Prevalence of Intestinal Parasites among patients visiting Arekit Health center, Gurage zone, south central Ethiopia; a facility-based Retrospective Study.

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Acknowledgment

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Abstract

Introduction: Parasites are organisms that reside on or with in another living organism, a host, in order to find shelter and nutrients required for its growth and reproduction. Medically important parasites may be classified as either single-celled protozoa or multi-cellular helminthes. Multi-cellular worms of three taxonomic groups: cestode (tapeworms), nematode (roundworms), and trematode (flukes**).** They are causing high rate morbidity and mortality worldwide particularly in developing countries like sub-Saharan Africa.

Objective: To determine the prevalence of intestinal parasites among patients seeking stool examination at Arekit Health Center, laboratory in the past three consecutive month (sept. 1, 2013-nov 30, 2013).

Method: The study was conducted at Arekit Health Center, from Sept.1, 2013 to Nov 30, 2013. Retrospective record review was done to obtain information from the three consecutive month reports. After this the data was coded, registered and analyzed.

Result: From Sept.1, 2013 to Nov 30, 2013 the laboratory has performed stool examination for 236 clients. Among these 108 are males and 128 are females. The prevalence of intestinal parasite was 69%. *G. lamblia* is most prevalent with 38.1% prevalence while *T. tricuria* is least prevalent (0.42%). the age group 0-10 is the most affected age group.

Conclusion and recommendation: Intestinal parasites are highly prevalent in our study area. Mixed infections have been observed in our study. We recommend that the right amount of data should be recorded and anti-helminthic treatments and health education about parasitic infections should be given accordingly.

Keywords: Intestinal parasitic infections, Arekit Health Center, Intestinal helminths

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Chapter One:

1. Introduction

1.1. Background

Parasites are organisms that reside on or with in another living organism, a host, in order to find shelter and nutrients required for its growth and reproduction. Generally, majorities of the parasites cannot exist independently [1]. Medically important parasites may be classified as either single-celled protozoa or multi-cellular helminths and the helminths consist of two phyla: the hermaphroditic Platyhelminths (flatworms) and the Nematoda (nematodes or roundworms) They present a striking variety of life histories, from direct fecal-oral transmission (*A. lumbricoides*)) to development through free-living stages (hookworm larvae) or dependence on invertebrate vectors (*schistosome* in snail vectors)[2].

Intestinal helminth: Include cestode tapeworms, nematode roundworms, and trematode flukes. Hookworm, Strongyloidstercoralis (S. stercoralis), Trichuristrichuria (T. trichuria). Intestinal helminthic infections are among the widest spread of all chronic infections worldwide [3]. Since so many people are infected with helminth parasites, there is little doubt that many individuals become exposed to non-helminth pathogens while harboring chronic helminth infectionsAnd the rate of infection is remarkable high in sub-Sahara Africa, where the majority of human immunodeficiency virus (HIV) and AIDS cases are concentrated [4].

Estimates of the infection rate of medically important parasites by the WHO in 2018 are: 250 million cases for Ascariasis (*A.lumbricoides*), 200 million cases for schistosomiasis (*Schistosoma species)*, 151 million cases of hook worm diseases (*Hook worm*), 100 million cases of Strongyloidiasis (*S.stercoralis*), 76 million cases of Taeniasis (*Taenia species*) and 45.5 million cases of trichuriasis (*T.trichuria*) infections.[5].. The main species involved are *A.lumricoides, T.trichuria* and hookworms, and there are now approximately one billion infections with each of these, worldwide [6].Cestodes (Cestoda, Platyhelminthes**):-**Area highly diversified group of parasites (Teaniaspecies, hymenolopis species) and the majority of Cestodes can cause serious diseases in humans such as dipylidiasis, hydatidosis, and cysticercosis [7].

Intestinal Protozoa: -*Entamoeba histolytica (E. histolytica) and Giardia intestinalis (G. Intestinalis)* are among the major intestinal protozoan that results in considerable gastrointestinal morbidity, malnutrition and mortality worldwide, particularly among young children in developing countries. Protozoan infections significantly contribute to the burden of gastrointestinal illness worldwide [8]. *G. lamblia* is a common cause of parasitic diarrhea, with prevalence ranging from 2 to 7% in developed countries to 20 to 30% in most developing countries. **[**9].

