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# Relationship between Intestinal Parasite Infection and Anaemic Patients

**B. L. Chaudhary*[1], Charu Chandra[2]**

[1]Department of Microbiology, Mayo Institute of Medical Sciences, Barabanki, UP, India

**Abstract:** ***Background:*** ***We wanted to investigate the relationship between intestinal parasitic infection and anaemic patients.*** ***Methods:*** ***stool samples were examined for Protozoa and Helminths infection by routine microscopy and blood samples were performed using the electronic cell counter Coulter. Results: Out of 592 samples 277(46.79%) were positive among them Entamoeba histolytica 80(28%), Ancylostoma duodenale 66(23.82%), Ascaris lumbricoides 55(19.85%), Giardia lamblia 53(19.13%) and Trichuris trichiura 23(8.30%). Along this finding 55(19.85%) were anaemic caused by Ancylostoma duodenale 30(54.54%), Ascaris lumbricoides 10(18.18%), Entamoeba histolytica 7(12.72%), Giardia lamblia 6(10.9%) and Trichuris trichiura 2(3.63%) Conclusion: We found that 19.85% anaemic among intestinal parasitic infections conferred an increased risk of health, suggesting common pattern of infection is not clinically benign and thus, should not be ignored.***

**Keywords:** Anaemia, Complete blood cell count (CBC), Intestinal parasite.

## 1. Introduction

Intestinal parasitic infections are an important public health problem worldwide, especially in developing countries. [1] It is estimated that 3.5 billion people are affected, and that 450 million are ill as a result of these infections, the majority being children. [2] Intestinal parasitic infection mostly helminths, have been linked with an increased risk for nutritional anaemia, growth deficits in children, low pregnancy weight gain and intrauterine growth retardation followed by low birth weight. [3] World Health Organization (WHO) definitions for anaemia differ by age, sex, and pregnancy status as follows: for children 6 months to 5 years of age anaemia is defined as a Hb level <11g/dL, children 5–11 years of age Hb<11.5 g/dL, adult males Hb<13 g/dL; non-pregnant females Hb<12g/dL; pregnant females Hb<11g/dL and Severe anaemia is defined as Hb<7.0 g/dL [4]. Recent work indicates that morbidity is generalized, in particular, iron deficiency anaemia, growth stunting, and malnutrition. [5] The relationship between parasitic infestation and anaemia is a pathogeno-physiologic type. [6] It is recognised 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] The prevalence of *Ascaris lumbricoides* was highest 68.3%, followed by *Trichuris trichiura* 27.9%, *Enterobius vermicularis* 12.7% and *Taenia saginata* 4.6%.[8] Therefore, it is important to monitor the problem time to time and tackle it in the interest of public health. Intestinal parasitic infections especially due to helminths, which causes anaemia. The aim of the present study is to investigate the relationship between the anaemic persons and the presence of intestinal parasites in different age group in a sample taken from Mayo Institute of Medical Sciences, Barabanki, UP.

## 2. Materials and Method

This study was carried out in patients from various out-patient departments and admitted in wards at Mayo Institute of Medical Sciences, Central Laboratory of Microbiology section. Over a period of six months from November 2013 to May 2014

### 2.1 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. [9]

Blood samples were obtained by veinpuncture and collected into a tube containing anticoagulant (K2EDTA). Soon after collection, blood smears were prepared, stained with May-Grunwald-Giens. All determinations (haematocrit, haemoglobin, total count of red blood cells, total leukocyte count) were performed using the electronic cell counter Coulter. [10] The packed cell volume (PCV) was done using microhematocrit machine. The mean cell hemoglobin concentration (MCHC) was calculated from the values of hemoglobin (HB) and PCV. [11] The reference values of hemoglobin and hematocrit were considered being: < 3 years, Hb = 10.4 - 14 (g / dL) and HT = 32 - 43, four to ten years Hb = 11.5 to 14.5 g / dL and HT = 33 - 43%, eleven to sixteen years Hb = 12.5 to 16.1 and HT = 36 - 47% and> 17 years, Hb = 13.5 to 18.0 g / dL and HT = 42 - 52 %.[12]

## 3. Result and Discussion

Table no 1.shows total of 592 samples were examined, out of which 277(46.79%) samples were positive for parasitic infection in which males 154(55.08%) and females were 123 (44.40%). The prevalence of intestinal parasites infection found in this study was higher than study by Kumar Deepesh 16.8% in which males 54.33% and females were 47.10%.[13] Present study had also similar correlation with international study. [14,15] Table no 2. Age wise distribution pattern of different intestinal parasite the highest percentage of infection by *E. histolytica* occurs in the age 1-10 and 21-30(26.25%) while the lowest was in the age >60(2.5% %). As regard infection of *Ancylostoma duodenale* the highest infection was in the age 31-40 (34.84%) while the lowest was in the age 1-10(1.51%). The infection with *Ascaris lumbricoides* the highest was in the age 31-40(29.09%) and the lowest in the age >(1.81%). The highest infection with *Giardia lamblia* was in the age 1-10(35.84%) while the lowest in the age >60(0 %). As concern infection with *Trichuris trichiura* the highest infection rate (39.13%) was in the age 21-30 while the lowest was in the age 51-60(0%). The highest percentage was in this age means that the highest infection was in the childhood and adolescent group which mean the persons are highly active and does not care about their hygiene as persons are in close contact with pollutant with soil as they play on the ground and less care about their hygiene. This study also correlate with by Koukounari et al. [16] In Kenyan schoolchildren similar conclusion was drawn by Le et al. [17] Table 3**.** Demonstrates the distributions of hematological (blood) indices according to gender with percentage of anaemia female are more prevalent than males but similar study by Oguntibeju shows percentage of anaemia males are more prevalent than females. [18] Table 4. Relationship between positive case of parasite and anaemia a total 55 Anaemic patients *Ancylostoma duodenale* was noticed as main causes of anaemia 30(54.54%) and lowest was by Trichuris trichiura 2(3.63%). This form of deficiency anaemia usually results from a heavy hookworm burden which causes chronic blood loss. It is said that an adult hookworm ingests about 0.03 ml to 0.2 ml blood daily. This is also supported with the findings of Agiomeaet al. and Heyneman et al. [19, 20]

