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EFFICACY OF PARAZOQUANTEL AGAINST *SCHISTOSOMA HEAMATOBIUM* INFECTION AMONG RESIDENT OF WASAI DAM IN MINJIBIR LOCAL GOVERNMENT, KANO STATE, NIGERIA

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ABSTRACT
Schistosomiasis is a chronic debilitating infection due to Schistosoma species belonging to parasitic trematode worms. It continues to threaten millions of people, particularly the rural poor in the developing countries. A study was carried out to determine the prevalence of urinary Schistosomiasis among dwellers of Wasai dam in Minjibir, Kano State and to evaluate efficacy of single dose of Parazoquantel. A total of 402 people in four selected villages residing around the study area were screened for the present or absence of Shistosoma haematobium ova and efficacy of single dose Parazoquantel was evaluated. Eggs of S. haematobium were examined using urine concentration sedimentation technique. The overall prevalence of the infection was 61.9% and Mean Eggs Per cubic Centilitre (EPC) of 31.8% were recorded. Males were more infected (67.9%) than females (54.8%). Cure rate in the present study was 97.9%. There was significant difference between mean EPC and cure rate ($p<0.05$). This study concludes that Parazoquantel is still highly efficacious at a single dose for the treatment of S. haematobium infection.
Keywords: Parazoquantel, therapy, Schistosomiasis, Wasai, Dam, Kano-Nigeria.

INTRODUCTION

The human Schistosomiasis is caused by a specie of trematode parasite belonging to the Genus *Schistosoma* in the Family Schistosomatidae. It continues to threaten millions of people, particularly the rural poor in the developing countries (Chitsulo *et al*., 2000). Adult worms slowly accumulate from early childhood over a period of 10-20 years. Mild or moderate symptoms occur in most infected children and severe disease develops (Eldryd *et al*., 2004).

In Nigeria, Schistosomiasis occurs in all 36 states including the Federal Capital Territory (Ekpo and Mafiana, 2004). Infection with *S. haematobium* and *S. mansoni* is found to be common in Nigeria. Prevalence of *S. haematobium* infections is as high as 86% in Nigeria while prevalence of *S. mansoni* infections is low in the country (Bassey, 1987). *S. haematobium* is almost exclusively a parasite of man and is transmitted by snail intermediate host *Bulinus globosus*. Mature worm lives in the vesicular veins of the urinary tract and female deposit eggs in the walls of the urinary bladder, ureter and urethra. Sometimes eggs are carried to the liver and to the other viscera leading to fibrosis. There is painful micturition (dysuria), followed by damage to the bladder, ureter and kidney. Bladder cancer is common in advanced case (Chitsulo *et al*., 2000).

Parazoquantel is a drug used for the treatment of all forms of schistosomiasis that infect human as well as against other Trematodes and Cestodes infection. Previously irreversible damage by schistosomiasis infection can now be successfully treated with Parazoquantel (Webbe and James, 1997). Awareness about the possible development of Parazoquantel resistance is growing, it has been speculated that antimicrobial resistance is responsible for the low cure rate in *S. mansoni* infected patients from Senegal (Danso and Devias, 2002; Tchuente *et al*., 2001). Therefore the current study was undertaking with the aim of assessing the prevalence of urinary Schistosomiasis as well as the efficacy of single dose of Parazoquantel in a rural settlement of Wasai dam in Kano Nigeria.

MATERIALS AND METHODS

Study Area

The study was carried out between October, 2010 and January, 2012 at four villages of Minjibir Local Government area of Kano State, namely Wasai, Kazawa, Farawa and Koya. The sites were selected because they are closer to Wasai Dam, which support water snail intermediate host for *S. haematobium* and *S. mansoni* (Bichi and Abubakar, 2009). Minjibir Local Government area based on year 2006 cencus has a population of 213, 792 (Wikipedia, 2010). It is located on a rock which is made of unconsolidated sediments of the Chad formation in the North Eastern part of Kano State (12^{o} 10′ 42″ N and 8^{o} 39′ 33″ E) about 400-700m above sea level. The vegetation of the area is a Sudan Savannah type with the mean annual rainfall is about 600mm. Wasai Dam provides water for irrigation and fish production. Wells are the common source of water for domestic activity in the area. The Wells are about one meter in diameter and 15-29m deep.

