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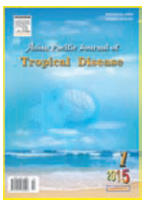

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Prevalence of intestinal parasites among street beggars in Jimma town, Southwest Ethiopia

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ABSTRACT

Objective: To determine the rate of intestinal parasitic infections and related risk factors among street beggars in Jimma town from February 10 to March 20, 2010.
Methods: A cross sectional study was conducted on 116 street beggars cached at four different churches in Jimma town during 'Abbey' or two months Easter Christian fasting days. Interview was made using a structured questionnaire to collect socio-demographic data. Concentrated stool samples were collected and examined microscopically using direct wet smear. The data was analyzed using SPSS version 11.5 software package.
Results: Of 116 street beggars whose stool had investigated, 104 (89.7%) harbored one or more intestinal parasites. The most frequent intestinal parasites were *Ascaris lumbricoides* 76 (65.5%) followed by *Trichuris trichiura* 52 (44.8%). *Schistosoma mansoni* accounted 14 (12.1%) and hook worm 11 (9.5%). The rate of multiple parasitic infections was 63 (54.3%). The finger nail status, habit of shoe wearing and using source of river water for bathing showed statistical significant association with parasitic infections ($P < 0.05$).
Conclusions: Ninety percent of street beggars harbored intestinal parasites and yet they do not have accesses to latrine indicates, these people obviously contribute for the spreading of parasites to the community and being potential risk for the environmental contamination. Therefore, regular deworming activity and insuring accesses of adequate public latrine in selected sites of the Jimma town need help to control parasitic infections in this town.

1. Introduction

Intestinal parasitic infections are cosmopolitan and represent the greatest single worldwide cause of morbidity in the contemporary world, especially developing countries. Factors such as poverty, illiteracy, poor hygiene, lack of access to potable water and hot and humid tropical climate are associated with intestinal parasitosis. The diseases remain serious public health problem in many developing countries, especially due to fecal contamination of water and food[1,2]. It is estimated that some 3.5 billion peoples are infected, and that 450 million are ill as a result of these parasite infections, the majority being children. Epidemiological survey conducted in Iran revealed that among a total of 1 100 school children, 33.3% had parasitic infections .These infections are regarded as serious public health problem, as they cause iron deficiency anemia, growth retardation in children and other physical and mental health problems[3].

Studies in different countries revealed that the social and economical situations of individuals are important causes of the prevalence of intestinal parasites. In addition, poor sanitary and environmental conditions have been directly linked with propagation of these infections agents[4]. Worldwide, 600-800 million people have soil-transmitted helminth infections, and 200 million people are infected with schistosomiasis. Among those, hook worm infection is the most devastating and poses childhood and maternal anemia, eventually results in the greatest disability, and is the highest-burden neglected tropical disease. Thus, disability-adjusted life years due to ascariasis were 1.2-10.5 million, hook worm infection 1.8-22.1 million, and trichuriasis 1.6-6.4 million[5].

Infections due to intestinal parasites are also common throughout the tropics posing serious public health problems in developing countries. In these parts of the world, high prevalence is attributed largely to socio-economic status, poor sanitation, inadequate medical care and absence of safe drinking water[6]. In sub-Saharan Africa, infection with intestinal parasites is among the major health

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problems. Infections with parasites have also been attributed to stunting growth, weakness and lowing educational achievement in school children. Furthermore, chronic intestinal infections have become the subject of speculation and investigation in relation to the spreading and severity of other diseases of viral origin, tuberculosis and malaria[7].

Accordingly, infection with these parasites is widely distributed in Ethiopia due to low level of living standards, poor environmental sanitation and personal hygiene. Although the prevalence rate of individual parasites vary considerably in different parts of the country. Several studies showed that *Ascaris lumbricoides* (*A. lumbricoides*) is the most prevalent parasite followed by *Trichuris trichiura* (*T. trichiura*), hook worms and *Strongyloides stercolaris*[8].

