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Research article

Schistosoma haematobium Associated with Urinary Tract Infection among the Children in Kano Metropolis, Kano State, North-Western Nigeria

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ABSTRACT

Aim: The aims of the survey were to determine the prevalence of *Schistosoma haematobium* infection in relation to age, sex and sources of drinking water among Children between the ages of 5-16years in Kano metropolis, Kano State, Nigeria.
Study design: The study is a descriptive cross-sectional study.
Place and duration of study: Urine specimen was collected from Children between the ages of 5-16years in Kano metropolis. Ten mls (10mls) of urine sample from each Child was collected and transfer into clean and dried universal container. If daily is unavoidable urine samples were stored at 40C. Samples were analyzed at the laboratory of the author. This work was carried out between November, 2013 and July, 2015.
Methodology: A urine sedimentation technique was carried out as describes by [1] and the preparation was examined microscopically using x10 and x40 objective lens for the characteristics eggs of *Schistosoma haematobium.*
Result: The relationship was not significantly associated ($P < 0.05$), when 162 infected Children were assed in relation to sex, the prevalence rate of *Schistosoma haematobium* infections was higher ($P < 0.05$) in males than the females patients with 102 (28.3%) and 60(16.7%) respectively. Even though, the relationship between different age groups was not significantly associated ($P < 0.05$), out of 360 children examined 162 were infected representing 45.0%, in which 90 of 9 to 12 years age group were found to be infected and 45 of 13–16 years age group were infected and 27 of 5–8 years age group were also infected representing 25%, 12.5%, and 7.5% rate of infection respectively. However, the prevalence of *Schistosoma haematobium* infection base on the source of water, 102 children that uses tap water as there sources of drinking water were more susceptible to infection, followed by 45 children that uses well water while, 15 children uses borehole water were the least infected and representing 28.3%,

12.5%, and 4.2% rate of infection re pectively. In addition, the relationship between different source of water was not significantly associated ($P < 0.05$).
Conclusion: Although, the relationship between different sex was not significantly associated ($P < 0.05$), from this study out of 360 children tested 162 were infected. Male, 9 to 12 years age group and those uses tap water as a source of drinking water (children) were more susceptible to *Schistosoma haematobium* infections with 102 (28.3%), 90 (45.0%), and 102 (28.3%) infection rate respectively. The overall prevalence of the infection was 45% which is an indication of the infection in the area. The result of this study shows that the major source of this disease transmission was attributed to the high level of water activities around the areas and the used of non-potable tap water.

Key words: *Schistosoma haematobium*; Urine samples; Children; Kano metropolis; Nigeria.

1.0 INTRODUCTION

Schistosoma haematobium a parasite that in the blood vessels of the liver before migrating to the veins surrounding the bladder (vesicle plexus) [1]. It is causative agent of urinary schistosomiasis (also known as bilharzias, bilharziosis or snail fever). The disease constituents are major public health problem in the Africa continent [2] and in some tropic and subtropics regions of the world [3]. Although infection with schistosoma does not always result in clinical disease and many infections are asymptomatic. *Schistosoma heamatobium* however, can cause haematuria dysuria, nutritional deficient lesion of the bladder kidney failure and elevated risk of bladder cancer and in children grow the retardation [4, 5].

The parasite was first observed in Cairo in 1851, by Theodor Bilharz in the blood of mesenteric veins of a young man on autopsy. After the name was of its discovered, it was named Bilharzias. The name was changed subsequently to schistosome. The name schistosome is derived from the appearance of the adult male the body of which has a longitudinal genital groove or canal known as gynaecophoric canal, which serves as a receptacle for the female during copulation [5]. The development of irrigation schemes and dams for hydroelectric power and flood control has greatly increased the prevalence of *Schistosoma haematobium* infection in several countries. The migration of refuges has also contributed to an increase in the distribution of the parasite [6].

Schistasomiasis or bilharzaisis is one of the most important parasite disease, and is endemic is about 75 tropic developing countries [7]. Schools and resident in rural and irrigated agricultural areas are estimated to be infected while between 500-600million people are at risk [8]. Like many disease, Schistosomiasis is caused largely by human behaviours, principally water use practice and indiscriminate urination and defaecation but also failure to take advantage of available screening services or comply with medical treatment [9].

Schistosomiasis is a chronic insidious debilitating trematodes infection which reduces productivity and affects the development of the young due to its insidious nature; it becomes apparently difficult to determine morbidity and mortality. Human infection is brought about by bathing or wading in infected water [10]. Urine contains blood (haematuria), in 50% of cases inflammation of the bladder increase frequently of passing urine (micturition) reduce bladder-capacity, fibrosis of ureter wall cancer of bladder lungs complications sometimes leading to death. The urethral lumen becomes greatly closed penis or scrotum may develop obstruction and fistula may tear through the skin [11].

