Original article

Intestinal parasitic infections in Western Abaya with special reference to *Schistosomiasis mansoni*

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Abstract: A cross sectional investigation on the distribution and prevalence of intestinal parasitic infections was undertaken in Western Abaya, North Omo, in January 1995. As the area is potentially irrigable for modern agriculture, emphasis was placed to explore on the endemicity of schistosomiasis, including malacological assessments. Five percent of the whole population on 1473 people, in 16 villages of the area, were parasitologically examined for intestinal parasites. Among the intestinal parasitic infections, hookworm was demonstrated in all of the villages with prevalences ranging from 4.1% (Algie) to 75% (Wajifo). The majority of the villages (10/16=62.5%) had hookworm prevalences of over 50%. *Schistosoma mansoni* infections were found in 11 villages with prevalences of up to 53% with more males than females being affected (P<0.001). Infected *Biomphalaria sudanica* snails with infection rates of up to 2.1% at two sites of Lake Abaya were also found. The importance of the dominant, *S. mansoni* and hookworm infections in the potentially irrigable area of Western Abaya and feasible measures of their control are discussed. [*Ethiop. J. Health Dev.* 1999;13(1):21-26]

Introduction

Intestinal parasitic infections are rampant in the poorest developing countries of the world often emanating from contamination of the environment by human excreta (1,2). In Ethiopia, like in other developing countries, intestinal parasitic infections are widely spread. A considerable proportion of annual visits at out patient services of the health institutions are due to such infections (3,4).

Intestinal schistosomiasis is widespread in the country generally at altitudes ranging 1000 to 2000 meters above sea level (5,6). Rapid spread of the disease also appears to have been facilitated in areas which were originally non-endemic as a result of the initiation of water- based development schemes (7).

Earlier reports on the occurrence of schistosomiasis infections in Western Abaya have been limited to a few villages around Lake Abaya (8,9,10). Evidence on the occurrence of *Biomphalaria sudanica,* intermediate host of *S. mansoni*, has also been documented in parts of the eastern (11) and western (12) sides of the Lake Abaya shores. Up-to-date information on the extent and distribution of parasitic infections in the area is limited to the laboratory reports of the Area Development Project (ADP) of the World Vision International-Ethiopia. A number of hookworm cases and a couple of schistosomiasis cases have been reported recently (13). The villages of Western Abaya are potentially irrigable for modern agriculture as they lie adjacent to Lake Abaya. Thus, a study of the possible health impact of irrigated farming, especially on *S. mansoni* transmission, prior to the initiation of this scheme was needed. This study was conducted in January 1995 because of this need.

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The study area and population: Western Abaya Woreda is located at about 445 kms south-west of Addis Ababa at altitudes ranging from 1170 to 1700 meters above sea level. There are 26 villages of which 16 have been included as development areas of the World Vision International (Figure 1). In this program, small scale integrated community- oriented development approaches have been introduced. Most of these villages are located close or adjacent to the western side of Lake Abaya that have potentials for irrigation-based agriculture.

About 30,000 people of 13 different ethnic groups live in these development villages. Wolaita and Gamu ethnic groups are the majority. All are protestant christians engaged mainly in farming and to a lesser extent, in fishing. Lake Abaya is the main source of water supply for all purposes in most of the villages. However, there are also some streams that originate from the nearby escarpment and used by a few villages.

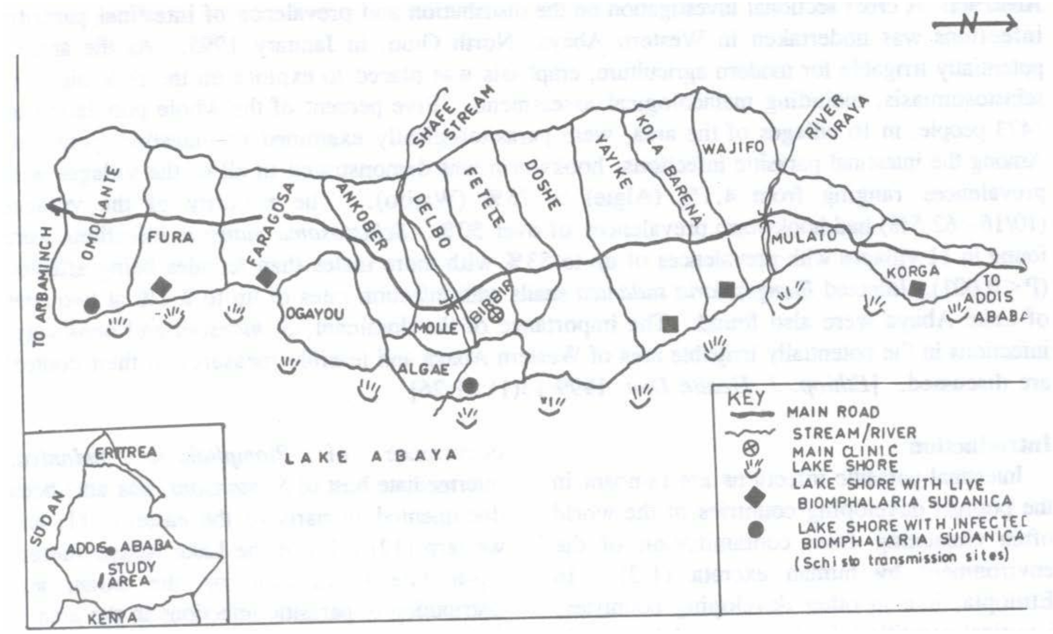

Figure 1: **Schematic map of study areas of intestinal parasites in North Omo, Western Ababya, Ethiopia**

