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Research Article

PREVALENCE OF INTESTINAL PARASITIC INFESTATIONS AMONG ANEMIC PATIENTS IN AND AROUND DURG

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A B S T R A C T

Introduction: Parasitic infestations caused by protozoa and helminthes continue to take their toll on mankind. The knowledge of prevalence will even strengthen or justify the prophylactic use of broad spectrum anti-parasitic drugs particularly in children.

Place of study: The prevalence of parasitic infestations and anemia were determined among patients attending Shri Shankaracharya Institute of Medical. Sciences, Bhilai, Durg, Chhattisgarh.

Methodology: Study was performed on 70 stool specimens of anemic patients from March 2017 to September 2017. Specimen collected and examined with direct wet mount, Iodine mount and saturated salt flotation methods.

Results: The parasites that were seen include *Hookworm*, *Trichuris trichiura*, *Ascaris lumbricoide*, *Entamoeba histolytica* and *Giardia lamblia*. Anemia in this study was defined as hemoglobin (g/dl) level below 11.5 g/dl. The study showed a high parasitic infestation in anemic population.

Conclusion: High prevalence of parasitic infestation, demands the re-examination and re-evaluation of the nutritional practices, social factors, and the environment of the people. The people here are generally poor, thus malnutrition may be secondary to poverty, and both in turn playing a significant role in the prevalence of parasitic infestation and anemia, although parasitic infestation tends to increase the prevalence, level, and severity of anemia. Urgent interventional measures are required.

INTRODUCTION

Anemia remains one of the most intractable public health problems in India. Because of lack of proper investigations, prophylactic and therapeutic measures, it is responsible for large number of morbidity and mortality. Iron deficiency is the predominant cause of anemia in all age groups[1]. However, the possibility that infestation could also play an important role has received increasing attention during last few years[1]. Many studies have shown that *Hookworms* cause chronic intestinal blood loss[2]. Blood loss can also occur in *Trichuris* infestation, but probably becomes significant only in severe infestations[3,4,5]. Few studies have shown that hemoglobin levels were significantly associated with malaria[6]. Menstruation and pregnancy place stress on iron balance of women of child bearing age, so they are frequently found anemic[7].

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Low bio-availability of dietary iron is the cause for widespread iron deficient anemia in our country[8]. In the present study, it has been tried to examine the prevalence of anemia, type of anemia and relationship of anemia with common parasitic infestations, including *Malaria*, *Hookworms*, *Ascaris*, *Trichuris*, *Giardia* and *Entoamoeba histolytica*. This study will help in designing of integrated control strategies aimed at reducing anemia, including anthelminthic treatment programmes, micronutrient supplementation and malaria control measures.

MATERIAL AND METHOD

This study was conducted between March 2017 to september 2017 in Shankaracharya Institute of Medical Sciences, Bhilai. 100 clinically suspected cases of anemia attending OPD and IPD of Pediatrics and Medicine departments were enrolled in the study. Informed consent was taken. A blood sample (4.5 mL) was withdrawn from each participant with minimal stasis from the antecubital vein using a dry, sterile disposable syringe and needle. The blood was dispensed into tubes

containing the anticoagulant ethylenediaminetetraacetic acid (EDTA). The specimens were labeled with the subject's age, and identification number. The EDTA samples were kept at room temperature until processing, which occurred within 4 hours of collection. Analysis was done with fully automated 5 part differential hematology analyzer mindray BC-5150, able to test 18 parameters per sample including hemoglobin concentration, PCV, RBC concentration, MCH, MCV, MCHC, WBC count, and PLT count. Standardization, calibration of the instrument, and processing of the samples were done according to the manufacturer's instructions.

Anemia was defined as hemoglobin concentrations < 11.5 gm/dL[9]. Blood samples having hemoglobin < 11.5 gm/dL were examined by peripheral blood smear and type of anemia was confirmed.

Patients having anemia were asked for stool examination explaining them possibility of infestation. Assessment of intestinal parasitic infestation was done by distributing the containers for collection of stools and was asked to collect and deliver a sample of their feces next day. Stool samples were examined by direct normal saline and iodine wet mount[10]. Stool concentration method by saturated salt flotation method was done and again examined by normal saline and iodine wet mount. A 10% sub samples of smears was reexamined for quality control. Protozoa and helminthes were identified according to their morphological details (Monica Chesebrough)[11].

RESULTS

In the present study 100 anemic subjects excluding tuberculosis, chronic renal disease, pregnant female and leukemia were screened at the hematology section.

Out of these 70 cases were picked up on the basis of peripheral blood smear examination showing microcytic hypochromic, macrocytic normochromic, normocytic hypochromic and dimorphic anemia.

The details of these 70 comprised the present study.

Descriptive statistics for the study population are provided in the table.

