Journal of Tropical Diseases

Feleke et al., J Trop Dis 2017, 5:2
DOI: 10.4172/2329-891X.1000235

Research Article OMICS International

Prevalence of Intestinal Parasitic Infections in St. Marry Hospital, Axum, Northern Ethiopia: A Retrospective Study

Daniel Getacher Feleke[1*], Shambel Tarko[2], Dr. Haftom Hadush[1], Daniel Gebretsadik[4], Yosef Zenebe[3] and Awol Seid[2]

[1]*Department of Biomedical Sciences, College of Health Sciences and Referral Hospital, Aksum University, Aksum, Ethiopia*

[2]*School of Nursing, College of Health Sciences and Referral Hospital, Aksum University, Aksum, Ethiopia*

[3]*Department of Psychiatry, College of Health Sciences and Referral Hospital, Aksum University, Aksum, Ethiopia*

[4]*Departmentof Medical Laboratory Science, College of Medicine and Health Sciences, Wollo University, Dessie, Ethiopia*

[*]**Corresponding author:** Feleke DG, Department of Biomedical Sciences, College of Health Sciences and Referral Hospital, Aksum University, Ethiopia, Tel: +251946747551; E-mail: danibest2002@gmail.com

Received date: April 02, 2017; **Accepted date:** April 18, 2017; **Published date:** April 31, 2017

Copyright: © 2017 Feleke DG, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Background: Intestinal parasitic infections are an important public health problem in developing countries. The aim of this study is to get information about the presence and prevalence of intestinal parasites.

Methods: A hospital based retrospective study was carried out for the prevalence of intestinal parasites in Axum Saint Marry hospital, Tigray from September 2013 to August 2015. In the study hospital standard operating procedures (SOPs) is used in every procedures of stool sample examination. Stool samples were examined by experienced laboratory technologists within 2 hours of collection using direct wet mount and formal-Ether concentration techniques.

Results: Of the examined 21,611 stool samples 7,663 (35.5%) were positive for intestinal parasites. The dominant parasites detected were *Entameoba histolytica* 3,892 (50.8%) followed by *Gardia lamblia* 2,507 (32.7%), *Hookworm* 499 (6.5%) and *Schistosma mansoni* 296 (3.9%). Other helminthes were also isolated and recorded in the laboratory registration book.

Conclusion: This retrospective study showed a variable prevalence of intestinal parasites from year to year but with no significant reduction. Health education and practical measures on personal and environmental sanitation such as proper waste disposal are important to reduce intestinal parasitic infection in the study area.

Keywords: Intestinal parasites; Protozoan parasites; Helminthes; Prevalence; Axum

Introduction

Intestinal parasitic infections are still an important public health problem [1]. Globally two billion individuals were infected with intestinal parasites; of these majorities were children in resource-limited areas [2,3]. World Health Organization estimated 800-1000 million cases of Ascariasis, 700-900 million of Hookworm infection, 500 millions of Trichuriasis, 200 million of Giardiasis and 500 million of *Entamoeba histolytica* worldwide [4]. In sub-Saharan African countries, up to 250 million people are infected with at least one intestinal nematodes [5]. The transmission mode of intestinal parasites are consumption of contaminated food and water, skin penetration and through feco-oral contact from person to person [6,7]. Socioeconomic conditions, education, sanitation practices and presence of domestic animals in the home are some of the factors which determine the prevalence of intestinal parasite [8,9]. In Ethiopia intestinal parasites are widely distributed largely due to lack of environmental and personal sanitation, contamination of food and drinking water resulted from open defecation around the settlement and lack of awareness of simple health promotion practices [5,10-12]. As far as we know no study was conducted on the prevalence of intestinal parasite in Axum St. Marry Hospital, Tigray. Therefore, this study aimed to get the real information about the presence of different species of intestinal parasites and their magnitude with time in Axum, Tigray by referring St. Marry hospital parasitology laboratory records.

