



WOLKITE UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCE

DEPARTEMENT OF MEDICAL LABORATORY SCIENCE.

PREVALENCE AND ASSOCIATED RISK FACTORS OF *GIARDIA LAMBLIA* AMONG PATIENTS ATTENDING AT WOLKITE UNIVERSITY SPECIALIZED HOSPITAL, SOUTH CENTRAL ETHIOPIA.

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WOLKITE, ETHIOPIA, 2021

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Abstract

Background : Giardiasis is one of the intestinal protozoan disease that cause public health problems in most developing countries as well as some developed countries. due to using contaminated water for drinking and lack of awareness of simple health promotion practices such as washing fruit before eating and hand washing after latrine usage, poor environmental sanitation, improper garbage disposal, unsafe water supply. it causes diarrhea, abdominal cramps, greasy stools, flatulence, epigastria, and steatorrhea.

Objective: the aim of this study was to assess the prevalence and associated risk factors of G.lamblia among patients attended at wolkite university specialized hospital. gurage zone, south central Ethiopia from May to-July , 2021

Method: A cross sectional study was conducted. to assess the prevalence of Giardiasis and associated risk factors among patients attended at wolkite university specialized hospital, gurage zone, south central Ethiopia. A total of 270 patients were used. By using standard statistical calculation with estimated prevalence of 19.95% (36). by 95% confidence level. A structured questionnaire was used to obtain information regarding the associated risk factors. Data were analyzed using SPSS version 20 and p value <0.05 was taken as statistically significant.

Result: The prevalence of G.lamblia infection among all age group in this study was 9.3%. Out of the 270 total study subjects 161(59.6%) were females. Among total positives 10(6.2%) were female and 15(13.8%) were males. Among the total study populations of 270 attendants, the highest prevalence of G.lamblia was observed whose residence was in rural and among farmers which is about 11 (13.8%).

Conclusion: G.lamblia is a flagellate protozoan referred to as G.intestinalis and has been recognized as the most common intestinal pathogen worldwide. It is considered among the most common human intestinal protozoa, especially in the tropics including our country. This is also true as observed in this study. In this study the overall prevalence of G.lamblia is 9.3%.

RECOMMENDATION

To reduce the problem of Giardia infection, health education in the community is needed and Further studies should be conducted to fully understanding the epidemiology of parasite using the appropriate longer period of study time is recommended.

Key words:-Prevalence, giardiasis , Giardia lamblia.

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ABBREVIATION AND ACRONYMS

IBS= IRRITABLE BOWEL SYNDROME

IP= INTESTINAL PARASITE

SOP= STANDARD OPERATING PROCEDURE

WHO=WORLD HEALTH ORGANIZATION

WKU=WOLKITE UNIVERSITY

WKUSH=WOLKITE UNIVERSITY SPECILISED HOSPITAL

SNNP = SOUTHERN NATIONS AND NATIONALITIES PEOPLE

CHAPTER ONE

INTRODUCTION

1.1. Back ground information

Giardia lamblia is a flagellate protozoan referred to as *G. intestinalis* and has been recognized as the most common intestinal pathogen worldwide. *Giardia* is a genus of parasitic protozoan that infects the small and large intestines of a broad range of vertebrate hosts. *G.lamblia* infection follows the ingestion of environmental hard cysts in food or water contaminated with feces and also anal oral route. Ingestion of as few as 10 cysts is sufficient to cause infection in humans. Because the mature cysts are infectious when excreted there after person to-person transmission occur and the parasite can disseminate widely and quickly in the population (7)

There are two stages in the life cycle of *Giardia lamblia* .These are cyst and trophozoite forms. The cyst is relatively inert, allowing prolonged survival in a variety of environmental conditions. After exposure to the acidic environment of the stomach, cysts excyst into trophozoites in the proximal small intestine. Trophozoites have nuclei and a well-developed cytoskeleton but lack mitochondria, paroxysms, and the components of oxidative phosphorylation. They have an endomembrane system with at least some characteristics of the Golgi complex and endoplasmic reticulum, which becomes more extensive in encysting organisms. The trophozoite is the vegetative form and replicates in the small intestine (6).

Giardiasis is said to be the most commonly reported human intestinal parasitic infection being responsible for more than 400 hospital admission and 100, 000 to one million infection per year in the united – state alone (3,4). The role of *G. lamblia* on the etiology of chronic and persistent diarrhea is also recognized. Persistence diarrhea and consequent malabsorption seriously affects nutritional status and growth (5).

1.2 STATEMENT OF THE PROBLEM.

G. lamblia is the most common protozoan parasite of the human throughout worldwide with rates of detection between 2-5% in developed nation and 20-30% in developing nation (8). The world health organization reported that 200 million people in Asia, Africa and Latin America have symptom of Giardiasis with some 500,000 new case a year especially among children (9). *G. lamblia* is the most common protozoan intestinal parasite isolated worldwide as causative agents of diarrhea. Epidemiological studies suggest that the parasite is responsible for about 5% of acute diarrhea and 20% of chronic diarrhea illness in the world (15).

