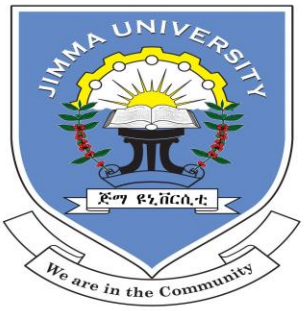

PREVALENCE OF GIARDIA LAMBELA INFECTION FOR THE PAST THREE YEARS (2011- 2013 E.C) AMONG JIMMA UNVERSITY MAIN CAMPUS STUDENTS

BY

TADELECH MARE

A RESERCH OF PAPER FOR THE PREPARATION OF THE SENIOR PAPER TO BE SUBMITTED TO DEPARTMENT OF BIOLOGY, JIMMA UNIVERSITY, NATURAL SCIENCE COLLAGE, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE BACHELOR DEGREE IN BIOLOGY

JUNE, 2014, 2014

JIMMA, ETHIOPIA

JIMMA UNIVERSITY
COLLEGE OF NATURAL SCIENCE
DEPARTMENT OF BIOLOGY

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JUNE, 2014

JIMMA, ETHIOPIA

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ACKNOWLEDGEMENT

First of all we would to thank my GOD for this every help to successful of the research work great and heart full thanks goes to my advisor Mr. Gemechiss Gemeda for his continues helping and encouragement at all the step of the study . My special thanks also extended to my families for their financial support from the beginning to the end of the preparation of the paper. I would like to tank and appreciate all Jimma University clinic workers employees for their giving the information and data.

ABSTRACT

The study Wes conducted in Jimma University student clinic to asses the prevalence of Giardia lamblia infection from 2003 E.C to 2005 E.C . The objective of this study was to determine the overall prevalence of Giardia lamblia for last three years I'e. From 2003 E.C 2005 EC from the secondary data registered in Jimma a University student clinic Jimma town, western Ethiopia from Feb to May 2014. The data was collected from patient cards documented in the Clinic and the collected data was analyzed using tables and descriptive methods table. Among the total of 847 patients. 727 (85.36 %) were males and the rest 124 (24.64 %) were females. The age group 20- 22 were more vulnerable Frequency of Giardia lamblia disease was registered in 2013, 361 (42 .62%). The prevalence infection this disease is avoids homosexuals, avoiding consuming of un cooked food and contamination of water Key word ;- cyst , Food ,Giardia , prevalence , Trophozite and water

CHAPTER ONE

INTRIDUCTION

1.1 Background

Giardia lamblia is flagellate protozoan referred to as giardia intestinalis, and has been recognized as the most common intestinal pathogen world wide (Robert et al, 2001). Infection is endemic throughout the world and epidemic of it occur sporadically. Giardiasis is one of the common cause of acute or persisting diarrhea in children in developing countries and , it interferes with intestinal absorption of patients and the growth rate of children (WHO ;1987).

Clinical aspect of human infection with *Giardia lamblia* ranges from the asymptotic carrier state to sever malabsorption (Nimri; 1994). Symptoms can be sever particularly in children under three years of age ,and in the under nourished (Sheesbrough ;1998).How ever epidemiological studies revealed a reduced incidence of symptomatics in persons repeatedly exposed to the parasite, people live in endemic areas are commonly asymptomatic (Nimri ; 1994).

Giardia lamblia is typically more prevalent in Children than adults, especially children of large families and those in or phanusyloms and elementary school (Beaver ;1984). Infants may be one infected as early as three month of age ,and infection rate in children less than ten years of age are 2-3 times higher than in adults (WHO ;1987). Thus, infection typically reaches its maximum frequency during child hood or at poverty, than decline in prevalence (Beaver; 1984).

Infection by *Giardia lamblia* follows the ingestion of environmentally hard cysts in food or water contaminated with feces and also through oral route (Cheesbrough; 1998). Ingestion of as few as 10cysts is sufficient for infection in humans. Because the mature cysts are infectious when fecal hyesiene is poor and the parasite can disseminate easily and quickly in the population (Athonys etal ;1998).