The major occupation of the villagers was farming and fishing. Pit latrines were available in most of the houses (Bichi and Abubakar, 2009).

Study Population and subject selection procedure

A total of 402 subjects were randomly screened for the presence or absence of urinary schistosomiasis in all the selected villages. The subjects are adult and children of both sexes. The purpose of study was carefully explained to the subject, following their written informed consent. The subjects were asked to provide urine sample between 10.00 - 12.00 pm for examination (Cheesbrough, 2004). Urine sample was collected along with personal data that consist of name, sex and address of each subject. People who refuse to participate or unable to produce specimen were not included in the analysis.

Procedure for Urine Examination

Quantitative examination of single urine specimen was done using modified concentration sedimentation technique for the detection of eggs of *S. haematobium* (Attah , 2000; Eldryd *et al*., 2004 and Cheesbrough, 2004). The subjects were given specimen bottle for sample collection. The urine sample was preserved with three drop of Hypochlorite and later transported to Postgraduate Research Laboratory, Department of Biological Sciences, Bayero University Kano, for the detection of eggs.

Ten millilitres (10ml) of the urine sample was collected in a clean dry container. It was then placed into a centrifuge machine for centrifugation; RCF = 44.72g. The supernatant was discarded and a drop of the sediment was placed on the glass slide and covered with cover slip. It was then examined microscopically using low power (×10) objective lens .The numbers of eggs in the preparation were counted and recorded. The intensity of infection was expressed as Mean Eggs per Centilitre (Mean EPC). From 0-20 eggs count was considered to be low infection, but 21-49 was considered to be moderate infection and 49 and above was considered to be severe infection.

Treatment of Individuals showing Schistosome Infection

Ethical clearance was obtained from Minjibir General Hospital on the administration of the drugs, following written informed consent that was given to the subject and was supervised by a local Medical Officer of the Hospital who was co-opted as an assistant in this research. One hundred and eighty (180) infected individuals received treatment with Parazoquantel at a single dose of 40mg/kg without regard to intensity of the infection (mean EPC).The weight of the subjects were determined using Bathroom scale. Since Parazoquantel tablet was 600mg, it was sub-divided into half (300mg) and quarter (150mg) in order to administer required dose. The subjects were told to swallow the drug with water in front research team in order to monitor adherence. After interval of two weeks, subjects that received treatment were re-screened to observe those that are cured and those that are not cured; in order to avoid counting eggs of re-infection (Miller and Wilson, 1980). Individuals were considered cured when they excreted 0, 1, 2, or 3 eggs after two weeks of treatment (Hatz *et al.,* 1990). Cure Rate (CR) was calculated according to (Schuffe *et al*., 2004).

$$CR = \% \frac{\text{Prevalence before treatment} - \text{Prevalence after treatment}}{\text{Prevalence before treatment}} \times 100$$

Statistical Analysis

Descriptive analysis for Mean EPC and cure rate, association between sex and age variables were conducted by Chi square (χ^2) test using Open EPI version 2.2.1 Statistical Software in order to determine the level of significance between variables at $p \leq 0.05$.

