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Research Article

Impact of Giardiasis on Plasma Protein profile of infected children

Iram Abdullah[1], Hidayatullah Tak[1] and Fayaz Ahmad[1]
[1]Dept. of Zoology, University of Kashmir, Hazratbal, Srinagar 190006, J&K, India

***Corresponding Author:**
Iram Abdullah
Email: miriram07@gmail.com

Abstract: *Giardia* is a common protozoan parasite infecting children in developing countries and is known to result protein loss in infected children. The objective of this study was to assess the association of plasma protein profile with Giardiasis among children in district Anantnag of Kashmir valley. The study included 268 children aged 5-15 years belonging to both the genders. Stool samples collected from children were screened for *Giardia* infection and blood samples were analysed to estimate plasma protein, albumin and globulin levels. The results showed a significant decrease in mean values of total protein between infected and uninfected children from 6.71±0.96 to 7.01±0.98. The mean values of albumin also showed a decrease in their values between infected and uninfected children from 3.7±0.45 to 4.21±0.51 and that of globulin showed an increase in mean values from 3.01±0.91 to 2.8±0.58 between infected and uninfected children. However the difference was statistically insignificant ($p > 0.05$).
Keywords: *Giardia*, plasma proteins, albumin, globulin.

INTRODUCTION

Giardia is a flagellated protozoan parasite of phylum Sarcomastigophora that colonises and reproduces in small intestines of humans, causing disease Giardiasis. In 1681, *Giardia lamblia* was the first microorganism reported by Antonie van Leeuwenhoek from his own stool after the invention of microscope. Life cycle alternates between a feeding stage called trophozoite and an infective stage called cyst. Infection is acquired by ingestion of mature cysts via contaminated water or food. In humans, *Giardia* infection can be symptomatic or asymptomatic. Symptomatic giardiasis can cause fatty diarrhoea, abdominal discomfort, vomiting, malabsorption and weight loss [1]. Giardiasis causes malabsorptive diarrhea [2]. The trophozoites remain attached to intestinal wall in large numbers and thus can be responsible for severe malabsorption syndrome causing maldigestion and malabsorption of fat, proteins, mineral ions, and fat-soluble vitamins [3]. Inadequate food intake, reduced absorption or excessive loss of nutrients due to Giardiasis can affect anthropomorphic indices and the infected children may suffer from growth disturbance [4]. Epidemiological studies indicate that there is decrease in serological zinc, copper and iron levels in children during chronic *Giardia* infection [5,6]. The micronutrient deficiencies inturn can result in anaemia, hypoalbunemia, poor psychomotor development [7-9] defects in the anti-oxidant system [10]. Chronic giardiasis in children is generally associated with clinical manifestations of failure to thrive [11-14].

MATERIAL AND METHODS

The objective of the present study was to assess the association of plasma protein concentration in children with Giardiasis. A total of 268 stool samples were collected from children aged 5-15 years belonging to both the genders and processed by direct smear method and Formal Ether Concentration Technique. About 1.5ml of blood were drawn with the help of sterile disposable syringes and collected in labelled sterile EDTA tubes from 44 children (22 infected and 22 uninfected) after ascertaining their positive and negative results for Giardiasis through stool examination. Albumin estimation was carried out by BCG method and Total protein estimation was done by BIURET method. Globulin estimation was carried out by subtracting the albumin value from total protein. Data analysis was done using a Mini Tab statistical programmer. The differences were considered to be significant when the p- value obtained was found to be less than 0.05

RESULTS AND DISCUSSION

Plasma proteins also called as serum proteins or blood proteins constitute 7-9 % of blood plasma and serve many vital functions. In the current study, the

effect of *Giardia* infection on these proteins was studied and the data is shown in tables (1-2) and figures (1-3).

Albumin

As shown in Table 1, Children infected with Giardiasis showed lower mean values of albumin (3.7±0.45) than the uninfected (4.21±0.51) ones. This difference was not significant when compared statistically (p=0.006). Present results are supported by Kadir *et al.* [20] and Dubey [17] who noticed a significantly lower albumin levels in infected children than in uninfected ones. Kadir and Al-Barzanjy [19] found a non-significant decrease in albumin values in *Giardia* infected children over uninfected ones. The low level of albumin among infected children may be attributed to protein losing enteropathy, or altered gastrointestinal flora or zinc deficiency since 70% of albumin remains bound to zinc.

