

East African Medical Journal Vol. 89 No. 3 March 2012

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ABSTRACT

Objective: To Provide baseline epidemiological data (Prevalence, Intensity of Infection and Knowledge) on Urinary Schistosomiasis in a New Focus behind Mount Cameroon.

Design: Longitudinal Study.

Setting: Eight (8) Primary Schools in Munyenge Health District, Fako Division, South West Cameroon.

Subjects: Six hundred and thirty six (636) randomly selected primary school children aged between five and sixteen years old of both sexes.

Results: The overall prevalence of urinary schistosomiasis was 78% with no significant difference ($P \leq 0.05$) between the different sexes. Visible haematuria had a prevalence of 35.1% with the highest prevalence observed in the 9 – 12-year-age group (87.5%). Response to questionnaires was very poor with only 20.8% of the inhabitants having the knowledge of urinary schistosomiasis. Health – seeking behaviour showed that only 10.4% of infected children had sought treatment of any kind. Prevalence rate and intensity of infection varied significantly with age at $P \leq 0.05$. Also mean egg counts varied significantly with schools ($P \leq 0.001$).

Conclusion: Munyenge village was identified as a very active focus for Urinary Schistosomiasis with heavy infection rates recorded in the schools closest to the springs. The construction of spring waters has provided suitable habitats for the survival of snails thereby enhancing the effective sustenance of transmission cycle which is capable of leading to further increase and severity of infection. Strengthening of school health programmes related to schistosomiasis in particular is, therefore, advocated.

INTRODUCTION

Urinary schistosomiasis is a serious environmental and social health problem in many tropical countries. Schistosomiasis is one of the occupational hazards encountered in rural farming populations of developing countries, and it is second to none in terms of prevalence amongst water borne diseases (1). In rural agricultural areas, schistosomiasis infection in tropical regions is due to poverty, ignorance, inaccessibility to safe water supplies, and bad hygienic practices (2). It is estimated to affect 200 million people in 76 countries and approximately 600 million others have been estimated to be at risk of infection (3). The disease continues to spread in rural communities with the expanding water resource projects which are needed to meet the increasing food

demands in Cameroon. Schistosomiasis is a public health problem in Cameroon and contributes to a third of the morbidity among school-age children in Kumba (4). The South West Region of Cameroon has an equatorial climate with approximately 8 months of rainy season and 4 months of dry season each year. The transmission of schistosomiasis takes place only where snail vectors are present and where there is contact between the population and infected water. Various socio-epidemiological factors are responsible for transmission of the disease amongst which are Migration, distance from transmission site and emergence of new foci, which is the main factor in this present case. The survey was designed to evaluate the prevalence and intensity of urinary schistosomiasis in primary school children, to determine the predisposing factors of the disease,

and to determine the level of awareness of the people with respect to the disease.

MATERIALS AND METHODS

Study Area: The study was carried out in Munyenge about 27 Km from Muyuka town. Munyenge lies at the back (foot) of mount Cameroon with a population of about 15000 inhabitants. This area is found in the rain forest region of the South West; with very rich volcanic soils encouraging farming activities, with their main cash crops being Cocoa and Plantains.

Urine procedures: The study was carried out between February 2011 and October 2011. Urine samples were collected from all the 8 primary schools which were close to the water contact sites. These included Government school group I (G.S I), Government school group II (G.S II), Catholic school (C.S), Cameroon Baptist Convention (C.B.C), Presbyterian school (P.S), Full Gospel Primary and Nursery school (FUGOPANS), New Generation (N.G) and The Apostolic Bilingual Primary and Nursery School (TABPANS).

Each pupil was given a sterile, wide mouthed, screw capped plastic bottle carrying their identification numbers and well instructed on how to collect the urine samples. A total of 636 urine samples were collected between 11 hours – 14 hours, and after exercise to ensure maximum excretion of eggs. Urine samples were then transported to the University of Buea Life Science Laboratory where they were examined using the filtration technique of (5).

Haematuria was determined by visual observation of urine samples and reagent strips. A questionnaire was administered to 227 parents whose children were passing out blood in their urine samples (visible haematuria). Knowledge on bilharziasis, health seeking behaviours and the perceptions of the inhabitants on urinary schistosomiasis were also assessed.

