

Full Length Research Paper

Prevalence of intestinal parasites at Ujjain, Madhya Pradesh, India: Five-year study

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Accepted 13 February, 2019

This study was conducted to determine the prevalence of intestinal parasites in hospitals at Ujjain. A total of 5990 samples were collected in five years: 3580 from Ujjain Charitable Trust Hospital (Urban population) and 2410 from R. D. Gardi Medical College (Rural population). Overall prevalence rate of intestinal parasite was 21.4%. *Entamoeba histolytica* (10.5%) was the commonest protozoa followed by *Giardia lamblia* (3.9%). Among the helminths, *Ascaris lumbricoides* (2.8%) was the commonest. Multiple infections were seen in 70 samples. There was difference in prevalence between urban (20.2%) and rural (23.1%) population. Females (27.4%) were more affected than males (18.2%) and age group 0 to 10 years old had the highest rate of infection. The results indicate that there is a need to implement control measures in form of regular deworming, health education and provision of safe water supply.

Key words: Intestinal parasites, prevalence, rural, urban, Ujjain.

INTRODUCTION

Intestinal parasitic infestation represents a large and serious medical and public health problem in developing countries. Risk factors for this high prevalence being low levels of sanitation, lack of safe water supply, poor hygiene, low socio economic status and impoverished health services. Helminths such as *Ascaris lumbricoides*, hookworm, *Trichuris trichiuria*, *Enterobius vermicularis* and protozoa *Entamoeba histolytica* and *Giardia lamblia* are some of the common intestinal parasites responsible for considerable morbidity in young and adult population (Koneman et al., 1997). In India, prevalence of intestinal parasites reported from different workers shows wide variations from 11.3 to 90% (Sethi et al., 2000; Rao et al., 2003; Chandrasedhar and Nagesha, 2003; Patel, 1986; Hedge and Patel, 1986) probably due to difference in time, place and method used. Prevalence has been reported in the past by: (a) Population study: giving us the prevalence of different types of parasitic infestation in given population (Kang, 1998) and (b) by analysis of

reports of stool samples received at Microbiology laboratory: giving prevalence in symptomatic patients. In present study, stool samples received at Microbiology laboratories of R. D. Gardi Medical College (RDGMC) and Ujjain Charitable Trust Hospital (UCTH), both being part of one establishment, were included. RDGMC being situated at the outskirts of Ujjain city caters mainly rural population and UCTH situated in the heart of city receives urban population. This, thus, is a hospital based study the purpose of which was to obtain information as regards to the frequency of different types of helminthic and protozoal infestation in symptomatic patients. These studies are important as they provide basic data for the control of parasitic infection in future.

MATERIALS AND METHODS

This study was conducted from January 2006 to December 2010 and includes stool samples of the patients admitted to the wards as well as those attending the outpatient department of the hospital. Stool samples were collected in screw capped, labeled plastic container, which were distributed to patients one day prior to the day of collection. Stool samples were subjected for complete examination – gross and direct microscopic examination

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Table 1. Prevalence of intestinal parasites in 5-year period.

Intestinal parasite	2006	2007	2008	2009	2010	Total
I) Protozoa						
<i>E. histolytica</i>	135 (11.8)	123 (10.3)	131 (10.4)	119 (9.9)	126 (10.5)	634 (10.5)
<i>G. lamblia</i>	51 (4.4)	58 (4.8)	48 (3.8)	41 (3.4)	37 (3.0)	235 (3.9)
II) Helminths						
Ascaris	41 (3.5)	37 (3.1)	32 (2.5)	33 (2.7)	30 (2.5)	173 (2.8)
Hookworm	22 (1.9)	26 (2.1)	19 (1.5)	28 (2.3)	29 (2.4)	124 (2.0)
<i>E. vermicularis</i>	10 (0.8)	6 (0.5)	8 (0.6)	3 (0.2)	6 (0.5)	33 (0.5)
<i>H. nana</i>	12 (1.0)	11 (0.9)	10 (0.7)	11 (0.9)	13 (1.0)	57 (0.9)
<i>Taenia</i> spp.	4 (0.3)	3 (0.2)	5 (0.3)	2 (0.1)	3 (0.2)	17 (0.2)
<i>T. trichiura</i>	1 (0.08)	3 (0.2)	2 (0.1)	3 (0.2)	1 (0.08)	10 (0.1)
III) Multiple infection						
Two parasite	14 (1.2)	11 (0.9)	10 (0.7)	9 (0.7)	16 (1.3)	60 (1.0)
Three parasite	3 (0.2)	0 (0.0)	1 (0.07)	4 (0.3)	2 (0.1)	10 (0.1)
Total +ve/ Total sample examined = %	276/1141 = 24.1%	267/1192 = 22.3%	255/1256 = 20.3%	240/1202 = 19.9%	245/1199 = 20.4%	1283/5990 = 21.4%

Figure in parenthesis indicates percentage.

(saline and iodine preparation) within 1 to 2 h of its collection. Negative samples were re-examined after formal ether concentration method. Protozoa and helminthes were identified according to morphological details (Garcia, 1999).

