



Occurrence of Intestinal Parasitic Infections and its correlation with haematological Parameters in a tertiary care centre

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Abstract:

Intestinal parasitic infections are highly prevalent among the general population in developing countries and these infections can lead to a number of adverse effects. This study was done to determine the predominant intestinal parasitic infestations with haematological correlation among all age groups of patients attending tertiary care hospital. A total of 238 stool & blood samples were collected from the patients for examination and haematological analysis. Out of 238 stool samples, 52 (21.8%) showed presence of ova/cysts of Protozoa or helminths. Helminthic eggs were 14.3% and Protozoal cysts or trophozoites were found in 7.5% of them screened for the parasites. Among these *Ancylostoma duodenale* was found predominant with 10.5% followed by *Entamoeba histolytica* with 5.5% of total patients. In our study parasitic infestations was predominant in 41-60 yrs. The study showed a relationship between parasitic infestation and Hb, Platelet count, PCV and MCHC which was decreased in protozoal infestations. Their occurrence is quite low compared to other studies which suggests an improved awareness of hygiene. Prevalence of helminths was higher than protozoa in the present study. Hence, it is recommended that appropriate steps be taken at the district level to prevent such infections among pediatric and adult age groups in rural Devanahalli.

Key words: *Ancylostoma duodenale*, *Ascaris lumbricoides*, *Entamoeba histolytica*, *Giardia lamblia*, Haematological parameters

Introduction:

Intestinal parasitic infections (IPI) have been the greatest individual worldwide cause of illness and disease which is endemic worldwide. IPI are a global health burden in developing countries affecting 450 million people of children and women of reproductive age group. IPI has also been a major health problem in India also like other developing countries.¹ The prevalence of IPI is probably due to inadequate personal hygiene and poor sanitation in developing countries. About 60% of the world's population suffers from morbidity due to IPI. Globally, the commonest parasitic infections are Hookworms 25(10.5%), *Entamoeba histolytica* 13(5.5%), *Ascaris* 9(3.8%) and

Giardia intestinalis 5(2%) IPI ranges from 12.5% to 66% in India with variation in prevalence of individual parasites.²

The clinical manifestations are malnutrition, seizures, iron deficiency anaemia, and impaired growth and cognitive development probably due to decreased appetite, nutrient loss, malabsorption and decreased nutrient utilisation.^{3,4} The intestinal parasitic infections are acquired by ingestion, inhalation or penetration of skin by infective forms and their high incidence is closely correlated to poverty and poor environment hygiene.⁵ Although many studies suggest the intestinal parasite infection endemicity among the community, there is no sufficient data

about the correlation of intestinal parasite infection and its relation to anaemia and nutritional status.⁶

Objectives:

1. To study the spectrum of intestinal parasites with respect to age and gender.
2. To determine the haematological parameters like haemoglobin, platelet count, packed cell volume and mean corpuscular haemoglobin concentration in persons having IPI.

Materials & Methods:

This is a retrospective study carried out in the Department of Microbiology, Akash Institute of Medical Sciences & Research Center, Devanahalli, Bengaluru, Karnataka, for a period of 6 months from August 2014 to January 2015.

Inclusion criteria: Children and adults of both sexes.

Exclusion criteria: Infants (less than 1 year)

A total of 238 stool & blood samples were collected from the patients of both sexes who visited the hospital as out-patient and in-patient. Stool samples were collected in wide mouthed, sterile plastic containers and transported to the microbiology department. The collected stool samples were processed within one hour for macroscopic and microscopic examination. Macroscopic examination of stool was done to look for colour, consistency, presence of mucus and blood and presence of parasitic structures such as *Ascaris*, scolices, or hookworm. Microscopic examination was carried out by saline wet mount and lugol's iodine wet mount. Saline wet mount was done to detect protozoal trophozoites and helminthic eggs or larvae and iodine wet mount was done to detect cysts. Saline and iodine wet mount were prepared by adding a drop of saline and lugol's iodine for clean glass slides and then mixed with a small amount of stool. Coverslips were placed and the slides were visualized microscopically first at low power to

detect trophozoites or ova and then at higher power for morphological details.⁷ Blood samples were collected in EDTA containers and processed for Haemoglobin (Hb), platelet count, packed cell volume (PCV) and mean corpuscular haemoglobin concentration (MCHC) in 3 part samsung analyzer which was confirmed by peripheral smear (manual method).⁸

