ORIGINAL ARTICLE

# PREVALENCE OF SCHISTOSOMIASIS AMONG SCHOOL CHILDREN IN THE LOWER RIVER VOLTA BASIN IN GHANA

**E. Nkegbe**

CSIR, Animal Research Institute, Achimota, Ghana

## ABSTRACT

**Background:** Schistosomiasis is endemic in 75 countries affecting more than 200 million people mostly those living in rural and agricultural areas near the water reservoirs. The objective of this study was to determine the disease prevalence among school children in five communities in the River Volta Basin in South Eastern Ghana and to determine the age groups most affected.

**Material & Methods:** Three hundred & eighty-five school children in the primary and the junior classes comprising both males and females were selected randomly to participate in this study. Urine and stool samples were examined for the presence of schistosoma.

**Results:** All the positive subjects fell in two age groups, i.e. 6-11 and 12-17 years. It was realized that these are the two age groups with more affinity for water contact as a result of domestic chores and other auxiliary activities like swimming and fishing related activities. The prevalence of disease in the children of the five study communities was 6%, 21%, 2%, 13.6% and 5.8%. These figures were however lower than an earlier study that gave a range of 66-89.2% in the riparine communities.

**Conclusion:** The prevalence of schistosomiasis in the children in the River Volta basin in South Eastern Ghana ranges from 2-21%. The most vulnerable age groups are 6-11 and 12-17 years.

**Key words:** Schistosomiasis, Prevalence, Ghana.

## INTRODUCTION

Schistosomiasis refers to infection with Schistosoma trematode flat worms or flukes that are transmitted by fresh water snails. Blood in urine signifies infection by Schistosoma haematobium and blood in stool by Schistosoma mansoni. Each has its intermediate snail host which facilitates the transmission of infective stage to man. The disease is endemic in 75 countries affecting more than 200 million people mostly those living in rural and agricultural areas. About 500 to 500 million people are at risk of being infected with schistosomiasis as a result of poverty, inadequate hygienic practices coupled with inadequate water supply as found mostly in the least developed tropical countries of the world.[1] Unfortunately, the above mentioned factors, in addition to continuous increase in population in these least developed countries leads to demand for food and energy resulting in increased construction of water reservoirs and dams for irrigational projects and for energy supply and also for drinking water. These developments most often have unfortunately become transmission sites of the disease.[2-10]

Along the River Volta basin in Ghana, the impoundment of the river at Akosombo and Kpong both upstream of the study area for hydro power generation has resulted in massive hydrological changes as a result of reduction in flow volume leading to intermittent impoundments, siltation and subsequent growth of aquatic vegetation which are potential habitats for the snail intermediate freshwater hosts of Schistosoma. A survey carried out between 1959 and 1961 by Medical Field Unit of the Ghana Health Services before the creation of the Akosombo dam showed that schistosomiasis was absent in many populations living close to the Volta River.[11] But after the creation of the Lake Volta, a survey of its shoreline showed that schistosomiasis was spreading. By 1982, prevalence levels among the riparine communities along the lake had become so high; ranging between 66% and 89.2%.[12]

The objective of this study was to determine the disease prevalence among school children in five communities in the River Volta Basin in South Eastern Ghana and to determine the age groups most affected by the disease.

## MATERIAL AND METHODS

Sample delineation and selection of subjects was based on the class registers and in communi-

ties where the number of children on role was small, all children were included.

Urine samples were collected from subjects after they were made to run round their school football field, into white 300 $cm^3$ rubber containers with wide necks and screw caps. The subjects ID, the schools name and the town or community were written on them. The containers were then neatly packed into thick rubber bags and sent to the laboratory for analyses the same day. The urine samples were collected between 11am and 2 pm. Sedimentation method of urine analysis was used. The samples were arranged on the laboratory bench for analysis. They were allowed to settle for 20 minutes. The supernatant urine was decanted carefully so as not to disturb the deposit, leaving behind about 10 ml. The deposit was then suspended in the remaining urine by shaking vigorously and the suspension poured into labeled 10 ml centrifuge tubes corresponding to the respondents ID number of the urine container. Eight containers were prepared at a time. The contents were spun in the centrifuge for 2 minutes. Pasteur's pipette was then used to remove all but a few drops of urine above the supernatant. With the pipette, the supernatant was mixed with the remaining urine and suspension transferred to a microscopic slide, covered with cover slip, observed under the light microscope with x40 magnification for S. haematobium eggs.

The data obtained were calculated in percentage positive cases of Schistosoma infection.

## RESULTS

The total number of children selected for the study was 385 of both sexes. Table 1 below shows the results of the prevalence study in the five study communities in the lower River Volta Basin in Southern Ghana. Four age groups were studied; 0-5, 6-11, 12-17, and 19-23. The study communities identified as; C1, C2, C3, C4 and C5 were Amedeka, Dorfor Adidome, Duffour Osudoku, Asutsuare and Volivo respectively.

The disease prevalence among the school children in the five communities was 6%, 21%, 2%, 13.6% and 5.8% for Amedeka, Dorfor Adidome, Duffour Osudoku, Asutsuare and Volivo respectively.

Only age groups 6-11 and 12-17 were positive for the disease. Age groups 0-5 and 18-23 did not have the infection.

