

## Incidence of Anemia among Hookworm Infection in Tertiary Care Hospital

Yogendra Singh<sup>1</sup>, Astha Gupta<sup>1</sup>, Ramaesh Yadav<sup>2</sup>

<sup>1</sup>Demonstrator, Department of Microbiology, Government College, Jalaun

<sup>2</sup>Lecturer, Department of Microbiology, Government College, Orai, Jalaun

Corresponding Author: Astha Gupta

### ABSTRACT

**Objective:** Hookworm infections are highly prevalent among the general population in developing countries and these infections can lead to development of anaemia.

**Materials and Methods:** The stool samples were collected and examined Macroscopic and microscopic findings. Blood samples were collected by vein puncture and collected into a tube containing anticoagulant (K2EDTA). The blood smears were prepared then stained with Giemsa stain. All determinations (haematocrit, haemoglobin, total count of red blood cells, total leukocyte count) were performed using the electronic cell counter Coulter. The microhematocrit machine was used for packed cell volume (PCV) determination. The mean cell hemoglobin concentration (MCHC) was calculated from the values of hemoglobin (HB) and PCV.

**Results:** The total number of 90 positive case of hook worm infections were included of which males were 56(62.22%) and females were 34(37.77) in various age group 20-30years 28(31.11%) was higher. A total of hook worm infection group 37(61.11%) was anemic. Mild anaemic was 30(80.08%) and moderate 7(18.91%). In anemic age group 20-40 years and 41-60 years was more 26(53.06%) and 9(52.94%) respectively. In which females were much higher 24(70.58%) compare to males 13 (23.21%).

**Conclusion:** The total 90 positive case of hook worm infection study males were higher 56(62.22%) but anaemic patients' females were much higher 24(70.58%). Mild anaemia was 30(80.08%) and moderate 7(18.91%).

**Keywords:** Anaemia, Hook worm, infection, Parasite

### INTRODUCTION

Human hookworm infection is a common soil transmitted helminth infection that is caused by the nematode parasites *Ancylostoma duodenale*.<sup>(1)</sup> Hookworms are hematophagous intestinal parasites and are a major cause of iron-deficiency anemia and malnutrition in children.<sup>(2)</sup> Adult worms cause intestinal bleeding, resulting in blood in the stool in amounts proportional to the parasite load in the intestine.<sup>(3)</sup> Symptom associated with hookworm infestation includes abdominal pain, diarrhea, weight loss, loss of appetite. In chronic infections, the patients may become anemic as the worms feed on the individuals blood. The loss of blood prompts loss of iron and protein, causing trouble in breathing, pale appearance, tiredness, increase heartbeat, summed up swelling and barrenness. Therefore there is moderate development rate, heart issues or even heart failure, subjective execution in youngsters and eventually their instructive accomplishment.<sup>(4)</sup> World Health Organization (WHO) definitions for anemia vary by age, sex, and pregnancy status as pursues: for children a 6 months to 5 years old anemia is characterized as a Hb level <11g/dL, kids 5-11 years old Hb<11.5 g/dL, for adults Hb<13 g/dL; non-pregnant females Hb<12g/dL; pregnant females Hb<11g/dL and Severe anaemia is characterized as Hb<7.0 g/dL.<sup>(5)</sup> The relationship between parasitic infestation and anaemia is a pathogeno-physiologic type.<sup>(6)</sup> It is recognized that certain factors play important roles, and include: the strain and number of the parasite, size and site,

metabolic processes of the parasite, particularly the nature of any waste products, age and level of immunity at the time of infestation, immune responses to the infestation, presence of co-existing diseases or conditions which reduce immune responses, malnutrition, and the life style of the person infested. (7) In this manner, it is imperative to screen the issue time to time and handle it in light of a legitimate concern for general wellbeing. Therefore aim of the present study was to investigate the relationship between the anaemic patients with hook worm infection in different age group in a sample taken from Santosh Medical College, Ghaziabad, UP.

### MATERIAL AND METHODS

This study was carried out in patients from various outpatient departments and admitted in wards at Santosh Medical College, Ghaziabad Central Laboratory of Microbiology section. Over a period one year (2017-2018)

**Specimen collection and processing:** Stool samples were collected by using a clean and labelled container, portion of the stool was processed with direct microscopic technique by saline wet mount and iodine wet mount to detect intestinal parasites immediately. Examined the samples microscopically first with 10x and then with 40x objective for detection of helminths eggs, larvae and cysts of protozoan parasites. The remaining part of the samples was emulsified in a 10% formalin solution. Stool examinations were done using formal ether concentration technique, which is considered the most sensitive for most intestinal helminths. (8)

