

Burden of Intestinal Parasite Among Patients Attended Wolaita Sodo University Comprehensive Specialized Hospital in Ethiopia

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Abstract: *Background:* Intestinal parasitic infectivity is still the major reason of morbidity and mortality globally. In developing countries, including Ethiopia, the prevalence of intestinal parasitic diseases is high. In Ethiopia, prevalence of intestinal parasite was varied from 46-79%. Local data is very important to plan and prevent this infection. Therefore, this study was aimed to assess the burden of intestinal among patients attended Wolaita Sodo University Comprehensive Specialized Hospital in Ethiopia. *Method:* A ten year retrospective cross sectional study was conducted from December 1-30/2021. The records of 2011-2020 were extracted from parasitological laboratory stool examination result logbook at Wolaita Sodo University Comprehensive Specialized Hospital. The stool samples were examined saline wet mount method. Extracted data were entered and analyzed in SPSS 20.0 software and the result was summarized using tables and graphs. The study excluded patient result with incomplete information. Also data from Pediatrics laboratory was not included due to result logbook storage condition was not appropriate. *Result:* The study included 13,679 patients who provided stool samples for the parasitology laboratory at Wolaita Sodo University Comprehensive Specialized Hospital over a ten-year period from 2011-2020. The overall prevalence of intestinal parasites was 47.9% for at least one intestinal parasite. The prevalence of helminth and protozoan infections was 20.3% and 27.6%, respectively. *Entamoeba histolytica/E. dispar* trophozoite was the most common identified parasite, which was seen in 18% of the patients, while *Enterobius vermicularis* (0.1%) was the least reported parasite. Other parasites identified were *Ascaris lumbricoides* (15.0%), *Hookworm* species (2.0%), *Taenia* species (1.8%), *Hymenolepis nana* (0.7%), *Strongyloides stercoralis* (0.3%), *Trichuris trichuria* (0.2%), and *Shistosoma mansoni* (0.2%). The prevalence of helminthes was higher in females (23.3%) than in males (19.5%), while that of protozoan infections was 28.5% in males than females 23.8%. *Conclusion:* Prevalence of intestinal parasite in patients attending Wolaita Sodo University Comprehensive Specialized Hospital was high. Therefore, personal hygiene and periodic screening for intestinal parasites was recommended.

Keywords: Prevalence, Parasites, Helminthes, Protozoa, Wolaita

1. Introduction

Human intestinal parasites are still the major causes of sickness and death; hence, they are a significant general medical issue globally [1]. It is estimated that 3.5 billion individuals are influenced world-wide and 450 million are sick because of intestinal parasites infection. Regardless of whether they have an overall appropriation, they are increasingly predominant in developing countries, causing real general medical issues [2]. In sub-Saharan Africa, the

prevalence of intestinal parasitic diseases is high, and its rate can extend to up to 95%. In these countries, up to 250 million individuals are assessed to be infected with at least one type of intestinal nematode [3]. These parasitic diseases are brought about by both protozoa and helminth parasites [4].

The Epidemiology of disease transmission of intestinal parasitic infections demonstrates that these parasites are found in each age group and in both genders [5]. Studies conducted in various countries revealed that an individual's circumstances play a significant role in the prevalence of

intestinal parasitic contamination [6]. High predominance is found in individuals with low financial status, poor living conditions, stuffed regions, poor environmental sanitation, inappropriate trash transfer, unsafe water supply, and unhygienic individual habits. These components are the reason for the high transmission and infection of intestinal parasites and death in developing countries [7].

Some studies in Ethiopia showed the prevalence of intestinal parasites varied from 46-79%. Other studies were conducted among different societies to reveal the predominance of intestinal parasitosis. As other developing countries, it was due poor environmental sanitation, poor hand washing, using unsafe toilet and eating un-cooked vegetables or dairy and raw meat [8, 9].

Around one third of Ethiopia's population is infected with intestinal parasites. The most common ones are *Ascaris lumbricoides*, *Trichuris trichiura*, hookworm, *S. stercoralis*. [10].

