Wolkite University

College of Natural and Computational Sciences

Department of Biology

Assessment of Prevalence of Intestinal Helminthes in Hawariat Health Center Muhur Aklil Woreda 2013, Gurage Zone,Ethiopia

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A Research paper submitted to department of Biology, college of natural and computational science, in partial fulfillment for the requirements of Bachler of Science Degree in Biology (B.Sc).

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List of Acronyms

AMREF - Africa medical researcher foundation

DALYs - Disability life years

FMOH-Federal ministry of health

HIV/AIDS - Human immune virus/ acquired immunes deficiency syndrome

IPS-Intestinal parasitic infection

NTDs-Neglected tropical disease

WHO - World health organization

Abstract

Intestinal helminthes infections are among the most common infections occurring throughout the developing world. A study was conducted from July 1, 2012- June 30, 2013 E.C. The main objective was to determine the prevalence of intestinal helminthes by retrospectives screening of the data from Muhur Aklil Hawariat health center. The finding of this study was based on secondary data in the healthy center. The present study shows that intestinal helminthes were prevalently identified H.nana,Ascaris lumbricoides and Hook worms. The prevalence was found to be high infection with Ascaris lumbricoides (40.8%) Hook worm (35.5%) and S. stericoralis (13.5 %) from the five helminthes parasite. There were higher prevalence patients form 5-14 years of age (44.8%) followed by age above 14 and 0-4 years with prevalence of 38.4 % and 16.8 % respectively. Regarding to their sex male was prevalent with 50.8% than female 49.2%. Even though little decrement in the annual prevalence it was noticed that the parasite diseases are still significant health problem in health center. Improvement of environmental and personal sanitation parasitic infection, transmission and controlling mechanism.

-Key words

Hawariat, infection, intestinal, helminths, prevalence

Chapter One

1. Introduction

1.1 Background of the Study

As in many developing counters case of intestinal parasitosis are highly abundant in Ethiopia. It is estimated that one third of Ethiopians are infected with A. lumbricoides one quarters infected with and one in eight lives with hook worm as result Ethiopia has the second highest burden of *T. trichiur* in sub-Saharan Africa. (Ayalew A, 2011.)

As result of this, the federal ministry of health (FMOH) of Ethiopia has prioritized intestinal parasitic infection as one of Neglected Tropical Disease (NTDs) in the national master plane of NTDs, to address the public health problem due to NTDs. Parasitic disease is widely distributed throughout the world they continue to be problematic in developing, less developed and developed countries. The diseases causing parasites may produce series infections and occasionally the death of their host. (Dadi Marami, Konjit Hailu and Moti Tolera, 2018)

Most of time, intestinal parasitic infections (IPS) do not show clinical sign and symptoms and also have a number of potential carriers, such as food handlers, which make it too difficult to eradicate and control. The spread of diseases by food handlers is a common and persistent worldwide. Those as food handlers with a poor personal hygiene working food service. Food with their hands during preparation and finally may be implicated in the transmission of many infections to the public in the local community. (Organization,W.H. 2012).

Furthermore, chronic intestinal helminthic infection has become the subject of speculation and investigation in relations to the spread severity of other infectious diseases of viral origin, tuberculosis and malaria. (P, 2016)

1.2. Statement of the Problem

Intestinal parasite infections still continue to be the major health problem worldwide.

Such infection presents persistence and threat to the health millions of people mainly in the tropic and sub tropics and their cost in terms of human life and economic loss is very high. Therefore, this study was conducted on intestinal helminthes infection due to morbidity and related cases with helminthes. Another reason of conducting this study is that helminthes may drive the victim to invest a lot of money to be cured from this disease which may include expenses for medicine and other treatment.

