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Prevalence of Intestinal Parasitic Infection and Associated Factors among Pediatric Patients at Shenen Gibe Hospital, Ethiopia

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Abstract
Background: Intestinal parasites are either helminths or protozoan that inhabit in gastrointestinal tract. The prevalence and severity of intestinal parasites are high in developing countries where health and sanitary facilities are under development. The parasitic infections mainly affect physical, mental development and nutritional status of young children by transmitting through feco-oral route and penetration of skin.**Objective:** The objective of this study was to determine the prevalence of intestinal parasites and its predisposing factors among pediatric patients in Shenen Gibe Hospital, Jimma zone south west Ethiopia **Method:** A cross-sectional study was employed from April to May, 2014 among pediatric patients at Shenen Gibe Hospital. A socio-demographic data was collected by predesigned questionnaires and microscopic results of intestinal parasites were collected by direct wet mount. Stool specimens were examined microscopically for the presence of parasite eggs, larva, cyst and trophozoite using direct saline thin smear method**Result:** out of the total 371 study participants; 123(33.1%) had one or more intestinal parasitic infections. Seven species of intestinal parasite was identified in this study. The most prevalent intestinal parasite was *Giardia lamblia* (42.3%) followed by *Ascaris lumbericoides* (31.7%) and *E.histolytica/dispar* (13.0%). The prevalence of intestinal parasitic infection from participant who wash their hands before meal and after defecation with frequency of always, sometimes and not at all were 5(1.35%), 88(23.7%) and (8.08%) respectively The prevalence of intestinal parasitic infection of participants who use pipe, spring and well water as the source of drinking water was 19.4%, 6.4%, and 7.3% respectively. **Conclusion and Recommendation:** There was significant prevalence of pediatric intestinal parasitosis due to protozoan or helimenthic infection in the study area. There was statistically significant association between intestinal parasitic infections and waste disposal pit, water source, finger nail status of patients. Appropriate prevention and control strategies should be employed to tackle the problem.
Keywords: intestinal parasitic infection, pediatric patient, risk factors

INTRODUCTION

Intestinal parasitic infection is an infection with intestinal helimenthic and protozoan parasites. It is common human infection in developing countries and cause a significant morbidity and mortality in endemic countries. Helminthes are worms, which are multicellular organisms. Nematodes, cestodes and trematodes are helminthes that inhabit the human gut (1). Intestinal parasitic infection by protozoan and helminthic parasites are widely prevalent and causes significant public health problems in developing countries (2).

The intestinal parasitic infections are among the most common health problem globally. It is estimated that 3.5 billion people are affected with intestinal parasitosis, and 450 million are ill as a result of these infections. According to the World Health Organization (WHO) estimation; *Ascaris lumbricoides,* Hookworm, *Trichuris trichiura*, *Giardia intestinalis* and *Entamoeba histolytica/dispar* cases globally are; 800–1000 million, 700–900 million, 500 million, 200 million, and 500 million respectively. There are about 39 million disability adjusted life years (DALYs) are attributed to intestinal parasitic infections which represent a substantial economic burden (3 – 5).

Intestinal parasitic infections are main public health problems in the tropics particularly in the third world countries. High prevalence intestinal parasitic infection is associated with low socio-economic status, poor sanitation, inadequate medical care and absence of safe drinking water supplies. The epidemiology of intestinal parasitic infection is also affected by the climatic and environmental conditions such as heat and humidity (6, 7).

World health report indicated that Ethiopia like many of the developing countries is affected by intestinal helimenthic infections mainly those of the soil transmitted helimenths. Different species of intestinal parasites was detected among children in previous studies done in Ethiopia, among which *Ascaris lumbricoides,* hookworm*, Trichuris trichiura, S. mansoni, Giardia intestinalis* and *Entamoeba histolytica/E. dispar* are commonly observed (8, 9).

As indicated by different studies done previously, the distribution and prevalence of various species of intestinal parasites differs from region to region because of several environmental, social and geographical factors. Determining the prevalence of various intestinal parasitic infections in an area is a prerequisite not only for formulation of appropriate control strategies but also to predict risk for communities under consideration. This study was conducted to determine the types and prevalence of intestinal parasitosis at pediatric patients at Shenen Gibe Hospital. The objective of the study was to determine the prevalence of intestinal parasitic infections and associated factors among pediatrics patients at Shenen Gibe Hospital.

