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# Schistosomiasis in Ogbese-Ekiti, Re-Infection After Successful Treatment with Praziquantel

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**Abstract** – Urinary schistosomiasis infection is one of the major public health problem facing developing countries with school age children at greater risk. Previous studies showed that Ogbese Ekiti is endemic for urinary schistosomiasis. The impact of chemotherapy was evaluated using praziquantel (40mg/kg body weight) on *S.heamatobium* among school pupils in Ogbese-Ekiti, Ekiti State, Nigeria. Urine samples were collected between the hours of 7.00am and 10.00am. The number of eggs in 10ml of each urine sample was calculated from the mean of two counts. At baseline, one hundred and seventy two (172) pupils were screened for eggs of the *S.heamatobium* out of which **75.6%** were positive with high egg intensity ranging between 40-780 eggs/10ml of urine. Out of the one hundred and seventy two screened, thirty subjects with high egg intensity (440-780 eggs/10ml of urine) were treated with praziquantel in January 2009. After 10 days post treatment, the urine samples of the thirty subjects were negative for *S.heamatobium*. The subjects were monitored monthly for re-infection for seven consecutive months (February – August).Re-infection was first noticed in May.

**Keywords** : *Schistosomiasis, praziquantel, S.heamatobium, endemicity, Macrohaematuria, Bulinus (B) globossus, cercariae.*

**GJMR-A Classification** : NLMC Code: WC 810



SCHISTOSOMIASIS IN OGBESE-EKITI, RE-INFECTION AFTER SUCCESSFUL TREATMENT WITH PRAZIQUANTEL

*Strictly as per the compliance and regulations of:*



# Schistosomiasis in Ogbese-Ekiti, Re-Infection After Successful Treatment with Praziquantel

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**Abstract** - Urinary schistosomiasis infection is one of the major public health problem facing developing countries with school age children at greater risk. Previous studies showed that Ogbese Ekiti is endemic for urinary schistosomiasis. The impact of chemotherapy was evaluated using praziquantel (40mg/kg body weight) on *S. haematobium* among school pupils in Ogbese-Ekiti, Ekiti State, Nigeria. Urine samples were collected between the hours of 7.00am and 10.00am. The number of eggs in 10ml of each urine sample was calculated from the mean of two counts. At baseline, one hundred and seventy two (172) pupils were screened for eggs of the *S. haematobium* out of which 75.6% were positive with high egg intensity ranging between 40-780 eggs/10ml of urine. Out of the one hundred and seventy two screened, thirty subjects with high egg intensity (440-780 eggs/10ml of urine) were treated with praziquantel in January 2009. After 10 days post treatment, the urine samples of the thirty subjects were negative for *S. haematobium*. The subjects were monitored monthly for re-infection for seven consecutive months (February – August). Re-infection was first noticed in May. The rate of re-infection for the months of May, June, July and August were 11(36.7%), 13(43.3%), 17(56.7%) and 19(63.33%) respectively. Macrohaematuria was absent in the thirty pupils in the first five months but surfaced in the sixth and seventh months with percentage macrohaematuria of 30% and 37.7% respectively. *Bulinus* (*B*) *globosus* collected from river Ogbese is the major transmission foci shed cercariae of *S. haematobium*. The study shows that mass chemotherapy, elimination of the snail intermediate host and not selective treatment will be an effective method to reduce transmission of *S. haematobium* in Ogbese-Ekiti community.

**Keywords** : *Schistosomiasis*, *praziquantel*, *S. haematobium*, *endemicity*, *Macrohaematuria*, *Bulinus* (*B*) *globosus*, *cercariae*

## I. INTRODUCTION

Schistosomiasis, is the second most important parasitic disease, with over 200 million people being infected in 74 countries world wide (Remme *et al*, 1993). Urinary schistosomiasis is endemic in Nigeria particularly in rural areas (Edunbgola, 1988; Adewunmi, 1991). Previous studies on urinary schistosomiasis in Nigeria has been concentrated in the Western and Northern areas (Ugbomoiko, 2000). The presence of many snail species especially the *Bulinus* species, and increased contact time with the

*Schistosoma haematobium* infested freshwater habitat were thought to be responsible for the prevalence of the disease in Ogbadibo local government area, Benue State, Nigeria (Mbata *et al*, 2008). In Ekiti state, the status of urinary schistosomiasis has been well documented., although majority of the studies were based on prevalence, pathology and epidemiology (Ologunde, 2005; Ologunde, 2009).

Chemotherapy is generally recognized to be the most important, rapid and cheap method to reduce morbidity due to schistosomiasis. The treatment of schistosomiasis has been transformed with the introduction of praziquantel which is effective generally in a single dose and against all species of the parasite. Other drugs include metronidazole and oxaminiquine. In 1998 Talaat and Miller treated schistosomiasis with high success rates (83.6%).