Although several studies have been conducted on the distribution and prevalence of intestinal parasites in Ethiopia, there are still several population proportions for which epidemiological information is not available such as street beggars. These people may have contributed for the spread of these parasites by contaminating the environment and water bodies as they are homeless and have no facilities to proper disposal of wastes. With this idea, the present study was aimed at assessing the magnitude and distribution of intestinal parasites among street beggars in Jimma Town, Southwest Ethiopia.

2. Materials and methods

A cross-sectional study was conducted to determine the prevalence of intestinal parasites among street beggars in Jimma Town, Southwest Ethiopia, from February to March 2010. The town is located 350 km from capital, Addis Ababa. It has an altitude of 1780 m above sea level with a mean annual rainfall of 1749 mm and the annual temperature range of 4-30 ℃. According to the 2007 population and housing census of Ethiopia, the town has a total of 120960 populations with sex ratio of 101 males to 99 females. The census also indicated that the town has 613 homeless people of which 593 are males and the remaining 20 are females.

Structured questionnaire was used to collect the data from all beggars cached during the study period at Hamere Noha St Kidane Mihret, Ephrata St Mariam, Debre Mewi Medhanealem and Debre Sahil Kiduse Michael churches during 'Abbey' or two months Easter Christians fasting days. These churches are usual places available for beggars to get support in the fasting days. The beggars were provided clean, dry lake proof labeled container with toilet paper and told to bring an estimated 3 g of stool samples. Then, the samples were immediately transported to parasitology laboratory and processed for both direct and formol ether concentration techniques following standard operational procedures[2]. Microsoft Office Excel 2003 was used for statistical analysis and chi-square test was employed to measure any statistical differences between variables. P values < 0.05 were considered as statically significant.

2.1. Ethical consideration

The study was approved by ethical committee of the College of Public Health and Medical Sciences of Jimma University. Prior to data collection, informed consent was obtained from each participant. The participants were also told that the laboratory examination would be done free of charges and the results would be given to them for any beneficiary measures to be taken.

3. Results

The gender profile of the street beggars cached during the study period indicated that 62 (53.4%) were males and 54 (46.6%) were females. The age group < 9 years took the highest proportion 35 (30.2%).

Out of 116 street beggars who had stool examination, 104 were harboring one or more parasites. Thus, the overall prevalence rate was 89.7%. Relatively high parasitic infection rate 27 (23.3%) was observed among < 9 years of age groups (Table 1).

Table 1

The distribution of intestinal parasites in relation to age group of beggars in Jimma town who had stool investigation from February to April 2010.

Age group	Intestinal parasites [*n*(%)]		Total
	Positive	Negative	
< 9	27 (23.3)	8 (6.9)	35 (30.2)
10-19	12 (10.3)	0 (0.0)	12 (10.3)
20-29	9 (7.8)	2 (1.7)	11 (9.5)
30-39	9 (7.8)	1 (0.9)	10 (8.6)
40-49	15 (12.9)	1 (0.9)	16 (13.8)
50-59	13 (11.2)	0 (0.0)	13 (11.2)
> 60	19 (16.4)	0 (0.0)	19 (16.4)
Total	104 (89.7)	12 (10.3)	116 (100.0)

The distribution of these parasites in relation to gender of the beggars showed that 62 (53.4%) males and 54 (46.6%) females harbored one or more parasites. However, no statistical significance between the sex and parasitic infection was observed ($P = 0.39$).

The prevalence of *S.* among the street beggars was 14 (12.1%). The highest infection rate (6.9%) was observed among those who used river water for bathing showing statistically significant with *S. mansoni* (*S. mansoni*) infection ($P = 0.001$) (Table 2)

Table 2

Distribution of *S. mansoni* infection with relation to water source for bathing among beggars in Jimma town who had stool investigation from February 10 to March 20, 2010.

