



A SURVEY OF FRESHWATER SNAILS: THE INTERMEDIATE HOSTS OF SCHISTOSOMIASIS IN BENDE L. G. A., ABIA STATE NIGERIA

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ABSTRACT

A preliminary survey of snail intermediate hosts of Schistosomiasis was randomly sampled in Bende L.G.A. of Abia State, Nigeria, between March 2009, to April 2010. A total of 320 snail species were caught and out of the 320 snail species caught, 266 species were found to be the intermediate hosts of schistosomiasis. The same number of snails 266 were dissected and 83(31.20%) were found to harbour cercariae, the causative agent of schistosomiasis. The snails identified were *Bulinus globosus*, *Bulinus truncatus*, *Oncomelania* spp; *Physa borbonica*, *B. forskalii*, and *Biomphalaria sudanica*. The snails and the cercaria were identified using the manuals of Brown, 1994. Of the 266 fresh water snails identified 61(22.93%) were from Bende town and was the highest. While the least number of snail species 10(3.76%) were collected from Igbere. The snails were collected using scooping net techniques, handpicking and the use of long forceps. *Oncomelania* spp had the highest number of 85 snail species, while the least was *Bulinus truncatus* 4 spp. Bende people are mainly rice farmers, fishermen, and timber dealers. The people are also constantly involved with water bodies, for recreational activities, fetching the water for drinking and other domestic purposes. Their constant contacts with the water bodies help in contaminating it with their infected urine and faeces. More snails were caught during the onset of the rainy season (March – May), when the water currents were low, unlike at the peak of the rainy season (June – Sept) where less snails were caught. Wearing of boots by the rice farmers, avoiding of contaminating the water bodies with infected stool and urine and the use of molluscicides will help in checkmating the snail vectors. However, with such high number of fresh water snails, this indicates the presence of schistosomiasis infection in Bende L.G.A.

KEYWORDS: Schistosomiasis, snails, net techniques, rice farmers, rainy season, Bende L.G.A.

INTRODUCTION

The intermediate hosts of Schistosomiasis are various species of freshwater snails. Eggs are shed from the human hosts in faeces or urine. Under optimal condition in the environment, the eggs hatch and release miracidia, which swim and penetrate specific snail intermediate hosts. The stages in the snail include two generations of sporocysts and the production of cercariae, swim and penetrate the skin of human host, where maturation of the worms continues. The fresh water snails are the intermediate hosts of the following schistosoma species, *Oncomelania* species the intermediate hosts of *Shistosoma japonicum*, *Neotricula* species the intermediate hosts of *S. mekongi*, *Biomphalaria* species the intermediate host of *S. mansoni* and *Bulinus* species the intermediate host of *S. haematobium* and *S. intercalatum*. These four species of schistosomes belongs to the phylum plathyhelminthes (Garcia and bruckne 1988).

Transmission

This occurs in freshwater when the intermediate snail hosts release infective forms of the parasite. People are infected by contact with water where infected snails live. Larval forms of the parasites (known as cercariae), released by the snails, penetrate the skin of people in the water. The snails themselves become infected by another larval stage of the parasite, known as a miracidium, which develops from eggs passed out in the urine or faeces of infected people. (WHO, 1984) TDR, 2001.

Symptoms

Adult male and female schistosomes pair and live together in human blood vessels. The females release eggs, some of which are passed out in the urine (in *S. haematobium* infection) or stools (*S. mansoni*, *S. japonicum*), but some eggs are trapped in body tissues (TDR, 2001). Immune reactions to eggs lodged in tissues are the major cause diseases in humans.

In urinary Schistosomiasis (due to *S. haematobium*) damage to the urinary tract is revealed by blood in the urine. Urination becomes painful and is accompanied by progressive damage to the bladder, ureters and then the kidneys. Cancer of the bladder is common in advance cases (Akogun and Obadiah, 1996).

In Intestinal Schistosomiasis (infection with *S. mansoni*, *S. japonicum*, *S. mekongi*), disease is slower to develop. There is progressive enlargement of the liver and spleen and intestinal damage, due to fibrotic lesions around eggs lodged in these tissues (Ngele, 2011; Akogun and Obadiah, 1996).

Pathogenicity and symptoms

Disease symptoms associated with Schistosomiasis are related to the stage of previous host exposure, worm burden and host responses. Symptoms include cercarial dermatitis, acute Schistosomiasis or katayama fever and related tissue changes resulting from egg deposition (Mott, and Cline, 1980).