Methods

A representative proportion of the inhabitants in each of the 16 villages was statistically determined and subjected for investigation. Five percent of the heads of households in each village were randomly selected and all members in each selected household were included in the study. Every member of the selected households provided fresh faecal specimen. The specimens were preserved in 10% formalin and transported to the Ethiopian Health and Nutrition Research Institute where they were processed and screened for diagnostic stages of intestinal parasites. The Ritche concentration method (14) was employed for specimen processing. Stool examination was performed by skilled senior laboratory technicians.

With the help of a snail collection gear, the lake shore along the villages was inspected for the occurrence of intermediate snail hosts. Collected snails were identified to species level using the standard identification keys (15,16). Their infection status was also determined by cercarial shedding .

The Chi-square (X^2) test was employed for comparision of prevalence rates among the study subgroups.

Results

A total of 736 males and 737 females were included in the study. Four geohelminths, i.e, *Ascaris lumbricoides* (10%), *Trichuris trichiura* (6.9%), *Hookworm sp*p. (53.1%), and *Strongyloides* *stercoralis* (2.8%); two cestodes, i.e, *Taenia sp* (1.3%) and *Hymenolepis nana* (0.7%); cysts of two protozoan species, i.e, *Entamoeba histolytica* (0.5%) and *Giardia lamblia* (0.3%); and one trematode, i.e, *Schistosoma mansoni* (4.1%) parasites were identified in all villages.

Hookworm infection prevailed in all of the villages with prevalences of up to 75% and schistosomiasis was recorded in 11 of the villages, with prevalence rates up to 53% (Table 1). Schistosomiasis infection rates among sex groups are shown in Table 2.

Table 1: **Hoodwork and Schistosomiasis prevalence among people in villages of Western Abaya, January 1995.**

Village	Number positive for parasite(s) (%prevalence)		
	No. Exam. (n)	Hookworm	*S. mansoni*
Omolante	183	106(57.9)	4(2.2)
Fura	67	20(29.9)	5(7.5)
Faragosa	46	11(23.9)	1(2.2)
Ankober	182	99(54. 4)	- -
Molle	142	93(65.5)	4(2.8)
Ugayohu	51	29(56.9)	6(11.8)
Korga-Giramo	17	11(64.7)	9(52.9)
Kola-Mulato	108	70(64.8)	3(2.8)
Birbir	159	58(36.5)	1(0.6)
Wajifo	103	77(74.8)	3(2.9)
Algie	82	33(4.1)	23(28.0)
Fetele	23	6(26.1)	- -
Doshe	48	22(45.8)	- -
Yayke	82	42(51.2)	2(2.4)
Deibo	107	62(57.9)	- -
Kola-Barena	73	43(58.9)	- -
Total	1473	782(53.1)	61(4.1)

Significantly more males (P< 0.001) than females were affected. The age and sex distribution among the *S. mansoni* positives is also shown in Table 3. Of those positives, 25 (41%) were below 15 years of age, of whom three (12%) children were under five. Among the males, the age group 514 was most affected (P<.05). Different Molluscan species, including *Biomphalaria*, intermediate host of *S. mansoni*, were recovered from seven sites. Infection rates of 1.5% and 2.1% were observed among *Biomphalaria* snails collected from the sites along Omolante and Algie areas, respectively. The particular sites of snail collection with the snail densities and their infection status are presented in Table 4 and figure 1.

Discussion

The occurrence of a wide range of intestinal parasites in a locality is not uncommon as reported by several investigators in several localities in the country (17,18,19,20). These are in agreement with findings of our present study. However, in this study the observed overwhelming magnitude of hookworm both at village level and in all villages considered together compared to the other parasites which were below or just about

Table 2: **Distribution of S. mansoni cases in Western Abaya, Janurary 1995.**

Village	No. Examined			N o. Positive (% psitive)		
Village	Male	Female	Total	Male	Female	Total
Omolante	84	99	183	3(3.6)	1(1)	4(2.2)
Fura	36	31	67	5(13.9)	-	5(7.5)
Faragosa	25	21	46	1(4)	-	1(2.2)
Ankober	88	94	182	-	-	-
Molle	78	64	182	3(3.8)	1(1.6)	4(2.2)
Ugayohu	33	18	51	4(12.1)	2(11.1)	6(11.8)
Korga-Giramo	12	5	17	6(50)	3(60)	9(52.9)
Kola-Mulato	48	60	108	2(4.2)	1(1.7)	3(2.8)