The ubiquitous nature, small size, and abundance in the environment of protozoan parasites make them difficult to control. But personal hygiene; hand washing after using or handling the toilet, changing diapers, or caring for a person with diarrhea and washing hands before and after preparing or handling food; proper disposal of excreta; and washing of soiled materials such as clothing or bedding. [10].

The routine diagnosis of IP: - In general several diagnostic methods such as direct fecal smear (wet mount), concentration techniques (formalin-ethyl acetate concentration) and (zinc sulphate flotation technique), [11].

1.2 Statement of the problem

Intestinal parasites and protozoan infections are among the most common infections worldwide [12]. It is estimated that some 3.5 billion people are affected, and that 450 million are ill as a result of these infections, the majority being children. Intestinal parasitic infections are the top global health problems whereas amoebiasis, hookworm infection and trichuriasis are among the ten most common infections.WHO reported that more than 980 million people are infected by A. lumbricoides, which is one of the most common public health problems in Africa invasive amoebiasis is a major health and social problem in western and southern Africa [13].

Most pathology associated with IPs is related to parasite species, load and host response. Ascariasis, Trichuriasis, and hookworm infection may be associated with eosinophilia and hookworm with anemia [16]. In addition, these nematodes have a relatively short lifespan and reinfection occurs only after a life-cycle stage outside the human host. However, *S. stercoralis* is a unique nematode that has an auto-infective cycle and frequently causes chronic infection. Moreover, *S. mansoni* infection is associated with liver cirrhosis and resulting clinical complications. Potentially devastating clinical manifestations occasionally occur when an egg enters the systemic circulation and travels to a normally sterile site within the body, causing severe inflammation. [3].

Apart from causing mortality and morbidity, infection with intestinal parasites has been associated with stunting of linear growth, physical weakness and low educational achievement in schoolchildren [4]. In addition to the health impact, these parasites have significant socio-economic impacts in terms absences frame work, treatment expenses and other costs [5].

Intestinal parasitism has been widespread in Ethiopia. Parasitic helminthic infections are the second most predominant causes of outpatient morbidity in the country. Several studies indicated that the prevalence of parasitic infections was high in the lower altitudes including southwestern

Ethiopia. Ethiopia has one of the lowest quality drinking water supply and latrine coverage in the world as comparison by 2000, Ethiopia had only 12% latrine coverage while Kenya had 87% [14].

Intestinal parasitic infections are more prevalent among the poor sections of population. Estimates of the infection rate of medically important parasites by the WHO in 2018 are: 250 million cases for ascariasis, 200 million cases for schistosomiasis, 200 million cases of giardiasis, 151 million cases of hook worm diseases, 100 million cases of strongyloidiasis, 76 million cases of taeniasis (T.saginata infection) and 45.5 million cases of trichuriasis [15].

The effect of altitude, urbanization, irrigation, and resettlement on the distribution of intestinal parasitism was depicted in previous studies [17]. Many reports illustrated that ascariasis is the most prevalent intestinal parasitic infection in different communities usually occurring together with trichuriasis [18].

Hookworm infection, strongyloidiasis and enterobiasis are also public health problem though the magnitude is lesser compared to ascariasis. The prevalence of taeniasis alone ranges from 1- 48% and the infection rate with H. nana is 3- 61% [19]. Schistosomiasis is common in northern region as compared to south and south west regions of Ethiopia [20]. Amoebiasis and giardiasis are common causes of intestinal protozoal infections throughout the nation. The prevalence of amoebiasis ranges from 0-4% and that of giardiasis is 3-23% [14, 19].

Chapter Two:

Literature Review

Several researches have been conducted on prevalence of intestinal parasites in different parts of the world in general and particularly in sub-Sahara Africa. Globally, in 2018, an estimated 819.0 million people were infected with *Ascaris lumbricoides*, 438.9 million with the hookworms and 464.6 million *Trichuris trichiura*. These soil transmitted helminthes (STHs) disproportionately affect people in developing countries, where sanitary facilities and clean water supply are scarce. In developed countries, the intestinal protozoan parasites are more common than the STHs. Giardiasis, amebiasis, cryptosporidiosis, cyclosporidiosis and isosporiasis are the common parasitic protozoan diseases of significant importance. The microbial agents causing these diseases are mainly waterborne. The coccidian parasites Cryptosporidum species, Cyclospora cayetenensis, Isospora belli and Blastocystishominis are opportunistic intestinal parasites of significant importance in HIV/AIDS patients [21].