Statistical methods:

The results were analyzed using SPSS version 12. Statistical test was carried out using chi-square test and P value. The parameters were considered as significant if the P value was < 0.05.

Results:

Out of 238 stool samples, 52 (21.84%) showed positive for either protozoal or helminthic infestations. Age of the patients ranged from one year to 90 years with a mean age of 45 years. The age groups and gender wise distribution of positive cases are shown in **Table I**.

Number of patients and the percentage of parasitic infestation was more in the age group 41-60 yrs. There was no statistical significance in the age groups but statistical significance was seen in gender distribution.

Ancylostoma duodenale was the commonest parasite found in stool followed by *Entamoeba histolytica*, *Ascaris lumbricoides*, and *Giardia intestinalis* as shown in **Figure I**.

In our study, children showed an equal incidence of *Entamoeba histolytica* and *Giardia lamblia* infestations (21.4%), whereas the adult population showed a high incidence of hook worm infestations (11.2 %). The geriatric age group also showed similar high incidence of hook worm infestations (9%) followed by *Entamoeba histolytica* (7%).

The mean value of the haematological parameters like Hb, PCV, MCHC and platelet count was less in *Giardia lamblia* infestation and then followed by *Entamoeba histolytica* shown in **Table II**.

There was no statistical difference in the haematological parameters in positive and negative groups.

Table I: Age groups and gender wise distribution of positive cases

Category		Total samples tested	Positive samples	Percentage (%)
Age Group*	1-20 yrs	17	7	41.18
	21-40 yrs	74	9	12.16
	41-60 yrs	103	28	27.18
	61-90 yrs	44	8	18.18
Chi Square= 9.294, df= 3, p = 0.0256				
Sex	Male	147	35	23.8
	Female	91	17	18.7
Chi Square= 0.866, df= 1, p = 0.359				