METHOD AND MATERIALS

Study area

This study was conducted at Shenen Gibe Hospital, Jimma town. Jimma town is the capital city of Jimma zone, located in Oromia region, southwest Ethiopia, at a distance of 345km from Addis Ababa. This city has a latitude and longitude of 7 º40'N and 36 º50'E. According to census conducted by central statistical agency (CSA) in 2007, this town the total population of 159, 009 of whom 80,897 were males and 78,112 were females. The study was conducted from April to May, 2014.

Study design

A facility based cross-sectional study was conducted to determine the prevalence of intestinal Parasites and its predisposing factors among pediatric patients at Shenen Gibe Hospital.

Data Collection

Intestinal parasitic infection was detected by examining microscopically for the presence of eggs, larva, trophozoite and cysts after preparing direct wet mount of stool sample by using 10x and 40x objective lens. The findings were recorded on pre-prepared formats. Socio-demographic and other variables were collected by using questionnaire.

Data analysis

Data were entered in to computer and analyzed using SPSS windows version 20. Descriptive statistics was used to give a clear picture of background characteristics like age, sex, availability of latrine, etc. and prevalence of intestinal parasites.

Chi-square test was used to determine the association between risk factors and the prevalence of intestinal parasitic infection. P-value less than 0.05 was considered as statistically significant.

Sample size: The single population proportion formula was used to determine the sample which was 374

Study variables

Dependent variable

- Intestinal Parasitic infection

Independent variables

- Age, sex, latrine usage , shoe wearing habit, finger nail trimming habit, hand washing after defecation, drinking water source

DATA QUALITY ASSURANCE

To ensure the reliability and validity of the study data, the following quality assurance was done during three phases. For **Pre-analytical phase**: The enough stool specimens were collected properly and the laboratory instruments and reagents were checked for proper functioning before actual work. For **Analytic phase**: standard operating procedures was followed during laboratory procedures and during **post- analytical phase**: the results were properly recorded and reported

Ethical consideration

Ethical clearance letter was from Jimma University student research program. Before starting data collection, official permission was also obtained from hospital administration. Consent was also obtained from family of the study participants.

RESULT

Table 1. Frequency of different variables among pediatrics patients at OPD of Shenen Gibe Hospital, Jimma 2014

Variables	Number	Percentage
Age		
1-5	182	49.05
6-10	108	29.1
11-15	61	16.44
16-18	21	5.66
Sex		
Male	191	51.5
Female	180	48.5
Hand washing before meal and after defecation		
Yes	344	92.72
No	27	7.28
Frequency of hand washing before meal and after defecation		
Always		
Sometimes	222	59.84
Not at all	119	32.07
	30	8.08
Finger nail status		
Trimmed	249	67.2
Untrimmed	122	32.88
Waste disposal pit		
Yes	184	49.6
No	187	50.4
Wearing shoe		
Yes	363	97.84
No	8	2.16
Water source		
Pipe	280	75.4
Spring	61	16.44
Well	30	7.38

Total of 372 pediatric patients were included in this study. Regarding the sex of the study subjects 191 (51.5%) were male. The majority of participants, 49.05%, were in age range of 1 – 5 years. The percentage of age range of 6 – 10, 11 – 15 and 16 – 18 years was 29.1, 16.44, and 5.66 respectively. About 75.47% of the study participants in study area use pipe as a source of drinking water and 16.44 % use spring water for drinking, the remaining 7.38 % use well water for drinking. Most of the study participants wear shoe about 97.84%. Among study participants, the percentage of partcipants who wash their hands before meal and after defecation always, sometimes and not at all were 59.84%, 32.07% and 8.08% respectively. Most of study participants 344(92.72%) wash their hands before meal and after defecation.