MATERIALS AND METHOD**THE STUDY AREAS**

The study was carried out in Bende L.G.A., a rural agricultural area in Abia State. There are many villages in Bende L.G.A. They include, Bende town, Ozuiem, Itumbauzo, Umuhu Ezechi, Uzuakoli, Nkpa, Ugwueke, Alayi Igbere, Item Umuimenyi etc. The population of Bende Local Government Area according to 2006 Federal Government authenticated census provisional result figures stand at one hundred and ninety two thousand, one hundred and eleven (192,111). The number of Males stood at ninety seven thousand seven hundred and eighty nine, while females stood at ninety four thousand three hundred and twenty two thousand (NPC, 2006). Ebonyi State and Akwa Ibom States are the main states bounded by Bende L.G.A. The land is fertile and produces a large scale of both cash and food crops for example rice, okro, cassava, melon and maize other crops produced are rubber, cashew, palm kernel, cocoa, 'Ogbolo', pineapple, beans, groundnut etc. The areas sampled include; Bende town, Alayi, Igbere, Item, Agbamuzo, Ozuiem, Ogoubi and Itumbauzo. The areas were chosen using the table of random numbers to avoid bias.

Methods of collection of snail species**The scooping net techniques**

This involves the use of scooping net in catching the snails. Here the scooping net was spread at random in the sample area with the aim of catching the snails around the water bank. The spread sites were first cleared of weeds, water debris and the net was stretched to catch the snails.

The snails caught were transferred into the collecting vessels and transported to the laboratory for macroscopic and microscopic identifications.

Manual picking

The areas were excavated using spade, rake and machete. Then long forceps were used to pick the snails. The snails were later transferred to collecting vessels and were taken to the laboratory for identifications and classification using Brown manual, 1994 (Brown, 1994).

Preservation of the snails

The snails were preserved in a plastic containers containing clay or sandy soil and were later dissected to look out for the effective stage (cecariae larvae) the causative organism of Schistosomiasis.

RESULTS

A survey of fresh water snails, the intermediate hosts of Schistosomiasis was carried out in Bende L.G.A. between March, 2009 to April, 2010.

TABLE 1: Different species of fresh water snails sampled in Bende L.G.A. and their sites of collection.

Name of village	Snail species	No of snail spp.	Location/site	Common use of water bodies
Bende	<i>Bulinus foshalii</i>	5	Onu Inyang beach	Recreational activities fishing and for timber lumbering.
Bende	<i>Bulinus truncatus</i>	5	Onu Inyang beach	Recreational Activities. Fishing etc
Bende	<i>Oncomelania spp.</i>	25	Onu inyang beach	Recreational activities; fishing, swimming etc
Idima Bende	<i>Oncomelania spp.</i>	20	Irrigation and swampy areas	Rice farming & palm plantation
Ndiokoroukwu (Bende)	<i>Ferrissia spp.</i>	6	Swampy areas	Rice farming
Alayi	<i>Physa borbonica</i>	20	Rice paddies	Rice and cucumber farming.
Igbere	<i>Biomphalaria sudanica</i>	10	Igwu river	Rice farming irrigation and vegetable farms.
Item	<i>Biomphalaria Sudanica</i>	15	Irrigation and swampy areas.	Rice farming and vegetable farms.
Agbamuzo	<i>Bulinus bulinus</i>	30	Miri omenuko	Rice farming activities, vegetable farm, fetching of water for drinking and domestic purposes.
Ozu-item	<i>Oncomelania Spp.</i>	40	Streams at Ozu-item ukwu	Rice farming activities, vegetable farming, fetching of water for domestic purposes.
Ogoubi	<i>Bulinus nasutus</i>	40	Ogoubi rice field	Rice farming.
Itumbauzo	<i>Bulinus globasus</i>	50	Rice field at Itumbauzo	Rice farming and cucumber orchards etc.
Total		266		

A total of 266 snail species, of 9 genera were sampled from Bende L.G.A. The snail species sampled include; *Bulinus foshalii*, *B. truncatus*, *Oncomelania spp.*, *Ferrissia spp.*, *Physa spp.*, etc. The highest number of 61 snail species was collected from Bende town while the least snail species (10 snails' spp.) were collected from Igbere.

TABLE 2: Number of snail species from different sites with respect to their months of collection in Bende L.G.A.

