



PREVALENCE OF GIARDIA LAMBLIA INFECTION AMONG PEDIATRIC AGE GROUP ATTENDING TERTIARY CARE CENTRE

Paediatrics

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ABSTRACT

Introduction: Giardia lamblia is a flagellated, binucleated protozoan parasite of human intestine. Infections occur when infective cyst of G. lamblia ingested by a sensitive host through contaminated water, food, via direct person to person or animal to person transmission. Giardiasis is associated with poor sanitary conditions, insufficient water treatment, eating unwashed fruits and vegetables, and drinking contaminated water. Giardiasis are the most common infections leading to Iron deficiency anemia, chronic diarrhea, seizures, portal hypertension, impaired physical development in children. **Aim:** To study the prevalence of Giardia lamblia infection among pediatric age group. **Materials and Methods:** This cross-sectional study was carried out among pediatrics cases attending OPD, Maharaja Suhel Dev Autonomous State Medical College & Maharishi Balark Hospital Bahraich for a period of six months from September 2019 to March 2020. A total of 239 children were included in the study. Fecal specimens were collected from each patient following standard procedures and the samples were examined within 1-2 hours of collection of sample to detect and identify cyst/trophozoite of Giardia lamblia in microbiology laboratory, ASMC Bahraich. Children less than 14 years of age, attending pediatrics OPD with diarrhea were included in this study. **Results:** Various factors like; age group, gender, social class, area and hygiene were assessed among the patients to compare the risk contributing to Giardia infection. In the present study, out of 239 samples, 34 cases were positive for Giardia lamblia (14.22%). The variables; social class, area and hygiene observed as the predisposing factors responsible for Giardia infection. **Conclusion:** Giardia infection was observed to be more prevalent among male patients of age group 1-5 years, residing in the rural areas, maintaining poor self hygiene and belong to lower socio-economic class.

KEYWORDS

Giardiasis, Hygiene, Socioeconomic Status, Diarrhea.

INTRODUCTION

Giardia lamblia, also known as G. duodenalis and G. intestinalis is a flagellated, binucleated protozoan parasite of human intestine. Giardiasis is one of the leading causes of diarrheal diseases throughout the world^[1]. The Giardia intestinalis (previously known as G. lamblia) is the causative agent and more common intestinal parasite isolated worldwide, being most common among children than in adults^[2]. Infection occurs when infective cyst of G. lamblia ingested by a sensitive host through contaminated water, food, via direct person to person or animal to person transmission^[3]. Giardiasis is associated with poor sanitary conditions, insufficient water treatment, day care centers and with institutional facilities such as nursing homes^[4]. In developing countries, common risk factors associated with G. lamblia infection are socio demography, improper sanitation, and bad personal hygiene, eating of unwashed fruits and vegetables, and drinking of contaminated water^[5]. According to WHO, more than one million (almost 15-20%) of the world's population is chronically infected with parasites^[6]. In India total prevalence rate of intestinal parasitic infection ranges from 12.5% - 66%, with varying prevalence rate for individual parasite^[7]. Globally, the intestinal parasitic infections such as, soil transmitted helminthes (STH) and protozoa infections have been identified as one of the most significant causes of illnesses and diseases especially among disadvantaged communities^[8]. The infection may cause severe diarrhea, malabsorption syndrome resulting in growth retardation and poor psychomotor development of child^[9]. Giardia infection reduces hemoglobin level and causes hypoalbuminemia. Giardia lamblia usually a zoonotic with cross infectivity between animal and human^[10]. Giardiasis are the most common infections leading to Iron deficiency anemia, chronic diarrhea, seizures, portal hypertension, impaired physical development in children along with other co-morbidities^[11]. Giardiasis is infectious disease may have both immediate and long term consequences including chronic diarrhea with or without dehydration and intestinal malabsorption, recurrent pain in abdomen, loss of weight. Additionally it has been further related to fatigue post infectious irritable bowel syndrome and particularly, in early childhood, poor cognitive function and failure to develop, all of these have attracted an increasing consideration to this protozoan infection in the recent years^[12]. Giardia is relatively resistant to chlorination and

ozonolysis and can remain viable for several weeks, especially in cold surface water^[13]. Food borne transmission and mechanical transmission by flies occurs less common^[14]. This study is conducted to find out the property of Giardia in pediatric age group and to associate a determinant that contributes to its transmission.

MATERIALS AND METHODS

Study design and source of data: It was a cross-sectional study carried out for screening of giardiasis among pediatrics cases attending OPD, MSDASMC & MBH Bahraich. A total of 239 children were included in the study for a period of six months from September 2019 to March 2020.

Inclusion criteria:

Children less than 14 years of age, attending pediatrics OPD with diarrhea were included in this study.

Exclusion criteria:

- (I) Children who had received antihelminthic drugs within three months of beginning of study were excluded.
- (II) Accompanying guardian not willing to give consent for their children participation for the study.

Statistical analysis:

The categorical data was investigated by calculating proportion. The standard statistics was applied to see the determination among categorical variables. However, Fisher exact test was used in case of small prevalence in different cell. The differences were considered significant when P value less than 0.05 was observed.

Collection of socio demographic and clinical data

Socio-demographic and clinical data was obtained using a structured questionnaire. The participants were also given a questionnaire to collect the information concerning their functional hygiene, socio-economic status and educational background, source of drinking water, food and diarrhea.