Materials and Methods

Study area and period

This hospital based retrospective study was implemented in Axum St. Marry hospital from September 2013 to August 2015. Axum is ancient town with a population of 56,500 residents (as of July 2012). Agriculture, government employee and small scale trading are means by which the local people earn their living. Axum is the original capital of the kingdom of Axum; it is one of the oldest continuously inhabited places in Africa. It has an elevation of 2,131 meters. Aksum University is located in the town. It has only one public general hospital and one health center. There are some private medium clinics but no private hospital. Axum St. marry hospital is a well known public hospital in 50 km radius from the center of the city. The availability of human and material resource, the good service it provides and fair price made this hospital preferable not only by the residence of the town but also the rural people from the surrounding areas. As a result, this hospital has very high patient load.

Data collection tools and procedures

Data were collected using a pre-designed data collection sheet. In Axum hospital pre-analytical, analytical and post-analytical quality control for stool examination was performed by strictly following the SOP. In this hospital, all specimens were collected using clean, wide mouthed stool sample container and examined by experienced laboratory technologists within 2 hours of collection. Macroscopic stool examination for the presence of whole or part of adult parasite and microscopic examination for the detection of parasite egg, cyst and trophozoite were performed. Saline wet mount was prepared and examined for microscopic detection of trophozoites of protozoa and helminthes egg and larva. Protozoan cysts were detected using iodine wet mount. Formal-Ether concentration technique was performed for patients who have strong suggestive clinical manifestations but no parasites detected in wet mount examination. Scotch tape technique for the diagnosis of E.verimicularis was not performed.

Stool specimens from the out patients and inpatients during the study period were included in the analysis irrespective of patient's disease status. Stool specimen provided by admitted patients for follow-up purpose and incomplete records were excluded from the analysis. In the laboratory record book there were patients provided more than one stool sample either for follow up purpose or for diagnosing parasites passed intermittently in stool. In this case if the entire submitted samples were negative, only one of the samples was counted; if one of the provided sample positive, it was included. Admitted patients provided more than one samples for follow-up purpose, the subsequent samples were excluded.

Data analysis

In this study only consistently recorded demographic information were used in the data analysis. Data was first entered in to the Excel and imported to the SPSS version 20 software package and analyzed. Crosstab was used for frequency distribution of both dependent and independent variables. Data was presented with appropriate figures and tables.

Results

A total of 21,611 stool samples were examined from September 2013-August 2015. Of the examined stool samples 7,663 (35.46%) were positive for intestinal parasites. Parasite positivity was slightly higher in females (36.49%) than in males (34.69%) (Table 1). More than 92.8% of the positive cases fall under the age group of ≥ 15 years.

	Category				
	Age			Sex	
	<5	5-14	≥15	Male	Female
Total samples examined	3,797	3,845	13,969	12,431	9,180
Positive cases	195	357	7,111	4313	3,350
Percentage (%)	5.13	9.28	50.91	34.69	36.49

Table 1: Distribution of positive cases by age and gender (n=7,663), Axum St. Marry Hospital, Tigray from 2013-2015.

The dominant parasites detected were *Entameoba histolytica* 3892 (50.79%) followed by *Gardia lamblia* 2507 (32.7%), Hookworm 499 (6.5%), *Schistosma mansoni* 296 (3.9%), *Hymenolepiasis nana* 270 (3.5%). The least common intestinal parasites were *Ascaris lumbricoides* and *Taenia* species. The prevalence of specific species of parasites in different age group was analyzed.

Hymenolepiasis nana, Trichuris tricuria and *Enterobius vermicularis* were more prevalent in less than five years old children while *Entameoba histolytica* was the most common intestinal parasites in age grope ≥ 15 (Table 2).