1.3. Objectives

1.3.1 General objectives

- To assess the prevalence of intestinal helminthes in Muhur Aklil Hawariyat health center

1.3.2 Specific Objectives

- To investigate the prevalence of intestinal helminthes in Muhur Aklil Hawariyat health center
- To evuate the prevalence of five different associated risk to intestinal helminthes

1.4 Significance of the study

Estimating the prevalence of intestinal helminthes infection and identifying the associated potential risk factors are important parameters required in the institutional control programs. Therefore, the data obtained from this study might help the regional and district health offices to take the necessary control actions against intestinal helminthes more over it aims to reduce the transmission of intestinal parasites. And the research may help them to take precautionary measures through giving due notice for the concerned stake holders and this aim to reduce to the transmission of intestinal parasite by improving personal hygiene and sanitations.

Extent of intestinal parasites infections suggest poor water quality or unsanitary water collection and storage practice and warrants targeted intervention so after doing this research it support the society to eliminate the parasites involving access, and use of water sanitation, the significance increase in house hold accesses and use of latrines

and clean water.

The generated data could become an additional input in regarding intestinal helminthes prevalence for this district as well as the regional health office. The finding of this study will be used by other researchers who are interested to due further study.

Chapter Two

2. Literature Review

2.1 Epidemiology of Intestinal Helminthes

The most affected region are tropical and sub-tropical areas. The highest incidences are in sub-Saharan Africa, central and east Asia, and the Americas. The soil-transmitted helminthes *(Ascarislumbricoides,Trichuratrichiura,Necatoramericanus and Ancyclostomaduodenale). Schistosomas* and Filarial worms collectively infect more than a quarter of human population at any time, far surpassing HIV/AIDS and malaria taking together. Schistosomiasis alone is the second most prevalent parasitic disease of all times in humans, next malaria Estimates for annual death due to soil-transmitted helminthes is high as 135,000. The death of toll due to malnutrition link is likely to be much higher. The total members of infected human by intestinal helminthes estimated at 2 billion people. Further 4.5 billion people are at constant risk of soil-transmitted helminthes infection (Kranth SJ, C.J.2012).

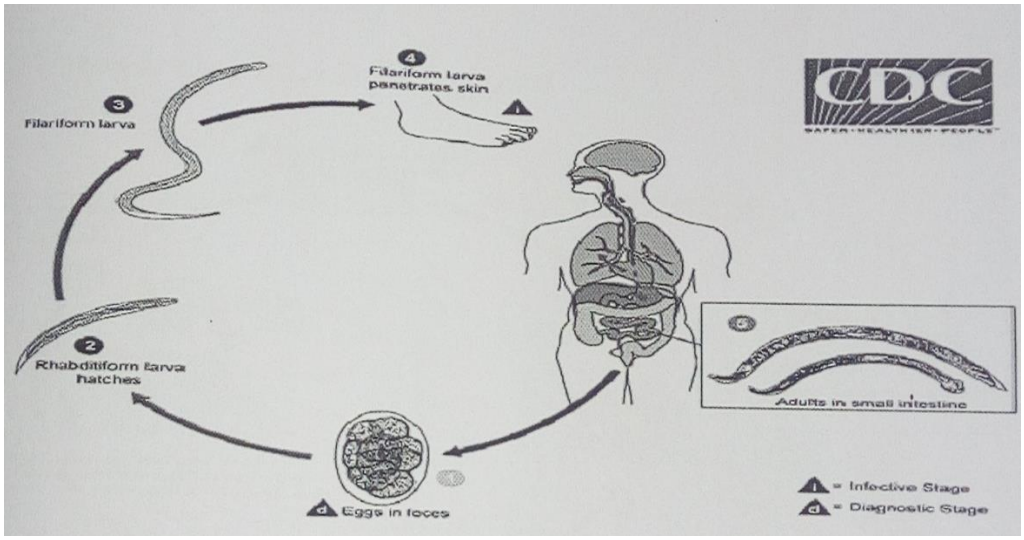
Because of their high mobility and lower standard of hygiene, the school-age children particularly vulnerable to be those parasites. A child in low economic country is estimated to harbor at least one helminthic and multi-species infection are very common. (Tsge Teshale, 2017)

