Research Article

DCSI 09: 166 –171 (2013)
Received: 27 May, 2013
Revised: 03 June, 2013
Accepted: 17 June, 2013
Online: www.dcsi.in

Intestinal Helminthiasis among School Children in Aurangabad district, Maharashtra state, India

S. B. Avhad and C. J. Hiware
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S), India.
Email: sunil_zoology@rediffmail.com, drhiware@rediffmail.com

Abstract:
A cross sectional study of intestinal helminthiasis among school pupils was undertaken in from eight schools in 7 tehsil of Zilla Parishad (Z.P) schools of Aurangabad district, Maharashtra, India during June 2012 to April 2013 were evaluated the prevalence and intensity of helminthic infections. Stool sample from 584 children were analysed using the Kato-Katz technique. The overall prevalence *Ascaris lumbricoides* was the most common STH (68.24 %) followed by *Trichuris trichiura* (23.22 %) and hookworm (12.5 %). Children age of 9-10 years had the highest rate of infection, respectively. Though there was no significant ($p>0.05$) sex related difference in the prevalence of helminth infection, *A. lumbricoides* and hookworm infection were relatively higher in male pupils. Mixed infections were recorded, with *Ascaris* and hookworm, and *Ascaris* and *Trichuris* being the two most commonly occurring combinations.

Key-word: Intestinal helminthiasis, school children and Prevalence

Introduction:

The World Health Organization (WHO) estimates that more than one billion of the World's populations including at least 400 million school age children are chronically infected with soil-transmitted helminths (STH). Evidently, there is need for continuous evaluation of prevalence of intestinal infection among school children, since they seem most likely group at risk for constant infection. The morbidity of STH infestations is greatest among children of school age and may have an adverse effect on growth (Nematian *et al*., 2008). Preschool children, defined as aged less than five years, make up between 10%–20% of the two billion people worldwide. Among them, 21 million were infested with Hookworm, 122 million were infested with *A. lumbricoides* and 86 million were infested with *T. trichiura* (De Silva *et al*., 2003).

In Sub-Saharan Africa, intestinal helminth infections are common and of major health concerns because factors that predispose man to the infections such as poverty, poor sanitation, ignorance and malnutrition prevail (Ijagbone and Olagunju, 2006). Furthermore, the habit of playing on sand resulted in very widespread parasitism with a variety of helminths, and eating habits that involve the consumption of raw vegetables, fish, crustaceans and meat allow the transmission of helminths infections (Montressor *et al*., 2002). The global prevalence and number of cases of intestinal helminths infection in school age children have been estimated to be Roundworm 35% (320million); Whipworm 25% (233million); Hookworm 26% (239million), others 14% (128million) (Partnership for Child Development, 1999). The severity of the disease caused by soil- transmitted nematodes has consistently been found to depend on the number of worms present per person (Crompton and Nesheim, 2002).

Although several studies on parasitic infections of school children have been carried out in some part of India, it is still necessary to do similar studies in different other parts of the country at different times, in view of the changing dynamic of parasitic infections. In India, various studies have been carried out to estimate the status of soil transmitted helminth infections (Bora *et al*., 2001, 2003, 2006; Avhad and Hiware, 2012) but there is paucity of report on intestinal heminthiasis among school children in from eight schools in 7 tehsil of Zilla Parishad (Z.P) schools of Aurangabad district, Maharashtra, India. Therefore, this study set out to assess the occurrence and intensity of intestinal helminth infections among the school children in the study area in order to serve as a guide for health planners in the state in evaluating worm control programs among school children.

Materials and methods:

Study Area:

Aurangabad is situated on 19^0 52' North Latitude and 75^0 18' East Longitude. The survey was conducted during June 2012 to April 2013. The stool samples were collected from 584 number of male and female school children in the age group 9-10 years from different eight schools of 7 Talukas of Aurangabad district Maharashtra, India.