RESULTS

During the survey, 371 (92.3%) male and 31 (7.7%) female participated (Table 1). Table 2 shows prevalence and mean EPC in relation to sex of the study population. The prevalence of the infection in males (67.9%) with mean EPC of 57.2 was significantly higher ($p<0.05$) than females (54.8%) with mean EPC of 6.4. The overall prevalence of the infection in the study area is 61.9%, with overall Mean EPC of 31.8. Table 3 shows cure rate among people infected with *S. haematobium* two weeks after treatment with single dose Parazoquantel. In the present study individuals were considered cured when they excreted 0, 1, 2, or 3 eggs two weeks after treatment. Cure rate was found to be 100% in people aged 21 - 30, 31 - 40 and 41 years and above. While people aged 1 - 10 and 11 - 20 years have 91.3% and 98.2% cure rate respectively, with only one person found not to be cured in each of that age group. Those that were not cured were re-treated and found to be cured two weeks after second treatment. The overall cure rate in the current study was 96.9%.There was significant difference between Mean EPC and cure rate ($p<0.05$).

Table1: Characteristics of Screened Subjects according to gender in study area

Sex	Wasai	Kazawa	Farawa	Koya	Overall
Male	120(98.89)	79(94)	83(83.8)	89(93.7)	371(92. 3)
Female	4(3.2)	5(6)	16(16.2)	6(6.3)	31(7.7)
Total	124	84	99	95	402

Values in parenthesis ( ) are percentages

Table 2: Prevalence and Mean EPC of Infection in Relation to Sex of the Study Population

Sex	Number examined	Number infected	Prevalence (%)	Mean EPC
Male	371	252	67.9	57.2
Female	31	17	54.8	6.4
Overall	402	269	61.9	31.8

Values in parenthesis ( ) are percentage

Table 3: Cure Rate among People Infected with *S. haematobium* 2 weeks after treatment with Single Dose Parazoquantel.

Age Ranges (years)	Initial Treatment	Mean EPC	Pre-screening	Still not cured	Mean EPC after Treat.	Cure Rate (%)	Mean EPC of uncured	Cure Rate of Second Treat.
1-10	34	12.7	22	1	5.3	91.25	3	100
11-20	112	22.2	69	1	3.9	98.21	3	100
21-30	21	21.8	15	0	0.8	100	-	-
31-40	9	11,4	1	0	0	100	-	-
41-above	4	7.2	2	0	0	100	-	-
Total	180	15.06	109	2	3.33	97.9	3	-

X^2 test was used at $p<0.05$ level of probability, it was observed that there was significant difference Between mean EPC and cure rate.

DISCUSSION

The overall prevalence of the infection in the study area was 61.9% and mean EPC of 31.8% (Table 1). This study shows that *S. haematobium* infection was prevalent in the study area, which could be attributed to human contaminated water contact activities by the inhabitant. Activities such as irrigation, farming, fishing, swimming and bare ground playing as reported by Abdullahi (2005) and Dua (2007) were strongly observed as predisposing factors. Prevalence of *S. haematobium* infection was found to be higher in males than in females (Table 2). This might be due to the fact that males are more exposed to contaminated water during their outdoors activities. This assertion is in conformity with the work of Adomeh (1998) in Yobe State as well as that of Tayo *et al.* (1990) in Malumfashi, Kastina State Nigeria. This show that *S. haematobium* infection is not gender specific disease, but rather occur as a result of exposure to contaminated water.

The high cure rate (96.9%) demonstrated in the present study indicates no resistance. However this value is in close agreement with the work of Shaw *et al.* (1999), where the cure rate was 80% – 93% and was slightly higher than the report of Duwa (2007) in Nigeria where the cure rate was 89.4% and also in Kenya 64.6% (Anthony *et al*., 1999). The cure rate (18%) reported by Stelma and Talla (1995) in Senegal was much lower than the present Study; following 12weeks after treatment with Parazoquantel. This low level of cure rate shows high level of resistance. The few people that remain infected two weeks after treatment may be due to development of immature worms (juvenile) that remain unaffected with the treatment, which later develop to maturity and the eggs will be excreted to the outside or remain trapped to the tissue (Anthony *et al.,* 1999).

CONCLUSION

The study shows that urinary schistosomiasis is endemic in the study area and that Parazoquantel is still efficacious as a single dose for the treatment of *S. haematobium* infection. Therefore, treatment should continue at the recommended normal dose to control schistosomiasis.

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