2.2 Transmission of Intestinal Helminthes

Helminthes are transmitted the final host in several ways. The most common infection is through ingestion of contaminated vegetables, drinking water and raw or undercooked meat. Such contaminated food may contain eggs of Nematodes such as Ascaris, Entrobius and Trichuris Cestodes like Taeia, Hymenolepis and Echinococcus and Trematodes such as Fasciola. Raw or undercooked meat is the source of Taenia (pork, beef or venations), Trichiella (pork and bear), Dephylobothrium (fish), Clonorchis (fish), and Paragonimus (crustaceans). Schistosomas and Nematodes such as hook worms (Ascyclostoma and Nectar) and Strongyloides can directly penetrate

the skin. Finally, Wuchereria, Onechocerea and ranunculus are transmitted by mosquitoes and flies. In the developing world contaminated water is the major risk factors of the helminthic infection.

2.3 Life Cycles of Some Intestinal Helminthes

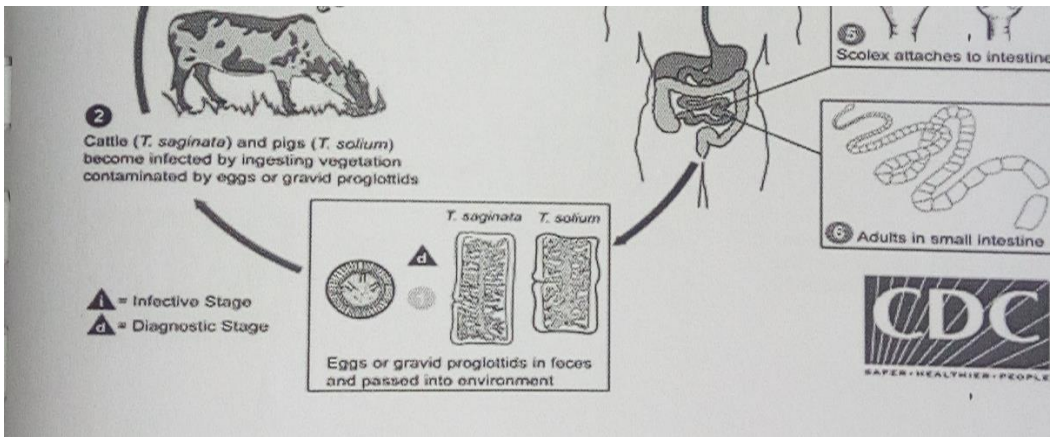


2.3.1 Life Cycle of Hookworm

Eggs are passed in the stool under favorable conditions (moisture, warmth, shade), larvae hatch in 1to 2 days. The released rahbditiform larvae grow in the feces or the soil and after 5 to 10 days and two molts they become filiform third stage larvae that are infective. These infective larvae can survive 3 to 4 weeks in favorable environmental condition. On contact with the human host the lungs. They penetrate into the pulmonary alveoli, ascend the bronchial tree to the pharynx and are swallowed. The larvae reach the small intestine, where they reside and mature into adults. Adult worms live in the lumen of the small intestine, where they attach to the intestinal wall with resultant blood loos by the host. Most adult worms are eliminated in 1 to 2 years, but the longevity may reach several years. Some A. duodenal larve, following penetration of host skin, can become dormant (in the intestine or muscle). In addition, infection by A. duodenal may probably also occur by the oral and trans mammary rout. N. Americanos, however requires attains pulmonary migration phase.

A. duodenale- Ancyclostoma duodenal, N. americanus- Necatoramericanus

2.3.2. Life Cycle of Taeniasaginata and Taeniasolium



Taeniasis is the infection of humans with the adult tapeworm of taeniasaginata or taeniasolium Humans are the only definitive hosts for *T. saginata and T. solium*. Eggs or gravid proglottids are passed with faces; the eggs can survive for days to month in the environment. Cattle (*T. saginata) and pigs (T. solium)* become infected by ingesting vegetation contaminated with eggs or gravid proglottids.