Water source	*S. mansoni* infection [*n*(%)]		Total
	Positive	Negative	
Pipe	2 (1.7)	60 (51.7)	62 (54.9)
River	8 (6.9)	18 (15.5)	26 (22.4)
Well	2 (1.7)	20 (17.2)	22 (19.0)
Spring	2 (1.7)	4 (3.4)	6 (5.1)
Total	14 (12.1)	102 (87.9)	116 (100.0)

The infection rate of hook worm among the street beggars was 22 (19.0%) being high on those who do not wear foot protection (shoes).

The rate of hook worm infection in relation to shoe wearing habit was 1 (0.9%), 4 (3.4%) and 6 (5.2%) for those who wore shoes always, some times and never, respectively. There was statistically strong association between habit of shoe wearing and hook worm infection ($P = 0.005$)

Among the total number of study groups, 50 (43.1%) had trimmed their finger nails and 66 (56.9%) had untrimmed finger nails. Parasite positivity rate of each pattern was 41 (35.3%) for trimmed and

63 (54.3%) for untrimmed respectively. The difference was statistically significant ($P = 0.018$)

Mixed infection status of the 104 street beggars who had intestinal parasites showed that majority 63 (54.3%) of them harbored two or more parasite species (Figure 1).

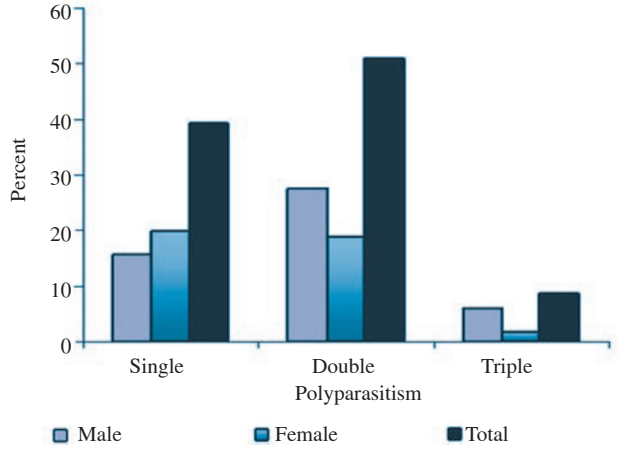

Figure 1. Mixed infection status of beggars harbored parasite in relation to sex Jimma town, February 10 to March 20, 2010.

In the present study, *A. lumbricoides* is the most frequently identified parasite accounted 65.5% followed by *T. trichiura* (44.8%) (Table 3). These two parasites were commonly identified as a mixed infection.

Table 3

Distribution of intestinal parasites among street beggars in Jimma town from February 10 to March 20, 2010.

Type of parasites	Frequency	Percentage
Protozoans		
Entamoeba histolytica	5	4.3
Giardia lamblia	4	3.4
Nematodes		
Ascaris lumbricoides	76	65.5
T. trichiura	52	44.8
Hook worm	11	9.5
Strongyloides stercolaris	4	3.4
Enterobius vermicularis	2	1.7
Trematodes		
S. mansoni	14	12.1
Cestodes		
Hymenolopis nana	8	6.9

Table 4

Distribution of parasites species in relation to sex of beggars harboring parasites in Jimma town from February 10 to March 20, 2010.

Type of parasites	Male ($n = 62$)		Female ($n = 54$)	
	n	%	*n*	%
Protozoans				
Entamoeba histolytica	2	1.7	3	2.6
Giardia lamblia	2	1.7	2	1.7
Nematodes				
Ascaris lumbricoides	39	33.6	37	31.9
T. trichiura	27	23.3	25	21.6
Hook worms	7	6.0	4	3.4
Strongyloides stercolaris	3	2.6	1	0.9
Enterobius vermicularis	2	1.7	0	0.0
Trematodes				
S. mansoni	10	8.6	4	3.4
Cestodes				
Hymenolopis nana	3	2.6	5	4.3

In this study, every parasite species showed fairly equal distribution in both sexes of the study participants (Table 4).

