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Research Paper

A Preliminary Study of Intestinal Parasitic Infection in a Tertiary Care Hospital of Western UP, India

Microbiology

KEYWORDS : Preliminary, Intestinal parasitic infection, a retrospective study.

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ABSTRACT

Background: Parasitic infections are a major public health problem worldwide; particularly in the developing countries. Aims: The aim of this study ware to determine the prevalence of intestinal parasitic infections among the patients. Material and Methods: A total of 692 stool samples were examined for Protozoa and Helminths infection by routine microscopy and Modified Ziehl-Neelsen stain. Results: In the study, Intestional parasitic infection is 16.8%. There are eight different type of parasite detected. The most common parasite identified were Entamoeba histolytica 49(42.24%), Giardia lamblia 28(24.13%), Ancylostoma duodenale 21(18.10%).The other Parasite detected as Strongyloides stercoralis 2(1.73%), Blastocystis hominis 2(1.73%), Isospora belli 1(0.86%) and Hymenolepis nana 1(0.86%) & Entamoeba coli 12(10.34%) also seen. Conclusion: It is need to develop effective diagnostic, prevention and control strategies including health education and environmental hygiene.

1. Introduction

Parasitic infections are a major public health problem worldwide; particularly in the developing countries [1]. The prevalence of the intestinal parasitic infections varies from one region to another and it also depends largely on the diagnostic methods which are employed and the number of stool examinations which are done. In India, malnutrition, unhygienic conditions, the improper disposal of sewage and the non-availability of potable water supplies in the rural and the urban areas are responsible for the high rate of intestinal parasitic infections [2]. Globally, as many as 500 million people may harbour Entamoeba histolytica and several tens of thousands die each year as a consequence of fulminating colitis or amoebic liver abscesses [3]. The number of people who are affected by Giardia lamblia, whipworm, roundworm and hookworm in the developing world has been estimated to be 200, 500, 700 and 800 million respectively [4]. The conventional methods which are used for the detection of intestinal parasites from stool include the direct wet mount and the iodine mount.Various concentration techniques like simple slat floatation, Zinc sulphate centrifugal floatation, formol - ether concentration and modified Formol-ether concentration are employed for the diagnosis and the epidemiologic surveillance of parasitic infections in humans. These techniques increase the detection of the Helminths eggs, larvae and the Protozoan cysts. The objectives of this study were to determine the prevalence of intestinal parasitic infections among the patients who attended a tertiary care hospital at our area.

2. Material and Methods

2.1 Methodology

A retrospective study was carried out in the Parasitological section of the Department of Microbiology, Subharti Medical

College & Hospital U.P, India, for a period of one year (January 2012 to December 2012).

2.2 Sample size

A total of 692 stool samples examined by routine microscopy and Modified Ziehl-Neelsen (ZN) stain.

2.3 Sample collection

The patients were provided wide mouthed clean, dry, properly labeled plastic container for collection of samples and recommend 5grams of solid or 10ml of liquid stool. The stool samples were examined within 1-2 hours of collection.

2.4 Microbiological examination

Each stool specimen was examined by the following techniques.

1. **Macroscopic examination:** The colour, consistency and the nature of the faeces were noted. The stool specimens were examined for the presence of worms like Ascaris, Enterobius, proglottids of Taenia, adult Hookworm and Trichuris, either with the naked eye.
2. **Direct microscopic examination by using saline and iodine preparations:** On a 1mm thick microscopic slide, a small amount of stool sample was emulsified in 1-2 drops of Normal saline(Himedia Pvt. Ltd Mumbai) and Lugal iodine (Himedia Pvt. Ltd Mumbai) solution. A cover slip was placed on it by taking care that the preparation was free of air bubbles and macroscopic debris. Unstained saline wet mount preparation was done to detect Protozoal tropozoites and Helminths eggs or larvae.iodine wet mount was done to detect cysts 5.
3. **The microscopic examination after the concentration technique:**
   Formol-ether concentration method6: The Formol-ether concentration technique was performed for those cases which were negative by saline preparation method but had strong clinical suspicion of intestinal parasitism.
4. **Modified Ziehl-Neelsen (ZN) stain method for I.belli, *C.parvum and C.cayetanensis6*-**
   Reagent- Carbol Fuchsin stain (Himedia Pvt Ltd Mumbai), Malachite green stain(Himedia Pvt Ltd Mumbai) and Acid alcohol 1%v/v (Himedia Pvt Ltd Mumbai) Methanol (Himedia Pvt Ltd Mumbai.

I. Prepare a smear from sediment obtained by formol-eyher oocyst concentration technique; fix the smear with Methanol for 2-3 minute.
II. Stain with unheated carbol fuchsin for 15 minutes.
III. Decolorize with 1% acid alcohol for 10-15 second.
IV. Counter stain with 0.5% malachite green for 30 second.
V. Wash off the slide with water after every step.

3. Results

1. A total of 692 samples were examined, out of which 116(16.8%) samples was positive for parasitic infection.
2. Children (21.55%) were less infected than adults (78.44%) and the infection rate is similar in female ≤ 15 year (15.68%) and ≥ 15 year (15.84%) (Table 1).
3. The infection was higher in age groups between 16yr-50yr (65.52%) (Table.2).

Table 1: Age and gender wise distribution of positive samples (n= 116).

