



## RESEARCH PAPER

## OPEN ACCESS

## Prevalence of *Giardia lamblia* in stool samples of diarrhea patients in Quetta, Pakistan

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**Key words:** *Giardia lamblia*, Drinking water, Microscopic identification, Quetta

<http://dx.doi.org/10.12692/ijb/12.3.116-121>

Article published on March 18, 2018

### Abstract

The present study was conducted to determine the prevalence of *Giardia lamblia* in Stool samples of diarrheal patients in Quetta. Two hundred thirty fecal samples were collected randomly from the male female and children patients who visited OPD (outpatient department) of different hospitals of Quetta from February 2017 to August 2017. The samples were screened for the presence of parasites using microscopic techniques (formalin ethyl-acetate sedimentation technique). Two hundred and thirty (230) patients having diarrhea and abdominal discomfort were examined for *G. lamblia* infection in Quetta district hospitals. Out of 230 sample analyzed protozoa etiological agent *Giardia* was detected in 65 (28.2%). out of 65 in male 66.5% and in female 33.8% positive was detected. To control *Giardia lamblia* is by good hygiene, adequate cooking of food, and protection of food from flies, properly wash raw vegetables before serving, use of boiled water and well developed sewage system. The study concluded that the use of raw animal manure for fertilizer, irrigation of vegetables with fecal contaminated water, poor sanitary system and improper treatment of water supplies can increase the threat of contamination of water which is main source of causing giardiasis and other infections.

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## Introduction

Intestinal parasitic infection found in all over world, high prevalence rate found in those people that living in crowded area with low socioeconomic status, poor environmental hygiene condition, and inappropriate waste disposal, unsafe water supply unclean personal lifestyles (Adamu *et al.*, 2006; Noor Azian *et al.*, 2007). In developing countries these are the major reason of illness and deaths (Adamu *et al.*, 2006). The etiological agents for infectious diseases include viruses, bacteria, and microscopic protozoan parasites. Among protozoan parasites most important are the *Giardia lamblia* (*syn G. intestinalis*, *G. duodenalis*) is one of the most common intestinal parasites in the world and is the source cause of Giardiasis (Brandborg *et al.*, 1980; World Health Organization, 2004).

Giardiasis may result in different intestinal symptoms including diarrhea, steatorrhea, abdominal cramps, bloating, and flatulence, pale greasy and malodorous stools, and weight loss, nausea or vomiting may also occur. Active infection also causes Lactose intolerance which may last for several months after clearance of the parasite (Ponce-Macotela *et al.*, 2005). The primary victims of the *Giardia lamblia* are school going children in both developed and developing countries (Dib *et al.*, 2008). In Asia, Africa and Latin America the World Health Organization (WHO) estimated that round about 280 million people are annually infected with *Giardia lamblia* (Addy *et al.*, 2004).

*Giardia lamblia* also known as giardia intestinal is a major public health problems in most developed and non-developed countries. *Giardia lamblia* is thought is one of the contributing agent of diarrhea or abdominal discomfort in both children (Addy *et al.*, 2004; Noor Azian *et al.*, 2007; Dib *et al.*, 2008) and adults (Nyarango *et al.*, 2008; Ayeh Kumi *et al.*, 2009). Control and eradication of *Giardia lamblia* is difficult because many infected person have no symptoms there for number of possible carriers such as adult males (5.3%) (Supanaranond *et al.*, 1990) Food sellers (2.0%) and school children (39%) (Ayeh-Kumi *et al.*, 2009).

Worldwide *Giardia* is most common agent of parasitic gastro intestinal infection. It is estimated that chronically infected 200 million peoples with *Giardia Lamblia* and 0.5 million new cases reported worldwide. The prevalence rate is differing in developing and developed areas, in developing countries the rate of prevalence is 20 to 30% and in developed countries 2 to 5% (Pereira *et al.*, 2007). The prevalence rate of diarrhea caused by *Giardia lamblia* is between 2.6–4% in sub-Saharan Africa (Hamer *et al.*, 1998). Over all the prevalence rate of giardiasis in developed areas is 2 to 5% (Noor Azian *et al.*, 2007).