Data Analysis: Prevalence of *Schistosoma haematobium* was calculated as the proportion of positive samples while that of haematuria was calculated as the proportion of positive samples that were found with blood. The data generated was presented using descriptive statistics and subjected to chi square statistical analysis using the Statistical Package of Social Sciences (SPSS) version 15. 0 for windows to determine significance in the relationship of infection rate to sex and age.

Ethical Considerations: This study was carried out with the approval of the Ethical Review Committee on Health Research, Regional Delegation of health for the South West Region Buea, Cameroon. Informed written consent was obtained from each study

participant. Each participant was free to withdraw consent at any time. All personal information of the participants was treated strictly confidential.

RESULTS

Characteristics of study population A total of 636 pupils were screened for schistosomiasis out of which 302 (47.5%) were males and 334 (52.5%) were females. The pupil covered only 3 age groups which included five to eight years, 9-12 years, and 13-16 years. The five to eight years age group had 89 pupils (14%), 9-12 years age group had 496 (78%), while the 13-16 years age group had 51 (8%). Also, a total of 227 questionnaires were administered out of which only 106 (24.5%) of them responded. At least four fifths of the population was from the lower socio-economic group (mostly cocoa farmers).

Prevalence and Intensity of Infection: The prevalence and Intensity of urinary schistosomiasis in the study area is presented on table 1. The overall prevalence of *Schistosoma haematobium* was 78% (496). School based prevalence revealed that N.G had the highest prevalence of 96%, closely followed by FUGOPANS with 95.9%, while the least prevalence was observed in C.S (44%).

Sex related prevalence and visible haematuria as demonstrated on table 2 showed that females recorded a slightly higher prevalence of 78.4% (262) than males with 77.5% (234). The overall prevalence of haematuria was 35.1% (223). Out of this lot, 32.5% (98) of the males had visible haematuria while 37.4% (125) of the females had visible haematuria. The most infected age group as revealed by the results on table 3 was the 9-12 years age group which recorded a prevalence of 87.6%.

Knowledge and Health-seeking behaviors and beliefs toward Schistosomiasis: Out of the 227 questionnaires that were administered, only 106 (46.7%) of the respondents answered and returned them. Illiterate parents were interviewed orally in pidgin by the researchers out of which the majority of them still declined to respond. Out of those who responded, only 22 (20.8%) of the respondents agreed having the knowledge of urinary schistosomiasis, while none was aware of its etiologic agent. Figure 1 shows the knowledge of social activities leading to the disease in the study area. Out of the 106 respondents, 78 (73.6%) of them did not know the social activities that lead to the transmission of the disease while 19 (17.9%) of them said swimming and playing in water could lead to the disease. Equally, avenues of health seeking behaviours as shown on figure 2 revealed that 89.6% (95) of the respondents had never really sought for any treatment, while 10 (9.4%) claimed they had visited hospitals (even though hospital records in the

district revealed no schistosomiasis cases), and up till September 2011, there were only six cases of blood in urine recorded in the district hospital in Munyenge (of which the head of the laboratory claimed that they were just cases of excess red blood cells in the urine of the children). Figure 3 summarizes the believed

cause of urinary Schistosomiasis in the study area. Out of the studied lot, 50 (47.2%) of the respondents believed that the disease was caused by water spirits while 31 (29.2%) believed it was by the sun's heat. Details are shown on the figure.

Plate 2; field view of *S. haematobium* eggs in a heavily infected patient (Mag. X10)



Table 1
Prevalence of Urinary Schistosomiasis amongst screened schools in Munyenge

Screened Schools	No Examined	No Infected	Prevalence (%)	Intensity of Infection (eggs / 10ml urine) Mean±SD
CS	150	66	44	29.81±99.39
FUCOPANS	97	93	95.9	112.15±193.74
G S.I	78	71	91	253.63±280.34
G.S.II	80	68	85	274.16±295.3
N.G	25	24	96	197.48±265.03
P.S	32	28	87.5	172.62±297.01
TABPANS	55	50	90.9	97.53±167.77
C.B.C	119	96	80.7	148.85±162.82
TOTAL	636	496	78	142.46±223.26

Table 2
Sex related Prevalence of Urinary Schistosomiasis and Visible Haematuria amongst the different Schools