In the animal's intestine, the oncospheres hatch, invade the intestinal wall, and migrate to the striated muscles, where they develop into cysticerci. A cysticercus can survive for several years in the animal. Humans become infected by ingesting raw or undercooked infected meat. In the human intestine, the cysticercus develops over 2 months into an adult tapeworm, which can survive for years.

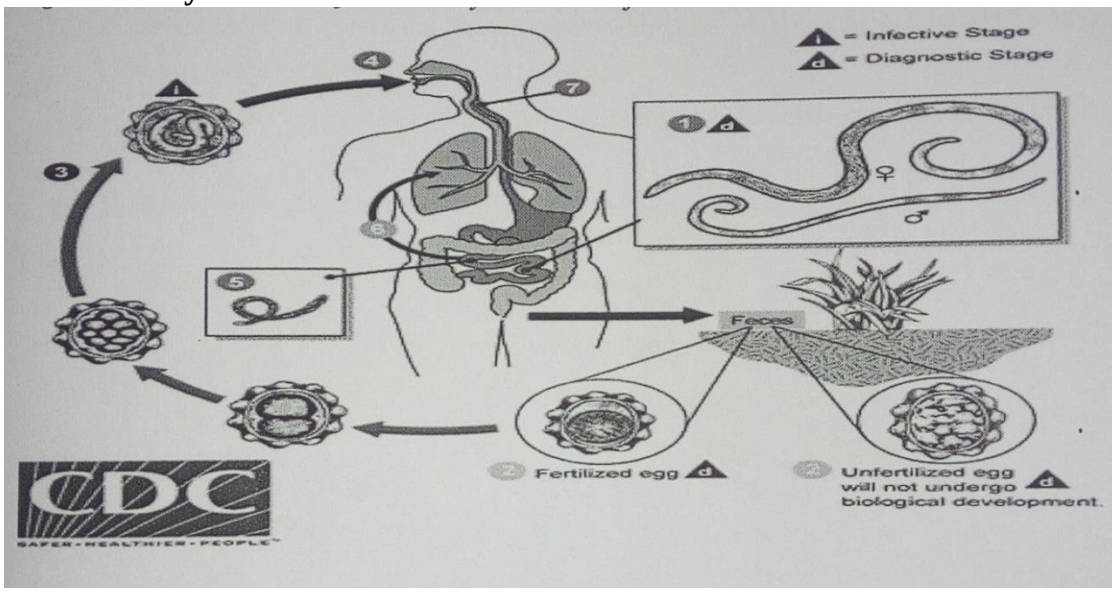
The adult tapeworm attaches to the small intestine by their scolex and reside in the small intestine the number 6. Length of adult worms is usually 5 m or less for T. Saginata (however it may reach up to 25 m) and 2 to 7 m for T. Solium. The adults produce proglottids which mature, become gravid, detach from the tapeworm, and migrate to the anus or are passed in the stool (approximately 6 per day). T. saginata adults usually have 1,000 to 2,000 proglottids, whileb T. Solium adults have an average in the gravid proglottids are released after the proglottids are passed with the feces.

T. Saginata may produce up to 100,000 and *T. Solium* may produce 50,000 eggs per

proglottids respectively.

Saginata - Taeniasaginata and solium- Taeniasolium

2.3.3. Life Cycle of Ascaris lumbricoides



Adult worms live in the lumen of the small intestine. A female may produce approximately 200,000 eggs per day, which are passed with the faces. Unfertilized egg may be ingested but are not infective. Fertile egg embryonate and become infective after 18 days to several weeks, depending on the environmental condition (optimum: moist, warm, shaded soil). After invective eggs are swallowed, the larvae hatch, invaded the intestinal mucosa, and are carried via the portal, then systemic circulation to the lung. The larvae mature further in the lungs (10 to 14 days), penetrate the alveolar walls, ascend the bronchial tree to the throat, and are swallowed. Upon teaching the small intestine, they develop into adult worms. Between 2 and 3 months are required from ingestion of the invective eggs to ovipositional by the adult female. Adult worms can live 1to 2 years.