McManus *et al*, 2010 in their study concluded that the inclusion of focal mollusciciding, improvements in sanitation, and health education into the control scenario, may help to achieve China's target of reducing the level of schistosome infection to less than 1% by 2015. While a need for national helminth control program is confirmed in Mozambique by Augusto *et al*, 2009.

Studies on schistosomiasis in Ogbese-Ekiti carried out by our research team started in the year 2000. The prevalence at that time was 82%. The prevalence increased gradually and by 2007 it was 87.5% (Ologunde, 2009). In the year 2008, mass chemotherapy with praziquantel was carried out among the primary and secondary school pupils in the community. Although a hundred percent cure was recorded after treatment, by the year 2009, the prevalence was 75.6% among the pupils. The resurgence of the disease in 2009 despite mass chemotherapy prompted our research team to carry out this study on the rate of re-infection after successful treatment with praziquantel. This research therefore studied the rate of *S. haematobium* re-infection seven months after successful treatment with praziquantel.

## II. METHODOLOGY

### a) Prevalence of Urinary Schistosomiasis

The prevalence of urinary schistosomiasis was carried out in the primary and secondary schools in Ogbese-Ekiti. Prior to collection of urine samples, all the

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school headmasters and principal were contacted for permission, cooperation and necessary briefing regarding the purpose, relevance and personal involvements of the exercise. In each of the schools, health education lectures were carried out for enlightenment about the disease. Questionnaires were administered according to the method of Edugbola *et al* (1988). Also, their urine samples were collected.

#### b) Collection of Urine

Urine samples were collected from 172 school children in two primary and one post primary schools in Ogbese-Ekiti between the hours of 10:00am and 11:00a.m aided by their class teachers, the samples were labeled appropriately and brought to the laboratory. Each of the sample was thoroughly mixed to ensure even distribution of contents. An aliquot of 10ml of each sample was centrifuged at 2000 rpm for 5 minutes. The supernatant (9ml) was decanted and a drop of 0.05ml of the supernatant and the number of eggs were counted. The number of eggs in 10ml of each urine sample was calculated from the mean of results of counts from four fields and recorded as number of eggs/10ml of urine. Of the 172 samples examined, 30 with high egg intensity (440-780) were selected (10 from each school) and drugs were administered to the children selected with the help of the nurses at the health centre in Ogbese-Ekiti. The drug administered was praziquantel (40mg/kg body weight) and it was taken at intervals of 4 hours after ingestion of food. Samples of urine were collected from the children for 10 days after drug administration to observe the rate of egg clearance. After total clearance

i.e. successful treatment, the children were observed every month for seven months for re-infection.

### III. RESULTS

There were 172 subjects examined in the study and 130 (75.6%) were positive for at least one *S. haematobium* egg. Egg intensity per 10ml of urine ranged from 40-780. The highest prevalence occurred among the 13-15 years age group while the lowest occurred among the 10-12 year as group. Males were more infected (79.8%) than female (70.5%) although there was no significant difference ( $P < 0.05$ ). The overall percentage macrohaematuria was 22%.

The results of selective chemotherapy and re-infection studies are presented in tables 3-4. The baseline average egg count was 567.3, this average baseline egg counts reduced by 54.2%, 69.9%, 99.6% and 100% on days 1, 2, 5 and 10 respectively.

All the thirty subjects treated with praziquantel had zero level of *S. haematobium* on or before day 10. The results of re-infection after zero level egg count in January is presented in fig. 1-2. There was no cases of re-infection in the first three months (February, March, April). There were 11(33.7%) cases of re-infection in May, 14(43.3%) in June, 17(56.7%) in July and 14(65.3%) in August. There was no visible macrohaematuria in the first five months. In July and August, the percentage of macrohaematuria was 30% and 36.7% respectively. Female had more re-infection (71.4%) than male (56.3%). The average egg intensity/10mL of urine increased from 32.7% in May to 38.6% in June, 72.9% in July and 105.3% in August.

### RESULTS

*Table 1 :* Prevalence of Schistosoma haematobium Infection in Relation to Age Group among School Pupils in Ogbese-Ekiti, Ekiti State.

