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The prevalence's of intestinal parasites among schoolchildren in Teklehymanot primary school.

By

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ABSTRACT

Parasite infections cause serious health problem in Ethiopia. There are more infestations in the poor segments of the population with low household income poor handling of personal and environmental sanitation overcrowding and limited access to clean water. The purpose of this study was to assess the intestinal parasitic infections in Muhre Aklile Woreda Teklyhymanot primary school, Ethiopia from September22/1/2013 – July 20/12/2014 E.C. the method of data collection was used to collect stool sampled and parasitological examinationation take places. And then the slide observed using microscope to identified the types of parasites. Result shows out of the total 385 students 94(48.96%) males and 135(69.95%) females had one or more intestinal parasitic infection. Among total 385 students examined in the Health Center a total of six parasites were obtained within one year. *G. lamblia* (52.40%), *Blasto cyttishominis* (51.976%), *E. hystolytica* (51.53%), *E. vermicularis, Taenia spp* 86(38.43%and *hook worm* 86(37.55)were detected as most infestation intestinal parasite infections in the Teklyhymanote primary school. Parasitic infection is highly prevalent in the study area. Among those intestinal parasitic infections, *G. lamblia*, *Blasto cyttishominis*, *E. hystolytica*, and *E. vermicularis* recorded are the most infestation parasitic infections. Public education on how to handle personal hygiene and proper use latrines should be given to reduce the prevalence of infection.

Key word: *E. hyistolytica, G. lamblia*, parasitic infection, prevalence

1. INTRODUCTION

1.1 Back Ground of the study

Intestinal parasitic infections are the most common global disease and have been described as constituting the greatest single worldwide cause of illness and disease (Steketee, *et al.*, 2003). Intestinal parasitic infections are linked to lack of sanitation, lack of access to safe water and improper hygiene; therefore, they occur wherever there is poverty. Intestinal parasitic infections deprive the poorest of the poor of health, contributing to economic instability and social marginalization. The poor people of under developed nations experience a cycle where under nutrition and repeated infections lead to excess morbidity that can continue from generation to generation. People of all ages are affected by this cycle of prevalent parasitic infections; however, children are the worst affected (Garzon, *et al.*, 2003).

About one third of the world, more than two billion people, is infected with intestinal parasites (Chan, 1997 and Wkly, 2006). Approximately 300 million people are severely ill with these worms and of those, at least 50%are school-age children (Wkly, 2006). Intestinal parasitic infections are rarely cause death but because of the size of the problem, the global number of related deaths is substantial (WHO, 2006).About 39 million disability adjusted life years are attributed to intestinal parasite and these infectious thus represented substantial economic burden (Stephenson, *et al.*, 2000).

Infants, toddlers and other young children are reported to be most vulnerable to the adverse nutritional effects of intestinal parasitic infections. One reason is that they often suffer from an increased intestinal parasitic infection burden associated with a greater exposure to those infectious agents by virtue of unsanitary practice associated with child development e.g. playing in contaminated dirt and water, sucking on dirt finger and other objects (Sebastiaan, *et al.*, 2007). In 2002, WHO estimated the number of people infected by digestive tract parasites were 3.5 billion and the numbers of people made ill by them were 450 million (WHO, 2001).*Entamoeba histolytica*and *Giardia lamblia* are estimated to infect about 60 million and 200 million people worldwide, respectively (Murray, *et al.*, 2002) and

recent estimates indicated that approximately 1472, 1298 and 1049 million people have round worm, hookworm and whip worm infection, respectively (Bentwich, *et al.*, 1995).

However, the incidence and prevalence of intestinal parasitic infections varies within and across the countries due to environmental, social and geographical factors (Astizarian, *et al.,* 2000; Bentwich, *et al.,* 1995; Rao, *et al.*, 2006).