A retrospective study was conducted to determine prevalence of IPs in the north of Lebanon between 2018- 2019. They analyzed parasitological records of 17, 126 patients and evidence of parasitic infection were found in 5,713 (33. 35%) cases. According to the result there was no significance difference in prevalence between male and female for any of the parasites. The most prevalent parasites were *E. coli* (38.45%), *A. lumbricoides* (37. 14%), *G. lamblia* (15.39%), *E. histolytica* (4.57%) and Taenia species (3.30%) [22].

A study was conducted in Gondar, Northern part of Ethiopia, showed the overall prevalence rate of intestinal parasites infection was 55.6%. The parasite encountered during the study were *A. lumbricoides*(17.8%), *T.trichiura*(13.8%), Hookworm (4.3%), *H.nana* (14.4%), *S. mansoni*(2.1%), *E.vermicularis*(0.3%) as single infections among school children(24).

Community-based cross-sectional study was conducted between September 2010 and July 2011 at Lante, Kolla Shelle, Dorze and Geressie kebeles of Gamo Gofa Zone, South Ethiopia. Out of the

total examined subjects, 342(39.9%) were found positive for at least one intestinal parasite. The prevalence of *Entamoeba histolytica/dispar* was the highest 98(11.4%), followed by *Giardia lamblia* 91(10.6%), *Ascaris lumbricoides* 67(7.8%), *Strongyloides stercoralis* 51(5.9%), hookworm 42(4.9%), *Trichuris trichiura* 24(2.8%), *Taenia* species 18(2.1%), *Hymenolepis nana* 7(0.6%) and *Schistosoma mansoni* 1(0.12%). [29].

A cross-sectional study was carried out in October, 2008 in four Woredas of Jimma zone bordering Gilgel Gibe Dam. Of the 937 selected individuals, 855 participated in the study giving a response rate of 91.2%. The prevalence of intestinal parasitosis was 47.1% where 174 (20%) had *Ascaris lumbricoides* mono-infection; 4.3% had dual infection involving *Ascaris lumbricoides* and *hookworm* and 0.2% had triple infection but all the infections were of light intensity. [30].

A retrospective study was conducted in Southern Sudan to determine the prevalence of IPs among school children. A total of 275 stool samples were examined using formol-ether concentration techniques yielded 15 different species of parasites. Hook worm with prevalence of 13.1% was the predominant nematode followed by *S. stercoralis* (3.3%), *T. strongylus* (2.5%), S. mansoni (2.2%) and *T. trichiura* (1.8%). *A. lumbricoides* and cestodes were not detected in this population. The common intestinal protozoa were *E. coli* (37.8%), *E. histolytica* (28.4%) and *G. lambilia* (9.8%). Children in the age group 6-10 years old were the most affected followed by 11-15 years age group. The infection rate was slightly higher in males than females [31,32].

Another retrospective study was also conducted in Chilga District, North West Ethiopian, 687 pupils had their fecal specimens examined by Kato-thick smear technique. The infection due to *A. lumbricoides* was the most prevalent (42.9%) followed by hook worms (37.7%), S. mansoni (19.4%) and *T. trichiura* infection (14.8%). Single, double and triple infections were encountered respectively, in 29.1%, 32.2% and 7.1% of the examined specimens. Most of the double infection was a combination of *A. lumbricoides* and hook worms (20. 2%). Over all infection was neither age nor sex related [13].

According to a retrospective research which was conducted in Butajira, Ethiopia nine hundred thirty-two child-mother pairs were followed up at one year, and 908 (97.4%) of the mothers and 905 (97.1%) of their infants provided adequate stool samples and were included in the analysis. The majority were from rural areas (87%) and there were roughly equal numbers of male (460; 50.7%) and female (448; 49.3%) infants. The age range of interviewed mothers was 15 to 44 years, with almost one third (38.7%) aged under 25. Four species of soil-transmitted helminths (STHs) were identified in the stool samples, with the overall prevalence of any STH infection being 43.5% in mothers, and 4.9% in children, respectively. Hookworm was the predominant intestinal helminth infection, detected in 36.1% of mothers and in 2.3% of children, and *A. lumbrcoides* the second most frequently detected intestinal parasite with prevalence of 8.8% in mothers and 1.5% in children. About one third (36.2%) of mothers and 4.4% of children had a single infection, while 6.6% of mothers and 0.4% of children had double infections [5].