Screened schools	No Sampled		No infected (%)		No infected with Visible haematuria (%)		P-value
	M	F	M	F	M	F	
C.S	69	81	27 (39.1)	39 (48.1)	5 (57.2)	9 (11.1)	0.658
FUCOPANS	46	51	45 (97.8)	48 (94.1)	13 (28.3)	18 (35.3)	0.55
G.S I	37	41	34 (91.9)	37 (90.2)	20 (54.1)	24 (58.5)	0.159
G.S II	37	43	31 (83.8)	37 (86.0)	23 (62.2)	23 (53.5)	0.612
N.G	9	16	9 (100)	15 (93.8)	6 (66.7)	6 (37.5)	1.963
P.S	19	13	15 (78.9)	13 (100)	6 (31.6)	3 (23.1)	0.276
TABPANS	26	29	25 (96.2)	25 (86.2)	6 (23.1)	9 (31.0)	0.438
C.B.C	59	60	48 (81.4)	48 (80.0)	19 (32.2)	33 (55.0)	6.284
TOTAL	302	302	234 (77.5)	262 (78.4)	98 (32.5)	125 (37.4)	

Table 3
Age related Prevalence of S. haematobium amongst the screened schools

Age group (Yrs)	No examined	No infected	Prevalence (%)
5 – 8	89	68	76.4
9 – 12	496	434	87.5
13 – 16	51	39	76.5
Total	636	496	78