		Parasites species										
		Eh	Gl	Hw	Sm	Hn	Ev	Ss	Tt	Al	Taenia spps	Total
Total number of positive cases percentage (%)		3,892 (50.8)	2,507 (32.7)	499 (6.5)	296 (3.9)	270 (3.5)	66 (0.9)	47 (0.6)	37 (0.5)	31 (0.4)	18 (0.2)	7,663 (100)
Age categories	<5	78 (40.0)	63 (32.3)	0 (0.0)	0 (0.0)	24 (12.3)	11 (5.6)	6 (3.1)	8 (4.1)	5 (2.6)	0 (0.0)	195 (2.5)
	5-14	112 (31.4)	92 (25.8)	35 (9.8)	8 (2.2)	42 (11.8)	20 (5.6)	12 (3.4)	14 (3.9)	18 (5.0)	4 (1.1)	357 (4.7)
	>15	3,702 (52.1)	2,352 (33.1)	464 (6.5)	288 (4.1)	204 (2.9)	35 (0.5)	29 (0.4)	15 (0.2)	8 (0.1)	14 (0.2)	71 11(92.8)
Keys: Gl: Giardia lambila; Eh: Entameoba histolytica; Hw: Hookworm; Sm: Schistosoma mansoni; Hn: Hymenolepis nana; Al: Ascaris lumbricoids; Ss: Strongyloides sterocoralis; Tt: Tricuris tricuria; Ev: Entrobious verimicularis												

Table 2: The distribution pattern of different intestinal parasites in different age categories in Axum St. Marry Hospital, Tigray from 2013-2015.

Hookworm was the most commonly detected helminth parasite with 296 (3.86%) followed by *S.mansoni* and *H.nana* with 270 (3.52%) and 66 (0.86%) respectively (Figure 1).

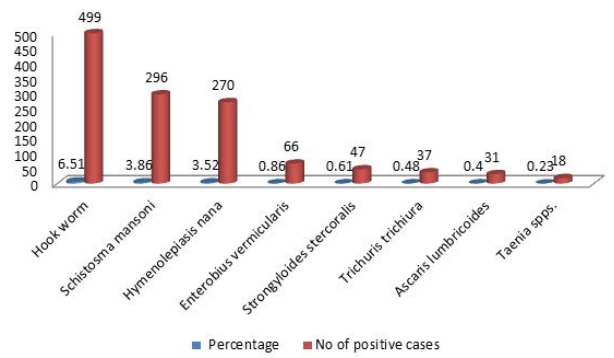

Figure 1: Intestinal helminthes distribution in Axum Saint Marry hospital, Tigray from 2013-2015.

Although there were differences in the number of total stool samples examined and positive cases year to year, there was no any significant association between positive cases and year.

The most common intestinal parasites were *E. histolytica* (49.37-52.10%), *G. lamblia* (30.25-35.86%), *Hookworm* (5.84-7.90%) and *S. mansoni* (3.58-4.35%). The rest parasite detected were *H.nana, E.verimicularis, T.trichuria, A.lumbricoids* and *Taenia spps* (Table 3).

Year	Samples/year											Positive samples/ year
		Protozoan species		Helminth species								
		Gl	Eh	Hn	Al	Ss	Tt	Ev	Hw	Taenia spps.	Sm	
2013	6,893	916	1261	89	12	16	18	20	140	1	111	2554
		-35.9	-49.4	-3.5	-0.5	-0.6	-0.7	-0.8	-5.8	0	-4.4	-37.1
2014	7,305	856	1396 (52.1)	102	12	11	11	18	167 (6.7)	6	96	2679
		-32		-3.8	-0.5	-0.4	-0.4	(0. 7)		-0.2	-3.6	-36.7
2015	7,413	735 (30.3)	1235 (50.8)	79	7	20	8	28	192 (7.0)	11	89	2430
				-3.3	-0.3	-0.8	-0.3	-1.2		-0.5	-3.7	-32.8
Keys: Gl: Giardia lambila; Eh: Entameoba histolytica; Hn: Hymenolepis nana; Al: Ascaris lubricoids; Ev: Entrobious verimicularis; Ss= Strongyloides sterocoralis, Tt: Tricuris tricuria, Hw: Hookworm; Sm: Schistosoma mansoni												

Table 3: Intestinal parasites distribution by year total number and percentage (%) in Axum St. Marry Hospital, Tigray from 2013-2015.