The infection may produce severe acute diarrhea in children less than five years of age with chronic infections resulting in weight loss and growth retardation (13). In developed countries such as Western Europe and United States *Giardia* infection is also associated with ingestion of contaminated water and recreational swimming (14). Most of prevalence rate of African countries reports are from under-five years and school children. This indicates that children are most susceptible to *Giardia* infections because of immunological status of children as well as lack of knowledge of simple personal hygiene procedure. Giardiasis is widely distributed in Ethiopia largely due to the low level of environmental and personal hygiene, contamination of food and drinking water that results from improper disposal of human excreta. In addition, lack of simple health promotion practices is also a contributing factor (34).

Humans are the principal reservoir of infection, but *G. lamblia* can infect dogs, cats, beavers and other animals. These animals can contaminate water with feces containing cysts that are infectious for humans. The transmission of *Giardia* to human is depending up on the ingestion of cysts excreted in the feces of infected person or animals. The principal mode of transmission to humans appears to be person to person. And also indirect transmission from contaminated water and food originating from humans and animals has been described. Intestinal parasitic infections have a worldwide distribution with high prevalence found in people with low socio-economic status and poor living conditions as well as people in over-crowded areas with poor environmental sanitation, improper garbage disposal, unsafe water supply and unhygienic personal habits. These factors are the causes of a major proportion of the burden of disease and death in developing countries. Giardiasis is one of the intestinal protozoa that cause public health problems in most developing countries as well as some developed countries (11)

The gastrointestinal manifestations include diarrhea, abdominal cramps, greasy stools, flatulence, epigastria, tenderness and steatorrhea accompanied by full-blown malabsorption syndrome. However, infection that is not associated with such overt symptoms occurs frequently, especially in resource-poor countries. These infections may often go unnoticed but epidemiological observations suggest that they are still associated with a malabsorption phenotype (12).

Giardiasis was most prevalent in children who drank municipal water. *Giardia* survives in chlorinated water. To protect against transmission all drinking water should receive chemical pre-treatment, preferably with sedimentation, and filtration in addition to disinfection. Municipal water should supply water with a concentration of less than 0.7–70 cysts per 100 liters. Untreated surface water is a recognized vehicle of *Giardia lamblia* transmission since concentrations of chlorine used in drinking water treatment do not kill *Giardia* cysts municipal water or inadequately treated sewage has been linked to outbreaks of giardiasis. Well water could also be a source for *Giardia lamblia* (13). After incubation period of 2-3 weeks symptoms including watery, foul-smelling, diarrhea, abdominal cramps, flatulence, anorexia and nausea may develop. In severe cases malabsorption syndrome steatorrhea and weight loss may occur (10).

Farmers in Ethiopia are engaged in mixed agricultural practice and use cow manure as a fertilizer and dried dung as fuel. In such localities where people have close contact with animals and their manure, the possibility of infection with pathogenic *Giardia duodenalis* is high (17).

When coming to Jimma town, according to research done on the prevalence of *Giardia lamblia* among all age groups patients of Jimma Health center 2002, it was reported 11.4% rate of *Giardia lamblia* (18). Low socio economic status, low level of public health facilities, poor personal and environmental hygiene in the zone may be the possible reason to elevate the prevalence.

Treatment of giardiasis relies on derivatives 5-nitro-imidazoles such as the metronidazole, marketed since 1959. To date, some resistant cases of *G. lamblia* to these products have been reported. Unfortunately, no new drug is under development for specific treatment of intestinal protozoa. In order to reduce or delay development of resistance, certain authors recommend avoidance of mass treatments in favor of targeted treatments and greater effort put into prevention. Collection of epidemiological data is necessary to develop effective strategies against these parasites (10).

Designing a study in WKUSH is essential to assess the problem and take measures of the Prevention like keeping personal, environmental sanitations, educating the communities.

Secondly, the result will help the communities to aware and solve their problems by themselves or in collaboration with the concerned bodies.

This study will give important information for further studies on the prevalence of Giardia lamblia.

1.3 Significance of the study.

Giardiasis is a major health problem and major contributing factor for morbidity and mortality throughout the world. It is considered as one of the main health problem in developing as well as in developed countries.

Therefore this study were gave important information on the prevalence of Giardia infection in this area. It will serving as a base line data for future studies. It also will give clues for the means of prevention by knowing the possible source of infection.

Furthermore, it will also provide baseline data for governmental and non-governmental organization that have interest to the community problems as well as finding out the possible solutions for the problem.

The study also provides a worthy assistance to the concerned body, especially for the Gurage zone health bureau and WKUSH to outlay and know the burden of giardiasis in the area and help health service managers to give attention to the problems.