2.4 Pathology of Intestinal Helminthes

The direct from intestinal helminthes is the blockage of intestinal organs from effects

of pressure exerted by growing parasites. The intestinal worms can cause a variety of pathologic changes in the mucoisa, some refecting physical and chemical damage to the tissues, other resulting from immune- pathologic responses. Heavy infection with intestinal helminthes is host tissues is an important causes of pathology, particularly when it includes the hyper- plastic and meta-plastic changes in the epithelia. Indirectly the infection with the intestinal helminthes can damage tissue through chemical or mechanical effects of the helminthes on the host immune response to the parasite. The severity indirect damage is the result of the chorionic nature the infection. (vellen Y, 2013)

2.5 Diagnosis of Intestinal Helminthes

Diagnosis is the mainstay in the control of helminthes. For the basic diagnosis, specific helminthes can be generally identified from the feces; their eggs are examined and enumerated using the fecal egg count method by concentration technique. This is particularly useful in veterinary investigation. It fails to identify mixed infection and on clinical practice, the technique is highly accurate and unreliable, such as Schistosomas and soil-transmitted helminthes. Sophisticated tests such as Serological assays, Antigen tests and Molecular diagnosis are also available. However, they are time consuming and expensive as well not always reliable. (Tsge Teshale, 2017)

2.6 Signs and Symptoms of Intestinal Helminthes

In most case helminthiasis is asymptomatic. However, heavy infections are directly damage tissue as the parasites can block internal organs or exert immense pressure in the gut. Infections are predominantly found in alimentary tracts and sometimes in circulatory systems as the parasite inhibit these organs. Generally, symptoms are stomachache, fever, vomiting, diarrhea, and loss of appetite, loss blood, fatigue and listlessness. In humans, under chronic infections such as those in Schistomiasis,

extreme morbidity is the common symptom. Morbidity is accompanied persistent poverty, decreased productivity, poor birth outcomes, poor school and work performance, and poor socio-economic development. (P.F. Ayehu Kumi, S.G.(n.d.)

2.7. Treatment of Intestinal Helminthes

Treatment of helminthiasis is by using anthelminthic through medication the patient. Broad spectrum Benzinidazoles (such as Alendazole and Mebendazole) are recommended for treatment intestinal round worms and Tape worm infections; while micro-cyclic lactones (such as Ivermectin) are effective against adult and migrating larval stages of Nematodes; and praziquantel is the drug of choice for schistosomiasis, Taeniasis and most common types of food-borne Trematodiasis. Oxaminquine is also widely used in mass-deworming programs. Arthemesininns and derivatives are proving to be candidates as the drugs of choice for Trematodiasis. Mass-deworming is also performing among highly affected regions.*(P.F.Ayehu Kumi,S.Quarcoo,G.Kwakye;)*

Chapter Three

3. Materials and Methods

3.1 Study Areas

Hawariat town is administration is the city of Gurage zone as well as Muhur Aklil woreda Muhur Aklil is one of the woreda in the Southern Nations, Nationalities, and Peoples' Region of Ethiopia. was established in 1993 E.C. This woreda is one of the sub-groups of Sebat Bet Gurage. Mhur Aklil is bordered on the south by Ezha, on the northwest by Kebena, on the north by Kokir Gedebano, and on the east by Meskane. It was part of former Ezhana Wolene woreda. Based on the 2007 Census conducted by the CSA, this woreda has a total population of 87,756, of whom 41,022 are men and 46,734 women; 723 or 0.82% of its population are urban dwellers. The majority of the inhabitants practiced Ethiopian Orthodox Christianity, with 73.51% of the population reporting that belief, while 25.68% were Muslim. According to the existing health service delivery system, there are 5 health centers: these are Hawariat,Mojer,Wukiye,T/haymanot & Megeran. My research paper work done by Hawariat Health Center. This health center, was established in 1998 E.C. (Southern Nations, 2007)

3.2, Study Design

Clinical records of who were diagnosed for July 2012- June 2013 intestinal parasites at Muhur Aklil woreda Hawariat Health Center.