Figure 1
Knowledge of social activities leading to schistosomiasis in Munyenge

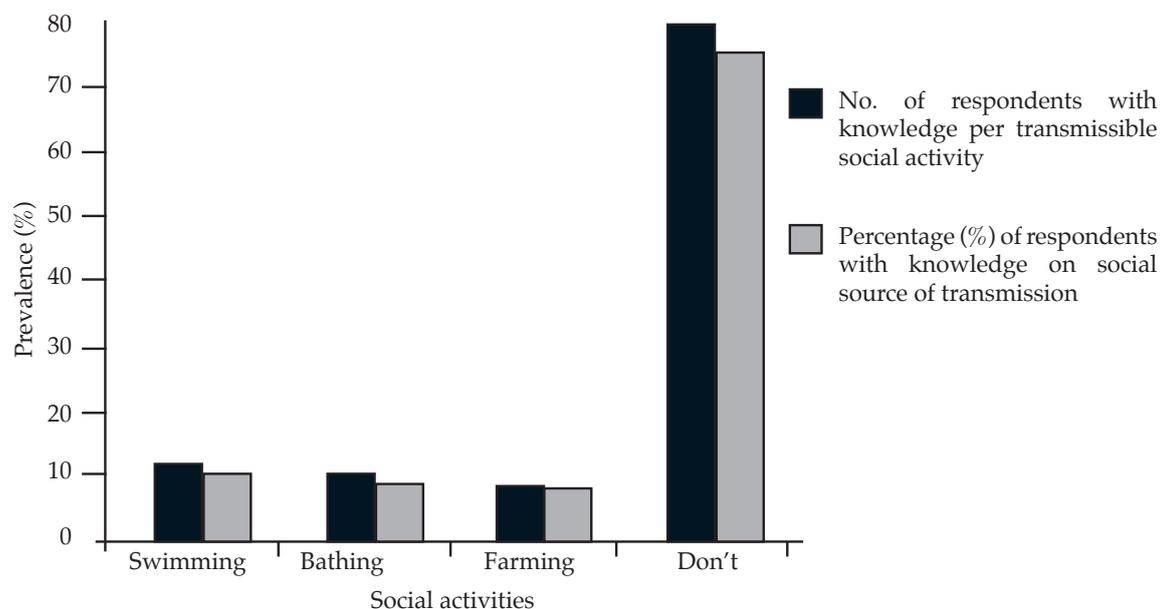


Figure 2
Avenues for health seeking behaviours in Munyenge

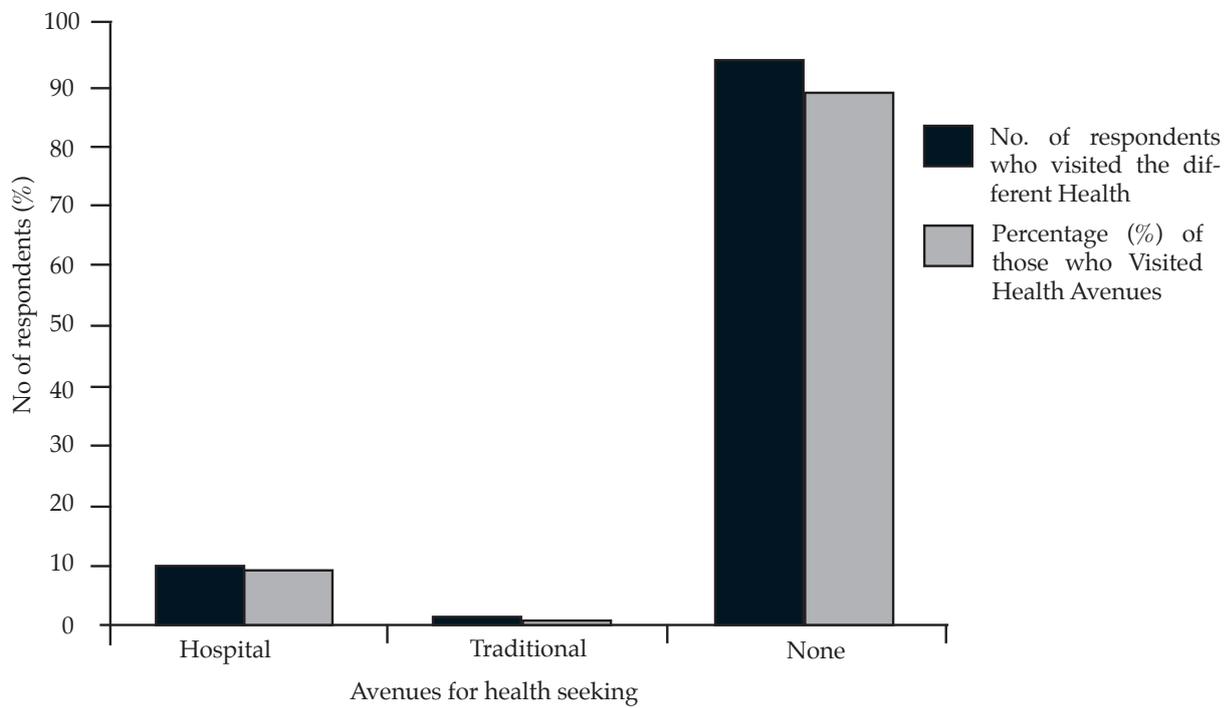
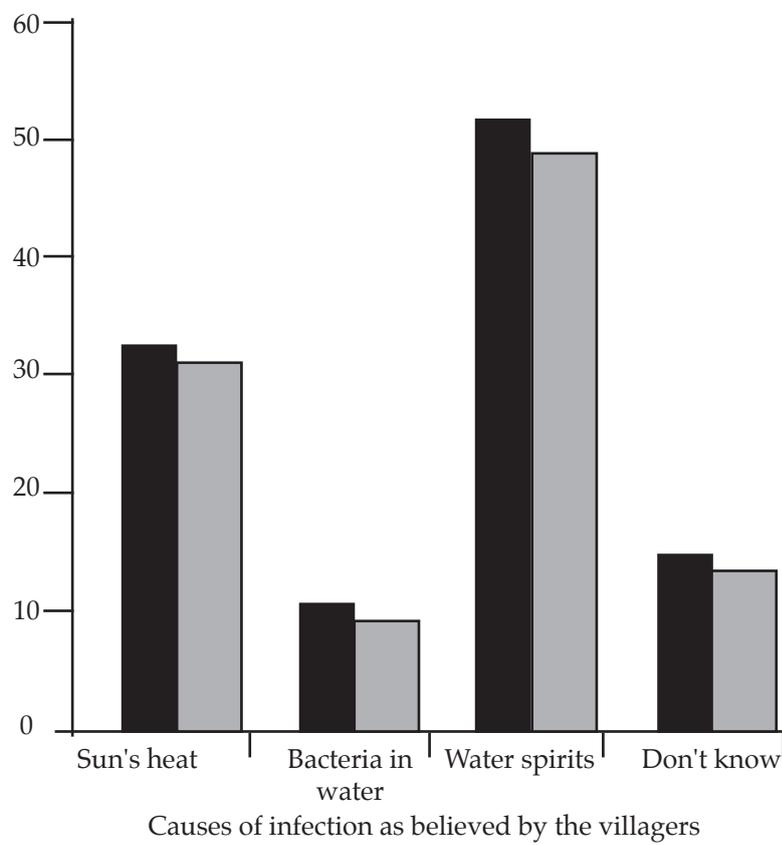


