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Prevalence of Urinary Schistosomiasis Among Patients Suspected of Urinary Tract Infection in Birnin Kebbi, Kebbi State, Nigeria

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Abstract: Schistosomiasis is an acute and chronic parasitic disease caused by blood flukes (trematode worms) of the genus Schistosoma. It is one of the leading cause of some death in some part of African country and Nigeria. People are infected during routine agricultural, domestic, occupational, and recreational activities, which expose them to infested water. One hundred randomly selected patients attending Federal Medical Centre Birnin Kebbi, Nigeria, using the recommended sample clean universal bottle and a bio-data form was given to each of the patient. Routine examination of urine for *Schistosoma haematobium* was done according to Monica Cheesbrough, (2000) and was used to examine to determine the occurrences and prevalence of urinary schistosomiasis caused by *Schistosoma haematobium.* The infection rate varied with age reaching the peak among 20-39yrs, males with an infection rate 9 (2.8%) were significantly more infected than females, with an infection rate of 1 (3.3%). Haematuria was more prevalent among males with an infection rate of 2 (4%) as opposed to 0 (0%) in females. Those engage in either farming or fishing activities had the highest prevalence. It is seen that people living in riverine area are the most affected with Schistosomiasis and the study reveals that knowledge about the cause, transmission, symptoms and prevention of urinary Schistosomiasis is inadequate. This could be a challenging obstacle to the elimination of Schistosomiasis. Mass chemotherapy should be emphasized and those living in revering area are advice to properly treat water and try to eradicate snails which serve as vector for *Schistosoma haematobium.* Total eradication of snail minimized the spread or transmission of *Schistosoma haematobium*. Treatment for those infected will help to solve the problems because it is socio-economic impact, World Health Organization is introducing vaccine against this Schistosomiasis, it will go a long way to prevent the community against the disease.

Keywords: Prevalence, Schistosoma Haematobium, Patients, Heamaturia, Fishing

1. Introduction

Schistosomiasis is an acute and chronic parasitic disease caused by blood flukes (trematode worms) of the genus *Schistosoma*. People are infected during routine agricultural, domestic, occupational, and recreational activities, which expose them to infested water. Lack of hygiene and certain play habits of school-aged children such as swimming or fishing in infested water make them especially vulnerable to infection. In sub- Saharan Africa alone, it is estimated that 70 million individuals experience haematuria, 32 million difficulty in urinating (dysuria), 18 million bladder-wall pathology, and 10 million major hydronephrosis from infections caused by *S. haematobium* annually. The mortality rate due to non-functioning kidneys (from *S. haematobium*) and haematemesis has been estimated to be 150,000 per year

[1]. The above figures show that urinary schistosomiasis is an important public health problem in sub-Saharan Africa, second only to malaria in morbidity [2].

Urinary schistosomiasis caused by *Schistosoma haematobium* is endemic in the sub- Saharan region of Africa, including Nigeria [3, 4].

The economic and health effects of schistosomiasis are considerable and the disease disables more than it kills. In children, schistosomiasis can cause anaemia, stunting and a reduced ability to learn, although the effects are usually reversible with treatment. Chronic schistosomiasis may affect people's ability to work and in some cases can result in death. The number of deaths due to schistosomiasis is difficult to estimate because of hidden pathologies such as liver and kidney failure, bladder cancer and ectopic pregnancies due to female genital schistosomiasis.

Epidemiology

Schistosomiasis is prevalent in tropical and subtropical areas, especially in poor communities without access to safe drinking water and adequate sanitation. It is estimated that at least 90% of those requiring treatment for schistosomiasis live in Africa.

Table 1. *Shows parasite species and geographical distribution of schistosomiasis.*

	Species	Geographical distribution
Intestinal schistosomiasis	Schistosoma mansoni	Africa, the Middle East, the Caribbean, Brazil, Venezuela and Suriname
	Schistosoma japonicum	China, Indonesia, the Philippines
	Schistosoma mekongi	Several districts of Cambodia and the Lao People's Democratic Republic
	Schistosoma guineensis and related S. intercalatum	Rain forest areas of central Africa
Urogenital Schistosomiasis	Schistosoma haematobium	Africa, the Middle East, Corsica (France).

Sources: WHO, March 2020.

In African countries especially sub-Saharan, Nigeria has the heaviest burden of the disease with an estimated 29 million people infected [6]. The disease is transmitted by freshwater snail of the genus Bulinus [7]. Human acquires the infection from the infected snail which are the intermediate host when he comes contact with water containing infective larvae (cercariae) shed by the snail host [8].

