

THE INCIDENCE OF SCHISTOSOMIASIS IN BAHIR-DAR, ETHIOPIA

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ABSTRACT: A study was made in Bahir Dar, north-western Ethiopia, for a period of twelve months, to determine the incidence of schistosomiasis mansoni. All children aged 10 years and younger in Dil Chibo and Teyima Elementary Schools were stool-examined by the formal-ether concentration technique at the beginning of the study to select schistosomiasis mansoni negative children for a later incidence study. Accordingly, 139 children in Dil Chibo and 104 children in Teyima were found negative and used for an incidence study. In the incidence surveys, the stool specimens were examined by the Kato method. The overall annual incidence rates for Dil Chibo and Teyima school children were 194/1000 and 382/1000, respectively. The rates obtained at the second survey were higher than the rates obtained at the first survey, 164/1000 and 36/1000, respectively, for Dil Chibo and 292/1000 and 77/1000, respectively, for Teyima schools. Males had a higher schistosomiasis incidence than females ($P < 0.01$). The incidence also appeared to vary with age. The value of incidence as a measure of transmission is discussed. [Ethiop. J. Health Dev. 1993; 7 (1):17-20]

INTRODUCTION

In spite of a wealth of information on epidemiological parameters on schistosomiasis in endemic regions throughout the world, studies made on schistosomiasis incidence are few and the information available is scanty. In measuring the incidence of Bilharziasis in the Egypt. 49 Project area, Farooq and Hairston (1) described incidence as the most accurate and sensitive method of assessing the success of control operations, despite the fact that it is underestimated and that many cases become negative spontaneously. In St. Lucia, Jordan (2) and Jordan et al. (3) employed incidence to assess intervention effects in transmission control. In Ethiopia, even though research on schistosomiasis has been conducted since the 1930s, the studies have mainly focused on prevalence and intensity of infection. There have been two studies made on the incidence of schistosomiasis in Ethiopia (4,5). The present study was made to determine the incidence of schistosomiasis mansoni in Bahir Dar town. It is also hoped that the information generated will serve as a baseline for future control operations.

MATERIALS AND METHODS

The description of the study area has been given elsewhere (6). The study subjects were children of Dil Chibo and Teyima Elementary Schools, in Bahir Dar town, north western Ethiopia. The incidence surveys covered a period of 12 months. The initial survey was made at the beginning of November, 1990, and the first and the second incidence surveys were made at the beginning of May and October, 1991, respectively. The time interval between the surveys was six months. To select schistosomiasis mansoni negative children at the beginning of the study for incidence studies, all children aged 10 years and younger, 300 from Dil Chibo and 250 from Teyima, were subjected to a stool examination with the formol-ether concentration technique, as it is more sensitive than the Kato method in detection of eggs in light infections (7). Among these children, 139 in Dil Chibo and 104 in Teyima Schools were found negative and used for incidence studies. Because the Kato method is more quantitative than the formol-ether technique (9), a double Kato smear was employed in the incidence surveys for stool examination. Each Kato slide was read

twice, horizontally and vertically. The sliders were read by the same skilled technicians throughout the survey period at the Institute of Pathobiology, Addis Ababa University.

During the stool specimen collection, each child was questioned as to whether or not medical attention had been sought for their abdominal complaints. Among the children who had attended Hospital, only two claimed to be treated for schistosomiasis mansoni and these were dropped from the study.

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At every survey, children who were found positive for schistosome infection were treated with praziquantel at a single dose of 40 mg/body weight and excluded from the examination at the next survey. However, they were assumed positive at the first and the second incidence surveys and considered in the compilation of incidence as described by Jordan and Webbe (8).

RESULTS

The results of the stool examination of the cohort are given in Tables 1 and 2. In both schools the incidence obtained at the second survey was higher than that obtained at the first survey ($P < 0.01$). The annual incidence rates per thousand people for Dil Chibo and Teyima school children, for both sexes, were 194 and 382, respectively (Tables I and 2). The annual incidence among male children was higher than the annual incidence among female children, 275/1000 and 114/1000, respectively, in Oil Chibo school and 352/1000 and 340/1000, respectively, in Teyima school. The differences were found to be statistically significant ($P < 0.001$).