The Prevalence of intestinal parasitic infections in pediatrics patients at Shenen Gibe Hospital

Different types protozoans, and helimenths were detected from stool samples of the study participants. The overall prevalence of intestinal parasitic infection was 33.1%. The most prevalent intetinal parasites was *Giardia lamblia* (42.3%), followed by *Ascaris lumbericoide* (31.7%). The prevalence of *Entamoeba hitolytica/dispar*, *Hymenolepsis nana* and hookworm species was 13%, 7.3% and 3.25% respectively.

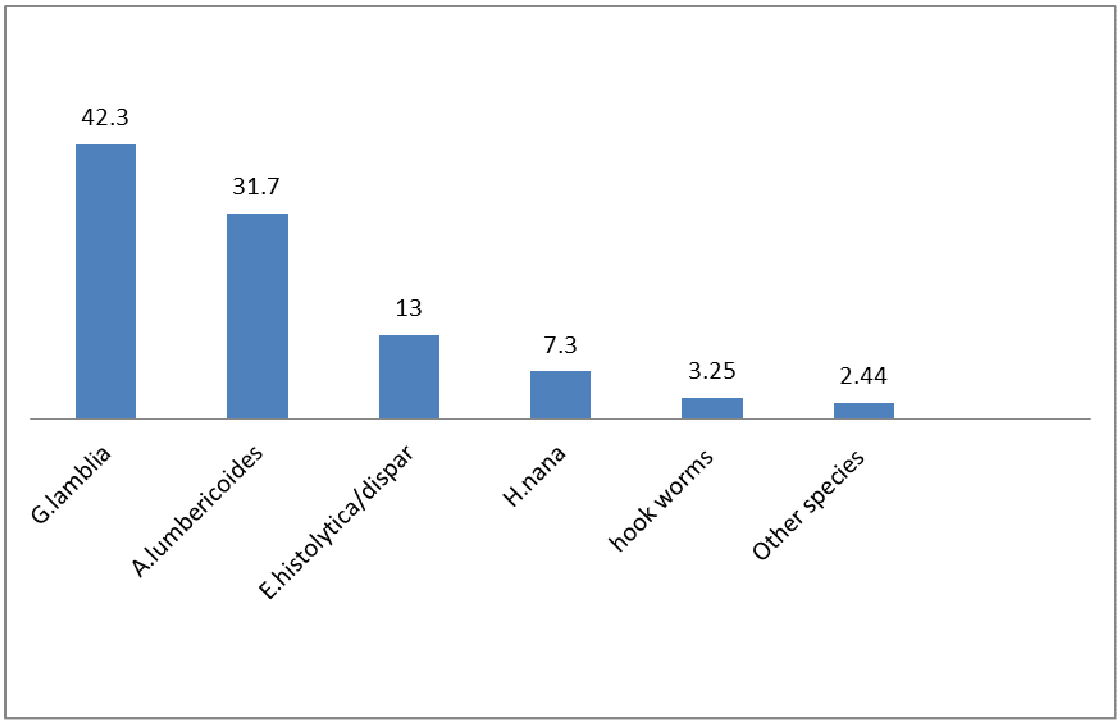

Fig 1; prevalence of different parasite species among pediatrics patients at shenen Gibe Hospital, Jimma, 2014

Table 2. Association between intestinal parasitic infection and different variables by using chi square test

Variables	Result of stool examination		P- value
	Positive(%)	Negative(%)	
Age			P=0.144
1-5	55(14.8)	127(34.2)	
6-10	37(9.97)	71(19.1)	
11-15	20(5.4)	41(11.05)	
16-18	11(2.96)	10(2.7)	
Sex			
male	58(15.6)	133(35.85)	
female	65(17.5)	115(31)	P=0.263
Hand washing before meal and after defecation			
Yes	96(25.87)	248(66.9)	
No	27(7.27)	0(0)	P = 0.000
Frequency of hand washing before meal and after defecation			
Always	5(1.35)	217(58.5)	P=0.000
Sometimes	88(23.7)	31(8.35)	
Not at all	30(8.08)	0	
Finger nail status			
Trimmed	39(10.5%)	210(56.6%)	P = 0.000
Untrimmed	84(22.6%)	38(10.24%)	
Waste disposal pit			
Yes	15(4%)	169(45.6%)	P = 0.000
No	108(29.1%)	79(21.3%)	
Water source			
Pipe	72(19.4%)	208(56.07%)	P = 0.00
Spring	24(6.4%)	37(10.04%)	
Well	27(7.3%)	3(0.8%)	