TOTAL				MALE			FEMALE		
Age group	Number examined	Number infected	% infected	No of examined	No infected (prevalence)	% infected	Number examined	Number infected	% infected
4-6	25	20	80.0	11	10	90.9	14	10	71.4
7-9	42	31	73.8	19	12	63.2	23	19	82.6
10-12	60	41	68.3	31	24	77.4	29	17	58.6
13-15	45	38	84.4	33	29	87.9	12	9	75.0
Total	172	130	75.6	94	75	79.8	78	55	70.5

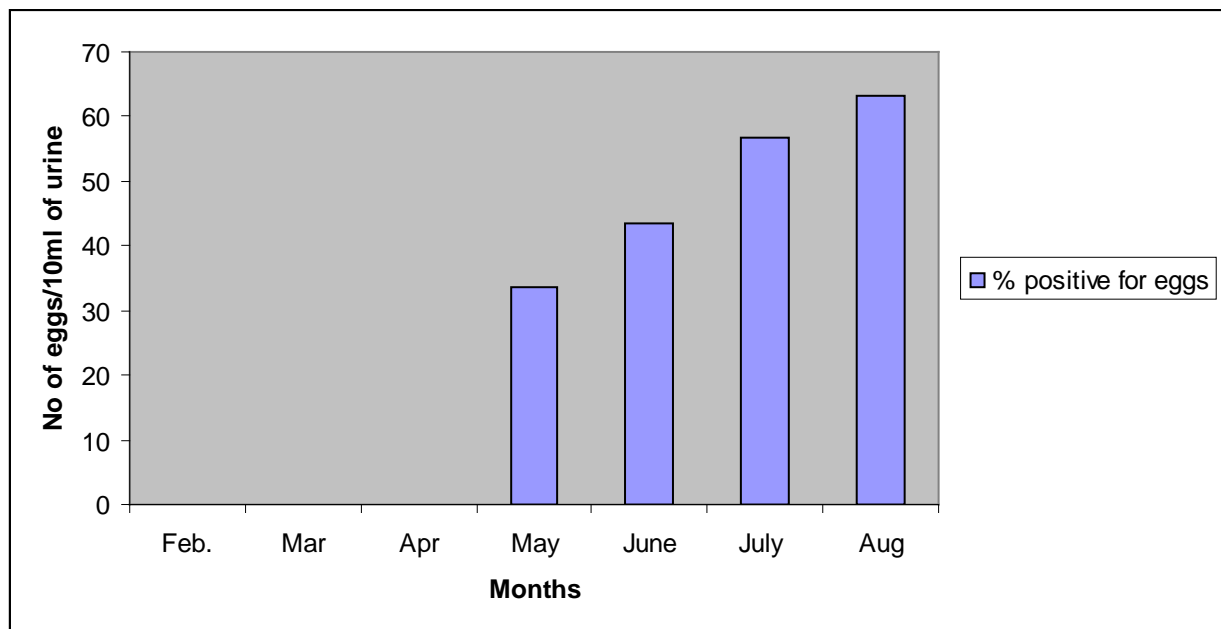
**Table 2 :** Prevalence of Macrohaematuria in Relation to Sex in School Children in Ogbese-Ekiti, Ekiti State.

Sex	Number Examined	Number Infected	Macrohaematuria (%)
Male	94	75	25(25.6%)
Female	78	55	13(16.7%)
<b>Total</b>	<b>172</b>	<b>130</b>	<b>38(22.1%)</b>

**Table 3 :** Average Rate of Egg Clearance after Drug Administration.

Days	Before Drug	After Drug				
	Administration	Administration				
Average	Day 0	Day 1	Day 2	Day 5	Day 10	
Egg intensity	567.3	260.00 [54.2%]	170.70 [69.9%]	2 [99.6%]	0 [100%]	

