

**SCHISTOSOMIASIS IN IPOGUN: UPDATE ASSESSMENT ON ENDEMICITY AND
EFFICACY OF PRAZIQUANTEL IN CHEMOTHERAPY.**

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ABSTRACT

Schistosomiasis, a water-borne disease, still remains a major public health disease and the second most prevalent tropical disease after malaria. This study assessed the present endemicity of urinary schistosomiasis among school aged pupils in Ipogun, a notable endemic village in Ondo state, Nigeria. It also assessed the efficacy of single dose praziquantel in treatment. Urine samples were collected from a total of 567 pupils from five different primary schools in the village and examined using centrifugation method. Results revealed that 100 pupils (18%) were positive at the first screening and were treated with single dose Praziquantel (40mg/kg body weight) and re-examined 3 weeks after treatment. Post-treatment urinalysis showed that 80 of the previously infected pupils returned negative three weeks after initial treatment giving 80% parasitological cure rate. Our findings revealed that prevalence of infection had reduced remarkably in the village and that praziquantel is still effective and remains a reliable drug of choice in chemotherapy.

Keywords: urinary schistosomiasis, endemicity, praziquantel, efficacy, Ipogun

INTRODUCTION

Schistosomiasis is caused by trematode flatworms of the genus *Schistosoma*. The second most prevalent tropical disease affects approximately 200 million people worldwide, an estimated 85% of whom live in Africa, and particularly the poor in rural settlements in the developing countries (Engels *et al.*, 2002; Chitsulo *et al.*, 2000; Chitsulo *et al.*, 2004). It is considered by the World Health Organization as the second most socio-economically devastating parasitic disease, next only to malaria, with hundreds of millions infected worldwide both in the tropical and

subtropical regions. The distribution of the different species depends mainly on the ecology of the snail hosts. Natural ponds and lakes are typical sources of infection, but over the past few decades man-made reservoirs and irrigation systems have contributed to the spread of schistosomiasis. The disease is largely a rural problem, but urban foci can be found in many endemic areas. [Akufongwe *et al.*, 1995] Snail populations, cercarial density, and patterns of human water contact show strong temporal and spatial variations, resulting in a focal distribution of the infection within countries, regions, and villages. Those at high risk of infection are people involved in fishing activities, farming, bathing, paddling of canoes, swimming and possibly handling of infected snail host in the case of collecting edible ones.

In Nigeria, *Schistosoma haematobium* infection had been found in many parts of the country with varying intensities and prevalence rates and incidence is believed to be on the increase (Okon *et al.*, 2007). The true epidemiological data appears difficult in developing nations, because of inadequate researches and no epidemiological control/ information centre on tropical diseases despite its relevance in planning for control in any locality. In Ondo state, the disease is a public health problem where the prevalence rates in all 18 Local Government Areas was between 41- 95.7%, with Ifedore Local Government having 47.3% (Odaibo *et. al.*, 2004). Urinary schistosomiasis is endemic in Ipogun village, Ondo state. The village came into limelight in 2001 when 'Newslime', a national television documentary reported it as a village where men menstruate! Since then it has remained endemic with epileptic prevalence rates ranging from 59% in 2003 (Oniya and Odaibo, 2006) to 53.1% in 2006 (Oniya and Jeje, 2010). Oniya and Olofintoye (2009) also reported a prevalence rate of about 18.22% among school pupils in the Local Government area in 2008.