**Table 1:** Age and gender wise distribution of positive samples.

| *Sex* | *Total tested (%)* | *Positive (%)* |
|---|---|---|
| Males | 325(55.88) | 154(55.59) |
| Females | 265(44.76) | 123(44.40) |
| Total | 592 (100) | 277(100) |

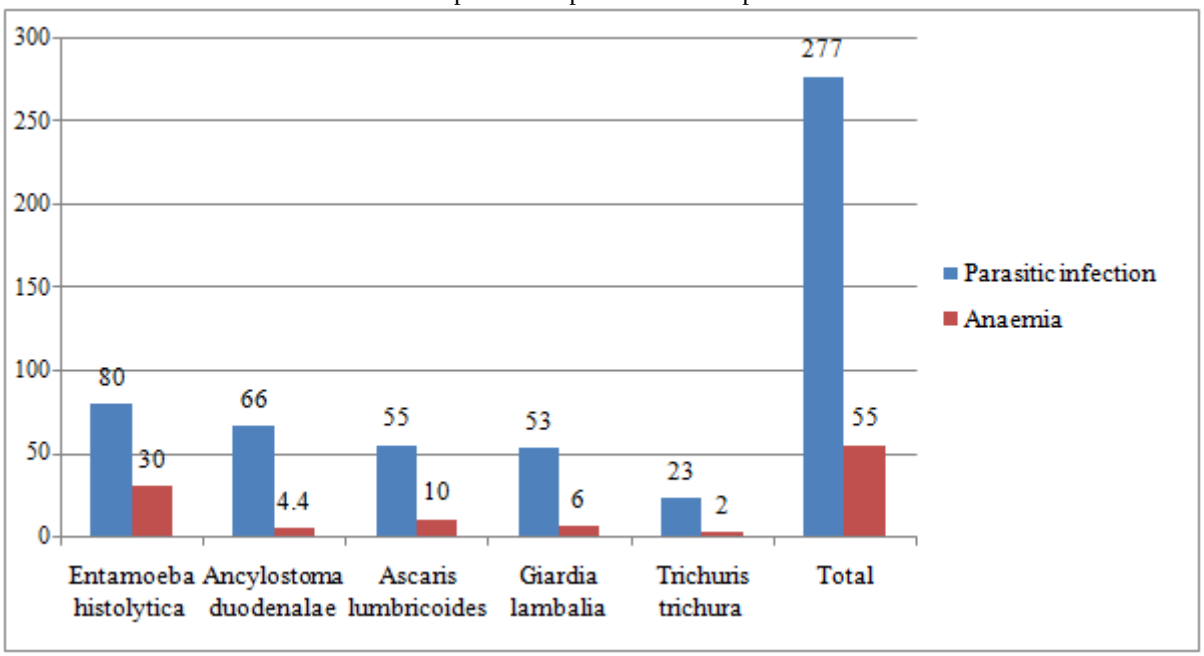
**Table 2**: Age wise distribution pattern of different intestinal parasite

| Age | *Entamoeba histolytica* (%) | *Ancylostoma duodenal(%)* | *Ascaris lumbricoides*(%) | *Giardia lamblia* (%) | *Trichuris trichiura* (%) |
|---|---|---|---|---|---|
| 1-10 | 21(26.25) | 1(1.51) | 3(5.45) | 19(35.84) | 0 |
| 11-20 | 17(21.25) | 6(9.09) | 7(12.72) | 14(26.41) | 7(30.43) |
| 21-30 | 21(26.25) | 10(15.15) | 11(20) | 10(18.86) | 9(39.13) |
| 31-40 | 9(11.25) | 23(34.84) | 16(29.09) | 5(9.43) | 5(65.21) |
| 41-50 | 7(8.75) | 17(25.75) | 12(21.81) | 3(5.66) | 2(8.69) |
| 51-60 | 3(3.75) | 7(10.6) | 5(9.09) | 2(3.77) | 0 |
| >60 | 2(2.50) | 2(3.03) | 1(1.81) | 0 | 0 |
| Total | 80(100) | 66(100) | 55(100) | 53(100) | 23(100) |

**Table 3:** Distribution of hematological indices according to gender

| Hemoglobin (Hb) | Males (%) | Females (%) | Total |
|---|---|---|---|
| >12gm/dl | 102 (45.94) | 120(54.05) | 222 |
| <12gm/dl | 15 (27.27) | 40 (72.72) | 55 |
| Packed cell volume (PCV) | | | |
| >35% | 133(59.90) | 89(40.09) | 222 |
| <35% | 20 (36.36) | 35 (63.63) | 55 |
| Mean cell hemoglobin concentration | | | |
| >31.0gm/dl | 107(48.18) | 115(51.8) | 222 |
| <31.0gm/dl | 37(67.27) | 18(32.72) | 55 |

**Table 4:** Relationship between positive case of parasite and anaemia



## 4. Conclusion

The prevalence of parasitic infections was (46.79%). warranting integrated approaches to food security including environmental sanitation, health education, and access to safe drinking water. We found that 19.85% anaemic among intestinal parasitic infections conferred an increased risk of health, suggesting that this common pattern of infection is not clinically benign and thus, should not be ignored.

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