The Figure in parenthesis represent percentage egg clearance

**Figure 1 :** Rate of Re-infection with *S. haematobium* with time.

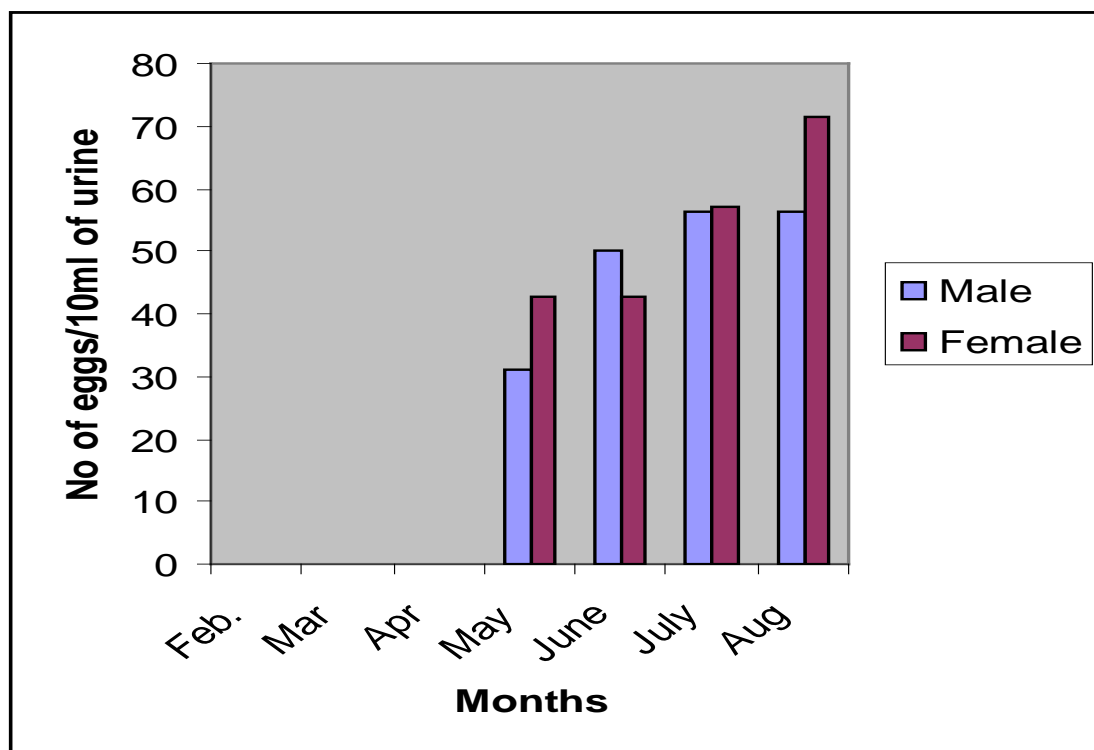


Figure 2 : Rate of Re-Infection according to Sex.

Table 4 : Rate Of Macrohaematuria With Time.

Months	Feb.	Mar.	Apr.	May	June	July	August
%							
<b>Machaematobium</b>	0	0	0	0	0	30%	36.7%

#### IV. DISCUSSION

Praziquantel is rapidly metabolized and excreted predominantly via the kidney and partially via the liver and has been proved to be effective against *S. haematobium* infection at 40mg/kg body weight (Dickmand and Buhning, 1976). Talaat and Miller (1998) reported 83.6% reduction in the prevalence of *S. haematobium*, one year after treatment with praziquantel in upper Egypt. In this study, a cure rate of 100% was observed at 40mg/kg body weight within one month of treatment. There were no reported cases of re-infection within 3 months after treatment and cure in this study. This is consistent with the observation that the time limit between cercariae penetration and the appearance of the first egg in the urine is 3-4 months (Ukoli, 1990). In this study, the rate of re-infection among female is higher than that of male, although there was no significant difference ( $P < 0.05$ ). Previous studies on water contact activities in Ogbese-Ekiti confirmed that female have higher water contact activities than male (Ologunde, 2005). However, males were more infected (79.8%) than female (70.5%) before treatment but there

was also no significant difference ( $P < 0.05$ ). This is in line with work of Chidi *et al* (2006). Macrohaematuria one of the indicator of urinary schistosomiasis was observed in the study. The rate was higher after cercariae reinfection than pretreated samples.

Although two brands of praziquantel bought from different locations were used in this study the results showed that adulterated praziquantel is presently not circulated in Ekiti State, Nigeria. The fact that Re-infection occurred 4 months after total cure showed that Mass Chemotherapy and not selective treatment would be an effective control measure against *S. haematobium*. Selective chemotherapy studies have different objectives; i.e. to reduce and prevent morbidity (Talaat and Miller, 1998). Several studies confirmed that incidence, re-infection and egg counts were higher in community where mass chemotherapy had not been applied (El-Enien *et al*, 1993; Webbe & Haky, 1990; Kessler *et al*, 1987; Kitron and Higashi, 1985; King *et al*, 1982). It is therefore important to carryout mass chemotherapy on all subjects adults and children in Ogbese-Ekiti community to reduce incidence, re-infection and egg intensity. Also, McManus *et al*, 2010 in

their study concluded that the inclusion of focal mollusciciding, improvements in sanitation, and health education into the control scenario will reduce significantly the level of schistosome infection. It is therefore also important to control the snail intermediate host of *S. haematobium* (*B. globosus*) as also confirmed by the study of Ologunde (2005, 2009). Mbata *et al* in 2008 showed that *schistosoma haematobium* infested freshwater habitat is responsible for the prevalence of the disease in the area studied. A national helminth control program is equally important (Augusto *et al*, 2009). Piped borne water should be provided in Ogbese-Ekiti to reduce water contact activities with river Ogbese the transmission site.

## V. CONCLUSION AND RECOMMENDATION

The study showed a high rate of re-infection and confirmed that mass chemotherapy and not selective treatment would be the most effective measure in the control of *S. haematobium* in Ogbese-Ekiti community of Ekiti-State, South-Western Nigeria.

The snail intermediate host of *S. haematobium* should be eliminated by treatment of the water with molluscicides in the month of February as confirmed by previous studies.

Health Education should also be organized to enlighten the subjects in Ogbese community about the health implication of urinary schistosomiasis.

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