Brief communication

Intestinal parasitism and related risk factors among students of Asendabo Elementary and Junior Secondary school, South Western Ethiopia

Ibrahim Ali, Girma Mekete, Negussie Wodajo

From the School of Medical Laboratory Technology, Jimma Institute of Health Sciences, P.O. Box 975, Jimma, Ethiopia.

Abstract: A cross-sectional parasitological survey was conducted in Asendabo elementary and Junior Secondary Schools, Omo-Nada Woreda, Jimma Zone. From 1322 students, 282 faecal specimens were collected by stratified random sampling and were examined for ova, larva and cysts of intestinal parasites using Kato-thick and direct wet mount techniques. The overall prevalence rate was 86.2%. A total of 10 species were identified with *Ascaris lumbricoides* leading (56.4%) followed by hookworm (25.5%), and *Trichuris trichuria* (21.6%), and with *Hymnolepis dimunita* as the lowest (0.4%). A statistically significant difference was observed in the prevalence rate of intestinal parasites by sex, ($p<0.01$). However, there was no statistically significant difference in prevalence of polyparasites by sex, ($P>0.5$). No statistically significant associations were observed between family size and infection, latrine usage and infection, source of drinking water and rate of infection, and habit of wearing shoes and rate of hookworm infection ($P>0.1$ in each case). However, there was significant association between status of personal hygiene and rate of infection ($p<0.001$) where poor personal hygiene favours infection. A multi-disciplinary action is recommended to minimize the risk factors emphasizing on repeated mass chemotherapy for school children. [*Ethiop. J. Health Dev.* 1999;13(2):157161]

Introduction

Intestinal parasitic infections are among the most common infections in the world, being responsible for considerable morbidity and mortality (1-3). The world Health Organization (WHO) estimates that there are 800-1000 million cases of ascariasis, 700-900 million hookworm infections, 500 million trichuriasis, 200 million giardiasis, and 500 million amoebasis (1). Intestinal parasitic infections are highly prevalent in developing countries, mainly due to deficiency of sanitary facilities, unsafe human waste disposal systems, inadequacy and lack of safe water supply, and low socioeconomic status (2). In general, the prevalence of parasitic diseases is an indication of environmental conditions (4).

In sub-Saharan African countries 200-250 million people are infected with at least one or

More species of intestinal nematodes (5).

In Ethiopia, intestinal parasitism prevailed because of low level of living standards, poor environmental sanitation, and ignorance of simple health promoting factors (2,6). Although the prevalence rates of individual parasites vary considerably latitudinally in different parts of the country, several studies show that *Ascaris lumbricoides* is the most prevalent intestinal parasite, followed by *Trichuris trichuria,* hookworm and *Strongyloides stercoralis* (2,610).

The former Keffa Rgion, which includes Jimma Zone, was found to have the highest rate of ascariasis, trichuriasis, hookworm infection and strongyloidiasis in the country (6,10). According to the annual report of the Jimma Zone Health Department (unpublished Report, 1996) helminthiasis is the first among the top ten diseases in the zone. However, no adequate information has so far been made available on possible risk factors to explain the situation.

Thus, the objective of this study was to determine the prevalence of intestinal parasitic infections and related risk factors among students of Asendabo Elementary and Junior Secondary School, Jimma Zone, South-western Ethiopia.

Methods

Asendabo town is situated 280 km southwest of Addis Ababa, on the road to Jimma. It has an altitude of 1660 metres above sea level with a population of about 5241(11). The study was a cross-sectional parasitological servery to determine the prevalence of intestinal parasitic infections and related risk factors among students of Asendabo Elementary and Junior Secondary Schools in OmoNada Woreda. There were 1322 students attending the school at the study period, November 1997. Using stratified random sampling technique, 283 students were selected. The stratification was based on the students' grade level. Once the domains were obtained, the subjects were chosen randomly from their grade categories.

Stool samples were examined at Asendabo Health Center using the Kato-thick technique (3) supplemented by direct wet mount preparation. Each student was interviewed for the availability of latrine, source of drinking water at home, shoe wearing habit, and family size. Furthermore, for the sake of uniformity, the general status of the subjects was assessed by one of the investigators. Thegrading as poor, medium, or good was based on the subjects' finger nails (trimmed, untrimmed), presence or absence of finger nail dirt, hair condition (clean and short as the case may be), and general appearance.

Descriptive statistics was used in data analysis and Chi-square method to determine association between infection and risk factors.

Results

The distribution of the ten different parasites identified among the Asendabo Elementary and Junior Secondary School is shown in Table 1. Out of the 282 study subjects, 40 (14.2%) had family members of less than five, 141 (50%) had 5-7, 86(30.5%) had 8-10, and only 15(5.3%) had 11 or more family members

(Table 2). The parasite prevalence rate in each of the four groups was found to be 75.0%, 88.7%, 88.4% and 80.0%, respectively. No statistically significant association was found between family size and rate of parasitic infection, ($X^2=5.745$, $P>0.1$).