Double infection	Male (n = 4,313) No. (%)	Female (n = 3,350) No. (%)	Total (n = 7,663) No. (%)
Al, Hn	3 (0.07)	2 (0.06)	5 (0.07)
Hw, Sm	4 (0.10)	0 (0.0)	4 (0.05)
Eh, Gl	17 (0.40)	12 (0.36)	29 (0.39)
Eh, Hn	7 (0.16)	3 (0.09)	10 (0.13)
Eh, Ss	2 (0.05)	0 (0.0)	2 (0.03)
Sm, Gl	1 (0.02)	2 (0.06)	3 (0.04)
Total	34 (0.79)	20 (0.60)	53 (0.69)
Keys: Al: Ascaris lumbricoides, Ss: Strongyloides stercoralis, Hn: Hymenolepissnana, Sm: Schistosomamansoni, Eh: Entamoeba histolytica, Gl: Giardia lamblia, Hw: Hookworm			

Table 4: Stool samples with mixed infections and types of parasite combinations in Axum St. Marry Hospital, Tigray from 2013-2015.

Of 7,663 positive stool samples, in 53 (0.7%) of the stool samples more than one parasite were recorded. All the multi-parasitic infections were a double infections and the most common multi-parasitic infection was *E. histolytica and G. lamblia* (Table 4).

Discussion

In this study the overall prevalence of intestinal parasite was 35.5%. Studies from different part of Ethiopia [2,5,9-12] and outside Ethiopia [4,7] reported a prevalence of 22.7-79.8%. There was higher prevalence in this study compared to studies conducted in India and Nepal [4,7]. This might indicate better personal and environmental sanitation practice in the study area of those countries. The prevalence in this study is very low compared to a study conducted in Delgi among school children in north Gondar which was 79.8%.

This might be due to lack of awareness about the transmission and prevention ways of intestinal parasite which result in low sanitation practice in school children. Ten different intestinal parasites were detected in this retrospective study. *E. histolytica* and *G. lambila* were the predominant protozoan parasites while Hookworm was the commonest helminth parasite. In other studies also E. histolytica and G. lambila were the commonly detected protozoan parasites [2,10-13]. With regard to helminth parasites, in contrast to our study *A. lumbricoides* [9-12] was the commonest parasite in other studies. In some other studies *H. nana* [2,14] and *T. trichiura* [13] were the commonly detected intestinal helminthes. Generally *E. histolytica, G. lambila, A. lumbricoides*, hookworm infection and T. trichiura are the common intestinal parasites worldwide. These parasitic agents are also very common in Ethiopia. However, very low prevalence of *A. lumbricoides* and *T. trichiura* were found in our study area. This might be due to good awareness and hygienic practice of the community in the study area. The high prevalence of *E. histolytic* and *G. lambila* in the study area might be due to lack of clean water supply. Amebiasis and giardiasis are parasitic diseases mainly caused by drinking contaminated water. In our study area there is shortage of clean drinking water. As a result, the community might drink water from unsafe sources. There might be also lack of awareness about the transmission and prevention of parasitic diseases caused by drinking contaminated water. These factors can contribute for the high prevalence of Amebiasis and giardiasis in the study area. *E.vermicularis* infection is transmitted by hand to mouth and/or person to person directly. Due to the sticky nature of E.vermicularis egg in the perianal area scotch tape technique should be used for the detection of the parasite egg. The method of diagnosis used in the study hospital was not appropriate for the detection of *E.vermicularis* egg. This might be one of the reasons for the low prevalence in this study area. Generally the prevalence of intestinal parasite was variable from year to year. This might be due to the inconsistency of health education about personal and environmental sanitations given to the people and other interventions used to tackle intestinal parasite in the area.

Conclusion

The burden of intestinal parasites in study area is very high. This retrospective study showed a variable prevalence of intestinal parasites from year to year but with no significant reduction. Health education and practical measures on personal and environmental sanitation such as proper waste disposal are important to reduce intestinal parasitic infection in the study area. In addition, the regional administration must provide adequate and safe water supply for the community.

Funding

This study was funded by the authors. There was also support from Aksum University.

Ethics Approval and Consent to Participate

Ethical clearance was obtained from the Ethical Review Committee of Aksum University, College of Health science and Referral hospitals. Permission letter was obtained from Tigray regional state health bureau and Axum saint marry hospital. The data was collected with no personal identifiers at all stages of the study.