With respect is socio-economic and public health impact, schistosomiasis is second only to malaria as the most devastating parasite in tropical countries [12]. Approximately 22 million Nigerian including 16million children need to be treated for schistosomiasis making the country the most endemic in the world [12].

Schistosoma haematobium is transmitted by cercariae penetrating the skin when bathing, washing clothes, fishing or engage in agricultural work or other activities involving contact with contaminated water, in most endemic areas; a large proportion of children and teenage become infected and re-infected [13]. The parasite can live for years in vein near the bladder laying thousands of terminally spines eggs that tear and scar tissue of the bladder [12]. It is the eggs of *Schistosoma haematobium* in the tissue not the clinical feature and damages to the bladder and ureter that

characterize urinary schistosomiasis. The degree of ill health and serious complications that develop later in life are related to the intensity and duration of infection [14]. For communities already burdened by poverty and ravaged by scourges such as malaria and tuberculosis, schistosomiasis is especially devastating weakening the body resistance to the other infections and preventing children from reaching their full potential [12].

2.0 MATERIALS AND METHODS

2.1 Study area:

Metropolitan Kano encompasses all the eight local governments of Dala, Fagge, Gwale, Municipal, Nassarawa, Tarauni, part of Kumbotso and Ungogo. Figure 1 this is in addition to part of local governments which was integrated in to local metropolis for planning purposes. It lies from Latitudes 11^0 52'N to 12^0 7'N and Longitudes 8^0 22.5`E to 8^0 47'E and is 1549ft above sea level. Kano metropolis is bounded by Minjibir LGA on the North East and Gezawa LGA to the East. While, Dawakin Kudu LGA to the South East, Madobi and Tofa LGA's to the South West and lastly Dawakin Tofa LGA to the North West. The climate of Kano is typical dry and wet climate. Annual rainfall is about 850 – 870mm. The temperature is averagely warm to hot throughout the year at about 27^0C [15, 16].