2.1 Significance of the study

The study was providing information the overall prevalence of intestinal parasites and the species distribution of intestinal parasites**.** Determining overall and individual intestinal parasite prevalence may have an influence in designing alternative prevention and control strategies and may help stake holders and policy makers revising the methods of parasite prevention and control. Moreover, the data could help as the base line to evaluate the progress of intestinal parasite in Arekit town and surroundings at large. Moreover, it can also use for baseline study for future research.

Chapter Three:

Objective

3.1. General Objective

- To determine overall prevalence of intestinal parasites among patients attended to Arekit Health Center, in the past three consecutive months (Sep 1,2013-Nov.30,2013)

3.2. Specific Objectives

- To determine the prevalence of helminthic infections in Arekit Health Center in the past three months.
- To determine the prevalence of protozoal infections in Arekit Health Center in the past three months.
- To assess single parasitic infections and mixed parasitic infections among individuals visiting laboratory at Arekit Health Center in the past three months.

Chapter Four

Method and Materials

4.1. Study area

Arekit town is capital of Gumer woreda, Gurage zone, SNNPR, Ethiopia. The town is located 224 kms south west of Addis Ababa the capital of Ethiopia, 68kms from Wolkite. The structural plan of Arekit is from 7 urban and 5 rural villages. According to Arekit town statistical agency report, Arekit town has a total population of 4001 peoples of these 1960 are males and 2041 females. (Gumer woreda administrative office).

4.2. Study design

Facility based retrospective study design was employed.

4.3. Study period

The study was conducted from sept 1, 2013-Nov 30, 2013.

4.4 Population

4.4.1. Source Population

The source population is those patients who came to the health center laboratory during the past three months.

4.4.2. Study Population

All Patients who had been examined for stool sample and having complete age, sex, and stool examination documentation over the study period.

4.5. Sample size and Sampling technique: -

The sample size was determined by using 95% confidence interval with considering single population proportion formula. The sample size was calculated as follows.

$ni = [z^2pq]/ d^2 = \frac{(1.96)^2 (0.5) (0.5)}{(0.05)^2} = 384$

Where ni = initial sample size

z = confidence interval

p = estimated prevalence

q = 1-p

d= Margin of error

but due to we have taken a three consecutive month all patients' data with complete age, sex, and stool examination documentation over the aforementioned study period were included in this retrospective study. But the total data we collect in the last three months was 236(n=236)

4.5.1. Data collection and data quality control

Using data extraction sheet/form, all required information for this retrospective study was obtained from the registration/record books of the Arekit Health Center. After data collection process, the data was rechecked and cleaned.

4.6 Eligibility

4.6.1. Inclusion criteria

Complete Laboratory records i.e. Report include patient name, ID age, sex and result.

4.6.2 Exclusion criteria

Incomplete Laboratory records i.e. reports lacking age, sex and result.

4.7 Data collection and processing

Data collection

Data was collected by reviewing three-month report records of Arekit Health Center laboratory. Information such as age, sex, month, of stool examination and results was recorded on a systematically prepared data collection format.

Data processing

Data collected, coded and checked for completeness and cleaned of any inconsistencies. It was processed. The data is presented using tables and graphs. Percentage was calculated to show prevalence.

4.8. Dissemination and Utilization of Results

- The result obtained in current study is submitted to Wolkite University Department of Medical Laboratory Science. Therefore, it will be a baseline for other studies. The findings of the study were presented.

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4.9. Ethical Consideration

Letter of permission was sought from all concerned bodies before the beginning of data collection. Confidentiality of the patients was maintained by removing identifiers like name.

Chapter Five

Result

Socio-Demographic Characteristics of the respondents

A three consecutive month stool examination results were taken and registered. A total of 236 result records are obtained. The overall prevalence of intestinal parasites were 69% and 7 different species of parasites were identified. From the total study participants 108(46%) were males and 128(54%) were females and 163(69%) were positive for intestinal parasites. From total males 108(46%) ,74(31.3%) of them are positive and from total females 128(54%), 85(36%) are positive for intestinal parasitic infections.

Single parasite infections,159(67.3%) and mixed parasite infections is seen on 4(1.6%) on the study. Among these *G. lambila* was the most predominant which accounts for 90(38.1%) followed by *E..histolytica/dispar, Taenia species, A.lumbricoides, hookworm species, H.nana, T.tricuria* ,30(12.7%,),16(6.8%,12(5.1%),11(5%*) ,3(1.27%),and 1(0.42%)* respectively.