Chemotherapy still remains the principal tool in the global battle against the scourge with Praziquantel being the current drug of choice. As eradication of schistosomiasis is still beyond human and financial resources, the aim of most control programs remains the reduction of morbidity by treating infected people on an individual or population basis by using chemotherapeutic agents such as Praziquantel [WHO, 1993]. Praziquantel was effectively used to treat schistosomiasis since the last two decades [WHO, 1993; Magnussen, 2003]. The

treatment of schistosomiasis by Praziquantel requires administration of a single dose 40mg/ kg of body weight [Engels *et al.*, 2002]. Recently, there have been concerns on drug resistance in praziquantel-induced therapy in schistosomiasis. Praziquantel is virtually the only drug currently available for clinical management and control. It is noteworthy that pressure on praziquantel is growing, following the policy adopted at the 54th World Health Assembly to increase distribution of the drug and treat at least 75% of school-aged children and other high-risk groups living in areas with high burden of the disease by 2010 (Colley 2001; WHO 2002; Hagan, 2004), and new efforts made by the Schistosomiasis Control Initiative to millions of school-aged children in selected African countries (Fenwick, 2006). In an earlier mathematical model, King *et al.* (2000) reported that praziquantel resistance by *S. haematobium* was predicted to emerge in about 10 or more years the import of resistance to praziquantel in disease management will be grave as there are no suitable alternatives for now. Hence constant field evaluation is desirable to keep up with the drug's performance.

MATERIALS AND METHODS

Study Area

The study was carried out in Ipogun, (7° 19'N; 5° 05'E), a village in Ifedore local government area of Ondo State, south west Nigeria. The primary source of water for agrarian and most domestic activities is the 'Aponmu' river, flowing through the village; it is this river that serves as the contact site. The inhabitants are mainly farmers who use water from the river in carrying out their daily and recreational activities including bathing and washing. The two distinct seasons in the area are the wet and dry seasons. The wet season lasts from April to October and is characterized by heavy rains characterised by occasional flooding of river banks. The dry season lasts from November to March, characterized by increased temperature (Oniya and Jeje, 2010)

Study Subjects

Five primary schools in Ipogun community were surveyed. The primary schools are Morohunkeji nursery and primary school, Muslim primary school, St. Jude primary school, St. Paul CAC primary school and Evangel nursery and primary school. Before embarking on urine collection, the state ministry of health was contacted and the study was integrated into the routine mass chemotherapeutic school based programmes carried out by the health ministry. Similarly,

the village king and the basic health care coordinator were informed as well as the heads of schools and teachers. The names of the pupils were collected in their various classes in accordance with the arrangement on the class register presented by the class teachers.

Urine Collection and Analysis

The survey was conducted between March and April, 2012, Urine samples were collected between 09:00 and 12:00h. Demographic data including the name, age, gender and weight of all participants were recorded. Each pupil was given a clean, dry, screw-capped bottle to urinate in. The urine collected was then immediately taken to the laboratory for analysis. A total of 567 [294 (52%) male and 273 (48%) female] samples were collected. Urine samples were analyzed using the centrifugation method as described by. The eggs were counted and recorded as eggs/10 ml of urine. All pupils were treated alongside the state's mass chemotherapy campaign with praziquantel (40 mg/kg body weight). Positive-Treated pupils, were rescreened three weeks post treatment. The drugs were supplied by the Ondo State ministry of health.

RESULTS

Urinalysis/ Prevalence by School

Out of the pupils 567 examined, 100 (18%) were infected, 109 (19%) showing visible haematuria (Table 1). The overall prevalence rate in the five schools was 18% and the highest prevalence recorded in Morohunkeji primary school with 48.44% and 32 (17%) cases of haematuria. St Jude nursery and primary school was the second highest with prevalence of 22% while Muslim nursery and primary school and Evangel nursery and primary showed prevalence of 15% and 13% respectively. The lowest prevalence rate was observed in St Paul CAC primary school (11%). Gender prevalence showed 58 (10%) male and 42 (7%) female infected pupils (Table 2).

Post-Treatment Assessment

3 weeks after treatment, the Positive-Treated subjects were re-screened to assess the efficacy of the administered drug. Out of the 100 pupils that were initially positive in all the schools, 20 (20%) of

146 them were still found infected after 3 weeks of treatment (Fig. 1). The drug showed an overall
 147 Parasitological cure rate of 80% and produced significant reduction in cases of haematuria, from
 148 109 (24%) to 4 (4%).