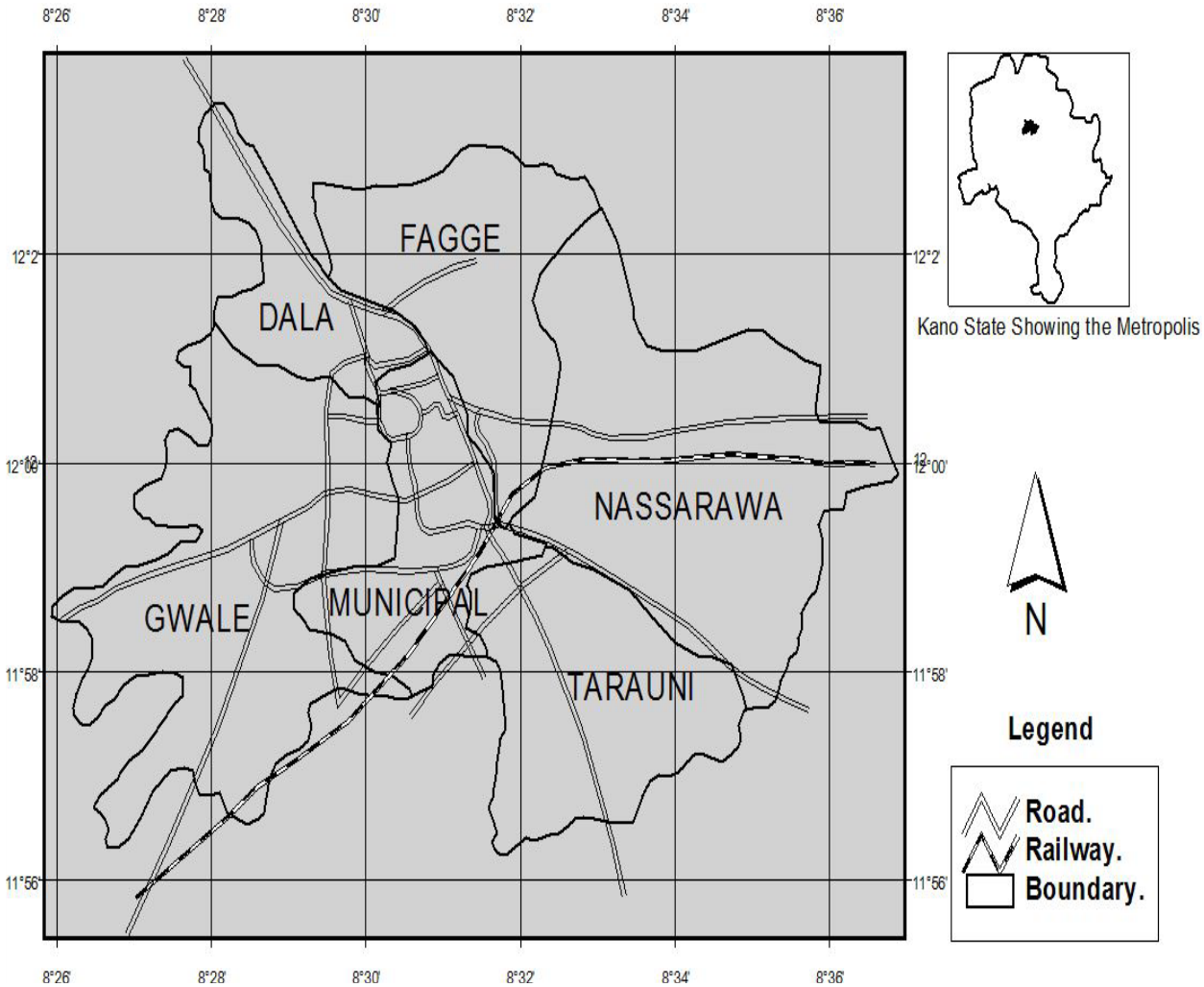

Figure 1: Map of Study area (Kano) indicating six (6) core metropolitan LGAs [16]

2.2 Study population

The population studied during this research work comprises of only the inhabitants of Kano metropolis, Kano State. A total two hundred (360) children were selected at random for the study after a designed consent form were signed by their parents/guardians.

2.3 Collection and Handling of Specimens

Urine specimen was collected from children between the ages of 5-16years in Kano metropolis, Kano State. Ten mls (10mls) of urine sample from each child was collected and transfer into clean and dried universal container. If daily is unavoidable urine samples were stored at 4^0C. Samples were analyzed at the laboratory of the author. This work was carried out between November, 2013 and October, 2014 [17].

2.4 Parasitological Analysis

A urine sedimentation technique was carried out as describes by [1] to detect the presence of *Schistosoma haematobium* ova in the urine sample, 5ml of urine sample was placed into a clean centrifuge tube. The tube was placed into a centrifuge machine and spin at 300g for 5minutes. The supernatant was discarded into a sink while the deposits was re-suspended and placed on a clean grease free slide and covered with a clean cover slip. The preparation was examined microscopically using x10 and x40 objective lens for the characteristics eggs of *Schistosome haematobium.*

2.5 Statistical analysis of results

Statistical Package for Social Science (SPSS) version 14 was used [18]. Descriptive statistics were used to categorical (frequency percentages) variables. Chi-square test analysis was use to determined association between the *Schistosoma haematobium* infections in relation to age, sex and sources of drinking water of children in Kano metropolis.

3.0 RESULTS

3.1 The prevalence rate of *Schistosoma haematobium* base on sex group

The relationship between different sex was not significantly associated ($P < 0.05$), when the 162 infected children were assed in relation to sex, the prevalence rate of *Schistosoma haematobium* infections was higher ($P < 0.05$) in males than the females patients with 102 (28.3%) and 60(16.7%) respectively (Table 1).

Table 1: The prevalence rate of *Schistosoma haematobium* base on sex

Sex	No Examined	No of infected	% of infected
Male	213	102	28.3
Female	147	60	16.7
Total	**360**	**162**	**45.0**

KEY: *NO. = Number; % = Percentage of total number of specimens tested (360).*

3.2 The prevalence rate of *Schistosoma haematobium* base on age groups

Even though, the relationship between different age groups was not significantly associated ($P < 0.05$), out of 360 samples of children examined 162 were infected representing 45.0%, in which 105 samples of 5-8 years age group were examined and 27 (7.5%) were infected, 144 samples of 9 to 12 years age group were examined and 90 (25%) were found to be infected and 102 samples of 13–16 years age group were examined out of which 45 (12.5%) were infected (Table 2).

Table 2: The prevalence rate of *Schistosoma haematobium* base on age groups.