CHAPTER – TWO

2. LITERATURE REVIEW

The infection of *Giardia lamblia* is a worldwide health problem. The world health organization reported that 200 million people in Asia, Africa and Latin America have symptom of Giardiasis with some 500,000 new cases a year especially among children (9). The infections may produce severe acute diarrhea in children less than five years of age with chronic infections resulting in weight loss and growth retardation (19, 21). In United States 1997 study of Giardiasis in Colorado suggested that two-thirds of investigated cases were attributable to drinking untreated water in mountains (2). The studies in the rural areas of Northern India showed that the prevalence of Giardiasis was 35% on examination of single stool samples and up to 75% if multiple samples were examined over period of time (21).

In Pakistan total of 300 samples were examined by PCR and the prevalence of *Giardia lamblia* has been reported 27.3% in all age groups (35)

A case control study conducted in Cuba showed that from 351 hospitalized children (94 cases, 257 controls, 210 boys and 141 girls) aged 0–14 years were enrolled and three faecal samples were collected from each of them. In the univariate analysis children aged 5 years appeared at greater risk of *Giardia* infection than the younger children but gender had no marked effect on risk.

The children who lived in a rural area appeared to be at a 3.1-fold greater risk of *Giardia* infection than their urban counterparts. Similarly, children from households that did not receive water from an aqueduct were also at relatively high risk of *Giardia* infection, as were those who drank unboiled tap water, those who bit their nails, and those who ate unwashed vegetables raw. Compared with other children, those who already had a personal history of parasitic infection had a 23% increased likelihood of having a current *Giardia* infection, and those who had a family history of parasitic infection had a 96% increased likelihood of current *Giardia* infection (22).

A prospective study of the prevalence of *Giardia* in stool specimens of children living in temporary houses in Armenia was carried out. From this study prevalence of *Giardia* cysts was 60.4% and *Giardia* trophozoite forms 4.6% in children living in post-earthquake camps from Armenia (Colombia) (23).

A research done in 2003 in Turkey from children showed that 192 (11.1%) out of 1730 children are infected by *G. Intestinalis* (24). In Malaysia a study on Three hundred and sixty-eight children (178 males; 190 females) aged 2–15 years was done. The overall prevalence of mild and significant underweight was 32.1% and 56.5%, respectively and the prevalence of mild stunting was 25.6%, while another 61.3% had significant stunting (25).

A study done on rural community of Thailand primary school showed that *Giardia duodenalis* was the second most common to with a prevalence of 6.2 % (26). A research done on patients with irritable bowel syndrome and dyspepsia to examine for the prevalence of *Giardia lamblia* in Italy. Out of 137 patients with irritable bowel syndrome 6.5 % (9) were positive for *Giardia lamblia* (27).

When consider African situation varying prevalence rate were reported from different localities of the continent. A study that was conducted in southern Sudan to determine the prevalence of intestinal parasite among school children by using formol ether concentration technique relieved that *Giardia lamblia* infection rate was 9% (28) and 21% of prevalence rate was also reported among fewer than five Sudanese children (29).

A research done in Ismailia province of Egypt from 191 herds and 165 diarrheal children showed that the prevalence of *G. duodenalis* was 53% in ruminants and 21% in symptomatic children below the age of 10 years and infection was not positively correlated with diarrheal symptoms (12). Parasitological survey in Ethiopia did not directly focused on this parasitic infection. It is reported in relating with other parasitic infection. As like other African countries most of the infection rate in Ethiopia was also reported from school and under five children (30).

According to a study which was conducted for parasitological investigation in Addis Ababa and Debreziet school children infection rate with Giardia in both cities were similar 9% since children were selected from low socio economic group there were a chance of acquiring on elevated results similar reports from two communities of under- five children showed that 12% prevalence rate from Jiga town (west Gojam) and 8% in methahara (31).

Recently in Ethiopia a total of 858 study participants were selected for investigation of prevalence of intestinal parasitic infection among patients high land and low land dwellers in Gamo Gofa area, south Ethiopia, the prevalence of Giardia lamblia has been reported 10.6% (32).

A cross sectional study was done on the overall prevalence of intestinal parasites at Teda health center northwest Ethiopia. This study showed that the overall prevalence of intestinal parasitic infection was 62.3%.out of 62.3% of intestinal parasites Giardia intestinalis was 12.4 %(33).

Unlike the other reports from different parts of the country relative low prevalence rate was recorded here in Jimma town in 1994. A cross sectional study conducted from student of Jiren elementary and junior secondary school 3.7% of prevalence was found (34).

A study conducted on prevalence of intestinal parasite and related risk factors among students of Asendabo elementary and junior secondary school south west Ethiopia showed that 1.3% and 16.3% of Giardia lamblia was observed respectively (16).

According to research done on the prevalence of Giardia lamblia among all age group at Jimma Health center 2002, the prevalence of Giardia lamblia has been reported 11.4%(18).

According to a research done on Prevalence of intestinal parasitic infections and associated risk factors from April to June 2017 among Jawi primary school children, Jawi town, northwest Ethiopia .Prevalence of Giardia lamblia was the highest (19.95%) (40).

According to a research done on Prevalence and factors associated with intestinal parasites among under-five children attending Woreta Health Center, Northwest Ethiopia from April–May, 2017. The prevalence of G.lamblia was 31(53.5%) (38).

