Self Diagnosis as a Possible Means of Diagnosing Urinary Schistosomiasis among School Children in an Endemic Community in Nigeria.

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Citation

Abstract
Self diagnosis as a possible means of diagnosing urinary schistosomiasis in an endemic community was studied among school children aged 1 -15 years in Adim community, Biase Local Government Area of Cross River State, Nigeria. Questionnaire and parasitological data were collected from 900 children randomly selected from all the schools in Adim community. Parasitological analysis revealed infection in 357 (39.7%). Children within the ages of 14 years and above had the highest prevalence rate 36 (66.7%). Male subjects had a higher prevalence rate of infection 195 (39.9%) than the females 162 (39.4) but there was no statistically significant difference in the distribution of infection by gender (P> 0.05). The percentage of children with knowledge of having the infection was 300 (33.3%) while those who truly had the infection were 357 (39.7%). The questionnaire data revealed that children of Adim community can easily detect the symptoms of urinary schistosomiasis but do not have knowledge of the aetiologic agents, mode of infection nor what to do if infected. We conclude that urinary schistosomiasis is still endemic in Adim Community and self diagnosis can be used as a possible means of diagnosing urinary schistosomiasis for the purpose of administering mass treatment and also monitoring outcome of the treatment in the community.

INTRODUCTION
Urinary schistosomiasis is a major health problem especially among school age children of the endemic tropical areas of the world. It is primarily a disease of rural agricultural communities where poverty is common (Useh & Ejezie 1999). Parents are likely to be constrained financially procuring drugs for the treatment of their children and if left untreated, may consequently lead to poor school attendance and academic performance (Useh and Ejezie, 1999a), growth retardation and decrease productivity (WHO,1990a) and urinary tract abnormalities (Chugh et al., 1986). Various reports of the endemicity of urinary schistosomiasis have been presented in Cross River State; for Adim (Ejezie et al., 1991 and Inyang-Etoh et al. 2009), Ogoja, Obubra and Obudu, (Opara et al 2003), Ijiman community (Ekanem et al 1994), and Otukwang community (Okun and Umeche, 2003). Urinary schistosomiasis is highly endemic in Adim community even with the various studies conducted on the efficacy of chemotherapy with praziquantel /or artesunate by various research groups on the control of this disease in this community (Ejezie et al., 1991, Meremikwu et al., 2000, Inyang-Etoh et al., 2004 and Inyang-Etoh et al. 2009).

Among others, Ejezie et al., 1991 and Inyang-Etoh et al. 2009 had reported a prevalence rate as high as 43.5% and 38.5% respectively.

Adim community is a typical rural setting which lacks clean piped water and good sanitation with no effective integrated approach for the control of schistosomiasis in this endemic community. World Health Organisation (WHO) recommends mass treatment of all school children with Praziquantel in areas where the prevalence of urinary schistosomiasis is greater than 50% (WHO, 1995). The symptoms of urinary schistosomiasis include lower abdominal pain, bloody urine and pain when urinating. Infection tends to be heaviest among school-age children and this can have harmful consequences for their nutrition, growth and school performance. Treating school children for worm infections is a highly cost-effective public health intervention in the developing world. However, laboratory-based microscopy for eggs in urine sample is expensive and time-consuming. The objective of the present study was to determine the present prevalence status of urinary schistosomiasis in Adim community, to determine whether
children in this endemic community have knowledge of the
disease, aetiological agent, mode of infection or can easily
detect or identify the symptoms of urinary schistosomiasis
and to evaluate the efficiency of self diagnosis as a strategy
for administration of mass treatment.

SUBJECTS AND METHODS

Study area The study was conducted in Adim community
located in Biase Local Government Area in Cross River
State, Nigeria. Adim is a typical rural community located
110 kilometres to the North of Calabar, the Cross River State
capital. There is no pipe-borne water in the community. The
inhabitants depend on three fresh water streams namely:
Ibeteuroma, Egboga and Ogamaenah for their domestic,
economic and recreational activities. The rainy season starts
about May and ends in October and the dry season occurs
from November and end in March with an average annual
rainfall of 1500-2000 centimetres. The main occupations of
the residents of this community include farming, hunting and
fishing.