1.2 Statement of the problem

Giardia lamblia is the most protozoan intestinal parasites isolated world wide as causative agents of diarrhea. Epidemiological studies suggest that the parasite is responsible for about 5% of acute diarrhea and 20% if chronic diarrhea illness in the world. The incidence of diarrhea associated *Giardia* it generally higher in developing countries in Africa, Asia, south and Central America where access to clean water and basic sanitation is lacking. The prevalence for *Giardia lamblia* in developed countries is around 2-5% but in developing countries may be up to 20-30% (Thielman and Guerrant, 1998).

In Ethiopia, the prevalence of giardiasis ranges from 3% to 23% (Haile *et al*., 2006). Ayalew, (2006) reported a prevalence of 38% among children from eastern Ethiopia (Dire-Dawa). *Giardia lamblia* infection is associated with the malabsorption of fats, carbohydrates, and vitamins, especially vitamins A and B12 (Curtale *et al*., 1998). The variation in prevalence depends on factors such as the geographical area, the urban or rural setting of the society, the age group composition and the socio-economical conditions of the study subject (Cairncross, 2010).

Moreover , as the study reported from Jimma Zone , Asendabo woreda revealed that 16.3% of *Giardia lambla* was observed (Ali etal; 1999) .It was found greater than the country wide surveys of Giardia among school children (Birrie etal; 1995). Low socio-economic status) low level of public health facilites, poor sanitation and environmental hygiene in zone may be the possible reason to elevate the prevalence. However there is no any published scientific data in sum on the prevalence of *Giardia lamblia* for past three years among students of Jimma University visiting the clinic.

1.3 Significance of the study

Giardia lamblia is considered as one of the main health problem in the developing countries like Ethiopia including the study area as well as in developed countries. This study will help to determine the distribution and magnitude of giardia infection among patient visiting Jimma University student clinic and also it will serve as a base line data for further studies how to tackle this major health problem before it cause irreversible hazards on the healthy population. It serves as a point of reference for others to conduct research issue.

1.4 Objective

1.4.1 General Objective

-To assess the prevalence of *Giardia lamblia* infection for past three years (2011-2013) among Jimma University main campus students.

1.4.2 Specific Objectives

-To assess the overall prevalence of *G. lamblia* infection for past three years compare and contrast the difference found within each year considered for the current study.

-To evaluate the infection status of *G. lamblia* with respect to age and sex

-To give recommendation based on the extent of *Giardia lamblia* infection in the study site.

1.5 Delimitation

The study was conducted in Jimma University student clinic .The study was limited to Jimma University student clinic patients of *Giaardia lamblia* in the past three years (2011-2013 E/C.

1.6 Limitation

While conducting this study, there were limitations such as shortage of time, financial problem ,lack of relevant information during data collection.

CHAPTER TWO

2. LITERATURE REVIEW

Giardia lamblia/intestinalis (also known as *Giardia duodenalis or G. intestinalis)* is a unicellular flagellated intestinal protozoan parasite of humans isolated worldwide and ranked among the top 10 parasites of man (Wolfe, 1992). It is one of the major cause of water borne disease worldwide (CDC ,2004). *Giardia lamblia* is possessing two equal size nuclei, each nuclei contains enteric genome and both nuclei are transcriptionally active which can be replicated simultaneously during cell division. Its genome consists of 1.2 billion base pair distributed among five linear chromosomes. (Adam, 2002). *G.lamblia* can exist in both cyst and trophozoite stage. *Giardia* trophozoites exhibit two morphologically identical nuclei (four in cysts), microtubular median bodies, four pairs of bilaterally symmetrical flagella, lysosome-like vesicles, a ventral adhesive disk, mitosomes and specialized vesicles in encysting trophozoites (Yu *et al.*, 2002).

Giardia species has two major stages in the life cycle; the cyst and vegetative tropozoite (figure.2). *Giardia* exhibits a simple and direct life cycle meaning that no intermediate host is required in the life cycle (Svärd *et al*., 2003). It exhibits a typical fecal-oral transmission cycle and infection is acquired by ingesting cysts. Factors leading to contamination of food or water with fecal material are usually associated with transmission (Bernander *et al*., 2001). In developing countries, poor sanitation may contribute to the higher levels of *giardiasis* and water-borne outbreaks due to inadequate water treatment have also been documented (Bernander *et al*., 2001).