CHAPTER THREE

OBJECTIVES

3.1 General objective

To assess the prevalence and associated risk factors of G.lamblia among patients attending at wolkite university specialized hospital during the study period.

3.2. Specific objectives

- To determine the prevalence of G.lamblia.
- To determine the socio-demographic features of study groups
- To determine the possible risk factors associated with prevalence of G.lamblia.

Chapter Four: Methods and materials

4.1 Study area

The study was conducted among patients who was attending at wolkite University specialized Hospital. The study site was wolkite University Specialized Hospital, located in gubra sub-city, Wolkite town, Gurage zone, southern nation nationalities and people (SNNP) region, which is around 150 km south central of Addis Ababa. The total population of gubre sub-city is estimated to be 8,000 as it is projected from 2009 Ethiopian population census

4.2 Study design

A cross- sectional study was conducted to assess the prevalence and associated risk of G.lambia among patients who was attending at WKUSH by using direct microscopy

4.3 Study period

The study was conducted from May to July .2021.

4.4.1. Source population

All patients who was attended at wolkite University specialized hospital during the study period

4.4.2 Study Population

Selected patients requested for stool examination during the study period.

4.5. Sampling technique

All of the patients who submit a stool sample for stool wet-mount test during the study period was included in the study by using consecutive sampling technique.

4.6. Sample size determination.

Single population proportion formula was used .by taking prevalence of giardia as 19.95 % from previous study which was done in Jawi primary school children, Jawi town, north-west Ethiopia (40). With margin of error 0.05 and level of confidence 95%. Therefore the minimum sample size was calculated as follows:

$$p = 19.95 \%, d = 5\%, q = 1 - p$$

$$N_i = \frac{(Z_{\alpha/2})^2 P (q)}{d^2}$$

Where, n=sample size required for the study

p= the estimated prevalence from previous studies.

$z_{\alpha/2}$ = z value at($\alpha=0.05$)=1.96 corresponding to 95% confident level

d=the margin of error= 0.05

$$n = \frac{(1.96)^2 0.1995(1 - 0.1995)}{(0.05)^2}$$

$$n = \frac{(3.8416) (0.159699)}{0.0025}$$

$$n = 245.$$

To minimize errors arising from the likelihood of noncompliance, 10% of the initial sample size is added to the sample for non-response as follows

$$245 \times 10\% = 25$$

$$\text{Then } 245 + 25 = 270$$

Therefore, the final calculated sample size is 270.

4.7. Study variables

4.7.1. Dependent variables

Presence of G.lambia infection

4.7.2. Independents variables

Sex

Age

Educational status

Occupational status

Presence of latrine

Habit of latrine usage

Habit of hand washing after latrine usage

Habit of hand washing before and after eating

Habit of fruit washing before eating

Presence of waste disposal pit

Residence

Habit of finger nails trimming status

Water source

4.9 Inclusion and exclusion criteria

4.9.1 Inclusion criteria

All patients who was attend WKUSH of all ages and all sexes during the study period.

4.9.2 Exclusion criteria

Patients who was taking drug within the one week of the study period like thindazole, metronidazole and albinazole drugs.

4.10. Materials and Reagents.

Equipment

Electric microscope

Reagents

Normal saline (0.85%w/v Nacl)

Materials

Slide	microscopic slide
Gauze	microscope
Cover slip	marker
Applicator stick	Glove
stool cups	

4.11. Laboratory procedure

A fresh stool Specimen was collected and a wet-mount using saline was prepared according to standard operating procedure protocol. And slides was labeled and as soon as possible examined microscopically immediately.

4.12.Data collection, processing and analysis

Data was collected during the study period using structured format .and the collected data was tallied and grouped to different variables from questionnaires manually. And the association between the prevalence of Giardia and different variables was determined by using chi-square and the result were presented using appropriate tables. Finally, comparison, conclusion, discussion and recommendation was drawn based on the finding of the study

Data were analyzed using SPSS version 20 software. Summary findings was presented by tables, graphs and figures. Descriptive statistics were employed to determine the demographic characteristics and the prevalence. The association between dependent variable and independent variables were tested in bivariate analyses (Chi-square or the Fisher exact test, as appropriate) separately. Finally a p- value < 0.05 was used as cut off point for presence of statistical significance.

4.13. QUALITY ASSURANCE

A quality assurance of pre-analytical, analytical and post-analytical phase of a parasitology investigation was applied.

4.13.1 Pre analytical phase

Pre analytical stage of quality assurance in G.lambia laboratory diagnosis include: appropriate identification individual, selection of appropriate parasitological tests, collection, and processing of stool specimens, appropriate labeling of sample container during sample collection. prior to data collection we had check quality of questionnaire by our advisors.

4.13.2 Analytical phase

This is a stage, which the actual laboratory diagnosis of G.lambia are done. There are several activities was done during this stage includes: preparation and following of clear and precise Standard Operating procedure technique. adjustment of the microscopes appropriate manner, doing of wet- mount. microscopic examination, monitoring and confirmation of results with laboratory professionals.