Table 1. single and mixed intestinal parasitic infections among patients who attended Arekit Health Center laboratory from sep.1-nov.30, 2013

Sex		Positive	negative	total	Percentage
	Male	74	34	108	46%%
	Female	85	43	128	54%
Type of infection	no of species	Species associated			case %
Single infection	1. intestinal helminthes	A. lumbricoide			4.66%
		Hookworm species			4.66%
		Taenia species			6.8%
		Hymenolepis species			0.85%
Total single infections		T.tricuria			0.42%

Mixed infection		G. Lamblia	37.7%
Total mixed infections		E. Histolytica	12%
	159		67.3%
	No of species=4	H. Nana & A. lumbricoides	0.84%
		E. histolytica & G. lamblia	0.84%
	4	4	1.6%
Total no of infected patients	163		69%

Table 2=Frequency distribution of intestinal parasites identified from patient stools attended to Arekit Health Center laboratory, Gumer woreda from sep.1-nov.30, 2013

Parasite species	Population infected	Prevalence (%)
Helminths		
Ascaris lumbricoides	12/236	5.1%
Hookworm species	11/236	4.46%
Taenia species	16/236	6.77%
Hymenolepis species	3/236	1.27%
T. trichuria	1/236	0.42%
Protozoa		
Entamoeba Histolytica/dispar	30/236	12.7%
Giardia Intestinalis	90/236	38.1%
Total	163	69%

Table 3. Distribution of intestinal parasitic infections by age among patients requested for stool examination at Arekit Health Center laboratory, Gumer woreda, Gurage zone, Ethiopia from sep.1nov.30,2013 (n=236)

Age group (In years)	Parasite Species	Frequency	Percent
0-10(n=38)	Taenia species	2	0.85%
	G. lamblia	24	10.2%
	E. histolytica	7	2.9%
	H. worm	1	0.4%
	A. lumbricoide	4	1.7%
11-20(n=26)	G. lambilia	11	4.66%
	E. histolytica	6	2.7%
	Taenia species	4	1.7%
	T. trichuria	1	0.4%
	H, nana	1	0.4%
	A. lumbricoide	3	1.3%
21-30(n=32)	G. lamblia	18	7.6%
	E. histolytica	8	3.4%
	A. lumbricoids	1	0.4%
	Hookworm	2	0.85%
	Taenia	3	1.3%
31-40(n=21)	G. lamblia	14	5.9%
	E. histolytica	5	2.1%

	A. lumbrcoides	1	0.4%
	Hookworm	1	0.4%
41-50(n=23)	G. lamblia	11	4.7%
	E. histolytica	3	1.3
	H. nana	1	0.4%
	A. lumbricoids	2	0.85%
	Hookworm	2	0.85%
	Taenia	4	1.7%
above 50(n=22)	G. lamblia	12	5.1%
	E. histolytica	1	0.4%
	H. nana	1	0.4%
	A. lumbricoide	1	0.4%
	Hookworm	5	2.1%
	Taenia	2	0.85%

- The highest prevalence intestinal parasites were seen between age group 0-10,38(16.1 %) with the least prevalence of intestinal parasites were seen in age group 31-40,21(8.9%).