Availability of Data and Materials

The authors confirm that all data underlying the findings are fully available without restriction. All relevant data are within the manuscript.

Competing of Interests

The authors declare that they have no competing interests.

Author's Contributions

DG* involved in proposal writing, designed the study and participated in all implementation stages of the project. DG* and HH also analyzed the data and finalized the write up of the manuscript. ST, DG and AS was responsible for critically revising the proposal and the manuscript. DG*, HH and YZ was responsible for data collection and drafting of manuscript. All authors reviewed and approved the final manuscript.

Acknowledgements

We deeply express our gratefulness to Aksum University for financial support without which this project would have not been possible. We would like to acknowledge all St. Marry hospital staffs for their cooperation for the accomplishment of this study. Special thanks to the laboratory head of St. marry hospital and other laboratory staffs.

References

1. Dagnew M, Tiruneh M, Moges F, Tekeste Z (2012) Survey of nasal carriage of Staphylococcus aureus and intestinal parasites among food handlers working at Gondar University, Northwest Ethiopia. BMC Public Health 12: 1-6.
2. Gelaw A, Anagaw B, Nigussie B, Silesh B, Yirga A, Alem M, et al. (2013) Prevalence of intestinal parasitic infections and risk factors among schoolchildren at the University of Gondar Community School, Northwest Ethiopia: A cross-sectional study. BMC Public Health 13: 1-8.
3. Alemu F (2013) Prevalence of intestinal parasites and other parasites among HIV/AIDS patients with on-ART attending dilla referral hospital, Ethiopia. Journal of AIDS & Clinical Research 10: 7-14.
4. Sah RB, Bhattarai S, Yadav S, Baral R, Jha N, et al. (2013) A study of prevalence of intestinal parasites and associated risk factors among the school children of Itahari, Eastern Region of Nepal. Trop Parasitol 3(2): 140-148.
5. Yami A, Mamo Y, Kebede S (2011) Prevalence and predictors of intestinal helminthiasis among school children in Jimma zone: A cross-sectional study. Ethiop J Health Sci 21(3): 4-8.
6. Bdir S, Adwan G (2010) Prevalence of intestinal parasitic infections in Jenin Governorate, Palestine: a 10 year retrospective study. Asian Pac J Trop Dis 3(9): 745-747.
7. Srihari N, Kumudini T, Mariraj J, Krishna S (2011) The prevalence of intestinal parasitic infections in a tertiary care hospital-a retrospective study. J Pharm Biomed Sci 12(8): 1-4.

8. Nguyen NL, Gelaye B, Aboset N, Kumie A, Williams MA, et al. (2012) Intestinal parasitic infection and nutritional status among school children in Angolela, Ethiopia. J Prev Med Hyg 53(3): 157-162.
9. Amare B, Ali J, Moges B, Yismaw G, Belyhun Y, et al. (2013) Nutritional status, intestinal parasite infection and allergy among school children in Northwest Ethiopia. BMC Pediatrics 13: 1-8.
10. Wegayehu T, Tsalla T, Seifu B, Teklu T (2013) Prevalence of intestinal parasitic infections among highland and lowland dwellers in Gamo area, South Ethiopia. BMC Public Health 13(1): 1-12.
11. Ayalew A, Debebe T, Worku A (2011) Prevalence and risk factors of intestinal parasites among Delgi school children, North Gondar, Ethiopia. J Parasitol Vector Biol 3(5): 75-81.
12. Haftu D, Deyessa N, Agedew E (2014) Prevalence and determinant factors of intestinal parasites among school children in Arba Minch town, Southern Ethiopia. Am J Health Res 2(5): 247-254.
13. Wakid D, Hamdi M (2009) Intestinal parasitic infection among food handlers in Holy City Makkah during Hajj season 1428 Hegira. Medical Science 16(1): 2-12.
14. Tadesse G (2005) The prevalence of intestinal helminthic infections and associated risk factors among school children in Babile town, eastern Ethiopia. Ethiop J Health Dev 19(2): 140-147.