Subjects and Consent

The targeted populations were primary school children
between the ages of 4 and 17 years. Ethical clearance from
the Honourable Commissioner for Health, Cross River State
was sought and obtained to enable us approach the school
authorities and parents/guardians of pupils for participation
in the study. The Onun of Abini (Village head) and that of
Ukwelo-Obudu were also briefed on the significance of the
study and the level of involvement of the pupils before its
commencement. The procedures, significant benefits, and
the unharmful nature of the study were also explained to all
concerned. The headmasters then briefed their pupils who
thereafter sought the consent of their parents to be part of the
study by signing the consent letters.

COLLECTION OF URINE SAMPLES

Two clean universal containers for collection of urine
samples were issued to each pupil selected for the study. The
samples were collected between 12.00 and 14.00 hours when
maximum egg excretion occurs (Chen and Mott, 1989).
After a rigorous exercise which involved the pupils jogging
up to three times from one goal post of their school football
pitch to the other, they were then made to produce two urine
samples each in two successive days, to reduce the effects of
the day-to-day variation in S. haematobium egg counts (Van
Etten et al 1997). All the study subjects submitted their urine
samples. The age and sex of the participants were duly
recorded.

DETECTION OF HAEMATURIA AND
PROTEINURIA

A report on the appearance of the urine, that is colour
whether clear or cloudy, presence or absence of visible blood
were made. Haematuria was detected soon after collection of
urine samples in the field using dipsticks (Ames; Bayer
Diagnostic, Brussels, Belgium). The results were read and
recorded immediately. Haematuria was reported as 5-10
ery/µl (+), 50 ery/µl (++), 250 ery/µl (+++). Proteinuria was
reported as 10mg protein/dl indicating trace proteinuria,
30mg/µl (+), 100mg/µl (++) and 500mg/µl (+++).

DETECTION OF OVA OF

After vigorous agitation, 10ml of the urine sample was
transferred into a universal container holding 5ml of 1%
aqueous solution of carbol fuchsin for staining and
preservation of ova (Useh and Ejezie 1999). The specimens
were preserved this way until the time for filtration. The
modified filtration system for the detection of ova of S.
haematobium was adopted for the study. This has been
elaborately described elsewhere by Useh and Ejezie, (1999)
These authors have associated the method with the
generation of standard and reproducible results.

Data Analysis: All statistical analyses were performed using
a commercial statistical package (SPSS for Windows; SPSS
Benelux, Gorinchem, Netherlands). The chi-squared (X²)
test was used to test for statistically significant difference in
prevalence of infection, haematuria and proteinuria by
gender. Comparison of the relationship between the presence
of infection (presence of ova of S. haematobium) proteinuria
and haematuria was analysed using the Pearson Correlation
coefficient. A two tailed P-value of < 0.05 was considered
indicative of a statistically significant difference.

RESULTS

Table 1 shows the prevalence of infection, haematuria and
proteinuria among subjects examined by age. Subjects aged
14 years and above had the highest prevalence rate of
infection 36 (66.7%), haematuria 30 (55.6%) and proteinuria
45 (83.3%) while subjects aged 8 -10 years presented with
the lowest infection 57 (21.8%) and haematuria 48 (18.4%).
The lowest rate of proteionuria 39 (27.1%) occurred among
subjects in the age group 5 – 7 years. Gender distribution of
infection, haematuria and proteinuria among subjects
examined is shown in Table 2. Male subjects had a slightly
higher mean ova count (39.8 ± 5.8/10ml urine), proteinuria

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(68.4 ± 11.1 mg/dl) and haematuria (43.4 ± 6.8 ery/µl) than female subjects with 33.2 ± 5.5/10ml urine, 50.6 ± 9.9 mg/dl and 38.6 ± 6.9 ery/µl respectively.

Figure 1
Table 1: Prevalence of infection, haematuria and proteinuria among subjects examined by age

Table 2: Gender distribution of morbidity indicators of infection, among subjects examined.

