence of urinary Schistosomiasis among children causes chronic infection which may negatively affect all aspects of children health and learning. Schistosomiasis infection during childhood causes substantial growth retardation and anaemia, and also causes abnormalities of urinary tract. The transmission cycle requires contamination of surface water by urine and fresh water snails (*Bulinus*) as an intermediate host and human water contact (Okori *et al.*, 2014).

Urinary schistosomiasis is caused by the infection with *Schistosoma haematobium*. It is widespread and causes substantial morbidity on the African continent (Mbabazi *et al.*, 2011).

*Schistosoma haematobium* causes more than half (at least 112 million) of world wide schistosome infections. Popularly known as urinaryschistosomiasis, *Schistosoma haematobium* infection was recently renamed “urogenital

schistosomiasis” in recognition that the disease affects both the urinary and genital tracts in up to 75% of infected individuals.

It is the eggs of *Schistosoma haematobium* in the tissue not the adult flukes that stimulates host inflammatory responses that result in the clinical features and damage to the bladder and ureters, which characterized urinary schistosomiasis. The degree of ill health and serious complications that develop later in life time are related to the intensity and duration of infection (Cheesbrough, 2010). In some endemic areas, chronic infection of long duration is associated with squamous cells bladder cancer. Granuloma, calculi (stones) in the bladder and urinary tract are also found with chronic urinaryschistosomiasis. Anaemia is also a common finding in urinary schistosomiasis, particularly in those with low dietary iron intake, coexisting hookworm infection or malaria. In Africa, urinary schistosomiasis is also reported as impairing the growth and development of children (Cheesbrough, 2011). Many of the eggs die and become calcified eventually producing what are known as sandy patches in the bladder.

In heavy infections eggs can be carried to other parts of the body. Following prolonged untreated infection, and a marked cellular immune response, the ureters may become obstructed and the bladder walls thickened leading to abnormal bladder function, urinary tract infection, and eventually obstructive renal disease with kidney damage. Complication can arise from genital schistosomiasis (Cheesbrough, 2010).

Untreated and serious urinary schistosomiasis could lead to kidney failure or uremia. Ova are deposited in

various organs of the body including liver, lungs and in female vulva,

cervix, vagina, fallopian tubes, ovary and placenta to cause pelvic schistosomiasis. This may lead to infertility (Warren, 1978). World Health Organisation (WHO) recommends annual treatment for school age children in areas of high endemicity (Mbabazi *et al.*, 2011).

## **MATERIALS AND METHODS**

### **Study area**

Bagwai town is the headquarter of Bagwai Local Government area in Kano state. It is located in the north-west of Kano state at latitude 12°09'28"N and 12.15778 N and longitudes 8°08'09"E and 8.13583E. It was created in 1988 with a total land mass of 156sqm. It has a population of 162,847 people according to 2006 census, comprising of mainly farmers and cattle rearers (Muhammad *et. al*, 1991).

The town is savanna region of the country and is characterized by two seasons namely, dry and rain seasons. Bagwai River is situated at the eastern part at least 1.5 km away from the town.

### **Study population**

The populations for this study were pupils of Bagwai Special Primary School, Bagwai Kano. 185 pupils were selected using systematic sampling technique for the study.

### **Sample size**

Sample size was calculated using the previous prevalence of Ahmad *et. al.*,(2014) with prevalence rate of 25%, by This was mounted on a light microscope and examined at X40 objective to identify *Schistosoma haematobium* ova which is characterized with a terminal spine (Ekpo

applying L. Wanga formula for determining sample size (Ahmad *et. al.*, (2014).

### **Questionnaire administration**

A questionnaire consisting of questions relevant to urinary schistosomiasis was used for each pupil to obtain information on: age, sex, occupation of parents, source of drinking water and water contact activities. The questions were translated and communicated to them in their local language for better understanding with the assistance of their teachers. A total of 185 pupils were systematically selected out of which 176 pupils returned urine samples which were subsequently used for the study. They comprise of 98 males and 78 females. (Houmsou *et al.*, (2012).

### **Sample collection**

This was carried out according to Ahmad *et. al.*, (2014). After responding to the questions, clean plastic universal containers (labeled) were given to the pupils to collect urine samples. The collection was done between the hours of 10am to 2pm. The samples collected were then immediately taken to Microbiology laboratory, Aminu Kano Teaching Hospital (AKTH), Kano, for analysis.

### **Sample and Data analysis**

A quantity, 10mls, of urine sample was centrifuged at 5000 rpm for five minutes. The supernatant was discarded to leave sediment which was transferred to the centre of a clean grease-free glass slide and covered with a cover slip. *et al*, 2010). The information obtained from the questionnaires and microscopic examination was analyzed using chi-square test.

**RESULTS**

Responses of the pupils on their sources of drinking water revealed that all studied subjects' use tap water as their drinking water. The result of this study showed that out of 176 pupils examined for the ova of *Schistosoma haematobium*, 93(52.8%) were found to be positive. The sex specific incidence indicated that the incidence is higher among males

(65.3%) than females (37.2%) as contained in table 1. In relation to age group, out of 116 pupils of the age group 10-17 examined, 67(57.8%) were found to be positive. Out of 60 samples of the age group 4-9 years examined, 26(43.3%)

were found to be positive (Table 2). Incidence in relation to parent's occupation was higher among children of farmers with 60 (75%) out of 88 samples examined being positive, pupils from civil servant parents have 19 (43.2%) infected, while pupils of traders parents recorded a relatively lower incidence 13(31.7%) out of 41 pupil's urine samples examined (Table 3).