From the study population, 182 (64%) responded that they use latrine always; 10 (3.6%) have latrine but do not use it always, and the remaining 90 (32%) were found to have no latrines. Parasite posetivity rate in each of the three groups was 85.2%, 100%, and 86.7%, respectively. There was no statistically significant association observed between latrine usage and infection, ($X^2=1.778$,$P>0.1$).

The majority of the students, 135 (47.9%), use unprotected well as a source of drinking water followed by those who use river, 64 (22.7%), and piped supply along with other sources, 44 (15.6%). Their parasite posetivity rate was 89.6%, 84.4%, and 86.4%, respectively. However, statistically significant association was not found between the source of drinking water and rate of intestinal parasitic infection ($X^2=1.778$,$P>0.1$).

Although 168 (59.6%) of the children had shoes, only 68 (24%) use it always, and 100 (36%) of them wear it sometimes. The remaining 114 (40%) were found to have no shoes. The percentage of hookworm infection in each group was 20.6% ,23%, and 30.7%, respectively.

There was no statistically significant association observed between hookworm infection and habit of wearing shoes ($X^2 = 2.814, P > 0.1$).

Results of the assessment of personal hygienic status revealed that 85 (30%) of the students were labelled as poor, 106 (38%) as medium, and the remaining 91 (32%) as of good status of personal hygiene. In each group, the rate of infection was found to be 95.3%, 82.0%, and 73.0%, respectively. There was a statistically significant association relationship between rate of parasitic infection and personal hygienic status ($X^2 = 21.869, P > 0.001$).

Discussion

The total prevalence of intestinal parasites in this study was quite high when compared with the findings of Haile *et al.* (68.4%) (8) and of Woldemichael *et al.* (58.4%) (7). But it is almost similar with other reports from South-western Ethiopia (12), Metehara Sugar Estate and Jigga town (13), and Wondo-Genet Zuria (14) with prevalence rates of 88.2%, 89.0%, 82.0%, and 89.4%, respectively. Considering the prevalence rate of *A. lumbricoides* (56.4%) alone, it was found in good agreement with the results of Haile *et al.* although it was lower than the value for Jigga town and Wondo-Genet Zuria. But other studies done in different parts of the country showed lower rates for *A.lumbricoides* (7,9,13). The high total prevalence in this study might be due to the climatic and environmental conditions of the area which could be more favourable for intestinal parasites, along with poor water supply and sanitation facilities prevailing in the area.

Unlike previous reports from South-western Ethiopia and other parts of the country (7-9, 14), the overall prevalence rates of the parasites in this study were significantly higher in females than in males. This finding is in agreement with the results of Kloos *et al*. with respect to all cases of parasitism (15) and Birrie *et al.* if only ascariasis is considered (16). This might be due to the burden in females in household activities, such as food preparation, cleaning, and water fetching which might expose them to the routes of transmission of the parasites.

Accounting to the prevalence rate of each species, *A. lumbricoides* was the leading parasite followed by hookworm. This pattern was different from other studies (7-9) but in agreement with the results for Jigga town. The prevalence rates of *Entameoba histolytica* and *Giardia lamblia* were higher when compared with other studies (8,12). When the prevalence of *G. lamblia* was taken alone, it was found greater than the results of the countrywide survey of giardiasis among school children (17).

Even though high proportions 64% of the students, use latrine always, 155 (85.2%) of them harbored one or more intestinal parasites. This might be explained by the improper usage and poor quality, of the latrines.

Use of unprotected water favours intestinal parasitic infection. However, in this study, Even though high percentage of parasitosis was found among those who used unprotected water, the result was not statistically significant. This might be attributed to the use of different sources of water at the same time and seasonal variation to the accessibility of the sources.

Among the 168 (59.6%) students who had shoes, only 68 (24%) used to wear them always. This indicates lack of knowledge for the use of shoes to protect

from hookworm infection. The prevalence rate of hookworm was considerably high (25.5%). Hookworm causes anaemia, and so, it needs great attention.

To alleviate this prevailing health problem of the country, it requires multidisciplinary effort. The decision-makers should mobilize the community to improve health facilities and for the provision of adequate and safe water supply. The health workers should concentrate on teaching the most elementary but important sanitary procedures. Moreover, as demonstrated elsewhere, repeated mass chemotherapy for school children will also be highly advantageous (18).

Acknowledgements

This study was financially supported by the Research and Publication Office of Jimma Institute of Health Sciences.

References

1. UNICEF. The Prescriber. May 1993;1-8.

2. Tesfamichael T, Kloos H. Intestinal Parasitism, In: Zein AZ and Kloos H. (Eds). The Ecology of Health and Disease in Ethiopia, Addis Ababa: Ministry of Health, 1988:214.