DISCUSSION

Incidence is defined as a measure of transmission over a given period of time. There are shortcomings to the use of incidence as a measure of transmission. For instance, the possibility that the initial negative parasitological result could be a false negative, due to light infection which might be missed with a single stool examination, makes measurements of incidence difficult(8). Despite its shortcomings, however, incidence has been used as an index to assess the efficacy of control programmes (2,3). There was a general tendency of increase in incidence with age (Tables 1 & 2). In children younger than five years, this could not be traced in our study since they did not enroll in the schools we studied. Jordan and Webbe (8) attributed such a rise in incidence of infection with age to corresponding increase in water contact activities.

Ayele and Tiruneh (5) studied a cohort of 439 subjects around Lake Tana for which they reported the incidence of 263/1000 during a four-month study. Since the duration was short, allowance cannot be made for seasonal patterns of incidence in such a study. The present study is a little longer in duration and gives insight into seasonal transmission of *S. mansoni* in the Lake Tana area.

The percentage incidence between May and October is higher than that between November and May in both schools (Tables 1 & 2). This could point out an intense transmission of season sometime between the months of May and October of the year. Berhanu Erko et al. (6) also reported in their previous study that intense transmission of schistosomiasis takes place during this period

of the year, which is associated with a dense growth of aquatic weeds that support a dense population of snail hosts.

Incidence of infection among male children was found to be higher than that of female children (Tables 1 & 2). Similar results were reported on prevalence and intensity of infection by Berhanu Erko et al.(6). This could be due to more frequent exposure of males than females to water bodies containing schistosome infected snails.

Table 1. Incidence of schistosomiasis mansoni among male and female children in Dil Chibo Elementary School 1991.

Age (years)	First incidence Survey (May)						Second incidence Survey (October)					
	Number ¹ examined			Number positive			Number ² Examined			Number positive		
	M	F	T	M	F	T	M	F	T	M	F	T
6	5	4	9	-	-	-	5	4	9	-	-	-
7	11	14	25	-	-	-	11	14	25	-	1	1
8	21	24	45	1	-	1	20	24	44	2	4	6
9	21	21	42	2	1	3	19	20	39	5	2	7
10	11	7	18	1	-	1	10	7	17	7	1	8
Total	69	70	139	4	1	5	65	69	134	15	7	22
Incidence (/1,000)	58	14	36				231	101	164			
Annual incidence (/1000)				?	F=114	?						

Note:1 Children found negative at the initial survey, Nov. 1990; 2 Children found negative at the May, 1991 survey. M: Male F:: Female T: Total

Table 2. incidence of schistosomiasis mansoni among male and female children in Teyima Elementary school 1991.

Age (years)	First incidence Survey (May)						Second incidence Survey (October)					
	Number ¹ examined			Number Positive			Number ² examined			Number Positive		
	M	F	T	M	F	T	M	F	T	M	F	T
6	3	2	5	-	-	-	3	2	5	1	1	1
7	3	4	7	-	-	-	3	4	7	1	-	1
8	16	16	32	1	1	2	15	15	30	4	2	2
9	17	10	27	-	1	1	17	9	26	4	3	7
10	12	21	33	1	4	5	11	17	28	6	7	13
Total	53	53	104	2	6	8	49	47	96	16	12	28
Incidence (/1000)	39	114	77				490	255	292			
Annual incidence (/1000)				M=352	F=340	T=38						

Not: 1 Children found negative at the initial survey, Nov., 1090; 2 Children found negative at the May, 1991 survey. M: Male F: Female T: Total

An attempt was not made to determine the rate at which infected children lost their infections (reversals) in the present survey. This is because the children that were found infected during the surveys were treated for their infections for ethical reasons.

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