Table-1: Mean value of Albumin in infected and uninfected children

Type	**Mean±SD**	**Range**	**value**
Uninfected	4.21±0.51	3.5 - 4.8	
Infected	3.7±0.45	3.1 - 4.3	0.006

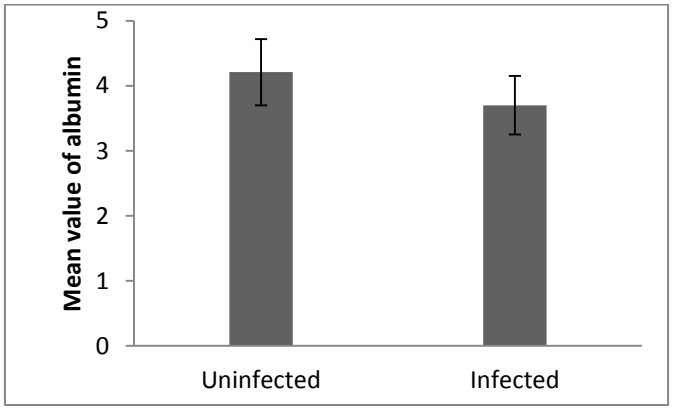

Fig-1: **Mean value of Albumin in infected and uninfected children**

Total Protein

As shown in (Table 2), children infected with Giardiasis also showed lower mean values of Total plasma protein (6.71±0.96) than the uninfected (7.01±0.98) ones and the difference was significant when compared statistically (p =0.05). Our results agree with the studies conducted by Sherman and Liebman [23] who believed that *Giardia* infection can result in intestinal protein loss. Peterson [22] was of the opinion that *Giardia* causes impaired absorption of proteins which results in abnormal protein loss.

Table-2: Mean value of Total protein in infected and uninfected children

Type	**Mean±SD**	**Range**	**Value**
Uninfected	7.01±0.98	5.2 - 8.0	
Infected	6.71±0.96	5.0 - 7.8	0.05

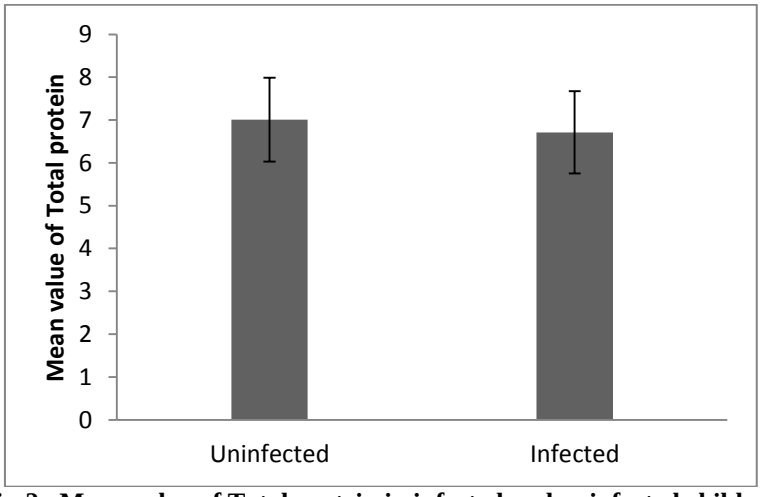

Fig-2: **Mean value of Total protein in infected and uninfected children**

GLOBULIN

As shown in (Table 3), children infected with Giardiasis showed higher mean values of Globulin (3.01±0.91) than the uninfected (2.8±0.58) ones. This difference was insignificant when compared statistically (p =0.06). Our results are in conformity with those of Baqai [15] who observed significantly higher levels of Globulin in plasma of infected children than in uninfected ones. This increase is attributed to higher levels of IgA and Ig E in infected children which are regarded to play an important role in immune defense against *Giardia* [16, 21, 18].

Table-3: Mean values if Globulin in Infected and Uninfected children

Type	**Mean±SD**	**Range**	**p value**
Uninfected	2.8±0.58	1.7 – 3.2	0.06
Infected	3.01±0.91	1.5 – 3.7	

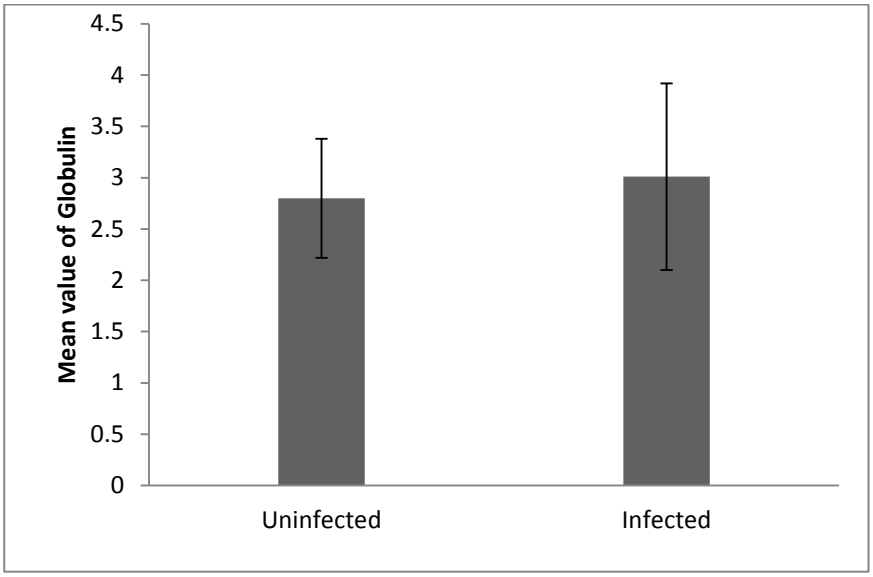

Fig-3: **Mean value of globulin in infected and uninfected children**

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