3. World Health Organization Basic Laboratory Methods in Medical Parasitology, Geneva: WHO, 1991:25-26.

4. Beaver P.C. Jung R.C, Cupp E.W. Clinical Parasitology, l9th Edition, Lea & Febiger, Philadelphia, 1984.

5. Hall A, Suvenchan M. Intestinal Worms: Strategies to Control Disease, African Health. 1994;17:23.

6. Tedla S. Introduction to Parasitology, Addis Ababa University Press, Addis Ababa, 1986.
7. Woldemichael T, Assefa T, Seyoum, S. Intestinal parasitism among the student population of Wonji-Shoa Sugar Estate. Ethiop J Health Dev. 1990;4:4549.

8. Haile G, Jirra C, Mola T. Intestinal parasitism among Junior Elementary and Junior Secondary School, South-western Ethiopia. Ethiop J Health Dev. 1994;8:37-41.

9. Mamo B, Assefa B, Lo C.T. Intestinal helminths in Akaki town, with special emphasis on the epidemiology of S. Mansoni. Ethiop Med J. 1989;27:183-191.

10. Tedla S, Ayele T. Ascariasis Distribution in Ethiop Med J. 1986;24:79-85.

11. Central statistic Authority Population and housing census, 1994: Analytical Report on Oromiya Region, Addis Ababa, 1996.

12. Aga A, Mola T. Effects of Ascaris infection up on nutritional status of children in South-western Ethiopia. Bull JIHS. 1993;3:28-32.

13. Birrie H, Balcha F, Abebe F. Intestinal parasitoses among under-five in two communities in Ethiopia. Ethiop J Health Dev. 1998;12:63-67.

14. Roma B, Worku S. Magnitude of Schistosoma mansoni and intestinal helminthic infections among school children in Wondo-Genet Zuria, southern Ethiopia. Ethiop J Health Dev. 1997;11:125-129.

15. Kloos H, Bedri A, Addis A. Intestinal Parasitism in three Resettlement Farms in Western Ethiopia. Ethiop J Health Dev. 1991;5:51-56.

16. Birrie H, Medhin G, Erko B, Beshah G, Gemetchu T. Intestinal helminth infections among the current residents of the Future Finchaa sugar plantation area, western Ethiopia. Ethiop J Health Dev. 1997;11:219-228.

17. Birrie H, Erko B. Giardiasis in Ethiopia. Ethiop J Health Dev. 1995;9:77-80.

18. Anderson R.H, Medloy G.F. Community control of helminth infection of man by mass and selective chemotherapy. Parasitology. 1985;90:629-660.

Table1. **Number of Male and Female Students positive for one or more parasite(s)**

Species of Parasite	Male (N-161)	Female(N-121)	Total (N282)
Ascaris lumbricoides	82(50.9*)	77(63.6)	159(56.4)
ookworm	43(26.7)	29(23.9)	72(25.5)
richuris trichuria	33(20.5)	28(23.1)	61(21.6)
Hymnelopis nana	6(3.7)	5(4.1)	11(3.9)
aenia species	5(3.1)	3(2.5)	8(2.8)
trongyloides stercoralis	3(1.9)	4(3.3)	7(2.5)
Entrobius vermicularis	1(0.6)	6(4.9)	7(2.5)
Hymnelopis diminuta	1(0.6)		1(0.4)
Enlameoba histolytica	34(21.1)	28(23.1)	62(21.9)
Giardia lamblia	22(13.7)	24(19.8)	46(16.3)
Total	131(81.4)	112(92.6)	243(86.2)

* Figures in parcnthesis indicate percentages.

Table 2. **Risk factor Assessment of Students of Asendabo Elementary and Junior Secondary School,**

1997

Parameter	positive	Negative	Total
Family Size			
<5	30(75)*	10(25)	40(14.2)
5-7	125(88.7)	16(11.3)	141(50)
8-10	76(88.4)	10(11.6)	86(30.5)
≥ 11	12(80)	3(20)	15(5.3)
Total	243	39	282
Latrine Usage			
Always	155(85.2)	27(14.8)	182(64)
Sometimes	10(100)	0(0)	10(3.6)
Not available	78(86.7)	12(13.3)	90(32)
Total	243	39	282
Source of Drinking Water			
Piped supply only	14(70)	6(30)	20(7.1)
Protected well & spring	16(84.2)	3915.8)	19(6.7)
Unprotected well	121(89.6)	14(11)	135(47.9)
River	54(84.4)	10(15.7)	64(22.7)
Piped Supply & other sources	38(86.4)	6(13.6)	44(15.6)
Total	243	39	282
Shoes Wearing Habit			
Always	14**(20.6)	54(79.4)	68(24)
Sometimes	23**(23)	77(77)	100(36)
No shoes	35**(30.7)	79(69.3)	114(40)
Total	72	210	282
Personal Hygiene			
Poor	81(95.3)	4(4.7)	85(30)

Medium	96(82)	10(18)	106(38)
Good	66(73)	25(27)	91(32)
Total	243	39	282)

* Figures in parenthesis indicate percentages.
** Positive for hook worm ova only.