2.1. Pathogenesis

The pathogenesis of *giardiasis* is not completely investigated. *Giardia* lives and replicates asexually on the smll intestines surface of hosts. According to the most recent studies, giardiasis is a complex of pathophysiological alteration. One of them is the changed permeability of entrocytes resulting from the cytopathological effect of parasites metabolites (Buret etal , 2002a , 2002b).

Giardiasis is the clinical manifestation of *Giardia* infection. It is characterized by several diarrhea malnutrition, weight loose and slight intestinal epithelial injury .The complet pathogenesis is not well known but several theres in exist .The description of the small intestine epithelium is proposed to be caused by induced apoptosis (Chin *et al*, 2002) .

2.2 Epidemiology

Even though infection with *Giardia Lamblia* has worldwide, its prevalence rate was higher in under –five and school children. Across – Section study that was conducted to determine the prevalence of intestinal parasite among school children in Northeren Joudan, *Giardia* was observed in 36 % of the speciment examined. (Nimri, 1994). When we consider African situation, varying prevalence rate reported from different localities in southern Sudan to determine the prevalence of intestinal parasite among school Children by using formal ether concentration technique revealed that *Giardia lamblia* infection rate was 9.8 % (Magambo . etal, 1998). Parasitological survey in Ethiopia did not directly Focus on this Parasitic infection .Only fragmentary reports have been made in a few surveys in conjunction with other parasitic infections. As like other African countries , most of the infection rate in Ethiopia was also reported from school and under five children according to a study which was conducted for parasitological investigation in Addis abeba and Debre Ziet School children, infection rate with *Giardia* in both cities were similar 9% (Aklilu etal; 1968).

2.3. Transmission

Giardia is highly contagious parasitic. Its transmission is depends on swallowing of mature cysts. Its prevention is depends on high lavel of sanitation. *Giardia* is transmitted from human to human .*Giardia* can be also zoonosis (transmit from animal to human). According to (Parija , 2004). *Giardias* is the most common pathogenic protozoan disease can spread from person to person by fecal oral routs . Water is the most common vehicle for the transmission of cysts. The most infection are result of drinking untreated water. Human are the main reservoir of the parasite but a variety of animals carry *Giardia lamblia and Giardia duodenalis* similar to those infecting humans (Harrison ;2002).

2.4. Diagnosis of Giardiasis

Diagnosis of *giardiasis* has been based on detection of cysts of trophozoites in stool samples or of trophozoites in the small intestine. New it has also become probable to culture trophozoites from duodenal Fluid (Gordts etal . ,1984) . The use of concentration methods and trichrome staining may not be adequate to identify *Giardia* for the reason that unpredictability in the concentration of organisms in the stool can make this infection not easy to diagnose .Therefore, stool immunoassays that are more sensitive and exact should be used (Johnston, 2003).In current years , direct fluorescent antibody assay and antigen detection through using enzyme –linked immunosorbent assay (ELISA) have been reported as cost effective alternative diagnostic methods (Verweij etal, 2003). Though, PCR- based methods have also demonstrated brilliant specificity and sensitivity compared with microscopy additnally with antigen detection (Ghosh etal,2000; verweij etal,2003). *Giardia* specific antigen in stool samples are detected through numerous different methods, EIA, indirect and direct immune fluorescent assays using monoclonal antibodies and direct florescent assays . The host immune. System emerges to play main role both in controlling infection and the development of protective immunity . Individuals with impaired immune function appear to have increased susceptibibility to *giardia* infection (Ament etala, 1975).

2.5 Life cycle

Giardia lamblia reproduces by binary fission. This is a type of reproduction in which one cell divides into two new cells by mitosis during the growth cycle, the components of the cell multiply so that each daughter cell is a complete copy of the parent cell. This parasite

has a simple direct life cycle consisting of on infective cyst and a vegetative trophozoite. The cyst of *Giardia lamblia* is elliptically shaped and contains two to four nuclei (Heresi and Cleary, 1997). The round or oval shaped cysts, which are the infective form of the protozoa, are approximately 11-14 μm long and 7-10 μm wide (Garcia, 1999). After ingestion the cysts pass unharmed by gastric acid through the stomach to the small intestine. Excystation normally occurs in the duodenum. Infection with *Giardia* is usually confined to the upper small intestine but also has been observed in the bile duct and gall bladder of ill patients (Neva and Brown, 1994). Generally the life cycle of G.lamblia has been shown as follow:

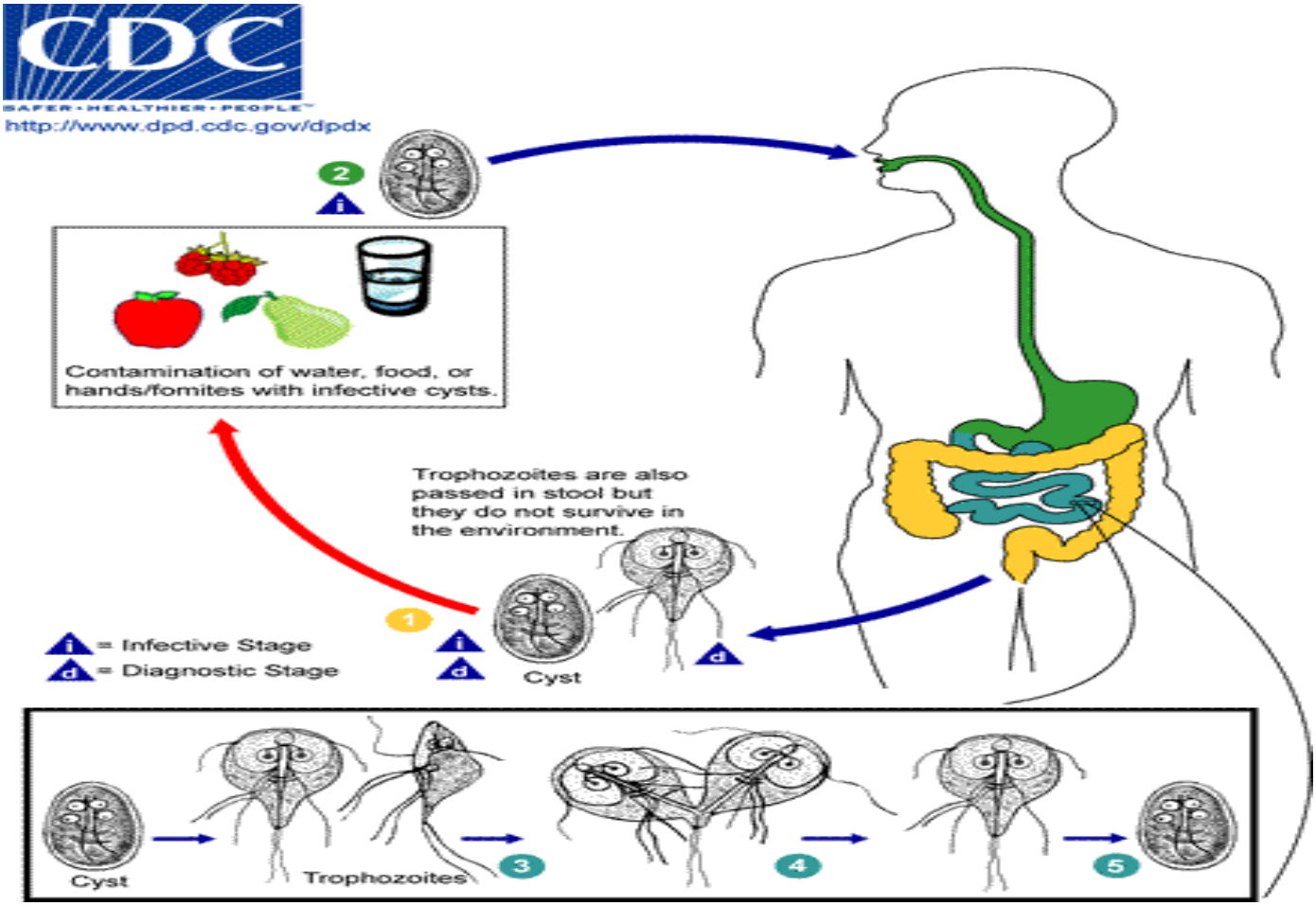

Fig. 1 life cycle of Giardia Lambia

Symptoms associated with *giardiasis* range from asymptomatic to acute gastrointestinal manifestations. Generally, the symptoms are more severe the first time a person experiences *giardiasis* and children are at the greatest risk for contracting clinical *giardiasis* (Buret *et al.*, 2002). In the majority of untreated patients the infection resolves spontaneously, but it can become chronic and last for several months or even years in rare cases. The acute symptoms are a sudden explosive, watery, foul-smelling diarrhea the stools are generally describes as loose, bulky, frothy, and greasy with no blood or mucous. This is sometimes accompanied by nausea, colicky epigastric pain, vomiting, and prolonged belching (Wit Mas *et al.,* 2001).

