

# **INTESTINAL HELMINTH INFECTIONS AT ZEGIHE, ETHIOPIA, WITH EMPHASIS ON SCHISTOSOMIASIS MANSONI**

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**ABSTRACT:** A total of 400 stool specimens were examined by Kato thick smear technique to determine the prevalence of schistosomiasis mansoni and other helminth infections among people living in Zeghie town, Northwest Ethiopia. The most prevalent infections were schistosomiasis, ascariasis, and trichuriasis. The infection rates among school children for *Schistosoma mansoni*, *Ascaris lumbricoides* and *Trichuris trichiura* were 69.7% , 77.7% and 64.7% , respectively. The respective infection rates of these helminths among the residents were 53.1%, 60.6%, and 50%. The prevalence of schistosomiasis appeared to be higher for males than for females. The high prevalence of infection observed for these helminths in the present study clearly indicates the need for timely control measures. [Ethiop. J. Health Dev. 1993;7(1):21-26]

## **INTRODUCTION**

Infections due to intestinal parasites are common throughout the tropics, posing serious public health problems in developing countries. In these parts of the world, socio-economic status, cultural practices and the environment favour transmission of soil-transmitted helminths, and water-related parasites as well as the distribution and development of vectors (1). Human schistosome infection has a wide geographical distribution in Ethiopia (2,3). The occurrence of endemic *Schistosoma mansoni* in Lake Tana regions is well documented (4-8).

The severity of schistosomiasis in Ethiopia, as in other developing tropical regions, is increasing due to water-based development projects, resettlement programs and population migrations. Other intestinal helminth infections, such as ascariasis, trichuriasis and hookworm infections, are also prevalent in Ethiopia (9-13). The wide distribution of these intestinal helminths in Ethiopia is attributable to low socio-economic status and poor sanitation (12).

The present investigation was aimed at assessing infection rates due to *Schisto mansoni* and those of other intestinal helminths, to determine their public health importance. It is believed that information generated by this study will serve as baseline data against which the future impact of development schemes on health can be compared.

## **MATERIALS AND METHODS**

**The study area and population:** The survey was carried out in January, 1991, at Zeghie, Gojam Administrative Region, north western Ethiopia (Fig 1). The founding of Zeghie town dates back to the 17th century. Zeghie is a peninsula nearly surrounded by and projecting into Lake Tana. It is one of the seven ports serving Lake Tana's navigation industry. It is located on the southwestern shore of the lake and to the northwest of Bahir Dar , at about a distance of 12 kms along the waterway. Astronomically, Zeghie is located at about 3° 19' E and 11° 41' N. It is about 1850 meters above sea level. According to the local population census of 1990, there were about 1500 inhabitants living in the town. The social units surveyed included 300 school children in Zeghie Junior Secondary School and 160 town residents. There were four farmers' associations in the vicinity with their administrative center in the town. The great majority of children attending school in Zeghie Junior Secondary School come from

these farmers' associations. The inhabitants of the town earn their living as merchants, government employees, farmers, daily labourers, tella and araki makers (local alcoholic beverages), fishermen, and a few as tanners, blacksmiths and weavers. However, since a proper census has not been taken, the proportion of the means of living of each could not be determined.

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The town has one clinic staffed by one health assistant, one guard and janitor. This clinic has no laboratory. According to the information obtained from the health assistant, patients coming to his clinic from the peninsula frequently complain of abdominal pain, headaches and chills. The complaints of abdominal pain are probably from intestinal parasitoses and the latter could be malaria. The town has a poor sanitary disposal system. The exact number of latrines and/or the number of people using latrines was not known. However, the health assistant pointed out that the majority of the inhabitants defecate in the open field. Observations also showed a lot of human excreta in the bush, under sheds, near the town and by the lake water. In the town, there is only one water well, and since this cannot meet the water demands of all inhabitants, the inhabitants depend on lake water for both domestic and recreational purposes.