Figure 3
Belief Cause of Urinary Schistosomiasis in Munyenge



DISCUSSION

In sub-Saharan Africa, schistosomiasis is mostly common in remote, disadvantaged settings without alert systems. However, large scale interventions can be organized to increase diagnostic and treatment outputs. None the less, preparedness and control have been seriously deficient in Africa. In the present study, not even a single tablet of praziquantel was available in Munyenge and even in Muyuka subdivision while the researchers were able to get just a single packet of praziquantel (which costed 8500frs = 4.5 dollars for an average 60 Kg individual) in the regional capital of the South West Region, Buea. There was no pipe borne water in the study area and all the inhabitants depended on spring waters whose immediate surroundings had been well arranged with large stones for laundry, where the snail intermediate hosts attached themselves onto (plate 1). The surface water provided by the spring is used for domestic activities, bathing, playing; swimming etc. The overall prevalence of urinary schistosomiasis in the district was generally on the high side. This might be due to the fact that this is a new focus where intervention had never been carried out before. Also, the two heavily infected water points (KCB "man" water and KCB "woman" water) were being used by almost all the villagers since the water points were gender oriented and no opposite sex came to the water point of the other sex. However, preliminary snail study showed that the male KCB water harbored almost twice the number of *Bulinus* species as was that of the females. Age was a major determinant of schistosomiasis in the study. Even though the 9-12 years age group harbored the highest prevalence of infection, in general, the age group between 5-20 years is the highest risk age group, probably due to the high level of exposure (playing, swimming, bathing) of the children. This is in agreement with the works of (6, 7, 4, 8), who carried out similar studies in various parts of Africa.

N.G recorded the highest prevalence of the disease followed by FUGOPANS. This might be due to the closeness of these two schools to the contaminated water bodies. N.G and FUGOPANS were the closest schools to the snail infected habitats while C.S, which had the lowest infection rate was actually at the outskirts of the village (found in mile 15) where almost half or more than half of the population came from mile 15 and the neighbouring village (mile 14), with alternative water sources. However the sample size of NG was the least while that of CS was the highest. This was probably due to the fact that most of the Christians in the study area were Catholics and so preferred to send their children to catholic schools, followed by the Full Gospel Christians, but NG being a private school without any religious inclination had the least population and so those who agreed to

participate in the study were very few here. In the present study, although females had a slightly higher prevalence than males, this could only be explained by the fact that most of the domestic activities were being carried out by the females, even though the male water point was more infected than that of the females. In rural Africa, farming activities are mostly carried out by females and a mother carries the food for her daughters to the farm so that after school, they have to go to the farm before taking their lunch. Only a very intense level of contact with surface water could be related to a high relative risk of infection. The water contaminated points had Cocoa plantations surrounding them and well hidden and so both sexes were not shy to bath or swim there. A negative association between knowledge and schistosomiasis in Munyenge is not surprising as the focus is a new one and so most of the inhabitants and surprisingly the medical laboratory technicians in the district were not aware of the disease.

Schistosomiasis in Cameroon has remained an undiminishing threat but up till now, only Kumba had been implicated in the South West Region of the country (9, 10, 4). This unawareness of the medical personnel in the district of the disease probably contributed to the negative health seeking behaviours of the inhabitants. Diagnosis in most or almost all hospitals in the South West Region of Cameroon is done by direct smear which is a very insensitive method. Even in research centers such as Universities, filter holders are owned just by a few privileged individuals. It is evident from this study that the construction of spring waters has provided suitable habitats for the survival of snails thereby enhancing the effective sustenance of transmission cycle which is capable of leading to further increase and severity of infection. In conclusion, this study has shown that urinary schistosomiasis is prevalent in Munyenge, and prevalence is slightly higher in females than in males. From the results of this study, it is hoped that the government of Cameroon will endeavor to equip all district hospitals with at least centrifuges so that stool and urine samples can at least be concentrated before observation, and that the government can carry out a mass chemotherapy using praziquantel which is presently not available in the district.

ACKNOWLEDGMENTS

The authors are grateful to the Chief of Munyenge and to the various Head teachers who participated in the study. Laboratory space and equipment was provided by the Parasitology (Malaria) laboratory and staff, for which the authors are most grateful. We are also grateful to the reviewers for their time and constructive criticism that has helped enrich the manuscript.

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