4.13.3 Post analytical phase

This stage, which documentation and reporting of results was takes place. Activities done in this stage includes: interpretation of laboratory result, and records were kept correctly. The data was kept for rechecking.

OPERATIONAL DEFINITION

Endemic: A disease that occur in extensive out break or unusually high incidence at certain time and place.

Outbreak: The occurrence of two or more cases those are epidemiological related.

Giardiasis: is a parasitic disease caused by the flagellate protozoan Giardia Lamblia.

Feces: waste matter remaining after food has been digested, discharged from the bowels; excrement.

Cyst: a stage in the life cycle of certain parasite, during which they are enveloped in a protective wall.

Trophozoite: stage in the life cycle of Giardia which develops from cyst.

Specimen: a sample of a substance or material for examination or study.

4.14. Ethical consideration

Before data collection, written supportive letter was obtained from department of Medical Laboratory Science. Following the endorsement by the department of Medical Laboratory science, the selected hospital was informed about the objective of the study through a support letter from Department of Medical Laboratory Science, and written permission was obtained from the hospital .and also a written consent was taken from individual participant. As the study will be conducted through questionnaire and clinical samples obtained from the individual participant will not be subjected to any harm as far as the confidentiality is kept. To preserve the confidentiality no personal identifiers was used on data collection form. The collected data was never be accessed by a third person except the principal investigator, and was kept with a firm confidentiality in much secured place

4.15 Dissemination plan

The research result was submitted to wolkite university, college of Medicine and Health Science, Department of medical laboratory sciences. To evaluate the research and the information also was informed to the wolkite university specialized hospital.

CHAPTER FIVE

5.1 RESULT

The prevalence of Giardia lamblia infection among all age group in this study was 9.3%. Out of the 270 total study subjects 161(59.6%) were females and 109(40.4%) were males. Among total positives 15(13.8%) were males and 10(6.2%) were females. Among the total study populations of 270 attendants, the highest prevalence of Giardia lamblia was observed among farmers, which is about 11 (13.8%).

Table 1: Prevalence of Giardia lamblia infection in relation to age group and sex group at wolkite University specialized hospital, 2021

Age	Positive		Negative		Total	%	Association
	NO	%	NO	%	NO	%	$X^2=12.93$ $p= 0.024$
7-17	8	20	32	80	40	14.8	
18-28	4	5.9	64	94.1	68	25.2	
29-39	8	16	42	84	50	18.5	
40-50	3	5.1	56	94.9	59	21.9	
51-61	2	6.7	28	93.3	30	11.1	
>61	0	0	23	100	23	8.5	
Total	25	9.3	245	90.7	270	100	
Sex	Positive		Negative		Total		$X^2=4.41$ $p = 0.052$
	NO	%	NO	%	NO	%	
Male	15	13.8	94	86.2	109	40.37	
Female	10	6.2	151	93.8	161	59.63	
Total	25	9.3	245	90.74	270	100	

As shown in the table the prevalence of *G. lamblia* is highest among the ages groups 7-17.which are most most of are childrens and 29-39.which are adults and most are farmers.This might be due to problem of personal hygiene.and have soil contact in farming activities.

The prevalence of *Giardia* has statistically significance association with age $p=0.024$

Among the total study population of 270 patents about 15 (13.8%) males and 10(6.2%) females are positive for giardia lamblia. This shows that the highest prevalence of *Giardia lamblia* was observed among males.

The prevalence of *Giardia lamblia* has not statistically significance association with sex group that is $P=0.052$

Table2. prevalence of Giardia lamblia infection by occupational status at wolkite University specialized Hospital, 2021

Occupational status	Giardia positive		Giardia negative		Total		$\chi^2=13.72$ $p = 0.003$
	NO	%	NO	%	NO	%	
Gov't employee	1	1.2	81	98.8	82	30.4	
Student	7	16.7	35	83.3	42	15.6	
Merchant	4	6.9	54	93.1	58	21.5	
Farmer	11	13.8	69	86.2	80	29.6	
Other	2	25	6	75	8	2.9	
Total	25	9.3	245	90.7	270	100	

Among the total study populations of 270 attendants the highest prevalence of Giardia lamblia was observed among a farmer which is about 11 (13.8%). Occupation has significant association with the prevalence of giardia lamblia, since p-value is less than 0.05 which is 0.003 and $\chi^2=13.72$

Table3. Prevalence of Giardia lamblia infection in relation educational status at wolkite University specialized hospital, 2021

Educational status	Positive		Negative		Total		Association
	NO	%	NO	%	NO	%	
Illiterate	5	7.9	58	92.1	63	23.3	X ² =22.57 p <0.001
1-4	10	19.2	42	80.8	52	19.3	
5-10	8	22.9	27	77.1	35	12.9	
11-12	1	5.3	18	94.7	19	7.1	
>12	1	1	100	99	101	37.4	
Total	25	9.3	245	90.4	270	100	

The highest prevalence of Giardia lamblia was observed among lower grades (1-4) which is about 10(19.2%). The prevalence of Giardia has statistically significance association with educational status p=<0.001

Table4. Prevalence of Giardia lamblia infection by residential area and habit of hand washing before eating food at wolkite University specialized Hospital, 2021.