RESULTS

The distribution of eight different parasites identified among hospital patients is shown in Table 1. Out of 5,990 stool samples examined, 1283 (21.4%) were positive for one or more intestinal parasites. The overall prevalence of intestinal parasite showed gradual decline from

2006 (24.1%) to 2009 (19.9%) with slight increase in 2010 (20.4%). The protozoal infection was two times more common than helminthic infection. *E. histolytica* (10.5%), *G. lamblia* (3.9%) were the predominant parasite followed by *A. lumbricoides* (2.8%) and Hookworm (2.0%). Of all processed samples, 70 samples showed multiple infections. The prevalence of double infection being 1% and that of triple infection being 0.1%. Samples collected from UCTH (3580) were considered to represent urban population and those from RDGMC (2410) as to rural population as shown in Table 2. Higher prevalence was noted in rural population (23.1%) in comparison with urban

population (20.2%).

Table 3 indicates that the rate of infection was higher in females (27.4%) than in males (18.2%). In age group distribution, most of the infected cases (24.0%) were in 1 to 10 year's group. No significant difference was noted in season wise distribution of intestinal parasite.

DISCUSSION

The prevalence of intestinal parasite in this study was 21.4% which is less when compared with the findings of Rao et al. (2003) (59.5%),

Table 2. Prevalence of intestinal parasites in urban and rural positives.

Intestinal parasites	Urban (n = 3580)	Rural (n = 2410)	Total
(i) Protozoa			
<i>E. histolytica</i>	357(49.3)	297 (53.1)	634
<i>G. lamblia</i>	140(19.3)	75(13.4)	235
(ii) Helminths			
Ascaris	104(14.3)	69(12.3)	173
Hookworm	56(7.7)	68 (12.1)	124
<i>E. vermicularis</i>	22(3.0)	11 (1.9)	33
<i>H. nana</i>	29(4.0)	28 (5.0)	57
<i>Taenia</i> spp.	10(1.3)	7(1.2)	17
<i>T. trichiura</i>	6 (0.8)	4(0.7)	10
Total	724(20.2)	559 (23.1)	1283

Figure in parenthesis indicates percentage.

Table 3. Prevalence of intestinal parasite by sex and age.

Parameter	Total no. of samples	Positive samples (%)
(i) Sex		
Male	3908	712 (18.2)
Female	2082	571 (27.4)
Total	5990	1283 (21.4)
(ii) Age group (years)		
1-10	2086	502 (24.0)
11-20	1008	195 (19.3)
21-30	940	207 (22.0)
31-40	995	189 (18.9)
> 40	961	190 (19.7)
Total	5990	1283 (21.4)

Figure in parenthesis indicates percentage

Chandrashekar and Nagesha (2003) (68%), Patel (1986) (75%), Hedge and Patel (1986) (90.6%) and Kang et al. (1998) (97.4%). But this finding is in agreement with reports of Vidyarthi (1969) (26.7%) and Chandrashekar et al. (2005) (21.3%).

The prevalence of protozoal infection was higher than that of helminthic parasites and *E. histolytica* was the commonest intestinal parasite isolated which is comparable to the study from Bombay (Patel, 1986). High prevalence has also been noted from Malaysia (21%) (Nor et al., 2003). Other studies (Chandrashekar et al., 2005; Nagaraj et al., 2004), however, have reported Giardia to be the commonest parasite, which appeared to occur in low percentage of patients (3.9%) here.

Among the helminthic parasite *A. lumbricoides* was the commonest; findings being in confirmation with the observations made by several other workers (Chandrashekar and Nagesha, 2003; Patel, 1986; Hedge and Patel, 1986; Nagaraj et al., 2004). The prevalence of hookworm in this area seems to be much lower than that reported from Southern India where it is 61.5% (Kang, 1998). Prevalence of other helminths such as, *Taenia* spp., *E. vermicularis*, *Hymenolepis nana* and *Trichuris trichiura* was quite low (<1%).

Prevalence rate was also higher in rural population, which is in concordance with studies from Karnataka (Chandrashekar and Nagesha, 2003) and Western Nepal (Chandrashekar et al., 2005). This could be attributed to

poor environment and low socioeconomic condition prevailing in rural areas.

Our result showed high infection among females. However, the sex predominance for parasite infection is still not confirmed. Some report higher rate in males (Sethi et al., 2000; Rao et al., 2003) and some in females (Ali et al., 1999; Yong et al., 2000). The others reported similar rate in both sexes (Patel, 1986; Hedge and Patel, 1986). The infection may relate to the daily activity of the patients rather than sex. Concerning the relation of age group and parasite infection, our study revealed the high infection rate in age group of 1 to 10 years which might be due to high exposure of children to contaminated surrounding.

To conclude, parasitic diseases are still common and responsible for mild but chronic morbidity. To alleviate this prevailing health problem of the country, it requires multidisciplinary effort. Health facilities should be improved and provision made for adequate and safe water supply. Also, there is need for health programmes to be held regularly that will involve periodic deworming, health education concentrating on teaching the most elementary but important sanitary procedures. Regular surveys regarding the prevalence of intestinal parasites in hospitals and communities should be encouraged as these surveys not only give an estimate of prevalence of particular parasite, but also serve as an index of the communities' progress towards effective sanitation.

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