African Journal of Microbiology Research Vol. 5(18) pp. 2711-2714, 16 September, 2011
Available online http://www.academicjournals.org/AJMR
DOI: 10.5897/AJMR11.459
ISSN 1996-0808 ©2011 Academic Journals

Full Length Research Paper

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

Yogyata Marothi* and Binita Singh

Department of Microbiology, R.D.Gardi Medical College, Ujjain (MP), Madhya Pradesh, India.

Accepted 22nd August, 2011

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.

*Correspondence author. E-mail: dryogyata@yahoo.com. Tel: 9300574488.

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

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

Intestinal parasite	2006	2007	2008	2009	2010	Total
I)Protozoa						
E. histolytica	135 (11.8)	123 (10.3)	131 (10.4)	119 (9.9)	126 (10.5)	634 (10.5)
G. lamblia	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)
E. vermicularis	10 (0.8)	6 (0.5)	8 (0.6)	3 (0.2)	6 (0.5)	33 (0.5)
H. nana	12 (1.0)	11 (0.9)	10 (0.7)	11 (0.9)	13 (1.0)	57 (0.9)
Taenia spp.	4 (0.3)	3 (0.2)	5 (0.3)	2 (0.1)	3 (0.2)	17 (0.2)
T. trichiura	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			
E. histolytica	357 (49.3)	297 (53.1)	634
G. lamblia	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
E. vermicularis	22 (3.0)	11 (1.9)	33
H. nana	29 (4.0)	28 (5.0)	57
Taenia spp.	10 (1.3)	7 (1.2)	17
T. trichiura	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 (Chandrasedhar 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, Hymenolepsis nana and Trichuris trichiura* was quite low (<1%).

Prevalence rate was also higher in rural population, which is in concordance with studies from Karnataka (Chandrasedhar 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.

REFERENCES

Ali I, Mekete G, Wodajo N (1999). Intestinal parasitism and related risk factors among students of Asendabo elementary and junior secondary school, South Western Ethiopia. Ethiop. J. Health Dev., 13: 157-161.

Chandrasedhar MR, Nagesha CN (2003). Intestinal helminthic infestation in children. Ind. J. Pathol. Microbiol., 46: 492-494.

Chandrashekar TS, Joshi HS, Gurung M, Subba SH, Rana MS and Shivananda PG (2005). Prevalence and distribution of intestinal parasitic infestations among school children in Kashi District, Western Nepal. J. Med. Biomed. Res., 4: 78-82.

Garcia LS (1999). Parasite identification, Chapter 7. In: Practical guide to diagnostic Parasitology. Washington D.C.: ASM Press., pp. 183-275.

Hedge GR, Patel JC (1986). Prevalence of intestinal parasitic infestation in rural area. J. Postgrad. Med., 32: 225-228.

Kang G, Mathew MS, Rajan DP, Daniel JD, Mathan MM, Mathan VI, Muliyil JP (1998). Prevalence of intestinal parasites in rural Southern Indians. Trop. Med. Int. Health., 3:70-75.

Koneman EW, Allen SD, Janda WM, Schreckenberger PC, Winn WC, editors. (1997) Parasitology, Chapter 20. In: Color Atlas and Textbook of Diagnostic Microbiology. 5th edn. New York: JB Lipincott., pp. 1071-1076.

Nagaraj S, Raghavan R, Macaden R, Kurpad AV (2004). Intestinal parasitic infection and total serum IgG in asymptomatic adult males in an urban slum and efficacy of antiparasitic therapy. Ind. J. Med. Microbiol., 22: 54-56.

Nor A, Ashley S, Albert J (2003). Parasitic infections in human communities living on the fringes of the Crocker range Park Sabah, Malaysia. ASEAN Review of Biodiversity and Environmental Conservation Available at http://www.arbec.com.my/pdf/art11janmar03.pdf. (Assessed on 20 June 2007).

Patel JC (1986). Ten year study of stool samples with particular reference to intestinal parasites. J. Postgrad. Med., 32: 219-224.

Rao VG, Aggrawal MC , Yadav R, Das SK, Sahare LK, Bondley MK, Minocha RK (2003). Intestinal parasitic infections, anaemia and undernutrition among tribal adolescents of Madhya Pradesh. Ind. J.Community Med., 27: 26-29.

Sethi S , Sehgal R, Malla N, Dudey ML, Mahajan RC(2000). Changing trends of intestinal parasitic infections in Chandigarh (Northern India): Hospital based study. Ind. J. Med. Microbiol., 18: 106-109.

Vidyarthi SC (1969). Prevalence of intestinal parasites in Lucknow. Ind. J. Med. Sci., 23: 654-660.

Yong TS, Sim S, Lee J, Ohrr H, Kim MH, Kim H (2000). A small scale survey on the status of intestinal parasitic infections in rural villages in Nepal. Korean J. Parasitol., 38: 275-277.