Table 4 shows the incidence of *Schistosoma haematobium* infection with respect to pupil's river contact which indicated 60(66.7%) were positive among pupils that have river contact higher than 33 (38.4%) among those that have no river contact history.

**Table 1: Incidence of *Schistosoma haematobium* infection with respect to gender of the pupils.**

Gender	No. examined	No. infected	Incidence (%)
Male	98	64	65.3
Female	78	29	37.2
Total	176	93	52.8

Key: No. = number, % = percentage.

**Table 2: Incidence of *Schistosoma haematobium* infection with respect to the pupil's age.**

Age	No. examined	No. infected	Incidence (%)
4-9years	60	26	43.3
10-17years	116	67	57.8
Total	176	93	52.8

Key: No. number; % = percentage.

**Table 3: Incidence of *Schistosoma haematobium* infection with respect to parent's occupation.**

Occupation	No. Examined	No. infected	Incidence (%)
Farming	88	60	75
Trading	41	13	31.7
Civil service	44	19	43.2
Total	176	93	52.8

Key: No. = number; % = percentage.

**Table 4: Incidence of *Schistosoma haematobium* infection among pupils with respect to pupil’s river contact.**

Water contact	No. examined	No. infected	Incidence (%)
Have water contact.	90	60	66.7
No water contact	86	33	38.4
Total	176	93	52.8

Key: No. = number; % = percentage.

**DISCUSSION**

The incidence and distribution of urinary schistosomiasis depend upon a number of important factors which include age, sex, occupation and contact with infected water. The occurrence of urinary Schistosomiasis among children causes chronic infection which can negatively affect all aspects of children health and learning. Schistosomiasis infection during childhood causes substantial growth retardation and anaemia, and also causes abnormalities of urinary tract. The transmission cycle requires contamination of surface water by urine and fresh water snails (*Bulinus*) as an intermediate host and human water contact.

From the results, high incidence of *Schistosoma haematobium* infection (52.8%) was observed in this study. This might be as a result of a number of factors which include; contact with infected water and lack of adequate awareness. Similar result was reported by Ekpo *et al.* (2010) who reported 58.1% prevalence among preschool children in a community near Abeokuta south west Nigeria. Similarly, Ugbomako *et al.* (2010) in their work factors associated with urinary schistosomiasis in two peri-urban communities in south-western Nigeria reported a prevalence rate of 62%. Bassey

(1988) reported the prevalence rate of 67.9% at Kadawa irrigation water scheme.

The level of incidence rate observed in this study may not be unconnected to the outdoors activities engaged by males which exposed them to cercariae infected water and socio-cultural factors.

In this study, the high incidence among pupils of farmer’s parent 75.0% and those that have contact with infected water bodies 66.7% may be attributed to the level of exposure to the contaminated water either by parents or guardians and caregivers due to their occupation or the pupils themselves. According to Ekpo *et al.* (2010), the incidence and distribution of urinary schistosomiasis depend upon a number of important factors which include age, sex, occupation and contact with infected water.

The high incidence rate observed among males 65.3% compared with females 37.2% which show statistical difference  $\chi^2 = 13.79$  is consistent with the findings of Sammy *et al.*, (2011) who recorded 66.4% prevalence of *Schistosoma haematobium* infection in males at Kumasi, Ghana.

Statistically, age difference has no impact on the incidence of *Schistosoma haematobium* infection  $\chi^2 = 3.302$  (at 0.05 level of significance).

The high incidence among age group 10-17 years 57.8% in this study agrees with the finding of Dakul *et al.*, (2001) who reported the highest prevalence 65.8% among the age group 10-14 years and 78% prevalence among age group 11-14 years (Ahmad *et al.*, 2014), Sarkin fada *et al.* (2009) reported 57.4% prevalence in age group 10-14 in Danjarima community, Kumbotso LGA, Kano State. This might be due to higher water contact activities of the boys especially within the age group of 10-17 years during outside activities such as errands, washing and bathing/swimming (Dawet *et al.*, 2012). In this study, the high incidence among pupils of farmer's parent 75.0% ( $\chi^2 = 16.62$ ) and those that have contact with infected water bodies 66.7% ( $\chi^2 = 14.13$ ) may be attributed to the level of exposure to the contaminated water either by guardians and caregivers due to their occupation or the pupils themselves. This is consistent with the work of Ekpo *et al.*, (2010).

## CONCLUSION

It is clearly evident that there was high incidence (52.8%) of urinary Schistosomiasis among the study population selected in the pupils of Bagwai Special Primary School, Kano, compared with the studies conducted in

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some other areas within Kano state. The infection affects both sexes of different age groups and parent's background. Male pupils, age group

of 10-17 years, that visit river for one reason or the other and pupils from farmers' parents are more vulnerable to *Schistosoma haematobium* infection.

## Recommendation

- There should be constant surveillance of the disease to reduce if not possible to completely eliminate it.
- Health education should be carried out in schools, communities and other public gathering to enlighten parents, farmers, care-givers, children and the general public on the epidemiology of the disease.
- There should be constant supply of safe drinking water and recreational facilities in communities to minimize contact with infected water bodies.
- Treatment of those already infected with the disease using praziquantel and other recommended drugs should be effected.

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