Blood samples were collected by vein puncture in tube containing anticoagulant (K2EDTA). Blood smear were made and stained by Giemsa stain. All determinations (haematocrit, haemoglobin, total count of red blood cells, total leukocyte count) were performed using the electronic cell counter Coulter. (9) The packed cell volume (PCV) was done with the help of microhematocrit machine. The mean cell hemoglobin concentration (MCHC) was

calculated from the values of hemoglobin (HB) and PCV. (10)

### RESULTS

**Table 1: Age wise and Sex wise Distribution of hookworm infection.**

Age (years)	Male (n=56)		Female (n=34)		Total (%)	
1-9	3	5.36%	2	5.88%	5	5.56%
10-19	8	14.29%	7	20.59%	15	16.67%
20-30	16	28.57%	12	35.29%	28	31.11%
31-40	13	23.21%	8	23.53%	21	23.33%
41-50	9	16.07%	3	8.82%	12	13.33%
51-60	4	7.14%	1	2.94%	5	5.56%
>60	3	5.36%	1	2.94%	4	4.44%
Total	56	100%	34	100%	90	100%

A total of 90 stool samples were positive hook worm infection in the different age group of study among which 56 (62.22%) were males and 34 (37.77%) were females. Among the positive hookworm cases, infection was relatively high in patient age of 20-30 years age group.

**Table 2: Characteristics of Positive case**

Characteristics	Frequency	Percent
Anemia		
Positive	37	41.11%
Negative	53	58.88%
Total	90	100.0%
Category of anemia		
Mild anemia	30	81.08%
Moderate anemia	7	18.91%
Total	37	100%

A total anemia was found to be 53(58.88%). Out of 53anemia cases, mild anemia 30(81.08%) and moderate anemia 7(18.91%).

**Table 3: Age wise and Sex wise Distribution of anemia**

Characteristics	Anemia		Total
	yes	no	
Age			
1-19 years	-	20 (100%)	20
20-40 years	26 (53.06%)	23 (46.93%)	49
41-60 years	9(52.94%)	8 (47.05%)	17
>60 years	2 (50%)	2(50%)	4
Gender			
Male	13(23.21%)	43(76.78%)	56
Female	24(70.58%)	10 (29.41%)	34

### DISCUSSION

Hookworms are the commonest intestinal parasites that cause the most severe anaemia resulting from iron deficiency due to chronic blood loss. Hookworm infestation is widely prevalent in India. Prevalence and intensity of hookworm infection are related to age and

sex.<sup>(11)</sup> However, there seems to be well variation within the age-intensity profile of hookworm infestation in the current study. The study revealed that individuals in age groups of highest incidence was in 20-30 years 28(31.11%) followed by 31-40 years 21 (23.33%). These observations are different with existing findings that prevalence of hookworm is high among children.<sup>(12)</sup> The high prevalence seen among individual within the age of 10 to 39 years could be attributed to the fact that they are physically active and are more likely to be involved in activities such as farming which exposes them to the infection.<sup>(13)</sup> There are, however, reports that suggest that hookworm infection in the elderly could be relatively high as observed in the study.<sup>(14)</sup> A total anemia among the hookworm infection was found to be 41.11% percent. Out of which mild anemia 30(80%) and moderate anemia 7(18.91%) was found to be respectively. This study results is also support by study of Nepal conducted by Sah RB et al. But some other study which showed the percentage of anemia was 82.5%. Out of which 39.5% were suffering from mild anemia, 35% were suffering from moderate anemia and 6.7% were suffering from severe anemia which was higher than our study.<sup>(15)</sup> In this study table number 3 shows that age group 1-19 years was not having anaemia but in age group 20-40 years was 26(53.06%) suffering from anaemia. Among total of 37(41.11%) female was higher 24(70.58%) compare to male 13(23.21%).

An investigation directed by Banu H et al in Bangladesh in 2014, which demonstrated that commonness of intestinal parasite among anaemic cases, was higher than on frail cases in all examination regions. It might be referenced herein iron deficient cases, the most elevated pace of disease was discovered 55.3% in Kamrangirchar and the second most elevated rate 50.7% in Zinjira. Out of all out 506 (32.2%) weak cases in the investigation, 59.1% were somewhat frail, 33.2% were reasonably and 7.5% were seriously anemic.

<sup>(16)</sup> Other concentrates detailed that parasitic invasion is one of the reasons for paleness.<sup>(17)</sup> Shah and Baig in 2005 revealed that iron deficiency altogether related with helminth infection.<sup>(18)</sup>

## CONCLUSION

The total 90 positive case of hook worm infection study males were higher 56(62.22%) but anaemic patient females were much higher 24(70.58%). Mild anaemia was 30(80.08%) and moderate 7(18.91%).

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