Prevalence and Intensity:

Five hundred and eighty four school children, age 9-10 years, in 8 randomly selected primary schools in Aurangabad district, Maharashtra state, were investigated for their intestinal helminthic infections during June 2012 to April 2013.

The schools included are as follows:

Sr. no.	**School**	**Code**
01	Bhartiya Primay School, Hudco, N-11 Aurangabad	S1
02	Amar Primary School, Sanjay Nagar, Aurangabad	S2
03	Zilla Parishad School, (Z.P.), Waluj, Tal –Gangapur	S3
04	Zilla Parishad School, (Z.P.), Dongergaon, Tal – Phulambri.	S4
05	Ramkrishna School, Tal- Sillod	S5
06	Zilla Parishad School, (Z.P.), Tal. Paithan	S6
07	Central school, Yellora, Tal- Khultabad	S7
08	Zilla Parishad School, (Z.P.), Tal – Vaijapur.	S8

Collection and examination of faecal samples:

The pupils were educated on the causes of intestinal helminthic infections among school aged children and they were convinced that every child ought to be free from such infections, thus the necessity of participating in the research work was appreciated by them. Thereafter, wide mouth corked sterile bottles were given to the pupils for the collection of their stool samples at home and structured questionnaires were distributed among the participating pupils for the collection of demographic information such name (optional), age, sex, type of toilet facility used, and number of individuals in the house, parents occupation, religion, foot were habits, pet/domestic animals reared, regularity of deworming etc. and accordingly labeled (ID).

The pupils were taught how to collect stool samples and with the aid of their teachers, the questionnaires were correctly filled. The height and weight of the pupils were taken in the morning of the following day as they submitted their stool samples between 7.30 and 8.30 am. The stool samples were properly labeled and were carried in a cold box filled with ice packs and transported to the private laboratory for analysis. The samples that could not be analysed immediately were preserved using 10% formalin until they were examined (Cheesbrough M, 1998). Stool analysis was performed using the Kato-Katz technique (WHO, 2003).

The following formula is used to calculate the prevalence and intensity of infection in a community according to WHO guidelines.

$$\text{Prevalence} = \frac{\text{Number of subjects testing positive}}{\text{Number of subjects investigated}} \times 100$$

Stool examination

Fresh morning stool samples were collected in nylon containers containing 10 ml of 10% formaldehyde. The containers were labeled, and immediately transported to the pathology laboratory for further processing. The stool specimens were processed using Water low's classification.

Results and Discussion

Table 1: Prevalence of intestinal helminthes in school children from selected primary schools of Aurangabad District, Maharashtra, India.

School code	No of pupils Examined	No of infected %	The prevalence of intestinal helminthes (%)		
			Ascaris	*T. trichuries*	Hook worm
S1	74	32	17(53.12)	8(25)	7(21.87)
S2	85	24	13(54.16)	8(33.33)	3(12.5)
S3	83	37	27(72.97)	7(18.91)	3(8.10)
S4	70	23	16(69.56)	5(21.74)	2(8.69)
S5	61	17	13(76.47)	4(23.53)	--
S6	58	13	9(69.23)	3(23.07)	1(7.69)
S7	81	34	26(76.47)	7(20.59)	1(2.94)
S8	72	31	23(74.19)	7(22.58)	1(3.22)

Table No.1 shows that the prevalence of infection of infection among the school ranged between 76.47 (S5 and S7) and 53.12 (S1). There were significant differences in the prevalence of infection between schools (S1, S2, S3, S4, S5, S6, S7 and S8).

Table 2: Prevalence of intestinal helminthes infections in relation to age and sex of pupils

Age range years	**No. Examined**	**No. of infected %**	***A. Lumbricoides* %**	***T. Trichuris* %**	**Hookworms %**
9-10	M – 380	168(79.62)	118(81.94)	38(77.55)	12(66.66)
	F – 204	43(20.38)	26(18.05)	11(22.45)	06(33.33)
	T - 584	211(36.13)	144(68.24)	49(23.22)	18(12.5)

% Prevalence of infection in parenthesis * $p>0.05$

M =Male, F = Female, T = Total.