Residential Area	Positive		Negative		Total		Association
	NO	%	NO	%	NO	%	
Urban	5	3.5	138	96.5	143	53	X ² =12.02 p-value=0.001
Rural	20	15.7	107	84.3	127	47	
Total	25	9.3	245	90.4	270	100	
hand washing before and after eating food	Positive		Negative		Total		X ² =6.68 p= 0.011
	(NO)	%	NO	%	NO	%	
Always	7	4.9	135	95.1	142	52.6	
Sometimes	18	14.1	110	85.9	128	47.4	
Total	25	9.3	245	90.4	270	100	

The highest prevalence of Giardia lamblia was observed among residential area is rural. which is 20(15.7) and among those who do not always wash hands before and after eating. The prevalence of Giardia lamblia has statistically significance association with residential area habit of hand washing before and after eating with p values 0.001 and 0.011 respectively.

Table 5 .prevalence of Giardia lamblia infection by habit of latrine usage and finger trimming status at wolkite University specialized Hospital, 2021.

Habit of Latrine usage	Positive		Negative		Total		Association
	NO	%	NO	%	NO	%	X²=10.33 P=0.005
Always	6	4.1	139	95.9	145	53.7	
Sometime	11	13.8	69	86.2	80	29.6	
Not usage	8	17.8	37	82.2	45	16.7	
Total	25	9.3	245	90.4	270	100	
Finger nail status	Positive		Negative		Total		X²=6.89 p=0.011
	NO	%	NO	%	NO	%	
Always trimmed	7	4.9	136	95.1	143		
Sometimes trimmed	18	14.2	109	85.8	127		
Total	25	9.3	245	90.4	270	100	

The highest prevalence of Giardia lamblia was observed among those who use sometimes and have not habit of latrine usage that is about 11 (13.8%) and 8(17.8) respectively. The prevalence of Giardia lamblia has statistically significance association with latrine usage p=0.005

The highest prevalence of Giardia lamblia was observed among patients which have not habit of finger nail trimming that is 18(14.2%).

The prevalence of Giardia has statistically significance association with finger nail status p=0.011

Table6. prevalence of Giardia lamblia infection in relation to presence of latrine and habit of washing hands after latrine usage at wolkite University specialized hospital, 2021.

Presence of latrine	Positive	%	Negative	%	Total	%	Association
Yes	6	4.1	139	95.9	145	53.7	X²=9.77 P=0.003
No	19	15.2	106	84.8	125	46.3	
total	25	9.3	245	90.4	270	100	
Habit of washing hands after latrine use	Positive		Negative		Total		X²=6.278 P=0.019
	NO	%	NO	%	NO	%	
Always	7	5	133	95	140	51.9	
Sometimes	18	13.8	112	86.2	130	48.1	
Total	25	9.3	145	90.4	270	100	

The highest prevalence of Giardia lamblia was observed among those who have not latrine. The prevalence of Giardia lamblia has statistically significance association with presence of latrine p=0.003

The highest prevalence of Giardia lamblia was observed among patients who have not habit of washing hands after latrine usage. The prevalence of giardia has significance association with habit of washing hand after latrine p=0.019

