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Short Communication

Urinary Schistosomiasis around Oyan Reservoir, Nigeria: Twenty Years after the First Outbreak

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Abstract

Background: Oyan reservoir, South-West Nigeria was constructed in 1984 to generate electricity but has altered the existing physical, biological and socio-economic environment of the people. This study, carried out between October 2006 and March 2008, aimed at investigating the current status of *Schistosoma haematobium* infection around the reservoir.

Methods: Urine samples from 536 participants in five communities were examined for haematuria using reagent strips and *S. haematobium* ova was detected using sedimentation by gravity method. The participants were drawn from Abule Tuntun (n= 115), Ibaro (n= 156), Imala Odo (n= 88), Imala (n= 103) and Apojula (n= 74) communitie.

Results: Prevalence rates by haematuria were (Abule Tuntun- 33.04%; Ibaro- 73.07%; Imala odo- 60.22%; Imala- 7.77%; Apojula - 39.19%) and by presence of parasite ova were (Abule Tuntun- 39.13%; Ibaro- 83.97%; Imala Odo- 62.5%; Imala- 20.39%; Apojula- 54.05%).

Conclusion: *S. haematobium* transmission has been sustained in the reservoir since the outbreak was first reported in 1988. Mass treatment with praziquantel was conducted 8 years ago (2001) in two of the communities. However, the infection has persisted due to lack of pipe borne water and safe waste disposal system.

Keywords: *Urinary schistosomiasis, Oyan reservoir, Nigeria*

Introduction

Schistosoma haematobium infection is widely distributed in Nigeria and is hyper endemic in many states of the north and southwest with moderate to low endemicity in the southeast (1-3). The infection has been associated with water resource development projects such as dams and irrigation schemes, slow-flowing or stagnant water, where the snail intermediate host of the parasite breeds (4). Ogbeide and Uyigue (5) also observed that the main courses of large rivers may not usually be a major source of schistosomiasis, but waters sustained by them through seasonal flooding, impoundment and extraction for irrigation. The disease is essentially an infection of rural and agricultural communities where the way of life of people promotes the contamination of inland water with human excreta.

The upsurge in dam construction in Nigeria in response to the Sahelian drought of the 1970s has contributed largely to the shift in the disease transmission bionomics, with a shift from flowing rivers, streams and ponds to artificial lakes and dams. Of 325 registered dams in Nigeria, over 246 (77%) were constructed since 1970 (4). More than 200 (62%) of these dams were built in 10 most endemic states, the rest in the other 26 less endemic states (3). One of such dams is Oyan reservoir in Ogun state, southwest Nigeria. The reservoir was constructed in 1984 and within four years of its construction, Ofoezie et al. (6) reported an outbreak of urinary schistosomiasis in two resettlement communities (Abule Tuntun and Ibaro) located around the reservoir.

According to the record made available to this research team by the Disease Control Unit of

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Ogun State Ministry of Health, a mass treatment with praziquantel tablets was conducted about eight years (2001) ago in just two of the communities, which are Imala and Imala Odo. This paper therefore reports the current status of urinary schistosomiasis in five communities around the reservoir, 24 yr after the reservoir was established and 20 yr after the outbreak of urinary schistosomiasis was first reported (6) in two communities (Abule Tuntun and Ibaro) around the reservoir.

Materials and Methods

Study sites

The study was conducted in 5 communities between Oct 2006 and Mar 2008. The communities were Abule Tuntun, Ibaro, Imala Odo, Imala and Apojula, all situated around Oyan Reservoir. The reservoir is located at latitude 7º14'N and longitude 3º13'E near Abeokuta, Ogun state, Southwest Nigeria. It is a multipurpose reservoir used mostly for water, flood control, fishing and irrigation. The main occupations in these communities are fishing and farming. The communities, just like many rural areas in the country, lack some basic infrastructures such as electricity, pipe borne water and safe waste disposal.

Participants' selection (Inclusion/exclusion criteria)

Everyone in the five communities was invited to participate in the study with the exception of children under the age of five, old and/or debilitated people, pregnant women and lactating mothers. Also any girl/woman menstruating at any point of urine collection was excluded. At the end of selection, the study participants were made up of 312 (58.2%) males and 224 (41.8%) females, and the age range was 5-82 yr with median being 30 yr.