*Stool collection and examination:* Labelled containers were randomly distributed, the day before collection, to school children at the school and to residents at home to procure stool specimens. When distributing the containers, the students and residents were told to bring freshly passed stool the following morning to the school and to the town's administration office, respectively. When handing in stool specimens, name, sex, age and source of water for domestic purposes of each study subject were registered. The stool samples were processed for microscopic examination by double Kato slides using templates, delivering 20 mg of a stool plug. Processing of stool specimens for examination and microscopy were made by skilled technicians at the Institute of Pathobiology.

Quantification of ova was made only for *Schistosoma mansoni*. For other helminths, only the presence or absence was recorded. Subjects which were found positive for *Schistosoma mansoni* were treated with a single dose of praziquantel (at 40 mg/kg body weight). For *S. mansoni* egg count, the average number was considered if eggs were viewed on the two slides. If eggs were viewed on only one of the slides, the number was simply recorded. The counts were then transformed to EPG (eggs per gram of faeces) by geometric mean.

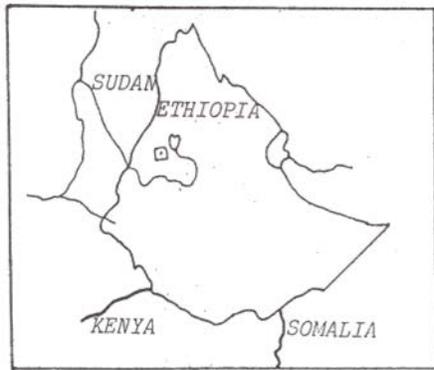
## **RESULTS**

Results of stool examination are presented in Tables 1-3. *Schistosoma mansoni*, *Ascaris lumbricoides* and *Trichuris trichiura* were the most prevalent parasites, both among school children and residents of Zeghie town. Individuals in the age group of 5-19 years appear to be most affected by schistosomiasis as evidenced by the high infection rates and intensity of infection (Tables 1 & 2). The prevalence of schistosomiasis tends to be higher among males than among females.

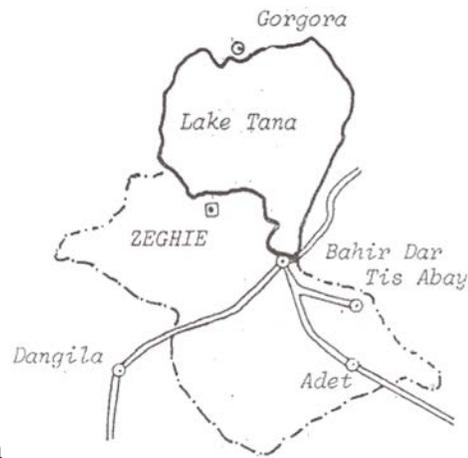
## **DISCUSSION**

The overall prevalence of *Schistosoma mansoni* appears to be higher for males both among school children and residents. As in other studies conducted in additional endemic areas of the country

(8, 14, 15), this could be explained in terms of differences in exposure between the sexes to cercariae-infested water bodies. Among residents of the town, the overall egg count for females (451 EPG) was higher than that of males (293 EPG) (table 2). However, this might have been exaggerated by



==== Road    - - - - - Awraja



0 20 40 60 80 km



Scale

Table 1 Prevalence and intensity of *Schistosoma mansoni* infection among children of Zeghie Junior Secondary School.

Age(yrs)	Number examined			Number examined		
	Male	Female	Total	Male	Female	Total
5-9	54	46	100	29(53.7)	24(52.2)	53(53.0)
EPG				231	152	191
10-19	130	70	200	111(85.4)	45(64.3)	156(78.0)
EPG				319	273	305
Total	184	116	300	140(76.1)	69(59.5)	209(69.7)
EPG				298	161	266

Table 2: Prevalence and intensity of schistosoma mansoni infection among residents of zeghie town.