However, prevalence of intestinal parasitic infections and the possible risk factors for intestinal parasitic infections will not illustrates in several localities of Ethiopia particularly in this proposal area. Therefore, this paper would be to determine the prevalence of intestinal parasitic infections and associated risk factors among school children of Muhr Aklil woreda. This research paper would be aimed at estimating the prevalence of intestinal parasites and its illness effect children residing in the Teklhaymanot primary school, Muhr Aklil woreda.

1. 2. Statement of the Problem

Globally, millions of people suffer from intestinal parasitic infections. The effects of these worm infections have been enormous. The migratory stages (larvae) and the obstructions caused by some adults create growth and mental problems especially in children. Skin rashes and discolorations are not excluded, while lack of certain essential vitamins remains a consistent effect (NDUKA, 2006). According to the Ministry of Health (1997), nearly 80% of the rural and 20% of urban populations have no access to safe water. Three-fourth of the health problems of children in Ethiopia are communicable diseases arising from environment, especially water and sanitation and furthermore it was found that poor education background, poor hygiene, and inappropriate latrine usage were found to be significantly associated with intestinal parasitic infections. Due to this entire problem the current study aimed to assess the prevalence of intestinal parasites among school children in Teklehymanot primary school, Muhr Aklil Woreda.

Furthermore this research is to answer the following questions at the end of the study.

1. What are the major impacts environmental especially water and sanitation on prevalence of intestinal parasites?
2. What is the possible solution to the impacts and prevalence of intestinal parasites?
3. How teachers can be affected by teaching due to the presence of prevalence of intestinal parasites?

1. 3. Objectives of Study

1.3.1 General objective

- To assess the prevalence of intestinal parasites among school children in Teklehymanot primary school, Muhr Aklil Woreda,

1.3.2 Specific objective

- To determine the prevalence of intestinal parasitic infection study area
- To identify intestinal parasites species in study area

1. 4. Significance of the Study

Intestinal parasitic infections are commonly distributed in the world and the most infectious disease in the Ethiopia. Many children are affected by these parasitic diseases. The rate of infection is remarkably high sub-Saharan African countries, including Ethiopia.

However, prevalence of intestinal parasitic infections and the possible risk factors for intestinal parasitic infections will not illustrates in several localities of Ethiopia particularly in the proposal area. Therefore, the aim of this paper would be assess the prevalence of intestinal parasitic infection and related risk factors in Muher Akilil woreda.

Accordingly, this research was thought to be significant in the following areas.

- It helps all stakeholder with in the primary school program mainly, researchers, educators, and policy makers to improve the current the prevalence of intestinal parasitic infection and related risk factors in the health center
- It can become a gap line for further investigation for other researches that focus on the prevalence of intestinal parasitic infection and related risk factors.
- Besides knowledge of the impacts of the prevalence of intestinal parasitic infection and related risk factors Muhre Aklile woreda Teklhaymanote primary school can encourage at the Muhre Aklile Woreda to take appropriate measures to maintain the prevalence of intestinal parasitic infection and related risk factors

1.5. Delimitation/scope

This study would be conducts in Muher Akilil woreda from September 22 up to July 20/11/ 2013 E.C. The paper has assisted the prevalence of intestinal parasitic infection in Teklhaymanot Primary Schools. However, assess of prevalence of intestinal parasitic infection in Teklhaymanot

Primary Schools, require several times and budget. Thus, due to time, resources, logistics and budget constrains the paper restricted only in Teklhaymanot Primary Schools.