The prevalence and morbidity of the infection are particularly linked to agricultural and water development schemes, plus the African lakes and rivers. Infection is predominant among school-age children, in special occupational groups (fishermen, irrigation workers and farmers), in females and other groups using infected water for their domestic purposes [9].

Many countries are working towards eradicating the disease with WHO promoting these efforts. In some cases, urbanization, pollution, and the consequent destruction of snail habitat have reduced exposure, with a subsequent decrease in new infections [10].

Schistosomiasis mostly affects poor and rural communities, particularly agricultural and fishing populations. Estimates show that at least 290.8 million people required preventive treatment for schistosomiasis in 2018, out of which more than 97.2 million people were reported to have been treated, (Global Health Estimates 2016).

The drug praziquantel is used for prevention in high-risk populations living in areas where the disease is common (WHO, 2013). A review of 2014 found tentative evidence that increasing access to clean water and sanitation reduces schistosome infection [10].

Schistosomiasis control has been successfully implemented over the past 40 years in several countries, including Brazil, Cambodia, China, Egypt, Mauritius, Islamic Republic of Iran, Oman, Jordan, Saudi Arabia, Morocco, Tunisia, etc. In Burundi, Burkina Faso, Ghana, Niger, Rwanda, Sierra Leone, the United Republic of Tanzania, and Yemen, it has been possible to scale up schistosomiasis treatment to the national level and have an impact on the disease in a few years, [5].

2. Methodology

2.1. Study Area

Kebbi is a state in north-western Nigeria with its capital at Birnin Kebbi. The state was created out of a part of Sokoto State in 1991. Kebbi State is bordered by Sokoto State, Niger State, Zamfara State, Dosso Region in the Republic of Niger and the nation of Benin. It has a total area of 36,800 km² (14,200sq mi), coordinates: 11°30′N 4°00′E/11.500°N. The northern part of Kebbi State is sandy with the Rima River passing through Argungu to Bagudo Local Government where it empties into the Niger River. In Birnin Kebbi Axis, there is a River called Dukku, which a lot of school children goes to swim, farmers used it for irrigation purpose and people close to that rivers used it for house hold chores and washing of their clothes. Kebbi State is mainly populated by Hausa people, with some members of Fulani, Lelna, Bussawa, Dukawa, Dakarkari, Kambari, Gungawa and Kamuku ethnic communities [11].

2.2. Study Population

The study was carry out among patient attending Federal Medical Centre, (FMC) Birnin Kebbi, within the period of July and August.

2.3. Ethical Approval

Federal Medical Centre, (FMC) Birnin Kebbi, gave the ethical approval for this study and the Head of Department, Medical laboratory was notified and permission granted to obtain the urine samples of those visiting the laboratory.

2.4. Urine Sample Collection and Analysis

2.4.1. Urine Sample Collection

One hundred (100) urine samples were collected from patient attending Federal Medical Centre in Birnin Kebbi metropolis. The samples were collected in a clean universal bottle and a bio-data form was given to the patient.

2.4.2. Procedure

The routine examination of urine of *Schistosoma haematobium*.

The sample was collected, 10-15ml of urine and this was between 10:00am and 2:00pm in a clean dry container. The appearance of the urine was noted and, moderate or heavy infection, the urine which usually contain blood appear red or red-brown and cloudy. Blood is present in some 2 drops of saponin solution was added to lyze the red cells. This make it easier to be detected (the egg). About 10ml of the urine was transfer to a conical tube (centrifuge test tube) and centrifuge at RCF 500-1000g to sediment the schistosome egg.

The supernatant fluid was discarded and the sediment was poured on a clean slide and covered with cover slip and it was view under the microscope with X10 magnification. (Monica Cheezbroug, 2000).

3. Results

Table 2 reveals the prevalence of urinary Schistosomiasis with regards to sex. The samples tested are 100 which 70 male are tested and have a prevalence rate of 12.8% while the female tested are 30 with prevalence rate of 3.3%.

Table 2. *Prevalence of Schistosoma haematobium by sex.*

Sex	Number Examined	Number Infected	Prevalence
Males	70	9	12.8%
Females	30	1	3.3%
Total	100	10	

Table 3 reveals the prevalence of urinary Schistosomiasis with regards to, Age group, high prevalence of urinary Schistosomiasis was recorded in the age bracket of 20-39 year with 13.3% while lowest prevalence was seen in the age bracket of 40-49 with 3.4%.