3.3, Study Population

All clinical records of Hawariat Health center patients, those peoples who have been treated intestinal helminthes infections at this study area were considered as the study

population.

3.4, Data Collection

Clinical laboratory patients' list book i.e. retrospective kind of data was used.

3.5, Data Analysis

The retrospective data were analyzed using descriptive statistics and present in tables in terms of percentage, age group, and sex and types of intestinal helmets.

3.6. Ethical Consideration and consent to participate.

This study was carried out following ethical consideration obtained from the research ethics review board of the university of wolikite ,college of natural & computational sciences.The permission was also obtained from UoWNCS supervisors.Informal verbal consent was obtained at each of course of the study was kept confidential.

Chapter Four

4. Result

The clinical records show that an increment from July 2012 to January 2013 year then decrement observed from February to Jun 2013, but a few increments seen at may 2013E.C. The intestinal helminthes were prevalently identified. *Ascaris lumbricoides, Hook worm, and S. stericoralis.* The prevalence was found to be high infection with *Ascaris lumbricoides* (40.8%), Hook worm (35.5%), and *S. stericoralis* (13.5%), from the five helminthes parasites. there was higher prevalence in patients from 5-14 years of age (44.8%). followed by aged above 14 and 0-14 years with prevalence of 38.4 % and 16.8% respectively. regarding to their sex male was prevalent with 50.8% female 49.2% (table1)

Among 451 outpatient intestinal helminthes suspected patient intestinal parasites were detected in *H.nana* 18.04%male &63.14%female, *Ascaris lumbricoides* 20.84%male,17.96% female,Taenia Species 3.99%male,3.99%female,*Hookwor*m 17.5.1%male,18.40%female,S.stericoralis7.32%male,5.99%female.Most frequently isolated parasites with the prevalence rate of detected *H.nana and Ascaris lumbricoides* respectively. Whereas were the least. (Table 2).

Prevalence of intestinal parasites among 451 patients suspected Hawariat Health center 2013 E.C

Table 1 prevalence of intestinal helminthes stratified by age, year and host gender at hawariat health center (July 1,2012- June 30,2013 E.C) in percent.