2. LITERETURE REVIEW

2.1 Global Epidemiology of Intestinal Parasitic Infections

Parasitic infections caused by helminthes and protozoa are the major causes of human diseases in most countries of the tropical region. It is estimated that about 3.5 billion people in the world are infected with intestinal parasites, of them 450 million are ill (Brooker, *et al.*, 2009; Pullan, *et al.*, 2014). Majority of these cases are children (Brooker, *et al*., 2009). About 1.45 billion people in the world were infected with Soil-Transmitted Helminthes and 5.19 million show associated morbidity in 2010 (Hotez, et *al.*, 2014; Pullan, *et al*., 2014). The estimated disease burden due to *schistosomias is* was 3.31 million during 2010. Out of 1.45 billion infections due to soil transmitted Helminthes, 438.9 were infected with hookworm, 819.0 million with *A. lumbricoides* and 464.6 million with *T. trichiura* (Pullan, *et al*., 2014). STHs are the second leading cause of mortality in children of age less than 6 years who live in Africa (WHO, 2010). Majority of the intestinal parasitic infections are attributed to soil transmitted Helmenthes and Schistosoma species. It is estimated that more than a billion people in the world are infected with *schistosomiasis* and soil transmitted Helmenthes, most of them suffer from associated severe morbidity (Lustigman, *et al*., 2012).

Human *schistosomiasis* is of considerable public health importance and mainly affects individuals living in developing countries where water resources allow development of snails and poor sanitation facilitates infection.

It is estimated that around 249 million people are infected with Schistosoma worldwide, many of whom live in sub-Saharan Africa. Intervention against intestinal helminthes infections is based on regular anti-helminthes treatment, improved water supply and sanitation and health education (Belayhun, *et al.*, 2010).In developing countries, however, control measures are difficult to implement due to clear water, sanitation and education problems.

As a result, intestinal helminthes infection remains a significant health problem in developing regions. Furthermore, the construction of dams for the purpose of irrigation and hydroelectric power has created new areas of transmission, which intensified community level infection by *S. mansoni* in children living in Africa (Steinmann, *et al.*, 2006).

2.2 Epidemiology of Intestinal Parasitic Infections in Ethiopia

In Ethiopia, intestinal parasitic infections are highly prevalent, being the first or second most predominant causes of outpatient morbidity in the country (Ali, *et al*., 1999; Leggese, *et al.,* 2004andTaddese, *et al*., 2005). Although the prevalence rates of individual parasite infections vary considerably in different parts of the country, most studies showed a higher prevalence of *A. lumbricoides* followed by *T. trichiura* and hookworms. Most previous studies conducted in Ethiopia focused on school age children and only few studies reported intestinal parasitic infections among under-fives (Birri, *et, al*., 1998;Liza,*et al.,* 2010 and Taffesse, *et al*., 2000). Thus, the current study was undertaken to assess the prevalence of intestinal helminthes infection with emphasis on *S. mansoni* among children less than five years of age in Wonji Sugar state, Ethiopia.

2.3 Disease Burden due to Intestinal Parasites

2.3.1. Intestinal protozoan infections

Infection with intestinal protozoan is associated with poor water and food hygiene and sanitation practices (Katz, *et al.,* 1989). They are endemic worldwide. In developed countries the prevalence of human intestinal parasitic protozoan infection is estimated to be between 1-7%, but it may be as high as 50% in developing countries (Katz, *et al.,* 1989). All age groups are equally affected during epidemics, but both subclinical infection and clinical disease are more common in children in endemic areas. Out breaks occur regularly in child care facilities. Immunocom promised individuals are also more commonly affected than members of the general population (Stoker, *et al*., 2009).

Amoebiasis/*Entamoeba histolytica:* The causative agent of intestinal amebiasis is the single-celled protozoan parasite *Entamoeba histolytica*. This parasite is endemic in most tropical and subtropical areas of the world, where it causes millions of cases of dysentery and liver abscess each year (Stoker, *et al.,* 2009). About 20% of patients with liver abscess have previously had clinical dysentery (Li and Stanley, 1996). Infection can spread from the liver by direct extension into the pleura pulmonary cavity and the pericardial cavity. Occasionally, usually in immune suppressed individuals, infection might be widely disseminated and affect other organs, including bone and the brain.

Amoebiasis affects around 480 million people worldwide, with an annual mortality of 40,000 to 110,000 persons (Walsh, 1986). Most *E. histolytica*-infected individuals clear the infection spontaneously, with only about 10% going on to develop colitis (Gathiram and Jacson, 1987). Acute amoebic colitis ranges from mild to severe, and can be fulminate, leading to colon perforation.