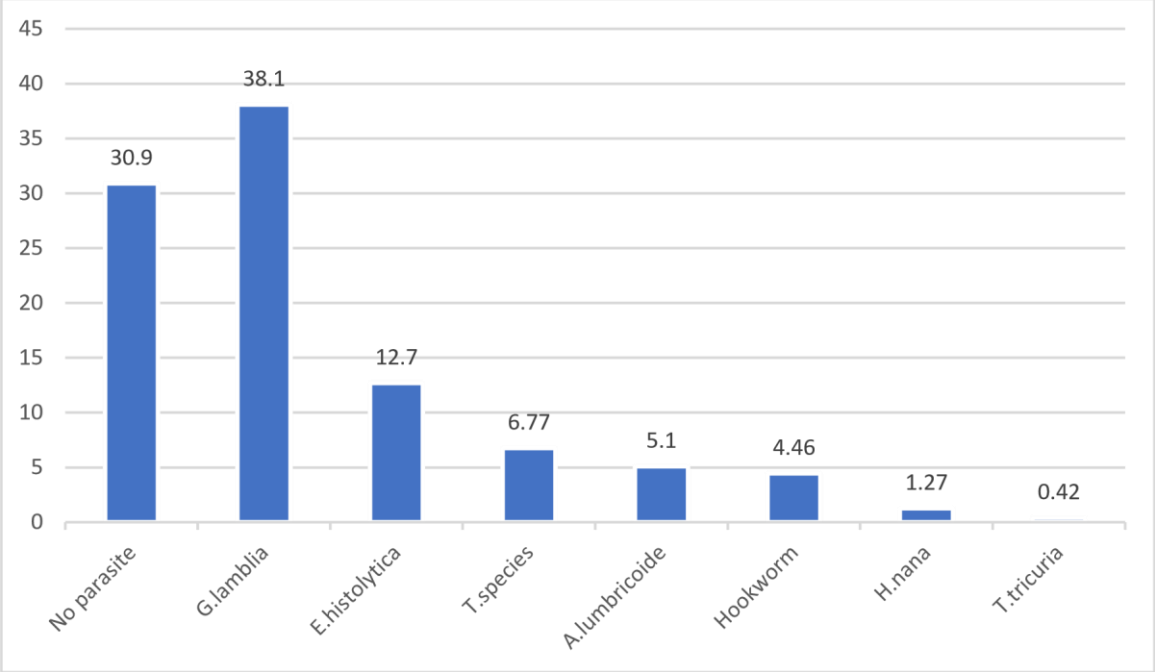

Figure. Frequency distribution of intestinal parasites identified from patient stools attended to Arekit health center laboratory, Gumer woreda from sep.1-nov.30, 2013

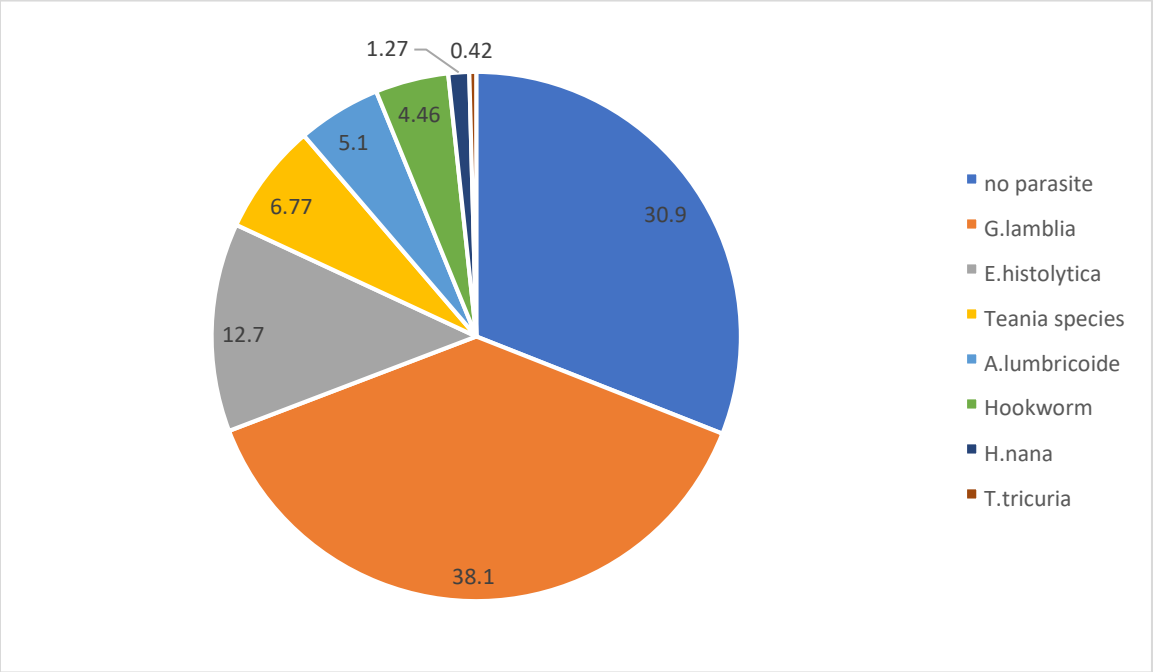

Figure 2: The chart above shows the Frequency distribution of intestinal parasites identified from patient stools attended to Arekit health center laboratory, Gumer woreda from sep.1nov.30, 2013