Table 2 shows that the overall prevalence of infection of the infection of the helminths was highest in pupils age 9-10 respectively, the table further shows that *A. lumbricoides*. Infections were highest in 9-10 years old pupils. Table 2 shows that out of 584 pupils examined 380 (65.06) and 204 (34.93) were males and females, respectively, of these 168 (79.62) males and 43 (20.38) females were infected; the difference was not significant. The prevalence of infection of *A. lumbricoides* and *T. trichiura* were higher in males than females, where as those of *A. lumbricoides* were and *T. trichiura* were higher in males, the differences are not significant (9.42 %) of the 211 infected subjects, 144 (68.24) and 49 (23.22) had double and triple intestinal helminth infections, respectively. *Ascaris lumbbricodes* occurred mostly with the other helminths, *Ascaris* + *T. trichuries* were the most common occuring combination. These results are shown in Table 3 as above.

Table 3: Polyparasitism in school children in Aurangabad district school

Parasite combination	No. of infected	Percentage of infection (%)
A. lumbbricodes +*T. trichura*	156	26.71
A. lumbbricodes + *T. trichura* + Hookworm	211	36.13

Total number infected with intestinal helminths = 211

% Prevalence of infection in parenthesis based on 211 infected.

In this study mix infection of *A. lumbbricodes* and *T. trichura* was common, which is in consonance with the finding of Mba and Amadi, (2001) as well as Ukpai and Ugwu (2003). The high prevalence of intestinal helminths in school children of Aurangabad municipal corporation and Z.P. could be due to refuse dumps around marked areas, along the major roads, which attracted stray cattle, dogs, cat, goats, rodents etc. Prevention of these intestinal helminths infections is possible by restricting goat, cattle from straying, avoiding ingestion of contaminated food, avoiding use of human and animal excreta as fertilizer in agriculture and by maintaining personal hygiene.

From different provinces of India, 24.6-91.0% of prevalence of helminthic infection has been reported by several workers (Singh *et al*., 2004). Occur in the lower age group. Such variation could be correlated with different degrees of poverty, hygiene, sanitation facilities and health care or education which provide favorable lower age group (Children) is highly associated with the lack of awareness pertaining to hygiene and sanitation 58.57-74.11% where reported by Larisha *et al*., (2002). The most prevalent among these helminthes is *A.*

lumbricoides (36.2%), followed by hookworm infection (10.5%). This result is consistent with reports of Adeyeba and Akinlabi (2002) and Taiwo and Agbolade (2000) showing that intestinal helminthiasis caused by roundworms and hookworms is a common disease among school children in Nigeria. The highest prevalence and intensity of *A. lumbricoides* recorded in this study could indicate high level of unhygienic practices and the habit of defaecating indiscriminately in open place among school children which eventually contaminate the environment. Intestinal parasites have been reported to have deleterious effect on school children (Adeyeba and Akinlabi, 2002).

Hadidjaja *et al*. (1998) observed that the presence of *A. lumbrioides* in school children is associated with nutritional status and cognitive development with a consequence of under-developed skills and learning ability. Although, the hookworm infection rate of 20.5% and 16.2% in studies respectively conducted by Ijagbone and Olagunju (2006) and Osazuwa *et al*. (2011) was less than that observed in this study, most of the school children were bare-footed. Similar survey carried out by the same team in Kangra district, Himachal Pradesh showed overall STH prevalence form community survey of other hilly area was reported by Bora *et al*. (2006). WHO guidelines recommended periodic treatment rounds for groups high intensity infections with 10% and above, regardless of the prevalence of overall infections. Since only 12.5 % was recorded in this study, a different approach of treatment of only infected persons in school- base control Programmes may be more cost-affective, given the semi-urban nature of the study area with relatively high population.

Acknowledgement

The authors are thankful to the University Grant Commission for Financial support and to the University authorities, Head, Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University Aurangabad, (M.S.) India, for providing necessary laboratory and library facilities during this work.

