Original article

Magnitude of Schistosoma mansoni and intestinal helminthic infections among school children in Wondo-Genet Zuria, Southern Ethiopia

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Abstract: A cross-sectional study was conducted in April, 1994 to determine the prevalence of *S. mansoni* and other intestinal helminths among students of Wondo-Genet Zuria Elementary and Junior Secondary Schools, Sidama Zone, Southern Ethiopia. A questionnaire was used to list each of the study subjects and Formol-ether concentration method was used to analyze stool samples collected. From a total of 520 students examined 465 (89.4%) were positive for different intestinal helminthiasis while 157 (30.2%) were positive for *S. mansoni*. The infection rate among the study group is discussed and possible recommendation is made for future action. [*Ethiop. J. Health Dev.* 1997;11(2):125-129]

Introduction

Schistosomiasis is one of the most widely spread parasitic infestations (1). It occurs in most countries of tropical Africa, Middle East, Central and South America, the Caribbean and the Far East, an estimated 200 million people in the world are infected with the parasite (1,). Ethiopia is one of the endemic countries for both *S. mansoni* and *S. haematobium* (2,3). Human infection caused by *S. mansoni* has a wide geographic distribution in Ethiopia (3,6). The severity of schistosomiasis in Ethiopia, as in other developing tropical countries, is increasing due to water related projects and population movements (4). The transmission of the disease is closely linked with the personal habits and livelihood requiring daily and frequent contact with contaminated water (5).

On the other hand, intestinal parasitic helminthic infections are among the most common infections world-wide (5,9). The World Health Organization (WHO) estimates that there are 800 - 1000 million cases of Ascaris, 700 - 900 million of hook-worm, 500 million of Trichuris infections, 200 million Giardia, and 500 million Entamaeba hystolylica (5).

Intestinal helminthic infections, such as ascariasis, trichurisis and hook-worm infections are also prevalent in Ethiopia (6). Shibru Tedla (7) reported eight intestinal parasites in a country-wide survey. Similar study indicated that 12 species of human intestinal parasites have been reported from various communities of Ethiopia (8). The wide distribution of these intestinal helminths in Ethiopia is attributed to low socio-economic status and poor sanitation (6,7,9). The prevalence rates of individual parasites vary considerably altitudinally and in different parts of the country (9). The present investigation aimed at assessing prevalence rates due to *S. mansoni* and other intestinal helminths. It is believed that information obtained from this study will serve as base-line data for future intervention.

Methods

Study Area and Population: The study area was Wondo-Genet, which is found in Sidama administrative Zone - Southern Ethiopia (fig.1). It is a fertile and evergreen area with tropical climate and located at a distance of 270 kms South-East of Addis Ababa. There are about 55,000 inhabitants (Data obtained
from Awassa District Agriculture Department, 1993), who earn their living as farmers, daily labourers and government employees. There are a few social service institutions: College of Forestry, seven schools (three Junior Secondary and four Elementary School), as well as Meat and

Vegetables Canning Factories. There is one governmental clinic and one non-governmental Health Centre owned by Philadelphia Mission.

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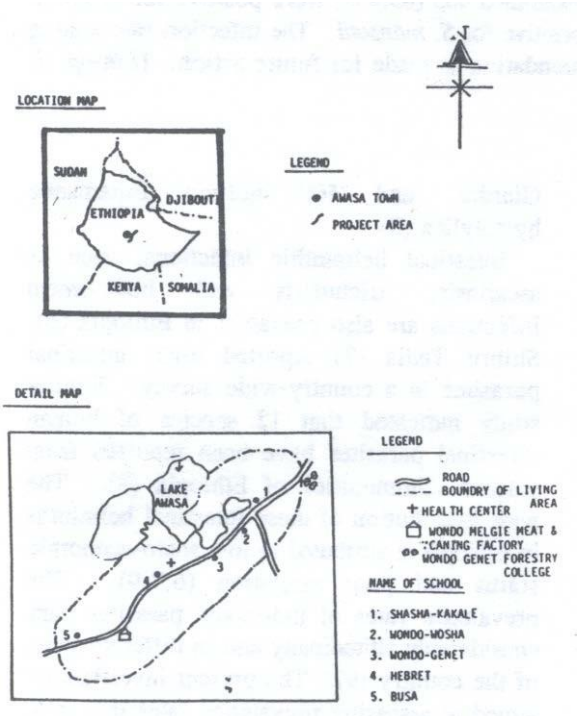

Figure 1: **Sketch map of the study area.**

Data Collection and Processing: The sampling unit were students of two junior secondary and three elementary schools with a total population of 2602 (Data obtained from Awassa District Education Office, 1993/94). Expecting prevalence rate of 50% with 95% confidence limit and ± 5% margin of sampling error, we planned to enroll 600 students systematically selecting every fourth and got 520 samples (Table 1) in which 352 (67.6%) male and 168 (32.3%) were female participants.

Labelled containers containing 5 ml 10% formaline were distributed on the day of sample collection and students were told to bring freshly passed stool. During handling stool specimens, questionnaire consisting some demographic factors (name, sex, age), source of water for the domestic purposes, personal habits, swimming and fishing of each study subject were registered.

Table 1: **Prevalence of *S. Mansoni* infection among three elementry and two junior secondary school children, by age group and sex, Wondo-Genet (April, 1994)**

Age group	No. Examined			No. of +ve		
	M	F	T	M	F	T
0 - 4	-	-	-	-	-	
5 - 9	91	52	143	25	13	38
10 - 14	219	103	322	76	18	94
15 - 19	41	13	54	17	8	25
20+	1	-	1	-	-	
Total	352	168	520	118	39	157

Samples collected were processed by formol-ether concentration technique (10,11,12) and analyses were done using EPI-Info Software.