Due to unhygienic water (poor quality water) 30% of all diseases and food 40% of all mortalities in Pakistan (Water Vision 2025 (2000)). The prevalence rate of *Giardia lamblia* in different zone of Pakistan was in Muzaffarabad city 11.8% in Punjab 24.2% (Chaudhry *et al.*, 2004) in Sakkur Sindh 36.19% (Shaikh *et al.*, 2009) and in Peshawar 30.96% (Younas., 2008). Epidemiological studies have presented that parasitic diarrhoea in teen-agers is mainly due to *Giardia lamblia* infection, mostly in regions where drinking water and fresh vegetables sources are contaminated with sewage supplies, and crops can be bought from street sellers (WHO. 1992). The study was carried out to determine the Prevalence and microscopic identification of *Giardia lamblia* form stool samples in Quetta, Pakistan.

## Material method

### Sample collection

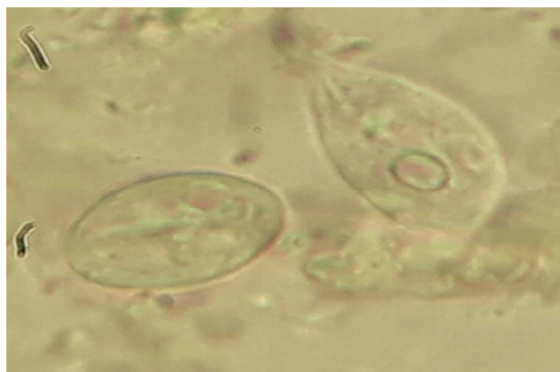
This study was conducted from February 2017 to August 2017 on those patients which were suffering from abdominal discomfort or diarrhea. A 230 fresh stool samples were collected from different age and gender into a disposable plastic container from different hospitals OPD patients with in Quetta city. Stool samples were immediately transport to the parasitology lab of the CASVAB University of Baluchistan for analysis. For analysis of stool samples Formalin-Ethyl Acetate Sedimentation Concentration sedimentation technique was performed to separate the parasite from debris and this method also increase the chance of detection of parasite when these are in low numbers. (Weber *et al.*, 1992; Garcia L. 2007).

### Microscopic identification of parasite

For Microscopy of the samples processed immediately without preservation. Two types of direct wet film preparation were done for each sample a, 1 slide using normal saline (0.85%) for detecting the actively motile trophozoite and Lugol's iodine (5%) for demonstrating structures. All samples were examined microscopically by using 10 × and 40 × lenses for the presence of cysts and trophozoites of *G. lamblia*. The microscopic examination was done 3 times on each sample for confirmation. The criteria for positive *Giardia* were active motile flagellated trophozoites and thick hyaline wall of cyst stages.



Cyst form of *Giardia*



Cyst and trophozoite form of *Giardia*

### Result

Two hundred and thirty (230) OPD patients of different hospitals of Quetta presenting diarrhea and abdominal discomfort were examined for *G. lamblia* infection. Out of 230 stool samples observed microscopically 65 (28.2%) were found positive presence of *G. lamblia*. Out of these numbers, protozoa etiologic agent giardia causing diarrhea was identified in 65 (28.2%) and the prevalence of giardia in male 66.5% is higher compared to female 33.8% (Table 1).

The month wise result showed that the low prevalence of *Giardia lamblia* recorded in Feb and in March, while the high prevalence was recorded in April, May and June Table 3.

**Table 1.** Shows overall, male and female prevalence of *Giardia lamblia*.

Samples	Overall Positive & %	Male positive & %	Female positive & %
230	65 28.2%	43 66.5 %	22 33.8 %

Seasonal or month wise variation of *Giardia lamblia* from Feb to July.