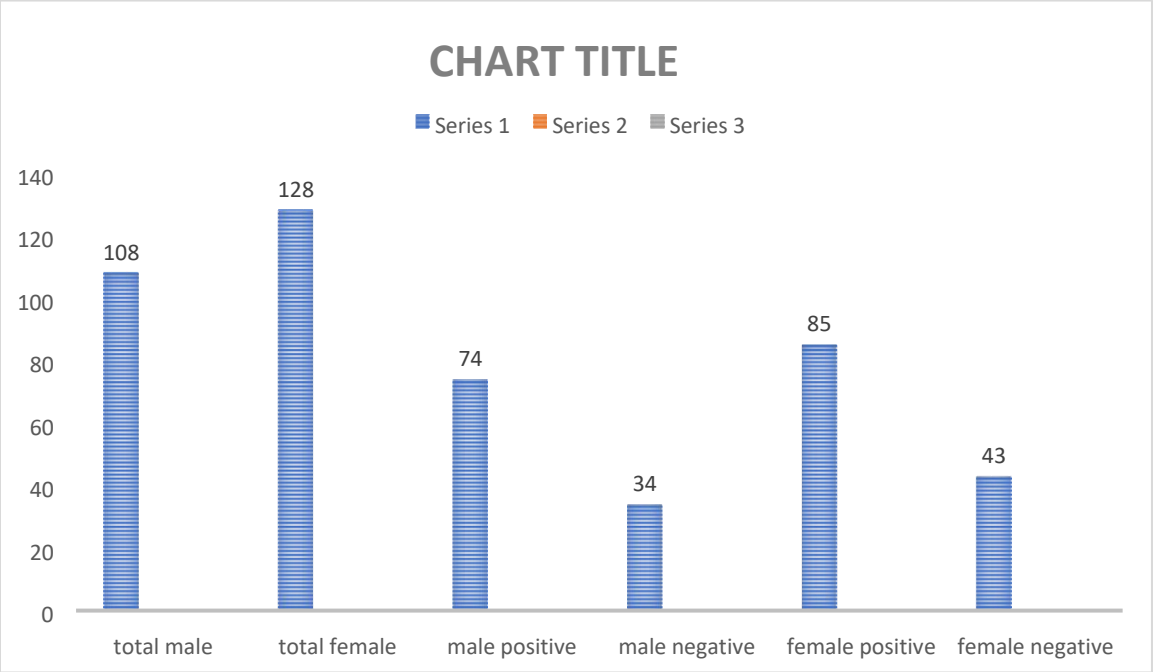

Figure 3. The graph shows the distribution of intestinal parasites by sex.

Chapter Six

Discussion

In the study area a retrospective study was conducted on 236 records to determine the prevalence of intestinal parasitic infection. In this study overall prevalence of intestinal parasitic infections in the study area was 69% with 7 different species were identified. The prevalence was relatively high in the study area when compared with the result that done in. In Saudi Arabia a retrospective study was conducted on the prevalence of intestinal parasites among expatriate workers and the overall prevalence of parasitic infection was 31.4%. 22.3% with single infections and 9.1 % with multiple infections (double, triple and quadruple). Hook worm, *T. trichiura* and *A. lumbricoide were* the most common infections in all nationalities [25]. But in our study finding the total prevalence of intestinal helminths 17.9 %was less than the result that done in Saudi Arabia. when we compare the overall prevalence of parasitic infection result that done in Saudi Arabia was 31.4% less than prevalence of intestinal parasite 69%that done in our area. Among these *G. lambila* was the most predominant which accounts for 90(38.1%) followed by *E. histolytica/dispar, Taenia species, A. lumbricoides, hookworm species, Hymenolepis species, T.tricuria, 30*(12.7 %,), 16(6.8%, 12(5.1%), 11(5%*), 3(1.27%), and 1(0.42%)* respectively.

Another retrospective study from January to December 2018 Laboratory of Princess Margaret Hospital, Dominica. Parasites were found in 393(10.47%) out of 3,752 stool samples. The main parasites identified were, E. coli (1.4%), *G. lamblia* (1.4%), Hook worm (1.5 %), *S. stercoralis* (1.0%), *T. trichiura* (0.9%) and *A. lumbricoides* (0.8%) [23].it is less than study done by our study area. The total prevalence of protozoa intestinal parasite was 50.8%. According to our study finding the total prevalence of intestinal protozoa was high among these *G. lambila* was the most predominant which accounts for 90(38.1%) followed by *E. histolytica/dispar,*30(12.7%,).