Giardiasis/*Giardia lamblia:* *Giardia 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 worldwide (Jerlstrom-Hultqvist, *et al*., 2010). Giardiasis, caused by *Giardia lamblia*, is a frequent cause of diarrhea that can have a negative impact on growth and development of children and affects approximately 200 million people worldwide (Mineno and Avery, 2003).

2.3.2. Intestinal helminthes infection

Intestinal Helminthes have been identified as a serious public health problem, predominantly among poor communities in the developing world (Cairncross, *et al.,* 2010). Over one billion people in the world are affected by soil transmitted Helminthes alone (Bethony, *et al.,* 2006). Particularly putting school age (5-15 years) children are at risk (Cairncross, *et al.*, 2010; Sackey, *et al*., 2003). Infections with helminthes e.g. *Ascaris lumbricoides*, hookworm, *Hymenolepis nana* and *Trichuris trichiura* are closely linked with conditions of poverty, unsafe water, sanitation and hygiene (Cairncross, *et al.,* 2010). At highest risk of morbidity are pre-school and school-aged children (Bethony, *et al.,* 2006). Negative effects of helminthes infections include diminished physical fitness and growth retardation, and delayed intellectual development and cognition (Bethony, *et al.,* 2006). Indeed, helminthes have been linked with an increased risk for nutritional anemia, protein-energy malnutrition (Sackey, *et al.,* 2003).

Round worm/*Ascaris lumbricoides:* *Ascariasis* is an infection by the nematode *Ascaris lumbricoides*. It is the most common helminthes parasite of humans, is reported to infect at least one-fourth of the world's population (Crompton, 1994). The females are between 20 – 35 cm in length, while the males vary between 15 and 30cm. Both usually inhabit the jejunum where they feed on the semi-digested food present in the host (Brown and Neva, 1994). The female lays about 200,000 eggs per day (Tadesse, *et al.,* 2004).

The eggs of ascaris are one of the most resistant of the helminthic egg and can remain infective for years embedded in the soil (Crompton, Gilgen and Mascie-Taylor, 2000). It has a worldwide distribution and it is particularly common in regions with poor sanitation. Man may acquire ascariasis by the ingestion of eggs in contaminated foods or rarely drinks. More frequently, eggs containing embryos reach the mouth directly from the soil via dirty hands. Hence, children are infected more often than adults (Tadesse, *et al.*, 2004). The majority of people with ascarias are live in Asia (73%), Africa (12%), and South America (8%), where some populations have infection rates as high as 95 percent (Chitkara and Sarinas, 1997).

Trichuriasis (whip worm infection): Trichuriasis is an infection of the human intestinal tract, caused by the nematode *Trichuri strichuira* (whip worm).Whipworm is a parasitic worm infecting 500 million humans in tropical countries. It lives its adult life in the large intestine. Whipworm gets its name from its appearance. The anterior is thin and long whereas the posterior end is thicker. The thin front part is burrowed in the intestinal wall eating nutrients from the mucosa. Adult female is 35–50 mm, whereas male is about 30–45 mm long. Both sexes are white-pink in color (CDC, 2013) and often occur in areas where human faces are used as fertilizer or where defecation onto soil happens. The worms are spread from person to person by fecal-oral transmission or through faces-contaminated food (Bundy and Cooper, 1989)

2.3.3. Hook worm infection

Hook worm infection is caused by one of the two hook worm species; namely *Ancylostoma duodenale* and *Necator americanus.* One fourth of the world's population is infected with one of the two hookworm species. Hookworm disease develops from a combination of factors such as heavy worm burden, prolonged duration of infection and an inadequate iron intake, and it is characterized by iron deficiency anemia and occasionally hypoproteinemia (Tadesse, *et al.*, 2004).