Even if there are studies conducted in Ethiopia on the prevalence of intestinal parasitosis in various parts of Ethiopia on a small number of patients, there are also regions for which epidemiological data isn't accessible, including the present study area. Therefore, this retrospective study was aimed to assess the burden of intestinal parasites among patients attending Wolaita Sodo University Comprehensive Specialized Hospital in Ethiopia. This studied included data of more than 13,000 patients over a period of 10 years. Finding of this study will help clinician, policy makers and other healthcare professionals to give attention for prevalence of intestinal Parasites and among patients visiting this hospital. It will be also useful to manage patients who are intestinal parasite positive and who are on care. It will be baseline information around study area in the future.

2. Method and Material

2.1. Study Area and Design

The study was conducted in Wolaita Sodo University Comprehensive Specialized Hospital, located in Sodo town, southern Ethiopia. It is 329km far from Addis Ababa, capital of Ethiopia and 154km from Hawassa, capital of South nations, nationalities and peoples region. According to the Hospital administrative staff report, the Hospital established in 1928. It is oldest hospital in area and give both patient care and teaching services centres. Hospital services more than 5 million people around area. The hospital gives general patient services, teaching and research activities. Patient services include both inpatient and outpatient services such as medical, surgical, pediatric, psychiatric, Ophthalmic, Emergency, oncology, dialysis, Gynecology and Obstetrics care. Inpatient ward, the hospital has a total of 370 beds in departments such as medical, gynecology/obstructive, surgical ward, Oncology, dialysis, Ophthalmology, dental unit, and pediatric.

A 10 year retrospective data from 2011 to 2020 was extracted cross sectional from December 1-30/2021.

2.2. Source and Study Population

All Patients who had been attended WSUCSH during January 1/2011- December 30/ 2020 were source population.

Patients who had been examined for stool for intestinal parasites and had complete age, sex, and stool examination result documentation over the study period January 1, 2011-December 30, 2020 were study population.

2.3. Inclusion and Exclusion Criteria

All patients who had been examined for stool samples and had complete age, sex, and stool examination documentation over the study period January 1, 2011-December 30, 2020. Patients with incomplete data, especially age, sex, and test results, were excluded from the study.

2.4. Sample Size Determination

All patients' data with complete age, sex, and stool examination documentation over the aforementioned study period were included in this retrospective study.

2.5. Data Collection and Quality Control

Data extraction format was used to collect all required information for this retrospective study. Age, sex and stool examination result was obtained from the registration logbook of the Wolaita Sodo University Comprehensive Specialized hospital Parasitology laboratory. After the data collection process, the data was rechecked and cleaned.

2.6. Data Analysis

The SPSS statistical package (version 20.0) and Microsoft Excel were used to double-check all the data. Descriptive statistics were used to summarize the results using the frequency and percentages. The results were presented in tables and graphs.

3. Results

3.1. Socio-demographic Characteristics

A total of 13,679 patients visited Wolaita Sodo University Comprehensive Specialized Hospital laboratory for stool examination, having a complete age, sex, and stool examination results. Regarding their gender, 65.5% were males and 34.5% were females (Table 1).

Table 1. Sociodemographic characteristics of Patients at Wolaita Sodo University Comprehensive Specialized Hospital (2011-2020).

Variable	Category	Number	Percentage
Sex	Male	8951	65.5%
	Female	4728	34.5%

In terms of the year patients visited the hospital, the lowest prevalence of intestinal parasites (35%) was detected in 2011, and the highest 62% and 58% respectively were detected in year 2013 and 2020. (Table 2).