Age(Yrs)	Number examined		Total	Number (percent infected		Total
	Male	Female		Male	Female	
0-4	11	18	29	2 (18.0)	0	2(7.0)
EPG				224	0	224
5-9	14	16	30	11 (79.0)	14(88.0)	25(83.0)
EPG				213	489	339
10-19	23	9	32	19( 82.6)	6(66.7)	25(78.1)
EPG				594	851	648
20-29	16	9	25	8 (50.0)	3(33.3)	11(44.0)
EPG				206	100	166
30-39	10	5	15	6 (60.0)	2(40.0)	8(53.3)
EPG				179	367	210
40-49	16	3	19	9 (56.3)	0	9(47.4)
EPG				143	0	143
>50	7	3	10	5 (71.4)	0	6(50.0)
EPG				271	0	271
TOTAL	97	63	160	60 (62.0)	25(39.7)	85(53.1)
EPG				293	451	332

Table 3; Prevalence (%) of helminthiasis among children of Zeghie Junior Secondary School and residents of Zeghie town

Helminths	School-children (n=300)	Residents (n=160)
Schistosoma mansoni	69.7	53.1
Ascaris lumbricoides	77.7	60.6
Trichuris trichiura	64.7	50.0
Hookworms	1.3	6.3
Taenia saginate	0	2.5
Enterobius vermicularis	1.0	0
Hymenolepis nana	0	13

the relatively high counts obtained for two females.

So far, up to 12 species of human intestinal parasites have been reported from Ethiopia from various communities (11). In a countrywide survey, including 12 administrative regions, Shibru Tedla (12) reported eight intestinal helminths employing formol-ether .concentration technique, with prevalence ranging between 0.8% (H nana) and 57.1% (A. lumbricoides). In the present survey, using Kato smear , we have recorded seven helminth parasites (Table 3). Had the technique been employed to suit detection of every 'intestinal parasite, it is highly likely that more intestinal parasites" would have been encountered in the Zeghie peninsula. The fact that A. lumbricoides and 7: trichiura have a similar geographical distribution, by virtue of having a similar life history, is well demonstrated in this survey. Both of them had higher rates of infection among school children as well as residents (Table 3). The distribution of hookworm parallels that of Strongyloides stercoralis (10). However, since the parasitological method employed in the survey was the Kato technique, Strongyloides stercoralis was not detected in the stool specimens examined. The hookworm

infection reported here was not differentiated into species since they cannot be differentiated in faeces using egg morphology. As both *Ancylostoma duodenale* and *Necator americanus* have a wide distribution in Ethiopia (16), it is expected that both species might be present in Zeghie.

In the Zeghie peninsula, a low level of sanitation, including open field defecation, an unclean water source, and low economic status, appear to favour transmission of intestinal helminths. Furthermore, interviews made with the study subjects and casual observations made on human water contact activities indicated that

bathing, fishing, travelling by canoe, swimming and water collection were common activities performed in the lake water. These activities are conducive for schistosomiasis transmission depending on the duration and extent of body exposure to water containing cercariae. Infection rates observed for schistosomiasis, ascariasis and trichuriasis indicate the need for timely and appropriate preventive measure. Mass treatment with biltricid and wide-spectrum anti-helminthic drugs is recommended. Although reliable control and preventive measures need the integration of all available means, these are not affordable in developing countries such as Ethiopia. On the other hand, delay in control measures in such a highly endemic area promotes the spread of diseases and morbidity.

Thus, the use of available and affordable means is advisable in order to reduce morbidity and the prevalence of the infection. Supplementing the suggested mass chemotherapy with health education may raise the awareness of the people and hence help modify behavior and attitude which would otherwise be conducive for transmission.

#### **ACKNOWLEDGEMENT**

This study was financed by the Research and Publications Office of Addis Ababa University. The administrators of Zeghie town school directors and teachers of Zeghie Junior Secondary School and the health assistant at Zeghie clinic are gratefully acknowledged for their cooperation during stool specimen collection. We also thank Dr. Taddele Adamu for reading the manuscript and making helpful suggestions.

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