Adult hook worms, which are about 1cm long, use buccal teeth or cutting plates to attach to the small bowel mucosa and ingest blood and intestinal fluid (0.2 ml /day per *Ancylostoma* adult) and cause large volume blood loss from intestinal bleeding (Gilgen and Mascie-Taylor, 2000: Katz, *et al.*, 1989). The female passes approximately 28,000 eggs per day (Katz, *et al*., 1989).

Both the eggs and larvae are very sensitive to exposure to the environment and do not survive for more than a month in the soil. Human infection is acquired through penetration of the skin occur in bare feet, areas on and between the toes, or through a hair follicle (Brown and Neva, 1994).

3. MATERIALS AND METHODS

3.1. Description of Study Area

The current study area would be Muher Aklil woreda, is one of the Gurage Zones in South Nations, Nationalities and Peoples Regional State. This woreda is named after the sub group of the sebat bet Gurage zone, the muhr, part of the Gurage zone, Muher na 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 Welene woreda. Mahr Aklil is the main town about 150 k. m from Addis Ababa.

Climate is a long period of average of weather condition of a defined geographical area .It is determined by altitude, Latitude, prevailing winds, cloud cover, pressure and wind belts. Among the elements of weather and Climate, temperature and rain are important elements in determining the pattern of population settlement, the range of crop and vegetation that can grow the water we drink, the place where we live, the clothes we wear and other. In general, our health, the quality of the Environment and our Economy depend on the spatial and temporal distribution of climatic conditions.

3.2. Study Design and Study Population

Research study design is a framework, or the set of methods and procedures used to collect and analyzed data on variables specified in a particular research problem. The study design used to answer a particular research question depends on the nature of problem and the availability of resources. Due to in this across sectional study design would be used in the current study. A cross sectional study examine the relationship between disease (or other health related state) and other variables of interest as they exist in a defined population a single point of time or over a short period of time.

The source of population for the research would be muheraklile Teklyhymanote primary school attendance at the time of the study would be used as source population from which the sample would be drawn by using simple random sampling technique.

3.3. Sample size and sampling techniques

The researcher used availability sampling in simple random sampling technique. Because it give all respondent equal chance to be selected and this sampling technique give equal chance to the entire respondent and reduce or avoid abases and to get accurate information in the sample and then researchers will be select 192 male and 193 female students with sum of 385 students from Teklhymanote primary school were expected to solve the problem the prevalence of intestinal parasites among school children in Teklehymanot primary school, Muhr Aklil woreda using the formula as shown below.

$$N = \frac{Z^2 P(1-P)}{E^2}$$

Where, Z is the value from the standard normal distribution reflecting confidence level that will be used (EX- Z = 1.96 for 95%)

E is the desired margin error that means 0.005 for 95% confidence interval

P is proportion of success in the population, range from 0 to 1 in my studies 95% confidence Interval is 0.5

$$N = \frac{Z^2 P(1-P)}{E^2}$$

$$\frac{1.96^2 \text{ X } 0.5(1-0.5)}{0.05^2} = \frac{3.8461 \text{ X } 0.25}{0.0025} = 385$$

3.4. Method of data collection

3.4.1. Stool Sample Collection

The subjects were educated on the method of stool collection. The consent of the student`s parent were obtained before stool sample collection from the selected children. The stool was collected in wide mouth plastic containers, sterile with screw caps having the appropriate information and identification number. A wooden applicator was also provided and children were educated on the methods of stool collection.

3.5. Parasitological Examination

3.5.1. Direct Wet- Mount Method

The students were supplied with a piece of plastic to bring about 2grams of stool.

Specimens were collected on-the-spot and mark with a marker for the identification number of each study participant was written at one end of the slide and a drop of physiological saline was placed in the center of the slide. With a wooden applicator stick, a small portion of stool specimen (approximately about the size of a match head) was taken and placed into the drop of saline and was thoroughly emulsified to make a thin uniform saline suspension which was not too thick that fecal debris may obscure organisms, and also was not too thin that blank spaces may be present.