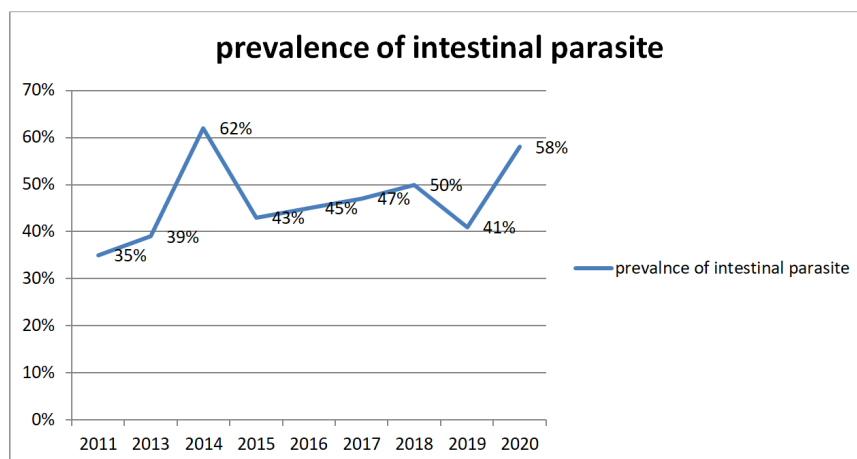
Table 2. The Burden (%) of intestinal parasites stratified by year at Wolaita Sodo University Comprehensive Specialized Hospital (2011-2020).

No	Parasite	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	All
1	<i>E. histolytica/d</i>	267 (21)	299 (24.)	392 (29)	287 (16)	203 (16)	284 (19.)	240 (27)	208 (13)	122 (8.3)	162 (13)	2464
2	<i>G. lamblia</i>	97 (7.6)	89 (7.3)	318 (19)	244 (13)	136 (11)	146 (10)	51 (6)	74 (5)	98 (7)	65 (5.5)	1318
3	<i>E. vermicularis</i>	3 (0.3)	0 (0)	1 (0.3)	1 (0.3)	0 (0)	2 (0.1)	2 (0.1)	2 (0.1)	4 (0.3)	2 (0.2)	15
4	<i>A. lumbricoid</i>	26 (2.1)	35 (3)	125 (7.7)	240 (13)	155 (12)	177 (12)	96 (11)	457 (30)	327 (22)	408 (34)	2046
5	<i>H. nana</i>	11 (0.9)	11 (0.9)	36 (2.2)	11 (0.6)	5 (0.4)	10 (0.7)	5 (0.6)	4 (0.6)	2 (0.1)	5 (0.4)	100
6	<i>Taenia species</i>	7 (0.6)	17 (1.4)	22 (7.2)	25 (7.6)	7 (2.8)	30 (7.8)	5 (1.8)	5 (2.0)	43 (2.9)	43 (3.6)	241
7	<i>T. trichiura</i>	2 (0.2)	1 (0.1)	10 (0.6)	2 (0.1)	5 (0.4)	4 (0.3)	2	2	4	0 (0.0)	32
8	<i>S. stercoralis</i>	2 (0.2)	10 (0.8)	12 ((0.7)	1 ((1)	1 (0.1)	2 (0.1)	2 (0.1)	1 (0.1)	0 (0.0)	0 (0)	35
9	<i>s. mansoni</i>	9 (0.7)	7 (0.6)	10 (0.6)	2 (0.1)	1 (0.1)	1 (0.1)	1 (0.1)	0 (0)	0 (0)	1 (0.1)	32
10	<i>h. worm</i>	26 (2.1)	14 (1.1)	89 (5.5)	44 (2.4)	27 (2.2)	31 (2.2)	7 (0.8)	19 (1.2)	5 (0.3)	8 (0.7)	270
	<i>Total parasites</i>	450 (35)	483 (39)	1015 (62)	857 (47)	540 (43)	651 (45)	411 (47)	772 (50)	605 (41)	694 (58)	6553 (47.9%)
	<i>Total sample</i>	1268	1227	1630	1813	1246	1439	867	1522	1468	1181	13,679

Intestinal Parasites identified were *Entamoeba histolytica/dispare*, *Giardia lamblia*, *Hookworm Species*, *Ascaris lumbricoides*, *Enterobius vermicularis*; *Trichuris trichiura*, *Schistosoma mansoni*, *Taenia species*; *Hymenolepis nana*; *Strongyloides stercoralis* (Table 2).