Month & number of infected patients	Total sample	Positive samples
Feb	30	3 (10%)
March	23	5 (13%)
April	40	14 (35%)
may	43	17 (39 %)
Jun	44	15 (29%)
July	50	11 (22 %)
Total	230	65 (28.3%)

### Discussion

Intestinal parasitic infections affect people all over the world, high prevalence rate found in those that are living in crowded area with low socioeconomic status, poor environmental hygiene condition, and inappropriate waste disposable, unsafe water supply unclean personal lifestyles (Adamu *et al.*, 2006; Noor Azian *et al.*, 2007). In developing countries these are the major reason of illness and deaths (Adamu *et al.*, 2006).

Water born flagellated parasite *Giardia lamblia* continue to be most frequent protozoan agent of intestinal disease world-wide, People who generally reside in rural or under developed areas are more susceptible to the ingestion of infective parasites as compared to those who live in urban/suburban or well developed areas where sanitation is presumably better; hence possess a lower chance of infection (Wongjindanon *et al.*, 2005).

In present study, a total of 230 stool samples were collected from gastroenteritis patients, out of these samples 65 (28.2%) were identified positive microscopically. Tigabul *et al* (2010) reported 26.6% stool samples positive for *G. lamblia* infection in

Ethiopia and same kind of study was done by Shaukat *et al.*, 2012 in Nowshera district Pakistan and reported 27.33% prevalence in stool samples, Shakkoury and Wandy (2005) reported 29.6% prevalence rate of *Giardiasis* among population in Amman and Younas *et al.*, 2008 in Peshawar 30.96% these reported finding to some extent comparable to our findings which are 28.2%. Prevalence of *Giardia lamblia* was reported in different areas of Pakistan in Punjab 24.2% (Chaudhry *et al.*, 2004), in another study which was done by Shaikh *et al.*, and 2009 in Sukkur, Pakistan reported the prevalence of giardia 36.19% which is higher than our findings.

Saeed and Issa *et al* 2010 reported 50.0% *Giardia lamblia* infection in Iraq, in Minawali Pakistan, giardia intestinal was recorded 37.7% (Khan Abrar Ul Haq *et al* June 2015), similar results were reported in Nawabshah Sindh (Akhund 1994), Argentina (Kang *et al.*, 1998) and in rural Southern India (Gamboa *et al.*, 1998), which are high as compared to our findings.

Rajeswori *et al* 1994 studied *G. intestinal* and reported *G.lambli*a (14.7%) in southern India. Omar Amer *et al* 2017 studied and reported 3.1% *Giardia* infection rate in 2011 and 2.19% in 2012 in Riyadh Region, Saudi Arabia, and in Muzafabad Pakistan city 11.8% (Chaudhry *et al.*, 2004) and Yakoob *et al.*, 2010 study conducted At the Aga Khan University showed that overall infection of giardia were 8.7% by microscopic method and PCR respectively. These reported results are lower than our findings, this difference could be due to variation in climate and living conditions.

In our study the prevalence of *Giardia lmbli*a was higer in males than females other study was done by Shenoy *et al.*, 1998; Surinder Kumar and Varsha, 2106 Singh also reported the higher incidence of these parasites in males. Possible reason may be that the males have more outside activities like offices shopkeeper and hoteling as matched to females with the result they are more exposed to unhygienic environmental conditions as studied by (Sayyari *et al.*, 2005).

There are many other factors affecting the prevalence of *G. lamblia* consisting of sanitary condition and environmental conditions such as location of sampling, animal diversity in the areas, climatic condition, season, volume of sample, rainy seasons and population of the animals in the areas etc. That's how the propagation of *G.lambli*a is high in developing countries than that of developed countries (Agha rodina & Teoderesco 2002). The study area keeps these conditions which are encouraging the transmission of giardia intestinal.

### Conclusion

These results demonstrate that *Giardia lamblia* is the most prevalent intestinal parasitic problem among children and environmentally resistant cysts could be widespread and thus an effective hygienic management system is needed to prevent them from serving as the source of infection for human beings.

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