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151 Table 1: Prevalence of Urinary Schistosomiasis among school pupils in the Study area

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School	Male (%)	Female (%)	No of Positive (%)	Haematuria (%)
Morohunkeji nur/pry	93 (48%)	99 (52%)	38 (20%)	32 (29%)
Muslim nur/pry	49 (54%)	42 (47%)	14 (15%)	5 (5%)
St Jude nur/pry	73 (53%)	65 (47%)	30 (22%)	50 (46%)
Evangel nur/pry	58 (57%)	44 (43%)	13 (13%)	16 (15%)
CAC nur/pry	21 (48%)	23 (52%)	5 (11%)	6 (6%)
Total	294 (52%)	273 (48%)	100 (18%)	109 (19%)

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163 Table 2: Gender prevalence in the study population.

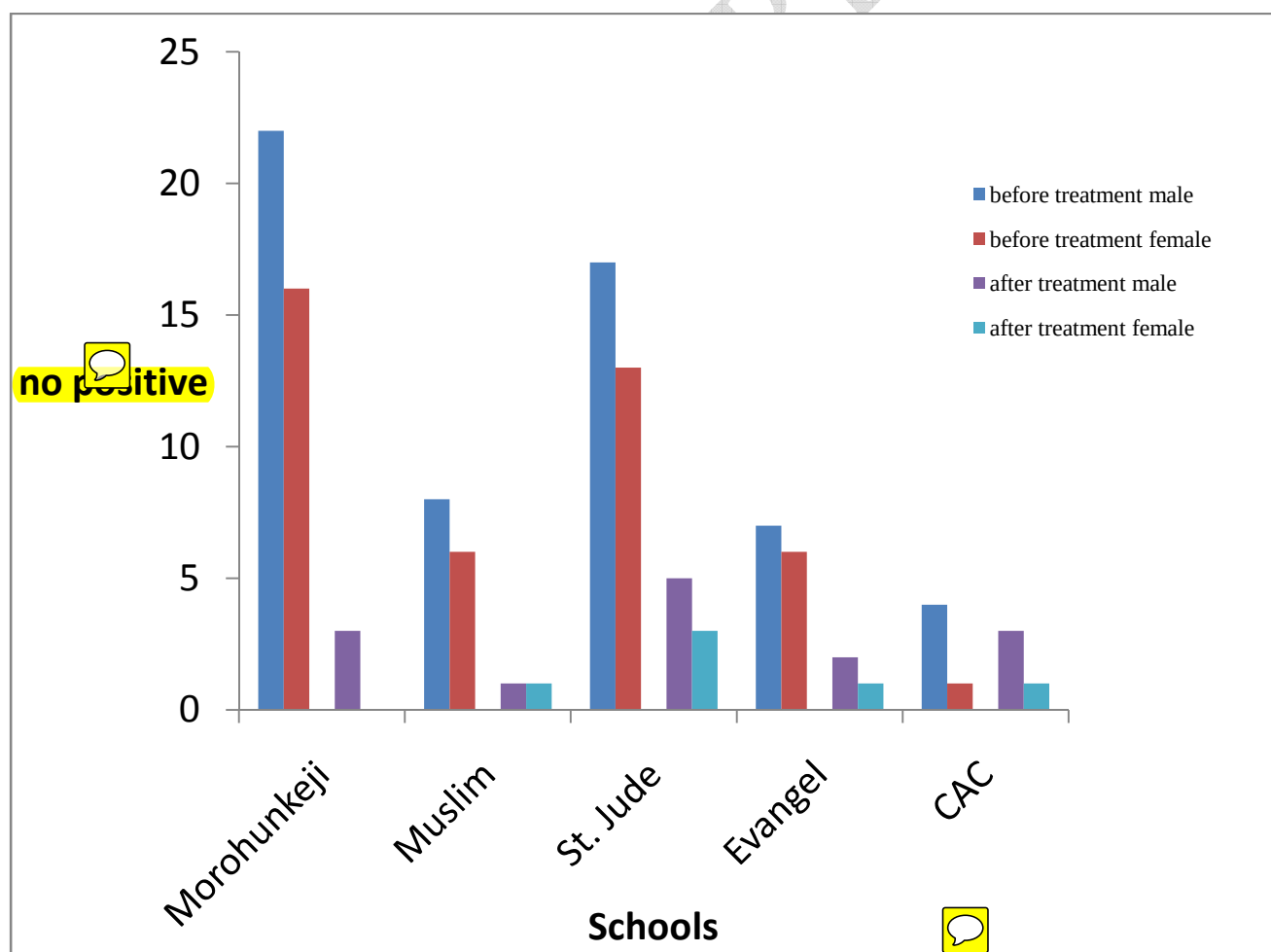
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School	No Examined Male (%)	No positive Male (%)	No Examined Female (%)	No positive Female (%)	Total
Morohunkeji	93 (45%)	22 (11%)	99 (52%)	16 (8%)	192
Muslim	49 (54%)	8 (9%)	42 (47%)	6 (7%)	91
St. Jude	73 (53%)	17 (12%)	65 (47%)	13 (10%)	138
Evangel	58 (57%)	7 (7%)	44 (43%)	6 (6%)	102
CAC	21 (48%)	4 (9%)	23 (52%)	1 (2%)	44
Total	294 (52%)	58 (10%)*	273 (48%)	42 (7%)*	567