The suspension was carefully covered with a cover slip in a way as to avoid air bubbles. One slides was prepared for each sample and examined once by well-trained laboratory technologist systematically under the low (10x) objective so that the entire cover slip area was scanned for the presence of parasite eggs/larvae. Detail examination about the morphology of the parasite was examined by 40x objective.

3.6. Method of Data analysis

The data were cleared and checked whether it is correctly examined laboratory technical in stool sampled. All the collected data were categorized and grouped using tables. Then the data was analyzed using simple descriptive statistics method such as percentage and tables.

3.7. Ethical consideration

Ethics of research here refers to the morals of investigation or intervention with regard to minimal abuse or disregard of social and psychological wellbeing of persons and community in participating in the research work. Therefore, the researcher needs to include a statement of ethical consideration and needs to obtain ethical clearance from student's parents. Assent from students would be also obtained. Here, the benefits, and any harm to the study participants should be clearly presented.

The issue of confidentiality (keeping the information only for intended purpose without any personal identifiers) should be indicated and data collected during the survey from each study participant and results of laboratory tests would be kept confidential. Finally, Children found positive for intestinal parasites should be treated with appropriate drugs by physicians from Muhre Aklile Tena Tabya free of charges.

CHAPTER FOUR

4 Results and Discussions

4.1 socio - demography of the study

Accordingly, more than half percentage 275(71.43 %) of the school children of the survey site that were engaged in the age range between 13 and 16, and followed by those felt in age range greater than sixteen (28.57%).Table 1- over all sex ratios nearly 1:1 that means male 192(49.87%) 193(50.17%) in muheraklil primary school.

Table1- Socio-demography of the study participant

Characters	Alternatives	Frequency(n = 385)	%
Age	13 – 16 years	275	71.43
	Above 16 years	110	28.57
Sex	Male	192	49.87
	Female	193	50.13

4.2 Prevalence of intestinal parasites

Table 2 demonstrated sex status of peoples that were engaged in prevalence of intestinal parasites in muher aklile district. Accordingly, more than half percentage 135(69.95%) of the peoples of the survey site that were engaged in prevalence of intestinal parasites were found in females, followed by those felt in males at about 94(48.96%).This result also supported by a study done by Amare Mengistu *et al* high prevalence in female than male (Amare Mingistu, *et al*., 2007).

Table 2- over all prevalence of intestinal parasites based on sex in muheraklile primary school

Characters	Prevalence			
Sex	Males	Positive %	Females	Positive %
	192	94(48.96%)	193	135(69.95)

Accordingly Table 3, more than half percentage 175(63.64 %) of the peoples of the survey site that were engaged in prevalence of intestinal parasites were found in the age range between 13 and 16, and followed by those felt in age range greater than sixteen 54(49.09%).This result also nearly similar with a study done by Al-Shamari, *et al*. (2001) showing an over prevalence 60% in age group between 1-10 years old.

Table 3- over all prevalence of intestinal parasites based on age in muheraklil primary school

Characters	Prevalence			
Age	13 – 16 years	Positive %	Above 16 years	Positive %
	275	175(63.64%)	110	54(49.09%)

As illustrated in Table 2 out of 385 people stool sample examined in 2013 E.C 229 people were infected by different type of parasites. As shown in Table 4 prevalence of parasites include *G.lamblia, Blasto cystis*hominis, *E. hystolitica, Tanea* spp and Hook worm with respective percentage of male 20(21.28%), 18(19.15%), 16(17.02%), 12(12.76%) and 11(11.70%) have low prevalence than female prevalence of parasite include *G.lamblia, Blasto cystis*hominis, *E. hystolitica, E. vermicularis, Tanea* spp and Hook worm with 30(22.22%), 26(19.26%), 24(17.78%), 18(13.33%), and 17(12.59%) respectively but *E. vermicularis* is high in male about 17(18.09%) than female about 20(14.48%).