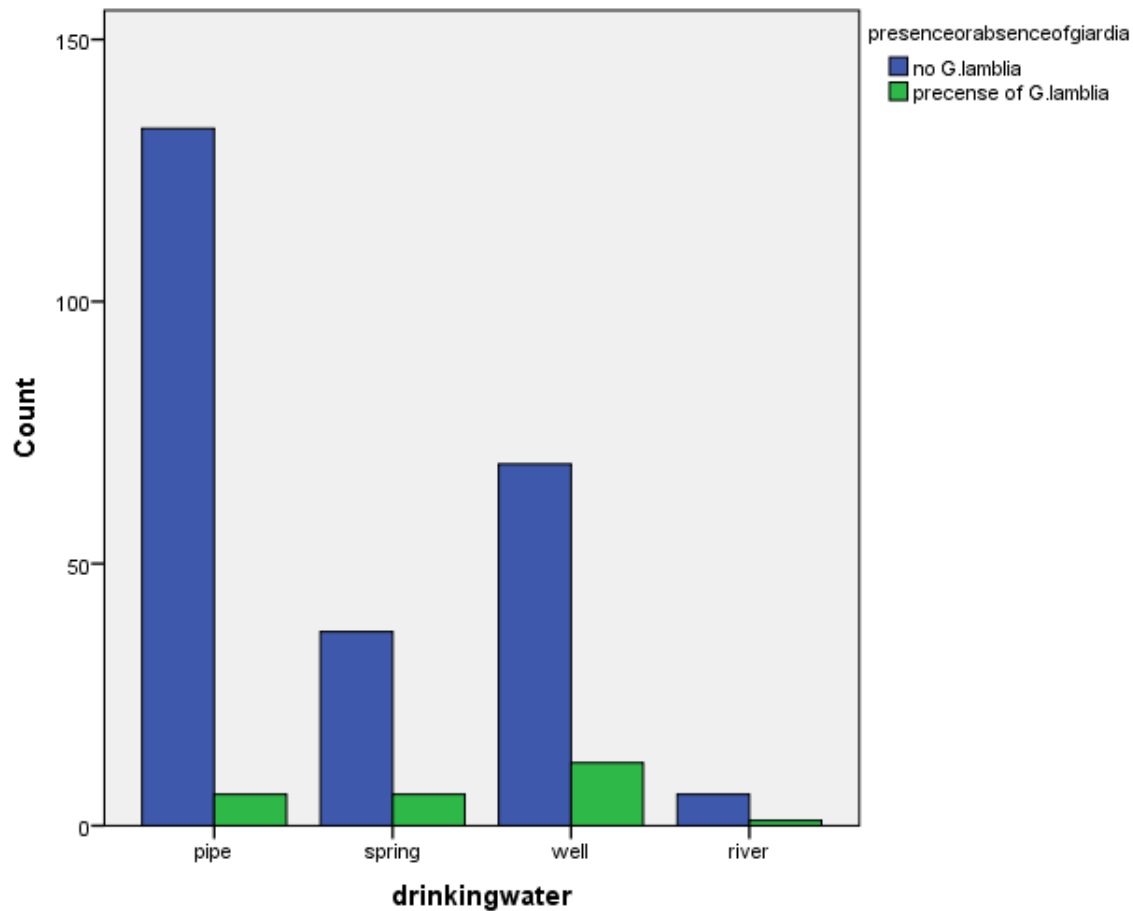
Table 7. prevalence of Giardia lamblia infection in relation to Presence of waste disposal pit and habit of washing fruits before eating at wolkite University specialized Hospital, 2021

Presence of waste disposal pit	Positive		Negative		Total		Association
	NO	%	NO	%	NO	%	
Yes	6	5.3	107	94.7	113	41.9	X²=3.61 P=0.004
No	19	12.1	138	87.9	157	58.1	
Total	25	9.3	245	90.4	270	100	
fruitwashing before eating	Positive		Negative		Total		X²=2.98 p=<0.001
	No	%	No	%	No	%	
Always	6	5.6	102	94.4	108	40	
sometime	19	11.7	143	88.3	162	60	
Total	25	9.3	245	90.4	270	100	

Out of total study population 157 have not waste disposal pit. From this about 19 (12.1%) were positive for giardia. This shows that the highest prevalence of Giardia lamblia was observed among those which have not waste disposal pit. The prevalence of Giardia has statistically significance association with Presence of west disposal pit p=0.004.

Out of 162 patients who have not habit of always washing fruits before eating about 19(11.7%) are positive for giardia. This shows that the highest prevalence of Giardia lamblia was observed among those which have not habit of washing fruits before eating. The prevalence of Giardia has statistically significance association with habit of washing fruits before eating p<0.001

Fig 1. prevalence of Giardia lamblia infection in relation to water source at wolkite University specialized Hospital, 2021.



The highest prevalence of Giardia lamblia was observed among those which uses well water the prevalence of Giardia has statistically significance association with water source $p=0.034$ and $X^2=8.36$

CHAPTER SIX

DISCUSSION

The prevalence obtained in this study 9.3% is lower than that conducted in Pakistan which is 27.3% (35). The variation may be due to the difference of method that study was performed by PCR, but in this study was performed by wet mount.

This study had higher prevalence rate than study done on rural community of Thailand school with a prevalence of 6.2 % (26). The variation may be due to the difference in study subjects.

According to research done on the prevalence of Giardia lamblia among all age group at Jimma Health center 2002, the prevalence of Giardia lamblia has been reported 11.4% (18). This result is higher than our study. Our study also had lower prevalence rate than study done among patients high land and low land dwellers in Gamo Gofa area, south Ethiopia 10.6 % (32).

The result of our study was lower than study conducted on prevalence of intestinal parasite among students of Asendabo elementary school 16.3% of Giardia lamblia (16). The possible reason might be the difference in study groups, since elementary students have poor personal hygiene and are exposed for contamination with soil.

Regarding to the predisposing factors among risk factor, many variables were assessed.

Most of the variables have association with the prevalence of giardia lamblia infection $p < 0.005$. But sex had not statistically significant association with the Giardia infection rate ($P > 0.05$). Regarding washing fruit before eating, there was statistically significant association with Giardia lamblia infection ($P < 0.05$). This is due to they use unwashed fruit. The contaminated fruit and raw vegetables can transmit Giardia lamblia.

Regarding to presence of waste disposal highest prevalence is seen among those who have not waste disposal pit. This is due to that giardia is one of the most known protozoa which transmitted by contamination with waste .