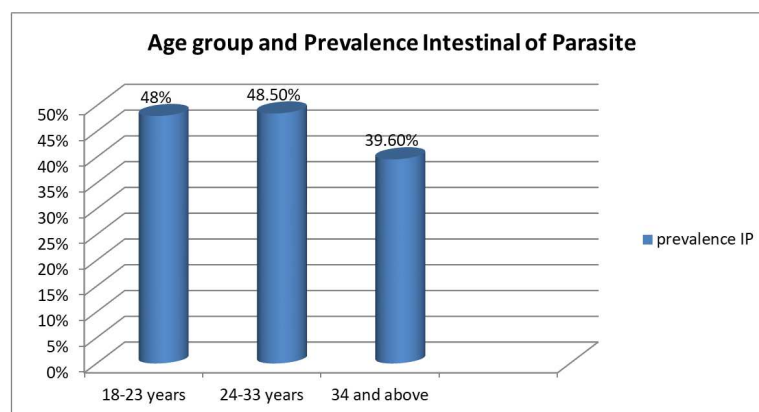
3.2. Prevalence of Intestinal Parasites by Year

In ten years, a total of 13679 patients were examined for intestinal parasites. Of these, 6553 patients were positive for intestinal parasites. In the year 2011, 35% of positive cases and in 2020, 58% of positive cases were identified (figure 1).

**Figure 1.** Prevalence of Parasites in each year at WSUCSH (2011-2020).

3.3. Age Groups and Prevalence of Intestinal Parasites

Regarding age groups, 48% of intestinal parasites identified from age group 18-23 years, 48.5% from 24-33 years and 39.6 from age group 34 and above (Figure 2).

**Figure 2.** Age group and distribution of intestinal parasites.

3.4. Prevalence of Intestinal Parasites by Gender

From a total of 13,679 patients, 6553 became positive, with 5405 (60.3%) male patients and 1148 (47.5%) female patients.

There were nine different parasites identified. The most common intestinal parasites identified were *Entamoeba histolytica* and *dispar* (18.0%), *Ascaris lumbricoides* (15.0%), and *Giardia lamblia* (9.6%). *Enterobius vermicularis* showed the least prevalence (0.1%). The other parasites identified were Hookworm species, *Trichuris trichiura*, *Schistosoma mansoni*, *Taenia* species, *Hymenolepis nana*, and *Strongyloides stercoralis* (Table 3).

Table 3. Burden (%) of parasites by gender year at Wolaita Sodo University Comprehensive Specialized Hospital (2011-2020).

Parasites identified	Male	Females	Total
<i>E. histolytica/d</i>	2077 (18.4%)	387 (16%)	2464 (18%)
<i>G. lamblia</i>	1131 (10.0%)	187 (7.7%)	1318 (9.6%)
<i>A. lumbricoid</i>	1593 (14.1%)	453 (19%)	2046 (15%)
<i>H. worm</i>	231 (2.1%)	39 (1.6%)	270 (2.0%)
<i>Taenia species</i>	188 (1.7%)	53 (2.2%)	241 (1.8%)
<i>H. nana</i>	86 (0.8%)	14 (0.6%)	100 (0.7%)
<i>T. trichiura</i>	26 (0.2%)	6 (0.3%)	32 (0.2%)
<i>S. stercoralis</i>	32 (0.3%)	3 (0.1%)	35 (0.3%)
<i>S. mansoni</i>	29 (0.29%)	3 (0.1%)	32 (0.2%)
<i>E. vermicularis</i>	12 (0.1%)	3 (0.1%)	15 (0.1%)
Overall prevalence	5405 (60.3%)	1148 (47.3%)	6553 (47.9%)
Total samples	8951	4728	13679

4. Discussion

Intestinal Parasite infections are major health problem in developing country like Ethiopia. Poor personal hygiene, overcrowding, shortage of water, lack of Health Education, and poverty are contributing factors. The present study used 10 years data from January 1 / 2011 to December 30 / 2020 with complete record of age, sex and result recorded legible.

In this study, the total of 13,679 stools sample was examined from 2011-2020, in 10 years and 6553 (47.9%) patients were positive.

The findings of the present study were higher than the findings from Tikur Anbessa Specialized Hospital, Ethiopia (34.5%), Nigeria (44.5%), Wonago Health Center, Sidama region, Ethiopia (16.6%), and Senegal (23.1%) [2, 11, 12].

The major intestinal protozoa parasite identified in the present study was *Entamoeba histolytica/dispar* with a prevalence of (18%).