Month	Age range (in year) + cases									Total diagnosed no %		
	0 - 4 No (%)			5 – 14 No (%)			≥ 15					
	M	F	T	M	F	T	M	F	T	M	F	T
Jul 2012	3(12%)	2(8%)	5(20%)	6(24%)	6(24%)	12(48%)	4(16%)	4(16%)	8(32%)	13(52%)	12(48%)	25(100%)
Aug2012	4(14.3%)	2(7.1%)	6(21.4%)	6(21.4%)	6(21.4%)	12(42.8%)	5(17.8%)	5(17.8%)	10(35.6%)	15(53.6%)	13(46.4%)	28(100%)
Sep 2013	3(10%)	4(13.3%)	7(23.3%)	5(16.7%)	5(16.7%)	10(33.4%)	6(20%)	7(23.3%)	13(43.3%)	14(46.6%)	16(53.4%)	30(100%)
Oct 2013	6(20%)	3(10%)	9(30%)	7(23.3%)	4(13.3%)	11(36.6%)	6(20%)	4(13.3%)	10(33.3%)	19(63.3%)	11(36.7%)	30(100%)
Nov2013	3(8.5%)	3(8.5%)	6(17%)	8(22.8%)	7(20%)	15(42.8%)	7(20%)	7(20%)	14(40%)	18(51.4%)	17(48.6%)	35(100%)
Dec2013	3(8.3%)	4(11.1%)	7(19.4%)	8(44.4%)	8(44.4%)	16(88.8%)	7(19.4%)	6(16.7%)	13(36%)	18(50%)	18(50%)	36(100%)
Jan 2013	4(6.7%)	1(1.7%)	5(8.4%)	15(25%)	15(25%)	30(50%)	13(21.7%)	12(20%)	25(41.7%)	32(57.3%)	28(46.6%)	50(100%)
Feb 2013	2(3.6%)	3(5.5%)	5(9.1%)	15(27.3%)	15(27.3%)	30(54.6%)	10(18.2%)	10(18.2%)	20(36.4%)	27(49.1%)	28(50.9%)	55(100%)
Mar2013	4(8%)	8(16%)	12(24%)	9(18%)	9(18%)	18(36%)	10(20%)	10(20%)	20(40%)	23(46%)	27(54%)	50(100%)
Apr 2013	3(8.6%)	1(2.9%)	4(11.4%)	9(25.7%)	7(20%)	16(45.7%)	8(22.8%)	7(20%)	15(42.8%)	20(57.1%)	15(42.9%)	35(100%)
May2013	4(10.8%)	4(10.8%)	8(21.6%)	7(18.9%)	10(27%)	17(45.9%)	6(12.2%)	6(12.2%)	12(24.4%)	17(45.9%)	20(54.1%)	37(100%)
Jun 2013	0	2(6.7%)	2(6.7%)	7(23.3%)	8(26.7%)	15(50%)	6(20%)	7(23.3%)	13(43.3%)	13(43.3%)	17(56.7%)	30(100%)
Total	40(8.8%)	36(8%)	76(16.8%)	102(22.6%)	100(22.2%)	202(44.8%)	80(17.7%)	93(20.6%)	173(38.4%)	229(50.8%)	222(49.2%)	451(100%)

Key- Male =229

Female=222

Total=451

Table 2 prevalence of total intestinal helminthes outpatients observed at Hawariyat Health center from July 1, 2012- June 30, 2013 E.C

	Total diagnosis	Sex	H. n a n a	Ascarislumbricoides	Taenia species	Hook worm	S. stericoralis
Jul 2012	5.54%.	M	1 (4%)	5 (20%)	1 (4%)	4 (16%)	2(8%)
		F	1 (4%)	4 (16%)	1 (4%)	4 (16%)	2(8%)
Aug2012	6,2%	M	0	5 (17.8%)	2 (7.1%)	6 (21.4%)	2(7.1%)
		F	0	5 (17.8%)	1 (3.6%)	6 (21.4%)	1 (3.6%)
Sep 2013	11%	M	0	2 (4%)	10 (20%)	9 (18%)	1 (2.%)
		F	1 (2%)	2 (4%)	10 (20%)	9 (18%)	6 (12%)
Oct 2013	6.65%	M	0	8 (26.7%)	1 (3.3%)	6 (20%)	3 (7.6%)
		F	1 (3.3%)	3 (10%)	0	5 (16.7%)	3 (7.3%)
Nov2013	7.76%	M	1 (2.8%)	6 (17.1%)	2 (5.8%)	7 (20%)	2 (5.8%)
		F	1 (2.8%)	7 (20%)	2 (5.8%)	6 (17.1%)	1 (2.8%)
Dec2013	7.98%	M	1 (2.8%)	7 (19.4)	2 (5.6%)	7 (19.4%)	2 (5.6%)
		F	0	8 (22.2%)	1 (2.8%)	8 (22.2%)	2 (5.6%)
Jan 2013	13.3%	M	2 (3.3%)	5 (10%)	15 (30%)	5 (10%)	6 (10%)
		F	0	5(10%)	15 (30%)	5 (10%)	4 (6.7%)
Feb 2013	12.19%	M	0	10 (18.2%)	2 (3.6%)	9 (16.4%)	6 (11%)
		F	2 (3.6%)	8 (14.5%)	4 (7.3%)	10 (18.2%)	4 (7.3%)
March2013	6.65%	M	0	6 (20)	2 (6.7%)	4 (13.3%)	2 (6.7%)
		F	0	7 (23.3%)	2 (6.7%)	5 (16.7%)	2 (6.7%)
Apr 2013	7.6%	M	1 (2.8%)	8 (23%)	2 (5.7%)	6 (17.1%)	3 (8.6%)
		F	0	7 (20%)	1 (2.8%)	6 (17.1%)	1 (2.8%)
May2013	8.2%	M	1 (2.7%)	6 (16.2%)	2 (5.5%)	7 (18.9%)	1 (2.7%)
		F	2 (5.4%)	7 (18.9%)	2 (5.4%)	8 (21.6%)	1 (2.7%)
Jun 2013	6.65%	M	0	6 (20%)	0	4 (13.3%)	3 (10%)
		F	0	6 (20%)	2 (6.7%)	6 (20%)	3 (10%)