In comparison to retrospective study which conducted in Southern Sudan, Hook worm with prevalence of 13.1% was the predominant nematode followed by *S. stercoralis* (3.3%). S. mansoni (2.2%) and *T. trichiura* (1.8%). *A. lumbricoides* and cestodes were not detected in this population. The common intestinal protozoa were *E. coli* (37.8%), *E. histolytica* (28.4%) and *G. lambilia*

(9.8% [31, 32]. But in our study prevalence of parasite predominant nematode was *A. lumbricoides, hookworm species, T. tricuria* ,12(5.1%),11(5%*1(0.42%)* respectively*).* In constract to this study *S. stercoralis,* S. mansoni were not detected in our study. When we compared protozoa*. lambila* 90 (38.1%) was greater than *G. lambilia* (9.8%) that found in Southern Sudan. But E. *histolytica/dispar30*(12.7 %,) less than *E. histolytica/dispar* (28.4%) that found in Southern Sudan.

Another retrospective study was also conducted in Chilga District, North West Ethiopian, 687 pupils had their fecal specimens examined by Kato-thick smear technique. The infection due to *A. lumbricoides* was the most prevalent (42.9%) followed by hook worms (37.7%), S. mansoni (19.4%) and *T. trichiura* infection (14.8%). Single, double and triple infections were encountered respectively, in 29.1%, 32.2% and 7.1% of the examined specimens. Most of the double infection was a combination of *A. lumbricoides* and hook worms (20. 2%) [13]. But in our study finding the the total prevalence of intestinal helminths 17.9 %was less than the Chilga District, North West Ethiopian. that is *Taenia species*, *A. lumbricoides*, *hookworm species, H. nana, T. tricuria*,16(6.8%,12(5.1%),11(5%*) ,3(1.27%), and 1(0.42%)* respectively.

In comparison to a retrospective research which was conducted in Butajira. Four species of soil transmitted helminths (STHs) were identified in the stool samples, with the overall prevalence of any STH infection being 43.5% in mothers, and 4.9% in children, respectively. Hookworm was the predominant intestinal helminth infection, detected in 36.1% of mothers and in 2.3% of children, and *A. lumbrcoides* the second most frequently detected intestinal parasite with prevalence of 8.8% in mothers and 1.5% in children [5].But in our study soil-transmitted helminths (STHs) those identified in the stool samples was less than retrospective that done in Butajira. That is *A. lumbricoides, hookworm species, T. tricuria12* (5.1%), 11(5%*) and 1(0.42%)* respectively. Prevalence of T. trichuria in this study was 0.42% which is much low compared to another study reported.

Chapter Seven:

Conclusion and Recommendation

conclusion

The overall prevalence of intestinal parasitic infections in this retrospective study was 69%. Intestinal parasites are highly prevalent in our study area. Mixed parasitic infections have been observed in our study.

Recommendation

More research has to be conducted on fully recorded and documented data to determine exact prevalence of infection in Arekit Health Center. And Patient information's like age, sex, result, moth of examination has to be properly recorded. Finally, after the required data is fully taken the proper diagnosis for the clients should be given timely. Anthelminthic drug and anti-protozoan treatments should be administered.

Limitation

- Result log book is not properly labeled that it was difficult to find the information required.
- Cards lost and cards not recorded without complete information's are not included in the study.
- In this study, since microscopic examination method was used, differentiation of *Entamoeba histolytica* from *Entamoeba dispar* in stool samples was not possible

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List of Annex

Annex 1: -Questionnaire

Result record format

1. Personal data

Code _____

Age of the baby _____

Sex _____

2. Parasitic species identified by direct wet mount and/or other microscopic examinations:

Declaration

We, the undersigned, declare that this BSC proposal is our original work, has not been presented for a degree in any other universities. We also declare that all sources of materials used for the proposal have been duly acknowledged.

Name	Signature
Surafel Welday	----------
Merid Ayele	----------
Dereje Mekonnen	----------
Zerihun Tilahun	----------

Date of submission: 30/04/2013EC

Name of advisor: Fitsum Bekele

Signature _____

Name of examiners	signature
1. Mr. Temesgen Abera (MSc).	----------
2. Mr. Kassahun Haile (MSc).	----------
3. Mr. Redi K. (MSc).	----------