Table 3. *Prevalence of Schistosoma haematobium by years.*

Age	Number Examined	Number Infected	Prevalence
10yrs	2	0	0
10-19yrs	9	1	11%
20-39yrs	60	8	13.3%
40-49yrs	29	1	3.4%
Total	100	10	

Table 4 shows the prevalence heamaturia among male and female (painful urination and blood in the urine). 100 samples was collected and tested with 70 samples from male and 30 samples from female. The prevalence rate was seen to be high in male with 4% and this can be attributed to majorly swimming, fishing and farming engage mostly by the male counterpart.

Table 4. *Prevalence of haematuria among males and females.*

Sex	Number Examined	Number Infected	Prevalence
Males	70	2	2.8%
Females	30	0	0%
Total	100	2	

4. Discussion

Examination of urine specimens revealed that there are characteristic eggs of *Schistosoma haematobium*. Males with 12.8% prevalence were significantly showing that they are more infected than their female counterparts with an infection rate of 3.3 % in this studies.

Urogenital schistosomiasis is a common parasitic disease and major cause of death topical countries and among children in Nigeria [12].

As shown in table 3 above, the highest infection rate 13.3% occurred among age 20-29yrs. This followed by those aged 10yrs and above with an infection rate of 11%.

The higher infection rates of heamaturia among males 2.8% than females 0% is attributed to greater water contacts behaviours, such as swimming, fishing and farming. The infection rates observed in females is attributed to practices in which girls, more than boys often assist their mothers to fetch water from stream and boreholes, this study recorded lower prevalence rate than that reported in Hassoba in Afar Regional state, Ethiopia (47.6%), from the White Nile River Basin of Sudan (45%), and from Benue (41.5%) [13-15,]. The difference could be as a result of differences in environmental factors such as temperature, humidity etc that can, in turn, lead to differences in transmission intensity and also the number of specimen or sample collected. [16].

The observed higher prevalence in age between 20-39yrs (13.3%) followed by 10-19 years with prevalence rate of 11%, this is probably due to the farming activities, fishing etc, because, that is the active stage in life (productive years) which are actively involved in farming and fishing. The finding on age difference of infection is identical to what is obtainable in many endemic communities in Africa. This differences occurrence of infection may be subjected to difference in epidemiological profile. Sample are collected just single day urine was used for this study which may likely underestimate the severity of infection.

It appears that urinary schistosomiasis is particularly common in this area. It is possible that the prevalence recorded in the present study was an under-estimate of the true value, given that it was based on the results of the examination of just one urine sample per subject [17].

With a 12.8% prevalence rate of *Schistosoma haematobium* infection observed among patient attending Fe=deral Medical Centre, Birnin Kebbi, the infection rate can be said to be relatively common. Many infected male children considered haematuria (blood with urine) as a sign of maturity rather than a symptom of infection. This has serious implication on the control and treatment of infection.

5. Conclusion

It is seen that people living in riverine area are the most affected with Schistosomiasis. The prevalence rate of those affected with Schistosomiasis at the time of study was low. It also reveals that knowledge about the cause, transmission, symptoms and prevention of urinary Schistosomiasis is inadequate and that this could be a challenging obstacle to the elimination of Schistosomiasis. Mass chemotherapy should be emphasized. Schistosomiasis is transmitted through species of snail vector and the human schistosomiasis is transmitted by Schistosoma haematobium.

6. Recommendations

Those living in revering area are advice to properly treat water and try to eradicate snails which serve as vector for *Schistosoma haematobium*. Total eradication of snail minimized the spread or transmission of *Schistosoma haematobium*.

Since the World Health Organization is introducing vaccine against this Schistosomiasis, it will go a long way to prevent the community against the disease. It is also recommended to complement the praziquantel for the treatment of those infected with the disease. Treatment for those infected will help to solve the problems because it is socio-economic impact.

Therefore, continuous disease evaluation and implementation of a broad-based public health and socioeconomic development that includes provision of clean and safe drinking water and health education are essential to prevent the transmission of infection in the endemic areas.

Authors' Contributions

This work was carried out in collaboration between the three authors. Author Adah Maria and Dajuma Basirat designed the study and wrote the protocol. Authors Iboyi Nathaniel Onuche performed the statistical analysis, wrote the first draft of the manuscript while Harrison Ogala and Chidozie Ekene managed the literature searches. Authors Ojei Shiela, Adipere Ebiye and Iboyi Nathaniel Onuche managed the analyses of the study. All authors read and approved the final manuscript.

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