4. Discussion

The 89.7% prevalence rate of intestinal parasite obtained in the present study was much higher than reports of similar study done on street beggars in Nigeria, where the prevalence rate was 34.4%[9]. It is also greater than prevalence rate of the study conducted among street children in Philippines, where 62% was reported[10]. The difference could be due to sample size, methods, study period, environmental hygiene and distance of geographic location of the study areas may have contributed for the observed variations. The disparity in living condition status and access to clean water supply may also need to be considered in increasing the chances of parasite infection.

Moreover, the overall prevalence of intestinal parasites in the present study is to some extent higher than the studies conducted among urban dwellers in the same town where 83% was reported as having intestinal parasites[5], Study by King, *el al.* revealed that from the total of 2 338 stool specimens that were examined, prevalence of *A. lumbricoides*, hook worm, and *T. trichiura* was 9.9% (95% confidence interval 7.2%-12.7%), 9.7% (5.9%-13.4%), and 2.6% (1.6%-3.7%), respectively[11]. The present findings were also considerably higher than school-based study conducted in Jimma by Alemu, *et al*[12], where a prevalence rate of 68.4% was reported and another study conducted on school children in Gondar, North Ethiopia, where the prevalence rate was 55.6%[13]. The possible explanation for this observed variation could be the poverty level of these street beggars might risk them for parasitic infection.

Multiple parasitic infections (polyparasitism) is one of the prominent finding of the study, which accounted for 63 (54.3%) of the study subjects. This finding is slightly elevated when compared to 48.2% obtained in bure area among the indigenous population of Illubabor, Southwest Ethiopia[11]. However, the rate of multiple parasitic infections in the present study is much higher than the study conducted in Argentina among school children, showing that 33.3% had poly-parasitism[14]. Double parasitic infection was frequently seen in 46.6% of these street beggars. This rate is much higher than the study conducted in the same town where 35.8% was reported[5]. Extreme poverty and living severe unhygienic conditions of these beggars could be the possible explanation for observed differences.

In the current study, *A. lumbricoides* is the most frequently identified parasite accounting 65.5% followed by *T. trichiura* (50.2%). These two parasites were commonly identified as a mixed infection. Unlike *T. trichiura*, the prevalence of *A. lumbricoides* is considerably higher than 40.9% prevalence rate reported from the study conducted among urban dwellers in Southwest Ethiopia by Hotez, *et al*[5]. The rate is also much higher when compared to among schoolchildren at the University of Gondar Community School, Northwest Ethiopia 5.9%[15] and average prevalence of ascariasis reported from most of other African countries which is 32%, ranging from 16% to

48%[16].

Furthermore, the rate 12.1% of *S. mansoni* infection obtained in the present study is lower when compared to 0.3% prevalence rate of previous study conducted on school children in the same area[12] and in the study conducted in Gondar which is 2.1%[13]. On the other hand it is slightly lower than report of Hotez, *et al*.[5] which was 14.8%. The report of various studies showed that prevalence of schistosomiasis was 4%-29% around villages near Lake Abaya and Gorgora in north coast of Lake Tana[17,18] areas where schistosomiasis is more common[15,17]. Since the prevalence of *S. mansoni* in the study area is high and frequent use of river water for bathing might be the reason for observed increase rate of schistosomiasis.

It has been unveiled with the result of different studies that intestinal parasites are the major health problem in the world, particular in developing countries. The present study demonstrated high prevalence rate of intestinal parasites among the street beggars whose stools were investigated for infection. The distribution of each parasites species showed that geo-helminthes were the most frequently identified parasites followed by *Schistosoma*. This is truly an indication of environmental contamination and inaccessible of pure water supply to these individuals. Poor socio-economic living standard and the humid climate of Jimma zone may also favored the transmission of parasites.

Since majority of these street beggars harbored multiple parasites and do not have access to latrine, they are potential risk for the environmental contamination including the soil and water bodies of the town. Moreover, these people are also contributing to the observed higher prevalence of intestinal parasites infection in Jimma town. Therefore, Jimma Health Bureau cooperating with the municipality need to improve the problem by providing public latrine services in the town, implementing regular deworming activity of street beggars, and establishing rehabilitation program in settling the street beggars.

Conflict of interest statement

We declare that we do not have any conflict of interests

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