References

Adeyeba O. A and Tijani B. D (2002): Intestinal Helminthiasis among Malnourished School Age Children in Peri-urban Area of Ibadan, Nigeria. *Afr J Clin Exp Microbiol*. **3**(1): 24- 28

Avhad S. B and Hiware C. J (2012): Soil transmitted helminthiasis among school age children in Aurangabad district, Maharashtra state, India. An International Journal of Trends in Parasitology Research, Volume 1 (2), Pp-31-34.

Bora D; Singh Sujeet K; Sharma R. C; Bhagat H and Datta K. K (2001): Status of soil transmitted Helminthic Infection in India- observation on surveys using Kato- Katz Technique. J. Com. Dis. 33(2): 110-116.

Bora, D; Meena, V. R; Bhagat, H; Dharilwal A. C and Shiv Lal (2003): Status of soil transmitted Helminthic Infection in Urban locality of Assam; as observed from surveys

Bora, D; Meena, V. R; Bhagat, H; Dharilwal A. C and Shiv Lal (2006). Soil transmitted Helminthes Prevalence in school Children of Pauri Garhwal District, Uttarachal State. The Journal of Communicable Diseases Vol. 38, No.1.

Crompton D. W. T and Nesheim M. C (2002). Nutritional Impact of Intestinal Helminthiasis during the Human Life cycle. *Annu Rev Nutr*. **22**:35-59.

De Silva, Nilanthi; Simon Brooker, Peter Hotez, Antonio Montresor, Dirk Engels and Lorenzo Savioli (2003). Soil-transmitted helminth infections: updating the global picture. Disease control priority project. Working paper no.12.

Hadidjaja P, Bonang E, Suyardi M. A, Abidin S. A, Ismid I. S, Margono S. S. (1998): The effect of intervention methods on nutritional status and cognitive function of primary school children infected with Ascaris lumbricoides. Am J Trop Med Hyg. 59(5):791-5.

Ijagbone IF and Olagunju TF (2006): Intestinal Helminths Parasites in School Children in Iragbiji, Boripe Local Government, Osun State, Nigeria. *Afr J Biomed Res*. 9(1):63-65.

Larisha M. Lyndem, Veena Tandon and A. K. Yadav (2002): Hookworm infection among the rural tribal populations of Meghalaya (North-East India). Journal of parasitic Disease, Vol. 26, No.2.

Mba, I. E. K and Amadi, A. N (2001): Helminthic Infection in school children in Aba. *J Mod Invest Prac*. 2: 43-45.

Montressor A, Crompton D. W. T, Gyorkos T. W and Savioli L (2002): *Helminths Control in School – Age Children: A Guide for Managers of Control Programmes. Geneva:* World Health Organisation.

Nematian J., Gholamrezanezhad A. and Nematian E. (2008): Giardiasis and other intestinal parasitic infections in relation to anthropometric indicators of malnutrition: a large, population-based survey of schoolchildren in Tehran. Ann Trop Med Parasitol. 102(3): 209-214

Osazuwa F, Oguntade M. A and Imade P (2011): A Significant Association between Intestinal Helminth Infection and Anaemia Burden in Children in Rural Communities of Edo state, Nigeria. *North Am J Med Sci.* **3**(1): 30-34

Singh G, lanes S, Triadafilopoulos G (2004): Risk of serious upper gastrointestinal and cardiovascular thromboembolic complications with meloxicam. American Journal of Medicine 117:100-106.

Taiwo A. K and Agbolade O. M (2000): Intestinal Helminthiasis among School Children in Oru, Ogun State, Nigeria. *Nig J Sci.* 34:283-286

Ukpai O. M, Ugwu C. D (2003): The prevalence of gastro-intestinal tract parasites in primary school children in Ikwuano Local Government Area of Abia State, Nigeria. Nig. J. Parasitol. 24: 129-136.

World Health Organization (2003): Manual of Basic Techniques for a2nd edn. Geneva: World Health Organization.