Persons who were found positive for *S. mansoni* were treated with praziquantel at a single dose of 40 mg/body weight. Those who were found positive for other intestinal parasites were treated with the standard regimen of mebendazole tablets.

Results

The over all prevalence rate of intestinal parasitism was 465 (89.4%). The predominant parasite was *A. lumbricoides* 391 (75.2%), followed by *S. mansoni* 157 (30.2%) and *T. trichiura* 127 (24.4%). Of the examined 520 subjects 88 (17.0%) were found positive for hook-worm. The prevalence of *S. stercolaris* and *H. nana* infestation was low (Table 2). The result indicated that the highest *S. mansoni* prevalence rate of 45.8% was observed at

Table 2: **Prevalence of intestainal parasites in three elementary and two junior secondary school, Wondo-Genet, (April 1994).**

No Name of school	Total No Examined			S. mansoni			A. lumrocoides			T. trichuria			Hook worm			H. nana			S. stercolaris		
	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F
1. Abbo Elementar	56	16	16	11	9	2	42	23	19	19	10	9	5	5	0						
2 Busa Jun. Sec.	156	44	44	40	26	14 1	125	87	38	34	21	13	36	24	12	3	1	2	5	4	1
3 Hebret Elementart	89	4	4	18	5	3	76	46	0 2	26	14	12	14	12	2	2	2	0	0	0	0
4 Shashe Kakale Elementary	120	47	47	55	37	18	85	56	29	29	18	11	17	7	10	0	0	0	1	1	0
5 Wondo Wosha Jun. Sec	105	27	27	33	29	46	63	54	9	9	17	2	16	15	1	1	1	0	1	1	0
Total	520	68	168	157	16	41	391	266	125	127	80	47	88	63	25	6	4	2	7	6	1
			(30.2)			(75.2)			(24.4)			(17.0)			(1.1)			(11.3)			

Shashe-kakale elementary school followed by Wondo-wosha junior secondary school. The lowest *S. mansoni* infection rate was recorded in Abbo elementary school (Table 2). Hebret elementary school had the highest infestation with *A. lumbricoides* 76 (85.3%). The lowest prevalence rate of *A. lumbricoides* was indicated in Wondo-Wosha Junior Secondary School 63 (60%) (Table 2). Of the 465 positive individuals for different intestinal parasites 49% had single, 35.7% double, 14.1% triple and 1% quadruple infestation.

An interview result showed that among *S. mansoni* infested subjects 29 (18.5%) had monthlybasis contact with water bodies, where as 83 (52.9%) had weekly and 45 (28.6%) have had daily contact with water bodies. On the other hand, of 157 *S. mansoni* positive students 69 (43.9%) used river water, 39 (24.8%) piped untreated, 28 (17.8%) spring and 21 (13.4%) used well water for domestic purposes.

In the present survey it was observed that swimming habit has significant association with the positivity of *S. mansoni*. Of 520 examined subjects, 273 (52.5%) had swimming habits, out of which 93 (59.2%) were found to be positive for *S. mansoni* ($P < 0.05$). Among 34(6.5%) students who had fishing habits, 3 (1.9%) were infested with *S. mansoni*. Snail collection was made at five sites in an area and it was identified that the snail Biomphalaria pfeiffere was an intermediate host of *S. mansoni*.

Discussion

Schistosomia mansoni is prevalent in Wondo-Genet as evidenced by high number of school children infestation with overall prevalence rate of 30.2%. A similar study of Finchaa Town by Hailu Birrie et al (13) reported that the prevalence of *S. mansoni* reached 33% among the school children.

In the present study, there was a general tendency of increase in infection rate of *S. mansoni* with increase of age and the association is statistically highly significant ($P < 0.001$). Such arise in infection rate with age corresponds with increase of human contact with contaminated water bodies, due to fishing, swimming or water fetching and has been observed in other studies (4,14). As shown in other similar studies the infection rate was found higher in males than in females (15,16). This could be explained by the fact that males have higher frequency of contact with cercariae-infested water bodies than females in this specific study.

The overall prevalence rate of intestinal parasite infestation was 89.4% in Wondo-Genet, where as an overall prevalence rate of 61.6% was reported among resettlement farms in Western Ethiopia (17). Among the prevailing nematode gut infestation A. *lumbrcoides* (75.2%) was the predominant species identified in this study. This is also true among other studied localities of Gondar Region and Western Ethiopia with prevalence rates of 31.8% and 38.8% were reported, respectively (17,18,19).

The high prevalence of *A. lumbrcoides, T. trichiura, hook-worm* and *S. mansoni* infestations was assumed to be due to conditions of poverty and poor personal and environmental sanitation. The *hook-worm*s reported here were not differentiated into species. Both *Ancylostoma duodenale* and *Nectar americanus* have a wide distribution in Ethiopia (6,9,20). It is expected that both species might have been present in Wondo-Genet. The use of unclean water source and the presence of infested subjects create conducive situations for high prevalence of the infections by intestinal helminths in Wondo-Genet.

Finally, the study indicated that children were at high risk and contribute to most parasite transmission within the community. The prevalence rates observed for *A. lumbrcoides, S. mansoni*, *T. trichiura* and *hook-worm* was high and need timely setting of preventive measures. Mass chemotherapy directed against the intestinal helminths is recommended. The direct benefit of chemotherapy is that the worm burden is removed which, for instance, immediately reduces the number of cases of acute complication due to Ascaris and alleviates morbidity due to all intestinal parasites. Besides mass chemotherapy we suggest health education which may play a significant role in changing human behaviour.

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