Regarding to age groups the prevalence of Giardia infection was higher in age between 29-39 and who live in farming work. and This might be due to the fact that age group of those is more likely exposed to infection through contamination at farming and labor activities.

CHAPTER SEVEN:

CONCLUSION AND RECOMMENDATION

7.1 CONCLUSSION

Giardia lamblia is a flagellate protozoan has been recognized as the common intestinal pathogen worldwide. especially in the tropics including our country.

This is also true as observed in this study. In this study the overall prevalence of G. lamblia is 9.3%. The highest prevalence of Giardia lamblia was observed among those who have no latrine groups. This indicates that the higher transmission of giardia is due to poor personal hygiene. Highest prevalence giardia is seen among those who have not waset disposal pit and whose residential area is rural which about 20 out of 127 is positives.

There is still the problem of giardia with lower socio economic standards in the area as shown by the finding. An important cause in the prevalence of Giardiasis is conditions, like poor personal hygiene, poor environmental sanitation, and habit of eating fruits without washing. The improper usage of water and lack of latrine usage result in high prevalence of the parasite.

7.2 RECOMMENDATION

To reduce the problem of Giardia infection, health education in the community is recommended about:-

- Transmission of Giardia lamblia.
- Improving the quality of water by protecting well, spring and pipe
- prevention methods like environmental sanitation, proper utilization of latrine and safe water provision for drinking.
- Giving awareness about the risk to health of the community
- Giving awareness about its treatment.
- Further studies should be conducted to fully understanding the epidemiology of parasite using the appropriate longer period of study time. These play an important role in reducing the prevalence of Giardia lamblia

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8. ANNEXES

8.1. Information Sheet

Title of the research: Prevalance of Giardia lambia and associated factors among patients attend at wolkite university specialize hospital, wolkite, south central Ethiopia, 2021.

Name of the organization:-

Wolkite University, Department of Medical laboratory sciences.

Purpose of the study

The aim of the study was to assess the prevalence of Giardia lambia and associated risk factors among patients attend at wolkite university specialized hospital, south central Ethiopia.

Procedures

If you are willing to participate in this study and you will sign consent form, after that some information on regarding socio demographic data and associated risk factors is obtained from you by using face to face interview.

Benefits of the study

The study will provide valuable information on the prevalence of Giardia lambia and associated factors among patients attend at wolkite university specialized hospital. Additionally, the study will be important for NGO and governmental bodies who seek this information in order to plan intervention and deworming programs. Moreover, it provides additional information for researchers to conduct further studies to determine prevalence of Giardia lambia and among patients on the study area by using large sample size.

Confidentiality

Any information that is obtained about you will be kept confidential. This is assured by avoiding use of any identifier about you and information will be recorded with code number. Your specimen will be used only for this study purpose.

ANNEX- I

PROCEDURE

Direct Microscopy

Routinely fecal specimens are examined in direct technique as follows.

- The correct container was labeled
- The correct type of sample was received
- A small portion of stool was emulsified using an applicator stick in a few drop of saline solution on a glass slide.
- The slide was covered with a cover slip.
- The slide was examined microscopically using 40* objective to detect intestinal parasite.
- The result was reported by explaining the stage of parasite whether it is at cyst or trophozoite stage

QUASTIONNARIE

WOLKITE UNIVERSITY,

COLLEGE OF MEDICINE AND HEALTH SCIENCE, DEPARTMENT OF MEDICAL
LABORATORY SCIENCE .

Laboratory request format for the prevalence of Giardia lamblia at wolkite university specialized
hospital from May to-July , 2021 G.C.

Cod No. _____ 1, Age _____ 2, Sex _____ Kebele _____

3. Educational status

a. Illiterate b. 1-4 grade c. 5-10 grade, d. 11-12 grade e. >12 grade

4. Occupation a) Gov't employee b) merchant c) Farmer d) student
e) other

5. Residence a) urban b) Rural

6. Presence of latrine a) yes b) No)

7. Habit of Latrine usage. a) Always b) Sometimes c) No

8. Water source for drinking a) pipe b) spring c) Well d) River

9. Habit of washing hands before and after meal.

a) Always b) Sometimes

10. Habit of washing hands after latrine usage

a) Always b) Sometimes

11. Status of finger nail. a) Always Trimmed b) sometimes trimmed

12. Type of food consumed a) engera by wott b) kocho) c) Vegetable and fruit d) Selling food
e) Others

13. Do you wash fruit and vegetables before eating?

a) Always b) Sometimes c) No

14. Presence of waste disposal pit A) Yes b) No

Laboratory Report Format

1. Macroscopic Examination

1.1. Presence of adult worm (describe it) _____.

1.2. Consistency

a). Hard and dry _____ b). Formed _____

c). Semi-formed _____ d). Soft _____ e). Bloody _____

f). Muroid _____ g). Diarrheal _____.

2. Microscopic Examination

2.1. No ova or parasite seen _____

2.2. Ova or parasite seen _____