This finding is lower than the findings from Nigeria (72%) and Rawnda (50.5%) [9, 10, 13]. This difference is likely because of time, geographical location, method used, and living condition.

The current finding was higher than the findings of studies conducted in Tikur Anbessa Specialized Hospital, Ethiopia (13.6%) and Wonago Health Center, Sidama Region, Ethiopia (8.9%) [2, 12].

The higher prevalence of intestinal protozoan parasites of *Entamoeba histolytica/dispar* (18%) and *Giardia lamblia* (9.6%) in this study may be linked with poor personal and environmental sanitation, which were causes of feco-oral

transmission. The higher prevalence of these two intestinal protozoan parasites goes in line with the report of the World Health Organization, which pointed out these two parasites as common major causes of intestinal parasitic disease throughout Ethiopia [14, 15].

In this study, the overall prevalence of intestinal helminth infections was 20.3%, and it was significantly higher in females (23.3%) than in males (19.5%). A higher prevalence in females (55.7%) than in males (44.32%) was found in a study conducted in Mwanza, Tanzania [11, 15]. But in a study conducted in Tikur Anbessa Specialized Hospital, Ethiopia, it was higher in males (50.9%) than females (49.1%) [2].

The prevalence of intestinal protozoan parasites was 27.6% and it was significantly higher in males (28.5%) than in females (23.8%).

This finding differs from the findings in Mwanza, Tanzania, where it was significantly higher among females (58.1%) than in males (42.3%) [11, 15]. This variation may be due to study design, living condition and geographical location of patients.

Regarding the distribution of the intestinal parasites among age groups, it was almost similar in age groups of 18–23 years (48%), and in age groups 24–33 years (48.5%), but lower in age groups 34+ years (39.6%). Helminthes prevalence was 20.3%, 20.1%, and 18.9% for the age groups 18–23 years, 24–33 years, and 34+ years, respectively [13].

Due to setup limitations, the wet mount saline method, the differentiation of *Entamoeba histolytica* from *Entamoeba dispar* in stool samples was not reported separately. The study design was retrospective; the patient addresses and economic and educational status were missing.

5. Conclusions and Recommendation

In this study, the prevalence of intestinal parasites in a ten-year was 47.9%. *Entamoeba histolytica/dispar* was the most commonly reported intestinal parasite, which was seen in 18.0% of the patients. The study showed that intestinal protozoan and helminthiasis infections are among the common parasitic infections observed among patients attended at Wolaita Sodo University Comprehensive Specialized Hospital in Ethiopia. It is necessary to develop effective prevention and control strategies, including health education at the health facility level and improving environmental sanitation using health extension programs.

Abbreviation

IP-Intestinal Parasites, CSA...Central Statistical Agency, FMOH- Federal Ministry of Health, NHS-National Health Service, SNNPR-South Nation, Nationalities and Peoples Region, WHO-World Health Organization, WSUCSH- Wolaita Sodo University Comprehensive Specialized Hospital.

Competing Interests

The author declared no competing interests.

Ethical Consideration

The ethical clearance was obtained from the Ethical review committee of Wolaita Sodo University, College of health sciences and Medicine. Formal permission was also obtained from Wolaita Sodo University Comprehensive Specialized Hospital Chief Clinical Director office. Since it was retrospective data no need of conversion with patient.

Author's Information

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Availability of Data & Materials

All important data analyzed were included the study.

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Appendix

Burden of intestinal parasite among patients attending at Wolaita Sodo University Comprehensive Specialized hospital in Ethiopia, a 10-year retrospective data extracting format.

Table 4. Burden of intestinal parasites among patients attended from 2011-2020.

Variable	Code	Number
Age	-----	
Sex	male	
	female	
	2011	
	2012	
	2013	
	2014	
Year of attend	2015	
	2016	
	2017	
	2018	
	2019	
	2020	
Parasites status	Positive	
	negative	
	<i>E. histolytica/dispara</i>	
	<i>G. lamblia</i>	
	<i>E. vermicularis</i>	
	<i>A. lumbricoid</i>	
Parasites species	<i>H. nana</i>	
	<i>Taenia species</i>	
	<i>T. trichiura</i>	
	<i>S. stercoralis</i>	
	others	

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