Figure I: Percentage of parasites found in the stool

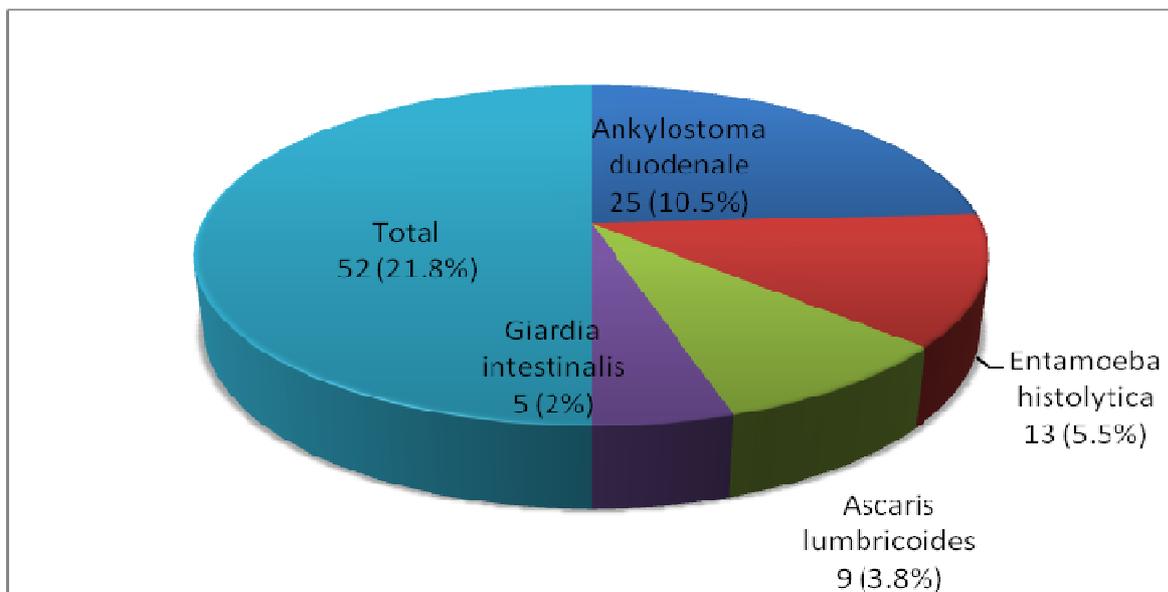


Table II: The relationship between parasitic infestation and haematological parameters.

Parasites	Haematological Parameters (Mean± SD)			
	Hb (gm/dl)	Platelet count (10 ³ /µl)	PCV %	MCHC (gm/dl)
Ancylostoma duodenale	13.04±1.95	212.55±56.91	39.51±5.49	31.5±3.37
Entamoeba histolytica	12.89±2.60	212.63±59.67	20.12±8.59	32.9±2.54
Ascaris lumbricoides	14.31±1.80	247.5±57.56	40.53±5.72	32.5±2.13
Giardia lamblia	10.85±2.57	169.2±54.65	30.57±3.61	30.5±3.10
Parasite Status				
Positive (52)	12.80±2.30	212.30±59.18	37.83±6.94	31.84±3.244
Negative (186)	14.08±2.39	281.62±298.51	41.07±6.05	33.222±2.044

Positive cases: p value =0.000, Negative cases: p value= 0.00

Discussion:

The parasite infestation varies from place to place as well as in adults and paediatric patients. The main risk factors identified with this infection are living in rural, tropical and subtropical areas social and economic factors & poor hygiene.⁹

In our study 52 (21.84%) of the patients showed parasitic infestation out of the total 238 patients. The prevalence of parasitic infestation varies from 25 to 70% in India^{10, 11, 12, 13, 14} and outside India.^{15, 16, 17, 18}

The prevalence in our study coincides with the Srihari N et al¹⁰ which is approximately 24.78%. The low percentage of parasitic infestation in our study can be due to awareness of personal hygiene in the study area. Males were more infected than females which coincides with other studies like Srihari N

et al, Wani SA et al,¹⁹ Singh DS et al,²⁰ and Ibrahim AH et al.²¹

The difference in prevalence rate of individual parasites may be due to variation between geographical regions, community's ethnic groups and seasonal variations. The prevalence of helminths was 14.3% and protozoal parasites were 7.5 % in our study as compared to 32.41 % and 20.8 % in Singh P et al¹¹ study. *Ancylostoma duodenale* (48%) was highest in our study. On the contrary, Fernandez MC et al¹² reported *Ascaris lumbricoides* (52.8%) as the major pathogen in stool followed by *Ancylostoma duodenale* (37.6%) and Srihari N et al¹⁰ reported *Entamoeba histolytica* (43.86%) as the predominant followed by *Giardia lamblia* (3.51%) and *Ancylostoma duodenale* (1.75%).

Intestinal parasites are strongly associated with the development of anaemia as they cause malabsorption, nutritional deficiencies and gastrointestinal blood loss.²² The haematological parameters like Hb, platelet count, PCV and MCHC were low in protozoal infestations than helminthic infestations. This correlates with Ahmed et al²³ and Hama AA et al⁶ studies where low haemoglobin levels were noted.

Conclusions:

The occurrence of IPI is quite low compare to other studies done. Lower positivity of the specimen hence suggests an improved awareness of hygiene. Prevalence of helminthes was higher than protozoa in the present study. Hence, recommended for appropriate steps to be taken at district level to prevent IPI in all age groups of rural population. The findings of the present study may provide useful information for such integrated strategies to overcome the public health burden of intestinal parasitic infections in the rural areas of Bengaluru.²⁴

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