Chapter Five

5. Discussion

Primary objectives of epidemiological studies on the prevalence of infection of intestinal helminthes in different regions or localities are to identify high risk communities and formulate appropriate intervention. In line with this view, the present study attempted to assess the prevalence of different intestinal helminthic infection in Mihur Aklil woreda Hawariat Health Center in Hawariat, and then recommended appropriate intervention.

The result of the study showed the occurrence of several intestinal helminths public health importance among outpatient case in Mihur Aklil woreda Hawariat Health Center, Hawariat, Gurage zone, South Ethiopia. The present study indicated that the intestinal helminthes H.nana,Ascaris lumbricoides, Hook worm, and S. stericoralis had been a major cause of patient's infection in Mihur Aklil woreda Hawariat Health Center from July 1, 2012- Jun 30, 2013 E.C.

This might be due to eating uncooked meat, and eating meals without washing hand, using household together with domestic animals, as major reason for the increase in the spread of the helminthic parasites. Poor sanitary conditions are the most important factors leading to intestinal worm infestation, this due to personal hygiene. The prevalence of H.nana,Ascaris lumbricoides and Hook worms are higher in the Hawariat Health center. This is due to the fact that eating of uncooked food and unwashed fruits and vegetables.

The prevalence of helminthes increased in September 2013 E.C, 20% & Jan.30% those could be possible due to eating raw meat at Meskel & x-mas festival which are common around the study area population. The prevalence of intestinal helminthes were stratified by age 5-14 the commonest one in the study area with prevalence rate of 44 .8%.

Regarding distribution of the intestinal helminthes among age groups more infection

rate was observed in the age from 5-14 years and followed by above 14 years and below 4 years. (Table 1).

Chapter Six

6. Conclusions and Recommendations

6.1. Conclusion

H.nana,Ascaris lumbricoides and Hook worms were found to be the most prevalent intestinal helminthes among individual visited in the health center during the past one year. Most intestinal parasites were more prevalent among individuals 5-14-year-old than individuals above 15 years old. So start giving emphasize for this town and the surrounding community around the town through providing school and community based deworming.

Generally, H.nana,Ascaris lumbricoides & Hook worms are the most prevalent species in this study from five parasitic helminthes species in the study area. This is due to the fact that most children were poor personal hygiene and due to sanitation problems.

6.2. Recommendations

From the above study the following recommendation were forwarded: - Personal and environmental sanitation is base for transmission of intestinal helminthes infection, so it must focus to reduced helminthiasis. Everyone should be responsible to the ways in which helminthes cause, prevent and control. Further study should be done to investigate the major associate risk factors for the prevalence of intestinal parasites.

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