S.No.	Variables	Population Estimate (N=100)	
01.	Anemic picture in peripheral blood smear	70	
02.	Type of anemia		
	Microcytic hypochromic	30	
	Dimorphic	17	
	Macrocytic normochromic	12	
	Normocytic normochromic	11	
03.	Age wise parasitic prevalence		
	2-20	20	
	20-40	10	
	40-60	01	
	>60	01	
04.	Grouping of anemia		
	Severity of anemia		
	hemoglobin level	20	
	Mild >= 9 gm %	29	
	Moderate 6-9 gm %	21	
	Severe < 6 %		
05.	Hematological values in cases of anemia screened	RANGE	MEAN
	MALES	5.9-9.0	7.5
	Hemoglobin	2.1-3.9	2.8
	RBC	18.5-25.4	23.3
	PCV%	63.3-110	83.8
	MCV	17.9-33.6	23
	MCH	28.2-35.6	32.4
	MCHC		
		RANGE	MEAN
	FEMALES	4.0-9.1	7.2
	Hemoglobin	1.78-4.18	3.0
	RBC	16.1-28.8	2.3
	PCV%	62.2-96.6	76.8
	MCV	15.1-30.7	24.3
	MCH	24.8-33.8	31.4
	MCHC		
06.	Cases of *Plasmodium* seen during peripheral blood smear examination	P.falciparum	06
		P.vivax	02
07.	Prevalence of intestinal pathogens in stool examination of anemic patients	**NO. OF CASES (70)**	
	INTESTINAL PATHOGENS	12 (17.14%)	
	Hookworm	07 (10%)	
	Trichuris trichura	05 (7.14%)	
	Ascaris	14 (20%)	
	Entoamoeba cyst	05(7.14%)	
	Giardia cyst	43(61.43%)	
	TOTAL		

DISCUSSION

Anemia is multifactorial in origin and disentangling its etiology remains problematic, with surprisingly few studies investigating the relative contribution of different parasitic infestations to anemia. We report anemia in 70 cases out of which 30 were Microcytic Hypochromic, 17 were Dimorphic, 12 were Macrocytic Norochromic and 11 were Normocytic Normochromic. More of young population was anemic (<20 years), which is in accordance to WHO reports.[12] Children espe- cially in rural areas have high rates of intestinal parasite infestation due to poor sanitation, contact with contami- nated water supply, low level of education and malnutrition. [13, 14]
8 cases of *Plasmodium* infestation were seen, which are in literature known to cause anemia. The anemia of malaria is multifactorial, involving a complexity of mechanisms including increased destruction of red blood cells (RBC's) through rupturing, phagocytosis and hypersplenism, and decreased RBC production through inflammation and dyserythropoisis (Menendez *et al*., 2000)[15].

Out of 70 cases of anemia, 32 (45.71%) cases were found to be infected cases of intestinal worms and out of which 11 samples were having mixed infestations. This is in agreement with the studies from Puducherry by Ragunathan *et al*. and from Lathur by Davane *et al*. but low when we compare it with the study from Vellore by Kang *et al*., showing a prevalence rate of 97.4%.[16,17,18] Various studies have shown that prevalence rate in India ranges from 12.5% to 66% with varying prevalence for individual parasites from region to region.[19,20,21,22] Population around this college is more engaged in handling of livestock and in field work too and thus are comparatively more exposed to contaminated soil and water, a major predisposing factor for infestation. The wide variation in the prevalence of intestinal parasites may be due to variations in factors like quality of drinking water supply, sanitation and other environmental conditions. The association between low hemoglobin and parasite positivity seems possible because intestinal parasites are lodged in the duodenum and jejunum, the site of iron absorption.[23] The relationship between parasite infestation and anemia is a pathogenic-physiologic type.[20] It is recognized that certain factors play an important role. They include the strain and number of the parasite, the size and site,

metabolic process of the parasite, particularly the nature of waste products, age and level of immunity at the time of infestation or presence of co-existing condition which re- duce immune responses, malnutrition and the life style of the person infested.[23]

Maximum prevalence among protozoan was of *Entomaoeba cyst* (20%) followed by *Giardia cyst* (7.14%) which is in accordance with study conducted previously by Nihar Dash *et al*. who reported *Entoamoaeba histolytica* (71.8%) and *Giardia lamblia* (17.5%) as most common protozoans.[24]

Giardia gets transmitted by feco-oral route by drinking contaminated water as it is a common environmental contaminant of water supply. The water supply is really an important risk factor for the Giardiasis, and several large outbreak of Giardiasis have resulted from the contamination of drinking water supply with the human waste. *Giardia* cysts have been isolated from water supplies in different parts of the world.[25,26,27,28,29]

The most common helminths infestation seen in our study was *hookworm* 17.14% followed by *T. trichura 10%* and *A. lumbricoides 7.14%*. This is in contrast to other studies in which *Ascaris* was the most common helminth.[16,17,30,31,32,33,34]
Prevalence of *hookworm* infestation can be attributed to walking barefoot in the fields as the infestation results from penetration of the skin by filariform larva.[18] *Hookworm* and *Trichuris trichura* are known cause of anemia which is consistent with other studies[2,3,4,35,36]. *Hookworm* causes chronic intestinal blood loss, thus is important cause of anemia[2]. *Trichuris trichura* is suggested to be associated with anemia mediated through iron deficiency caused by blood loss or anorexia[4]. Gastric juices that faci- litate iron absorption have been found to be reduced in Ascariasis.[37] Human parasitic infestation is a global problem of enormous proportion with wide variation in intestinal parasite from region to region; different geographic areas, communities and ethnic groups even seasonal variation are also known.[38]
High prevalence of intestinal parasitic infestation can be because of low socio- economic status, lack of health education, poor sanitation and contaminated water supply.[39]
In conclusion anemia is prevalent in young population and intestinal worms are important factor of malnutrition and anemia in the population. So, among interventional measures health education of school going children, maintenance of proper hand hygiene, provision of safe drinking water, proper waste disposal, identifying and treatment of infected as well as prophylactic antiworm treatment are most important.

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