There was no statistically significant association between sex of the study participants and intestinal parasitic infection (P= 0.263). Similarly the age of the study participants has no association with intestinal parasitosis (P = 0.144). Hand washing before meal and after defecation is significant associated with intestinal parasitic infection in this study (P < 0.0001). There was also significant association between the frequency of hand washing before meal and after defecation and prevalence of intestinal parasitic infection (p < 0.0001). The presence of waste disposal pit and drinking water source were significantly associated with intestinal parasitosis among pediatrics patients (p < 0.0001).

From participants who use pipe water for drinking water 19.4% were infected by intestinal parasites. The prevalence of intestinal parasite among children who use spring water and well water for drinking was 6.4% and 7.3% respectively. The prevalence of intestinal parasite in individuals who had no waste disposal pit was 29.1% and those who had waste disposal pit was 4.04%.

DISCUSSION

The overall prevalence of intestinal parasitosis in this study (33.1%) with is in agreement with a report 27.5% from Ethiopia (10) and from Nigeria, 25.8% (11), but it was much lower than a study at southeast of lake Langano in South Ethiopia (12) and higher than a report from Benin City, in Nigeria (3.9%) (13), this might be due to the difference in predisposing factors to intestinal parasitic infections in accordance with specific geographical area.

Giardia lamblia was the most common prevalent parasite observed in this study with incidence rate of 42.3%. Similarly, the prevalence of *Giardia lamblia* was 41.9% among school children at North Gonder (14). However, there were different in incidence rate of giardiasis from previous studies, 6.2% in Ethiopia (15) and 28.9% in Karachi (16) this difference may be due to difference in environmental and personal sanitation features among different communities.

Ascaris lumbericoides was the second most common parasite observed in this study with 31.7% prevalence, this is comparable to a report from Southern Ethiopia (17) but it is higher than a report from Araminch town, on study conducted on school children, 10.6% (18). The difference might be due to that the present study was conducted on patients at a hospital. The prevalence hook worm species was 3.25%, which is close to previous report, 5.9%, from Ethiopia (17). The incidence rate of Hymenolepis nana was 7.3% and was the only cestode helimnth detected in the study. *Hymenolepis nana* was reported from a previous study among school children with prevalence of 4.2% which is close to our finding (18).

Infections with pathogenic intestinal protozoa (*Entamoeba histolytica* and *Giardia intestinalis*) result in considerable gastrointestinal morbidity, malnutrition and mortality worldwide, particularly among young children in developing countries (19, 20). *Entamoeba histolytica/dispar* was the second protozoan parasite detected in this study with prevalence of 13%. This is compatible with a report from Vizianagaram with 10% prevalence (21). The prevalence of *Entamoeba histolytica* in a study done in Nigeria was 21 % (22) which is higher that our report, this difference might be due that our study was done on any of pediatrics patient at a hospital, however, study in Nigeria was conducted on HIV patients.

There was no statistically significant association between intestinal parasitosis and sex as well as age of the participants, P > 0.05. However, there was significant association between intestinal parasitic infections and waste disposal pit, water source, finger nail status (P < 0.0001). The prevalence of intestinal parasitic infection in individuals who had no waste disposal pit was significantly higher, 29.1%, than those who had waste disposal pit, 4.04%. There are previous studies that have also showed such associations. Ayalew et al. indicated that, hand washing practice before meal, water source for drinking, and finger nail condition had statistically significant association to any of intestinal parasite infections among school children (14).

Conclusion

Both protozoan and helimenthic infections were was observed among pediatric patients from which *Giardia lamblia* was the most common protozoan parasite and *Ascaris lumbericoides* was the most common helimenthic parasite detected. There was no significant association between intestinal parasitosis and sex and age of the participants. However, there was significant association between intestinal parasitic infections and waste disposal pit, water source, finger nail status of patients.The prevalence of intestinal parasitic infection in individuals who had no waste disposal pit was significantly higher than those who had waste disposal. Health education on personal hygine, environmental hygine, and prevention methos of parasitic diseases should be given to the community.

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