*% related to the total population not gender

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Fig.1. Frequency of infection in pupils before after treatment with Praziquantel.

DISCUSSION

Schistosomiasis remains one of the major health problems among school aged children in Ipogun. A high intensity of infection implies repeated exposure to infection (Betterson *et al.*, 1988) which may be the case in the present study as previously identified (Oniya and Odaibo, 2006). The low prevalence of 18%, same as reported by Oniya and Olofintoye (2009), may be as a result of increased awareness and some form of interrupted/staggered intervention through previous works conducted in the village (Oniya and Odaibo, 2006; Oniya and Olofintoye, 2009; Oniya and Jeje, 2010) over the last nine years. However the inherent socio-cultural behaviour in the village (Oniya, 2007) and interrupted control programmes will always expose them to re-infection thus making absolute control very tedious. Prevalence in male was higher than female. This may be attributed to the greater exposure of male pupils because of their water contact activities like fishing, swimming etc (Oniya, 2007).

Praziquantel administered in a single oral dose at 40mg/kg body weight showed 80% parasitological cure rate 3 weeks post-treatment. Presently, disease control is principally centered on chemotherapy in Ondo state, however, the rate of re-infection following parasitological cure is another concern for a multi prolonged approach. Gender specific result revealed that the number of male pupils (58) infected was higher than female (42) and expectedly, results also showed that pupils from schools that were close to the village river had the highest prevalence of infection.

There have been several calls for inclusion of infant and pre-school children for treatment in schistosomiasis control programmes in endemic countries (Mafiana *et al.*, 2003; Okpara *et al.*, 2007). Although, all school-aged pupils except under 3yr old that tested positive were treated with the standard dose 40 mg/kg of praziquantel and there were no apparent side effects or non compliance issues. However, the issue of the safety of praziquantel in infants less than 3 years old needs to be addressed as seen in a recent study where side effects were reported (Sousa *et al.*, 2010). Therefore, further studies are needed in other endemic communities on the safety of praziquantel treatment in infants so that the treatment can be extended to this age group.

The problem of lack of potable/pipe borne water supply in schools and homes in Ipogun puts the children at high risk of exposure to infection and re-infection. Having surveyed this community in the last nine years, one perhaps may wish to suggest that in developing countries, where there is abject poverty and poor health delivery system, control ambitions should first be to reduce the scourge to a single digit prevalence rate and once attained total eradication may ensue. Even at this, it will take concerted efforts to have a 2 to 5 year uninterrupted campaign in achieving this goal. The need for state and local governments in endemic countries to show genuine political commitment in order to halt transmission in their communities is urgent and once again brought to perspective..

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