Birbir	79	80	159	-	1(1.3)	1(0.6)
Wajifo	49	54	103	1(2)	2(3.7)	3(2.9)
Algie	41	41	82	18(43.9)	5(12.2)	23(28)
Fetele	11	12	23	-	-	-
Doshe	23	25	48	-	-	-
Yayke	34	48	82	1(2.9)	1(2)	2(2.4)
Deibo	58	49	107	-	-	-
Kola-Barena	37	36	73	-	-	-
Total	736	737	1473	44(6)	17(2.3)	61(4.1)

Table 3: **Age and sex distribution of the *Schistosomiasis* cases in villages of western Abaya, January 1995.**

Age (Years)	Male		Female		Total	
	Exa.	Pos(%)	Exa.	Pos(%)	Exa.	Pos(%)
< 5	156	1(0.6)	99	2(2.0)	255	3(1.2)
5 - 14	302	14(4.6)	292	8(2.7)	594	22(3.7)
15 - 24	72	11(15.3)	96	1(1.0)	168	12(7.1)
25 - 34	59	6(10.2)	125	4(3.2)	184	10(5.4)
35 - 44	61	4(6.6)	87	-	148	4(2.7)
45+	86	8(9.3)	38	2(5.3)	124	10(8.1)
Total	736	44(6.0)*	737	17(2.3)	1473	61(4.1)

* infection in males significantly higher than in females ($p<0.001$).

10% in prevalence is of special interest. This type of observation appears to be confined to few places such as the Melka-Sadi banana plantation zone of the Awash Valley (21). In both of these, and perhaps similar other places, the preponderance of hookworm infection could be attributed mainly due to the suitability of microclimate, soil type, and humid environment favourable for parasite development. Lack of footwears and the

Table 4: **Malacological survey results in villages of Western Ababa, January, 1995.**

Site of Collection (Village)	Snail fauna (Number collected)	Infection status of intermediate Host	
1. Omolante	B. sudanica (132)	Number Infected	% Positive
	B. forskalii		
	Melanoides tuberculata (2)	2	1.5
	small planorbids (7)	-	-
2. Fura	B. sudanica (12)	-	-
	Small planorbids (5)	-	-
3. Feragosa	B. sudanica (6)	-	-
	Small planorbids (5)	-	-
4. Algie	B. Sundanica (192)	4	2.1
	Bulinus sp. (3)	-	-

	B. forskalii (4)	-	-
5. Ayke	B. sudanica (11)	-	-
	Small planoribids (7)	-	-
6.Kola barena	B. Sudanica (9)	-	-
	Small planorbids (5)	-	-
7. Korga	B. Sudanica (163)	-	-
	Small planorbids (12)	-	-

N.B. B. Sudanica = Biomphalaria sudanica B.
forskalii = Bulinus forskalii

insanitary excreta disposal practices of the people may as well influence the spread of hookworm infection (22). Hookworm infection is a major cause of iron deficiency anaemia in adults, including pregnant women and children (23). It is reported to be associated with decreased productivity, especially where increased agricultural development activities are intensified (24-27). Thus, this calls for immediate actions for intervention in villages of Western Abaya where hookworm prevalence is already high. In villages of high hookworm prevalence immediate intervention measures are needed. Actions such as periodic deworming using broad spectrum anthelminthics, improvement of the local sanitary facilities, and health education are needed.

The occurrence of ***S. mansoni*** infection in some villages in Western Abaya such as Ugayou and Lante was previously reported (9). Now, our investigation, which included several villages, has revealed more endemic localities with considerable infection rates in some *B. sudanica* snails. Furthermore, prevalence of schistosomiasis among the youngest (< 5 years) age groups in some of the villages such as Algie and Yayke suggests that autochtonous transmission is taking place in the area. Our results confirm that intestinal schistosomiasis is endemic in Western Abaya. More males than females were affected, as in most other endemic areas. This may be due to the frequent water contact activities exhibited by the males.

Modern irrigation often contributes towards the spread of schistossomiasis as evidenced in several places, including along the Nile Valley, the Sudan, and Egypt (28). In Ethiopia, a similar situation has taken place in many places notably in Wonji and Metehara (7). The risk of intense transmission with the initiation of modern irrigation at the Western Abaya villages, where already the disease is locally endemic, cannot therefore be over emphasized.

In modern large scale agricultural schemes such as sugar cane plantations that require continuous irrigation, sound engineering and other technical safeguard measures which in turn incur heavy financial investment have to be considered to minimize the rapid spread of schistosomiasis. In vast areas such as the Western Abaya, small scale agriculture, limited and intermittent irrigation is prefered as this may give the opportunity to control the intermediate hosts. Even with the present status, however, control effort through chemotherapy and improvement of sanitation is recommended in these endemic villages of Western Abaya.

Acknowledgements

This work was financially supported by the World Vision International- Ethiopia. We are grateful to the Ethiopian Health and Nutrition Research Institute for logistic and technical input required for the study. A meaningful support was extended by Ato Tadese Zeleke and Ato Yigezu Saddi, leading authorities of the ADP, Western Abaya. We extend our appreciation to Wt. Zewdnesh Ayele for typing the manuscript.

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