Age group (years)	No. Examined	No. of infected	% of infected
5-8	105	27	7.5
9-12	144	90	25.0
13-16	102	45	12.5
Total	**360**	**162**	**45.0**

KEY: *NO. = Number; % = Percentage of total number of specimens tested (360).*

3.3: The prevalence of *Schistosoma haematobium* base on the source of drinking water

From Table 3 out of 360 samples of children examined 162 were infected representing 45.0%, 71 samples were examine for children that uses tap water as there sources of drinking water out of which 34 (28.3%) are infected and children that uses well water are 22 out of which 15 (12.5%) are infected, and 9 children uses borehole out of which are 5(4.2%) were infected. However, the relationship between different source of water was not significantly associated ($P < 0.05$).

Table 3: The prevalence of *Schistosoma haematobium* base on the source of drinking water

Source of water	No. Examined	No. of infected	% of infected
Tap water	71	34	28.3
Well water	22	15	12.5
Borehole	9	5	4.2
Total	**360**	**162**	**45.0**

KEY: *NO. = Number; % = Percentage of total number of specimens tested (*360*).*

4.0 DISCUSSION

From the result obtained in the current study 162 children out of 360 were found to be positive for *Schistosoma haematobium* infection, given a prevalence level of 45.0% an indication of the prevalence of the disease in the area, the value is high compared to 0.9% in Ganawuri village of plateau state as reported by [19] and 22.2% in Doguwa Town, Kano State [20]. This significant marked disparity in infection rates of observed could be attribute to differences in terrain, topography, drainage pattern and human habits in the place of investigation.

The result showed that the males were generally more infected than the females in studied area. This is presumably due to higher water contact activities by males such as fishing, irrigation, swimming and bathing, cercaries infested water besides. Females in the area are usually restricted from swimming and bathing in the rivers on religious and socio-cultural grounds. This similar to the observation made in Tanzania [21], and in South –Western Nigeria [22].

In infection with *Schistosoma haematobium* in this study have been found to be higher among children with 9-12 age group similar to the findings of Lower [23] and Okeli and Odaibo [24] closely related to the finding of Okpala and agwu [25] value. This could be due to socio-cultural factors as swimming, bathing, fishing and laundry services, which facilitate the transmission of the diseases.

The observation showed that the infection depends on sources of water supply. Okola *et al*, [26] states that the transmission of schistosomiasis takes place in the place where fresh water snail vector is present and where there is contact between the population and infected water.

Among pupils using well, pound and stream water may be as a result of contamination of wells, founds and stream in the area with carceriae. Generally, the observed prevalence of urinary schistosomiasis in the area is moderate as a result of low literacy level, lack of basic amenities, inadequate and indiscriminate disposal of human waste high water contact activity with snail infested wells, pounds and stream in the area.

5 CONCLUSIONS

Although, the relationship between different sex was not significantly associated ($P < 0.05$), from this study out of 360 children tested 162 were infected. Males, 9 to 12 years age group and those uses tap water as a source of drinking water (children) were more susceptible to *Schistosoma haematobium* infections with 102 (28.3%), 90 (45.0%), and 102 (28.3%) infection rate respectively. On the other hand Females, 5 to 8 years age group and those uses borehole water as a source of drinking water (children) were found to less susceptible to *Schistosoma haematobium* infections with 60 (16.7%), 27 (7.5%), and 15 (4.2%) infection rate respectively.

6. RECOMMENDATIONS

Mass campaign, public enlightenment should be given more attention on the effective personnel hygiene, food hygiene and environmental sanitation. Government and non-governmental organization such as UNICEF, WHO, PATH etc. should provide adequate drugs so that the infection will reduce. Government should provide adequate potable drinking water and build or renovated dispensary in such that it can eradicate the disease at early stage. Health official should act fast in order to arrest the situation through enlighten campaign about the danger association with disease. The children of this age group are frequently exposes to high activities with water such as swimming, bathing washing etc. to control urinary schistosomiasis it is therefore recommended that schistosomiasis control program in the state should be geared toward creating awareness in the people in order to reduce the infection rate.

There is a need to organize health education program to alighting the people of the area on the cause and mode of transmission of the diseases could be done by community health program and through mass media. The supply of safe drinking water is fundamental to schistosomiasis control. Boreholes should be provided for the people to reduce the rate of infection. Mass chemotherapy in the study area is advocated, Provision of modern toilet facilities rather than indiscriminate urination and defecation, Protective wear such as boots and gloves by individual who get contact with water bodies especially during irrigation, farming sand fetching of water is recommended. Introduction of mullicides into pounds and river breeding can help in controlling the intermediate host; Building of water project

such as Dams should be properly planned and strategically located in places so as to prevent people in nearby communities being infected.

CONSENT

"Author declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

"Author hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki."

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COMPETING INTERESTS

The author declared that I have no competing interests exist.

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