Category	Total tested	Positive	Percentage (%)
Age < 15 years	183	25	13.67
Male	132	17	12.87
Female	51	08	15.68
Age > 15 years	509	91	17.88
Male	244	49	20.09
Female	265	42	15.85

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Table 2: Age wise distribution pattern of Protozoa and helmints infection in children and adults.

Age of patient	Name of Parasites							
	E.H/ E.D	G.l	E.coli	H.w	B.h	I.belli	S.s	H.nana
0–5	8	3	1	-	1	1	-	1
6–10	-	4	-	-	-	-	-	-
11–15	2	-	3	1	1	-	-	-
16–20	6	2	4	3	-	-	2	-
21–30	16	6	4	2	-	-	-	-
31–40	5	8	-	8	-	-	-	-
41–50	7	2	-	1	-	-	-	-
51–60	3	2	-	4	-	-	-	-
≥60	2	1	-	2	-	-	-	-

E.H/E.D-*Entamoebahitolytica/Entaboebadispar*,G.l*Giardia lambliaa*, E.coli-*Entamoeba coli,* H.W-Hookworm, B.h-*Blastocystis hominis*, I.belli-*isosporabelli*, S.s-*Strongyloides stercorali* , H.nana-*Hymenolepis nana*.

Among eight deferent type of parasites detected, the most common parasite identified were *Entamoeba histolytica* 49(42.24%), followed by *Giardia lamblia* 28(24.13%), *Ancylostoma duodenale* 21(18.10%) and *Entamoeba coli* 12(10.34%) also seen. The other parasite present as *Strongyloides stercoralis* 2(1.73%),*Blastocystis hominis* 2(1.73%), *Isospora belli* 1(0.86%) and *Hymenolepis nana*1(0.86%) **(Table 3).**

Table 3: Distribution pattern of different intestinal parasite (n=116).

Name of parasite	No. of positive	Percentage (%)
Entamoeba histolytica	49	42.24
Giardia lamblia	28	24.13
Isospora belli	1	0.86
Blastocystis hominis	2	1.73
Entamobea coli	12	10.34
Ancylostoma duodenale	21	18.10
Strongyloides stercoralis	2	1.73
Hymenolepis nana	1	0.86

4. Discussion

Parasitic infestations are the major causes of morbidity and mortality in developing countries like India. The data on their prevalence and the sensitivity of various diagnostic methods help the clinicians and the microbiologists in the diagnosis and the management of the patients.The prevalence of intestinal parasites infection found in our study is much lower (16.8%). but still it seems alarmingly high in comparison to international scenario[7-13.] Various studies have shown different prevalence rates of the parastitic infestations in different parts of India. But most of the studies had less sample sizes. The isolation of Protozoal cysts was higher than that of the Helminths ova. Our study showed that the most common intestinal parasite observed was *E. histolytica* (42.24%). Prakash, Tandon, and Shrivastava have also reported 35.6% and 18.4% positivity for the same[14,15]. The prevalence of *E. histolytica* has been observed as a common finding in tropical and subtropical countries and is responsible for diarrhoea and amoebic liver abscess in several studies[16]. These intestinal parasite are commonly transmitted by infected drinking water and food. In India, the water supply poses a big problem due to faecal contamination of the same. The most common Helminths infection in our study was *A. lumbricoides* (18.10%) which was similar to studies by Shrivastava where 22.2% of stool samples demonstrated *A. lumbricoides*[15].

However, in their study, the prevalence of *E. histolytica* was highest (42.24%) followed by *G.lamblia* (24.13%), *A.lumbricoides* (18.10%).

The presence of oocysts of *Isospora belli* 1(0.86%) was an unusual finding in our study, as it is usually associated with AIDS patients and is responsible for chronic diarrhoea. Dalvi *et al,* have reported *I. belli* as the most common pathogen among HIV associated diarrhoea17.

The prevalence of parasitic infections was more common in males (20.1%) as compared to that in females (15.8%), in age >15 year (Table-1). Marothi Y et al.,[18] showed that the infections had a female preponderance. Various studies have shown the varying sex prevalence of the parasitic infections. However, the sex predominance for the parasite infections has still not been confirmed. The reason for the male preponderance in our study may relate to the daily activity rather than the sex predominance. Kang G et al.,[19], The maximum number of parasites which was shown in a single sample was 3 (*Entamoeba histolytica cysts*, *Isospora belli oocysts* and *Giardia lamblia*).

The diagnosis of parasitic infections in humans is challenging and it requires skills to identify and to differentiate them from one another. The routine diagnostic procedures lack sensitivity. The concentration methods should be performed routinely for the examination of parasites. Concentration permits the detection of the organisms which are present in small numbers: these may be missed by using direct wet mounts. The organisms that can generally be identified by using concentration procedures include: helminths eggs and larvae; cysts of *Giardia lamblia*, *Entamoeba histolytica / Entamoeba dispar, Entamoeba coli, Endolimax nana, Blastocystis hominis* and *Iodamoeba butschii*; and the oocysts of *Isospora belli*.

5. Conclusion

1. The prevalence of parasitic infections low (16.8%). Studies from different part of India and outside from India have reported a parasite prevalence rate of 25% to 70%.20
2. The infection of *Entamoeba coli* 12(10.34%), a commensal parasite is indicative of the populations precarious sanitary conditions and of elevated environmental contamination high listing the need for education, focused on hygiene measures.
3. Protozoal infection is more common than Helminths infection.
4. The Formol-ether technique to increase the diagnostic sensitivity.

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