Table 3 shows the intensity of infection, haematuria and proteinuria among subjects examined by age. The highest mean ova count (79.4 ± 21.9/10ml urine), proteinuria (227.2 ± 53.4 mg/dl) and haematuria (87.8 ± 27.9 ery/µl) occurred among subjects aged 14 years and above while the lowest mean ova count (14.9 ± 5.6/10ml urine), proteinuria (35.0 ± 14.8 mg/dl) and haematuria (8.5 ± 5.4 ery/µl) occurred among subjects aged 5 – 7 years respectively.

Figure 3
Table 3: Intensity of infection, haematuria and proteinuria among subjects examined by age

The comparison of subjects with infection to those with knowledge of having the disease is shown in Table 4. Subjects within the age of 14 years and above had a greater knowledge of infection (50%) compared to the lowest knowledge of infection (16.1%) among subjects aged 8-10 years. However, there was no statistically significant difference (p>0.05) between the number of subjects with infection and the number with knowledge of having the disease by age (t = 0.26; p>0.05). Table 5 shows the gender comparison of subjects with infection to those with knowledge of having the disease. Male subjects had a slightly higher percentage 195 (39.9%) and 168(34. 4%) for both number (percentage) with infection and number (percentage) of subjects with knowledge of having the disease compared to 162(39.4%) and 132(32.1%) seen among female subjects respectively. However, there was no significant difference (p>0.05) between the number (percentage) of subjects with infection and knowledge of having the disease by gender (t = 0.48; p>0.05).

Figure 4
Table 4: Comparison of knowledge of having the disease by age

Figure 5
Table 5: Comparison of subjects with knowledge of having the disease by Gender

DISCUSSION

This study has reconfirmed the endemicity of urinary schistosomiasis in Adim community with a prevalence of 39.7%. This is in consonance with that of Ejezie et al., 1991 and Inyang-Etoh et al. 2009 who had reported a prevalence rate of 43.5% and 38.5% respectively. The reliability of using proteinuria and haematuria as a diagnostic marker for treating urinary schistosomiasis in this community was also established by Inyang-Etoh et al., (2005).

Among the 900 subjects screened for urinary schistosomiasis, self diagnosis with the aid of gross haematuria has proven to be a reliable diagnostic tool for diagnosing urinary schistosomiasis as the 34. 4% and 32.1% of male and female subjects respectively who reported having current infection were tested positive as against the 39.9% and 39.4% of male and female subjects respectively who truly had the infection. The reliability of this result was confirmed using a diagnostic reagent strip and urine microscopy where the history of gross haematuria correlated. Compared to microhaematuria and urine microscopy, a
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history of gross haematuria was much specified and had a reasonably good sensitivity in detecting morbid conditions. This makes history of gross haematuria an appropriate method for the monitoring of morbidity control and mass treatment of a community. There was no statistical significant difference (p>0.05) between subjects who reported having current infection and those who truly had the infection (Tables 4 & 5) This ascertains the fact that when ever there is a report of gross haematuria (bloody urine) especially in urinary schistosomiasis endemic community, it is usually associated with urinary schistosomiasis. Based on the above facts, the act of self diagnosis can be used as a basis for diagnosing urinary schistosomiasis infection in an endemic community thus, avoiding time consuming aspect of detecting the ova in urine and urinary strip test. Savings made by not spending money on microscopy and microhaematuria detection by strip could be invested in procuring drugs for infected subjects.

The prevalence of infection observed in this study reflects the continued exposure of children in this community to urinary schistosomiasis due to absence of pipe – born water which compels the inhabitants to frequently visit the only stream in the community for the domestic and recreational activities. The high level of water contact in children can explain the preponderance of infection in children. This is supported by an earlier study by Useh & Ejezie, 1999 on the questionnaire approach of the water contact pattern of infection in this community. Although the proportion of infected individuals with history of gross haematuria was relatively high 100(33.3%), the questionnaire approach revealed that the children of this community do not have knowledge of the aetiologic agent and mode of infection of urinary schistosomiasis. We conclude that urinary schistosomiasis is still endemic in Adim Community and self diagnosis can be used as a possible means of diagnosing urinary schistosomiasis for the purpose of administering mass treatment and also monitoring outcome of the treatment in the community. However, a combination of mass treatment with control of snail vector will be advantageous.

References

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