All the study communities had the disease. Only the age group 6-11 year had the disease in Community 1 and Community 4. 12-17 year group in Communities 2, 3, 4 and 5.

**Table 1: Age-group prevalence of schistosomiasis per study communities.**

| Age Group | C1 | C2 | C3 | C4 | C5 |
|---|---|---|---|---|---|
| 0-5 | 0 | 0 | 0 | 0 | 0 |
| 6-11 | 6.5 | 0 | 0 | 4.5 | 0 |
| 12-17 | 0 | 21 | 2 | 9.1 | 5.8 |
| 18-23 | 0 | 0 | 0 | 0 | 0 |

C1-Amedeka, C2-Dorfor Adidome, C3-Duffour Osudoku, C4-Asutsuare, C5-Volivo

**Table 2: Prevalence of Schistosomiasis in study communities.**

| Community | Number of Children | Number Positive | Percent Prevalence |
|---|---|---|---|
| Amedeka | 50 | 3 | 6 |
| Dorfor Adidome | 100 | 21 | 21 |
| Duffuor Osudoku | 50 | 1 | 2 |
| Asutsuare | 133 | 18 | 13.6 |
| Volivo | 52 | 3 | 5.8 |

## DISCUSSION

The age group 12-17 had the highest prevalence of the infection followed by age group 6-11. These are in agreement with the findings by Paperna,[13] Onori et al,[14] Wilkins et al,[15] and Lehman et al.[16] These age groups have very high affinity for water, for such children are often found swimming, bathing or playing in the water. Most of these also fetch water from the river for domestic use, washing of clothes and utensils as well as fishing. These activities expose them to the infection, hence could account for the high prevalence among them.

The disease prevalence among the school children in the five communities was 6%, 21%, 2%, 13.6% and 5.8% for Amedeka, Dorfor Adidome, Duffour Osudoku, Asutsuare and Volivo respectively. These figures however are lower than the prevalence of 66% to 89.2% as determined by Klump.[12]

## CONCLUSION

The prevalence of schistosomiasis in the children in the River Volta basin in South Eastern Ghana ranges from 2-21%. The most vulnerable age groups are 6-11 and 12-17 years.

## REFERENCES


1. Rollinson D and Simpson AJG. 1987. The Biology of schistosomiasis. Academic Press limited, London.
2. Madsen H and Franklin F. The spread of fresh water snails including those of medical and veterinary. Acta Trop 1989; 46: 139-46.
3. Hira PR. Schistosomiasis at Lake Kariba Zambia. Prevalence and potential intermediate snail hosts at Siavionga. Tropical Geo Med 1970; 22: 323-34.
4. Paperna I. Study of an outbreak of schistosomiasis in the newly formed Volta Lake in Ghana. Zeitchlift fur Trop 1970; 21: 411-25.
5. Dazo, BC and Biles JE. The schistosomiasis situation in the Lake Nasser area, the Arab Republic of Egypt. Report on a visit 1971 Aug 16-Sept17. Unpublished document. WHO/SCHISTO/72
6. Waddy BB. Research into the health problems of man-made lakes with special reference to Africa. Trans R Soc Trop Med Hyg 1975; 69: 39-50.
7. Hunter JM, Rey L, Scott D. Man made Lakes and man made disease. Towards a policy revolution. Soc Sci Med 1982; 16: 1127-45.
8. Scott D, Seneker K, England EC.Epidemiology of human Schistosoma haematobium infection around Volta Lake, Ghana. 1973-1975. Bull WHO 1982; 60: 89-100.
9. Ripert C, Same-Ekobo A, Enyong P. Evaluation des repercussions sur les endemis parasitaires (malaria, bilharziose, onchocercose, dracunculose) de la construction de 57 barrages dans les monts Mandara (Nord-Cameron). Bull S Path Exot 1979; 72: 324-39.
10. Ripert CL and Raccurt CP. The impact of small dams on parasitic diseases in Cameroon. Parasitol Today 1987; 3: 287-9.
11. Tagoe CE. A brief account of the irrigation and land reclamation programme in Ghana. Gh Med J 1965; 4: 91-3.
12. Klump RK. A study of the transmition of S.haematobium in Volta Lake Ghana.Univ of Lond Facul Trop Med Lond. Sch Hygie Trop Med 1982; 280.(PhD Thesis)
13. Paperna I. Study of an outbreak of schistosomiasis in the newly formed Volta Lake in Ghana. Zeit Trop 1970; 21: 411-25.
14. Onori E, McCullough FS, Rosei L. Schistosomiasis in the Volta Region of Ghana. Annl Trop Med Parasitol 1963; 57: 37-59.
15. Wilkins HA, Goll P, deC Marshall TF. The significance of proteinura and haematuria in S. haematuria infection.Trans. Roy Soc Trop Med Hygie 1979; 73: 74-80.
16. Lehman JS, Mott KE, Morrow RH. Intensity and effects of infection with S. mansoni in rural community in northern Brazil. American J Trop Med Hyg 1976; 25; 285-94.



**Address for Correspondence:**

E. Nkegbe
CSIR, Animal Research Institute
P.O. Box AH20
Achimota, Ghana
E-mail: kwakunkegbe@yahoo.com