2.6 Treatments

Currently there are different groups of drugs available to treat giardiasis in stools. Based on different age group, endemicity of the parasite, pregnancy etc, the use of antimicrobial therapy varies (Gardner and Hill, 2001). In developed countries, unlike the developing counties, all patients who have *G lamblia* in stools should be treated (Gardner and Hill, 2001). The most commonly used anti *Giardia* drugs include metronidazole, Furazolidone and Paromomycin. Metronidazole is the most common drug used for the treatment of giardiasis worldwide. Unlike other drugs, it is quickly and completely absorbed and penetrates body tissues and secretions such as saliva, breast milk, semen, and vaginal secretions (Gardner and Hill, 2001). Of the common anti-*Giardia* therapeutics, Furazolidone is the only one available in a liquid suspension and is an important therapeutic agent worldwide and it has been widely used in pediatric populations .Paromomycin has been proposed as a treatment for *G.lamblia* in resistant infections and during pregnancy (Bailley and Erramuqspe, 2004).

2.7 Prevention and control Method

As in most diarrhoea-causing agents, disease outbreaks can also be prevented by**:** testing of purified and unpurified water to check for the presence of cysts of the parasites, boiling water intended for consumption, thoroughly washing hands before handling food, maintaining good personal cleanliness, properly disposing of fecal material and

information dissemination through print media to educate the public regarding the dangers of giardiasis (Backer, 2000).

Control measures to prevent or reduce *Giardia* infection will depend on the specific circumstances of the transmission. In general it involves measures that prevent the ingestion of substances contaminated with fecal material (Gray *et al*, 1994). Health promotion and education aimed at improving personal hygiene and emphasizing hand washing, sanitation and food handling are effective control activities for the reduction of person-to-person transmission. Special attention to personal hygiene in high-risk situations such as day-care centers and other institutions is needed (Gray *et al.*, 1994).

CHAPTER THREE

3. METHODOLOGY

3.1 Description of Study area

The Study was conducted in Jimma town among Jimma University Student clinic. Jimma Zone which is located 220 miles (353km) south west of Addis Ababa, the capital of Ethiopia. The town geographical coordinates approximately 7^{o}41' N latitude and 36^{o} 50' E longitude. The town is found in area of average altitude about 1780m above sea level. It lies in the climatic zone locally known as woyan daga which is considered ideal for agriculture as well as human settlement. The town is generally characterized by worm climate with a mean annual maximum temperature of 30^{o}c and a mean annual minimum temperature of 14^{o}c. The annual rain fall ranges from 1138mm to 1690mm (Alemu et al., 2011).

The total number student of Jimma University in 2003 E.C were 16,265 in which male is 13,720 and female is 2,545 , in 2004 E.C the total population were 18,161 in which male I 15, 625 and female is 2,536 ,2005 E.C is male 15,466 and female is 3,364 total 18 ,830

3.2 Study design and period

Cross sectional study on compiled documents for past three years (2011-2013) was conducted to assess the prevalence of *Giardia lamblia* infection in Jimma University student clinic found in main campus from March 2014 to April 2014.

3.3 Source of Data

The data was found out from patient cards in Jimma university student clinic those registered between 2011-2013 years and those patients was used as study population.

3.4 Data Collection

The data was collected from patient cards in Jimma University student clinic registered in past three years (2011-2013).

3.5 Data Analysis

Data was analyzed and presented in the form of percentage through tables and bargraph.

3.6 Ethical Consideration

Before preceding the study, ethical clearance was obtained from Jimma University, college of natural sciences, Biology department for the current study.