Name of site	No Of Snail Spp. Collected From Each Site	March – May	June – Sept
Bende	61	40	21
Alayi	20	11	9
Igbere	10	6	4
Item	15	10	5
Agbamuzo	30	15	15
Ozu-item	40	30	10
Ogoubi	40	35	5
Itumbauzo	50	30	20
Total	266	177	84

From table 2, more snail species (177) were collected between in the months of March - May, when rainfall and water currents were less. While less snail species 89 were collected between the months of June and September when rainfall and water currents were high.

TABLE 3: Percentage prevalence of different species of fresh water snails from Bende L.G.A.

Village	No of snail species	Percentage (%)
Bende	61	22.93
Alayi	20	7.52
Igbere	10	3.76
Item	15	5.62
Agbamuzo	30	11.28
Ogoubi	40	15.04
Itumbauzo	50	18.79
Total	266	83.13%

Table 3 shows the number of snail species collected from the villages in Bende L.G.A. and their percentage prevalence. Bende town had the highest number of snail species 61(22.93%), while the least number of snail species 10(3.76%) was collected from Igbere. A total number of 266(83.13%) snail species were collected from Bende L.G.A.

TABLE 4: number of snail species dissected and their percentage prevalence

Snail Species	No of snail species Dissected	No positive with ceacariae	%
<i>Onchomelania</i> spp	85	26	9.77
<i>Physa borbonica</i>	20	5	1.88
<i>Bulinus globosus</i>	50	18	6.77
<i>Biomphalaria sudanica</i>	25	7	2.63
<i>Bulinus forskalii</i>	5	2	0.75
<i>Bulinus truncatus</i>	4	1	0.38
<i>Ferrissia</i> spp.	6	2	0.75
<i>Bulinus tropicus</i>	30	9	3.38
<i>Bulinus nasutus</i>	40	13	4.89
Total	266	83	31.20

A total of 266 snails with 9 different species were dissected. *Onchomelania* spp. had the highest prevalence of (9.77%) while *Bulinus truncatus* had the least prevalence of (0.38%). The total prevalence of infected snails stood at (31.20%).

DISCUSSION

The preliminary survey of snail intermediate hosts of human Schistosomiasis was carried out between March and September 2011 in Bende Local Government Area. The snail intermediate hosts found during the study were *Bulinus* spp., the vector of *S. heamatobium* and *S. intercalatum*, (Cheesbrough, 2002). Other snail species found were *Biomphalaria* spp., which transmits, *S. mansoni* and *Oncomelania* spp. which transmit *S. japonicum* (Akogun and Obadiah, 1996).

The species of snails caught were commonly found in areas that have high human contacts and activities such as (rice farming, timber lumbering, fishing, and swimming)

(Akogun and Obochah, 1996; Ngele, 2011). The indigenes were equally seen using the water for domestic purposes like washing of cloths, plates etc. All these help to encourage the spread and increase in the number of snail intermediate hosts because the infected individuals were found contaminating the water bodies with their infected urine or stools (Brown, 1994; Ngele, 2011).

More snail spp. was found in Bende town 61(22.93%) while the least snail species were found in Igbere 10(3.76). This is as a result of increase in commercial fishing, recreational, domestic and rice farming activities that take place more in Bende town than in any other area sampled. However, as a result of these factors, many people were found in these sites and thereby contaminating the river as well helping in increasing the population of the snail

intermediate hosts. In other areas like Igbere and Item where there were less number of snail species, less number of people were found engaged in one activity or the other which may be recreational, farming and domestic activities which led to less number of snail species caught in these areas (Akogun and Obadiah 1996; Ngele, 2011) made similar observations.

Also it was observed from the study that the fluctuation of the rainy seasons affects the number of snail species caught. More snail species 177 were caught between the months of March and May when the rainy season was not high Ngele, and Onyeukwu, 2008 made similar observations from their work. And less snail species 89 were caught during the months of June and September. That is, the peak of rainy season. Most of the snail species and their eggs were carried away by high water current thereby resulting into less snail species caught during this period (Kenneth 2002).

However, with high number of snail species of intermediate hosts of Schistosomiasis, in Bende L.G.A, urinary and intestinal Schistosomiasis is incriminated in this area. Ngele and Onyeukwu, 2008; Ngele, 2011) had earlier reported prevalence cases of urinary Schistosomiasis in the area.

In conclusion, the populace of Bende L.G.A., should be treated of Schistosomiasis. Mulluscicide should be used in controlling the snail species. The farmers should be advised not to urinate or defecate into the water bodies to avoid the spread of the infection.

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