The prevalence of *G.lamblia* in our study also higher in female than male that of Teklu wegayehu report on prevalence of giardiasis about 21% (Teklu Wegayehu, *et al*., 2013).

In other way our result was higher than Al-karamoh teaching hospital in Saudi Arabia Al-kut city about 60% people negative for *G. lamblia* infection in Female.

Table 4- List of parasites present in parasitic infection positive individual from stool sampled examined 2013 E.C

Type of parasites	Sex				Total
	Total number of positive				
	Male (n=94)	Percentage	Female (n=135)	Percentage	Percentage
Giardia lamblia	20	21.28%	30	22.22%	50(21.83)
Entamoeba hystolytica	16	17.02%	24	17.78%	40(17.47)
Blasto cysttishominis	18	19.15%	26	19.26%	44(19.21)
Hook worm	11	11.70%	17	12.59%	28(12.23)
Taenia spp	12	12.76%	18	13.33%	30(13.10)
E. vermicularis	17	18.09%	20	14.82%	37(16.16)

As presented in Table 3 above further 229 people were infected by six different types of gastrointestinal parasites with in the year 2013 E.C. among those as presented in Table 5 below out of infected 120(52.40%) *Giardia lamblia*, 50(21.83%) *Blasto cysttishominis*, 44(19.21%), *Entamoeba hystolytica* 40(17.47) and 37(16.16%) *E. vermicular is*. The present finding on *G. lamblia* was relatively lower than reported from urban dwellers in south west Ethiopia with 23% (Amare Mingistu, *et al*., 2007). It shows that from six different parasite prevalence is the four parasites are the most common intestinal parasites in the study area includes *Giardia lamblia*, *Blasto cysttishominis*, *Entamoeba hystolytica,* and *E. vermicularis* 21.83%, 19.21%, 17.47%, and 16.16% respectively. this result also nearly similar with a study conducted by Dawit Ayalew in the rural part of Dire Dawa 21.06%%, 19.00%, 17.3% and 16.11% (Dawit Ayalew, 2006).

Table 5 - the most prevalent parasitic infections in positive individual from stool sampled examined 2013 E.C

Type of parasites	Sex				Total
	Total number of positive				
	Male	Percentage	Female	Percentage	Percentage
Giardia lamblia	20	21.28%	30	22.22%	50(21.83)
Entamoebahystolytica	16	17.02%	24	17.78%	40(17.47)
Blastocysttishominis	18	19.15%	26	19.26%	44(19.21)
E. vermicularis	17	18.09%	20	14.82%	37(16.16)

UNIT FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Findings from this study reveal that gastro intestinal parasitic infections were higher among the primary school children of muhre Aklile primary school. The most prevalent parasite was *Giardia lamblia*, *Blasto cysttishominis*, *Entamoeba hystolytica* and *E. vermicularis* recorded. Prevalence of infection of gastro intestinal parasites was higher among age group 13-16 years.

Female were highly affected than male from highly prevalent gastro intestinal parasites identified from Teklhymanote primary school. The majority of the female students which uses stream of water as a source of cooking and drinking, and hand washing habitat were also showed significant association with gastro intestinal parasitic infection than male.

Majority of male students' have latrine usage habit in the school was not sufficient that means latrine use in the school around fence or forest and not properly organized were also showed significance associated with gastro intestinal infection than female. As a general absence of safe water supply, latrine usage as well as hand washing habit in the school led community higher prevalence of gastro intestinal infection among school children.

5.2 Recommendations

Based on the findings of the present study, the following recommendations were made:

- ✓ Sanitation aims to interrupt transmission and prevent re-infection so that improved health education on transmission of gastro intestinal infection should be needed.
- ✓ Construction of sanitary facilities should be encourage which aim to stimulate changes in behavior related to environmental and family hygiene.
- ✓ Use safe water supply for drinking and cooking

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