CHAPTER FOUR

4. RESULT AND DISCUSSION

4.1 RESULT

Prevalence and severity of *Giardia lamblia* among 847 patients,723 (85.36%) were males and 124 (14.64%) were females according to this result males were more more affected than females (Table1)

Table 1 .The sex group of infected people from 2011- 2013 year

Year	Male N(%)	Female N(%)	Both sex (N%)
2011	2621(30.93)	37(4.36)	299 (35.3)
2012	162(19.13)	25(2.95)	187 (22)
2013	299(35.30)	62(7.31)	361 (42.62)
Total	723(85.36)	124 (14.64)	847 (100)

As shown in table 2, the prevalence of *Giardia lamblia* was high in the age group between (70.1 %) and followed by the age groups between followed by the age groups between (15-35%).

On the other hand ,*Giardia lamblia* has been again identified in the other age groups in low percent (2.15%)and (3.06%).

Age group	Year			
	2011 (N(%)	2012 (N%(%)	2013 N(%)	Total%
17-19	42 (0.025)	26(0.14)	62(0.33)	130(15.35)
20-22	212(1.3)	133(0.73)	248(1.32)	593(70.01)
23-25	30(1.18)	20(0.11)	30(0.16)	80(9.45)
26-28	9(0.055)	6(0.33)	11(1.06)	26(3.06)
29-31	6(0.05)	20.01)	10(0.05)	18(2.15)
All age group	299(1.84)	187(1.32)	361(2)	897(100)

DISCUSSION

Giardia lamblia/intestinalis (also known as *Giardia duodenalis or G. intestinalis)* is a unicellular flagellated intestinal protozoan parasite of humans isolated worldwide and ranked among the top 10 parasites of man (Wolfe, 1992) which affects both sex and age without discrimination. In this study the prevalence of Giardia from 2011 -21013 G.C was 1.84%, 1.32 %, 2% and (2%) respectively. In all years From 20-22 age of students were high level of positve with giardia lambla because large number of students were included in this age but 29-31 and 26-28 age of students were in small number .This finding nearly related with (Toson etal, 1993) Which states that *Giardia lamblia* also reported from adults those whose immunity is was suppressed in HIV infection or any other cases . A study conducted to evaluate the prevalence of *Giardia lamblia* in 60 infected patients with a man age of 35 years range 19 to 52 by (Tonon etal ; 1993) indicates similar finding .In age specific groups the age between 20-22 were more affected by *Giardia lamblia* . Because in Jimma University all most all of students have the age between 20-22. So only these students were helped by clinicians.

This current finding shows that the percentage of males found infected with the Giardia parasites were about 83.36 % which was greater than the percent of females infected with this parasites (14.64%). This finding was nearly in agreement to other study conducted in Libya by (Kassem etal ; 2007) This difference could be explained by the fact that the number of males in Jimma University were greater than female as documented data for registrar of the University shows .Moreover the current observation of Giardia lambilia might shows that there could be poor personal hygiene practice and lack of clean water access among students.

Generaly Giardia is the most protozoan intestinal parasites which is higher in developing country where access to clean water and basic sanitation is lacking .

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

From this study it could be concluded that Guardia affects individual of both sex and ages. Giardia is disease that cause by contaminated water and food .The rout of transmission was thro contaminated water and food. The rout of transmission was through fecal oral. The clinical infection of this disease was acute infection and chronic infection .The disease was diagnosed was diagnosed by finding trophozoite or cyst under microscope 'The disease threated and control by using drugs student most affect Giardia from 20.2age

.Because the age of the student was mostly in this age. Male student was more positive than female. So the female was less in number compare to male .Giargia different distribution in different years.

Generally from age and sex distribution of the prevalence of Giargia individuals around the age of 20-22 year are most susceptible to the diseases, but male are more positive than female. Females are not diagnosis to the clinic because females are affected by cultural, natural shy and fear. So they do not check to the clinic but male is not affected by these Factors.

5.2 Recommendation

The student should prevent infection of Giargia lamblia by

1) A voiding consuming of uncooked food.
2) Wash hand with water and soup before eating the food
3) Boiling the water before drinking
4) Proper waste disposal and use toilet
5) Treating the drinking water by using chlorine
6) Avoiding homo sexualism
7) Keeping environment hygiene to reduce the rate of transmission of diseases.
8) Keeping personal hygiene to reduce the of transmission of the diseases.

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