Collection of Samples:

Fecal specimen were collected from each parents or guardians and

placed into a wide mouthed clean plastic container. The stool samples were examined within 1-2 hours of collection to detect and identify cyst/trophozoite of *Giardia lamblia* in microbiology laboratory, ASMC Bahraich.

Preservation of fecal samples:

A solution consists of formalin 10%, glycerine 20% and distilled water 70% was used for preservation of specimen.

The samples were processed using standard procedures in Departmental Microbiology Lab, ASMC Bahraich as follows,

- I) Macroscopic examination
- II) Microscopic examination:
 - A) saline wet mount
 - B) Iodine wet mount
- III) Concentration technique:
 - A) floatation method
 - B) Sedimentation method

RESULT

The present study mainly determines the prevalence of *Giardia lamblia* and its association with various demographic and other factors like, age group, gender, social class, area, hygiene etc. The study was conducted on a total number of 239 children having diarrhea.

Table-1: Prevalence of *Giardia lamblia* among pediatric patients:

Total subject	No. of positive cases	%
239	34	14.22

Table 2: Prevalence of *Giardia* based on age group, Gender, Area, Socioeconomic status and Personal Hygiene-

Variables	No. of Cases	Positive cases	*p value
Age Groups	1-5 years	20	0.18
	6-10 years	52	
	11-14 years	33	
Gender	Male	116	0.06
	Female	89	
Area	Rural	102	0.001
	Urban	103	
Socioeconomic Status	Lower	105	0.001
	Middle	100	
Personal hygiene	Poor	109	0.03
	Good	96	

*P value less than 0.05 is considered significant

In the present study, out of 239 samples, 34 cases were positive for *Giardia lamblia* so the overall prevalence of *Giardia lamblia* was 14.22%. (Table no.1)

DISCUSSION

According to Deepesh Kumar et al (2013), the popularity of *Giardia lamblia* infection in the study was (13.67%) out of 183 samples^[15]. In present study, out of 239 samples 34 were positive (18.36%) for *Giardia lamblia* (Table-2). According to Iram Abdullah et al (2016) *Giardia lamblia* infection investigated in 268 children who provided the samples, 8.2% were found to be positive for giardiasis^[16]. According to D.K. Jethwa et al (2015) out of 300 children with diarrhea, 15 (5%) had infection with *Giardia lamblia*.

In this study gender wise prevalence out of 136 male & 103 female, 20 males (17%) and 14 female (16%) were positive for *Giardia lamblia* (Table-2). In comparison to another study, popularity of parasitic infection was more common in female (15.68%) as compared to that in male (12.87%) in age group ≤ 15 years (Deepesh kumar et al, 2013), according to Iram Abdullah et al (2016) (125 male & 143 female), male (10.04%) were prone to infection with *Giardia lamblia* as compared to female (6.29%).

In present study, the distribution of age group was 1-5 years (17.24%) as 1st group, 6-10 years (7.1%) as 2nd group and 11-14 years (13.1%) as 3rd group. The prevalence was higher in age group 1st as compared to 2nd & 3rd group (Table-2). In comparison to another study, predominance in different age groups on the basis of their age, the children were divided into 5-8 years as 1st, 9-12 years as 2nd and 13-15 years as 3rd group. The infection rate was highest in case of group 1 (13.7%), then showed a devolution with increase in age and was least in case of group 3

(3.88%) (Iram Abdullah et al; 2016). In another study, distribution of children declare with diarrhea were categorized according to their age groups, where preschool children were mostly affected with *Giardia* infection (6.4%) (D.K. Jethwa et al; 2015).

With respect to area distribution and *Giardia* infection, 27 infected subjects (26%) out of 129 belonged to rural area whereas, 07 (6.7%) out of 103 from the urban area. The maximum number of positive patient belonged to rural area (Table-2). According to Iram Abdullah et al (2016), prevalence in rural area is more (9.87%) than urban area (6.03%), which is similar to our study.

The present study shows a positive correlation between personal hygiene and *Giardia* infection. Patients infected having poor hygiene were 25 (23%) out of 134 compared to the patients with good hygiene 09 (9.3%) out of 105. These results are at par with the study carried out by Iram Abdullah et al.

Numbers of patients infected with *Giardia* having lower socioeconomic status were 26 out of 131 (25%) whereas, in middle socioeconomic class 08 out of 108 (8%). In present study, higher positive cases were observed in lower class patients compared to middle class (Table-2). The study was compared to Kuppu swamy socio-economic status (2018).

Table No.03: Comparison of severity of *Giardia lamblia* infection of present study with other studies:

Sl.No.	Study	Severity of <i>Giardia lamblia</i> infection
1	Deepesh Kumar et al (2013)	13.67%
2	Iram Abdullah et al (2016)	8.2%
3	D.K. Jethwa et al (2015)	5%
4	Sangram S. Patel et al (2015)	16.13%
5	Chatterji et al (1989)	2.6%
6	Shadma M et al (2009)	25.3%
7	Present study (2018)	14.22%

CONCLUSION

A total of 239 samples were examined out of which 34 (14.22%) were positive for *Giardia lamblia* infection. *Giardia* infection was observed more prevalent among male patients (17%) compared to female (16%). Age-wise the higher rate of infection (21%) was observed in the age group 1-5 years. The percentage of infected patients was more in rural area (27%) compared to urban area (7%). The patients with lower socioeconomic status were found to be at higher risk (25%) of infection compared to middle class (8%). When enquired about personal hygiene of the study patients, most of the positive cases were observed in poor hygiene group (23%) compared to patients maintaining good hygiene (9.3%).

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of the paper.

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