Ethical consideration

The study was approved by the Institutional Review Board of the Nigerian Institute of Medical Research, while permission to carry out the study in the communities was taken from Ogun State Ministry of Health and Abeokuta North Local Government Authority. Informed consent was obtained from each participant or parents/guardians of children aged below 18 yr prior to the investigation.

Urine collection

Demographic data including the name, surname, age, sex and weight of all participants were recorded while every participant was allocated a unique code of six digits representing village, household and individual numbers. About 200ml of voided mid-stream urine was collected between 10.00 am and 2.00 pm, on each collection day, for maximum egg yield following the observations made by Weber et al. (7) into sterile wide mouth containers labeled with the corresponding study code. The urine samples were transported immediately to the laboratory.

Parasitological examinations

Urine samples collected from each of the 536 participants were examined for hematuria using commercially prepared semi quantitative reagent strips (Hemastix; Boehringer Mannheim, Germany). Each urine sample was examined for *S. haematobium* ova using the sedimentation by gravity method according to Asaolu and Ofoezie (8).

Statistical analysis

The data was analyzed using Epi Info with the application of Chi-square and Analysis of Variance (ANOVA).

Chemotherapy

All the infected participants were offered treatment with a single dose of praziquantel (Bilarcil, Bayer) at 40 mg/kg of body weight at the end of the investigation.

Results

Study population

There were a total of 536 participants drawn from the 5 communities as follows: Abule Tun-

tun- 115; Ibaro- 156; Imala Odo- 88; Imala- 103; Apojula - 74 as shown in (Table 1). Out of these were 312 (58.2%) male and 224 (41.8%) female, and the age range was 5 to 82 yr with the median being 30 yr.

Schistosoma haematobium *infection*

All the 536 participants from the five study communities were examined for *S. haematobium* infection. Two hundred and forty two (45.15%) tested positive for haematuria (Table 2) while parasite eggs were seen in 293 (54.66%) as shown in (Table 3). Schistosome infections were found across the five communities, Imala recorded the lowest prevalence of 7.77% while Ibaro exhibited the highest prevalence of 83.97% as shown in Tables 2 and 3 respectively.

Table 1: Populations of the participants in the five study communities

Serial no.	Community	Male	Female	Total	%
1	Abule Tuntun	70	45	115	21.5
2	Ibaro	95	61	156	29.1
3	Imala Odo	51	37	88	16.4
4	Imala	54	49	103	19.2
5	Apojula	41	33	74	13.8

Table 2: Prevalence of *Schistosoma haematobium* infection in the study communities determined by haematuria

Serial no.	Community	No. examined	No. infected	Prevalence (%)
1	Abule Tuntun	115	38	33.04
2	Ibaro	156	114	73.07
3	Imala Odo	88	53	60.22
4	Imala	103	8	7.77
5	Apojula	74	29	39.19

Table 3: Prevalence of *Schistosoma haematobium* infection in the study communities determined by presence of parasite ova in urine

Serial no.	Community	No. examined	No. infected	Prevalence (%)
1	Abule Tuntun	115	45	39.13
2	Ibaro	156	131	83.97
3	Imala Odo	88	55	62.5
4	Imala	103	21	20.39
5	Apojula	74	40	54.05

Discussion

This study showed that transmission of urinary schistosomiasis has continued in Oyan reservoir twenty years after it was first reported by Ofoezie et al. (6). This is also typical of many other communities situated around water reservoirs, lakes and dams in Nigeria where there are uneven distribution of natural water resources, poverty, ignorance and low-sanitation standards (5, 9). These results also showed that although only two communities were investigated between 1984 and 1991 by Ofoezie et al. (6), the risk of transmission in Oyan reservoir has also spread to three new settlements that were created thereafter.

In conclusio*n* we suggest that sustainable schistosomiasis control in artificial water bodies requires a holistic approach, involving simultaneous implementation of control measures in all endemic communities around artificial water im-

poundments. This will help to avoid a situation whereby transmission will be interrupted in some communities while it continues actively in others and also spreading to the control areas sooner than later.

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