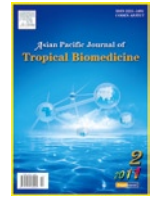




Contents lists available at ScienceDirect

Asian Pacific Journal of Tropical Biomedicine

journal homepage: www.elsevier.com/locate/apjtb

Document heading

Prevalence of intestinal parasitoses in urban and rural children of a developing country

AKM Mamunur Rashid^{1*}, AKM Saifur Rashid², Abdur Rahman³¹Department of Paediatrics, Khulna Medical College, Khulna²Department of Economics, National University, Bangladesh³District Hospital, Chuadanga, Bangladesh

ARTICLE INFO

Article history:

Received 18 August 2011

Received in revised form 5 September 2011

Accepted 28 September 2011

Available online 15 October 2011

Keywords:

Prevalence

Intestinal parasitoses

Urban and rural children

Developing country

Enterobius vermicularis

Parasite

Parasitic infestation

Anthelmintic drug

Sanitation

Worm infestation

Intestinal worm

Bangladesh

Helminth

ABSTRACT

Objective: To compare intestinal parasitoses between urban and rural children in developing countries and its related factors. **Methods:** Children of 1–6 years old in the urban and rural areas who had not taken anthelmintic drugs in the last 6 months were randomly selected. Various factors were taken as variables in a preformed questionnaire. **Results:** Among the total 52 children, 24 were in urban and 28 were in rural group. Male/female ratio of the rural group was 1:1 and that of the urban group was 1.4:1. Average income was 12000 taka and 4000 taka per month in urban and rural areas, respectively. None of the rural group used sanitary latrine, whereas every one in urban group used sanitary latrine. Majority (71%) of the mothers in rural group were below the primary level of education. Majority (75%) of fathers were educated above higher secondary level in urban group. In the rural group 18 (64%) fathers had not received any education. *Enterobius vermicularis* was observed only in 1 (4%) stool samples of urban children but in rural group it was found in 7 (25%) of the stool samples. *Enterobius vermicularis* was the main parasite isolated from both groups. Exclusive breast feeding practice of less than 6 months was observed in 20 (83%) children of urban group but in rural group that of less than one year was found in 22 (78%) children. **Conclusions:** Intestinal parasitic infestation is mostly found in rural children. Urban children almost have no intestinal parasitoses. It has the relation with the poor sanitation, low standard of living, less parental income and education, and early weaning. Unnecessary universal deworming of the urban and rural children in developing countries should be discouraged in order to use the money economically and effectively. It can be carried out in rural children and their living standard should be improved.

1. Introduction

Parasitic infestation is a major health hazard in developing countries. It is estimated that at least one quarter of the world's population is clinically infested with intestinal parasites and the majority of them live in developing countries[1,2]. About 10% health problems in developing countries are related to diarrhea and helminthes, both of which are mostly water borne[3]. In Madagascar, a study revealed prevalence of 93% for *Ascaris lumbricoides*, 55% for *Trichuris trichura* and 27% for hook worm[4]. In 1987 it was estimated that 1000 million of world population

were infested with *Ascaris lumbricoides*, 900 million were with *Nector americana* and *Ankylostoma duodenale* and 500 million people were *Trichiuris trichiura*[5]. The prevalence of intestinal worm is alarmingly high both in rural and urban areas of Bangladesh[6]. Impure water, low socio-economic state, poor sanitation coupled with low literacy rates of parents, particularly the mothers, are the main causes of this prevalent malady. Worm infestation is one of the major causes of childhood malnutrition, anaemia, stunted physical and mental growth, psycho-social problems, and this along with repeated gastrointestinal and upper respiratory tract infection contributes to high morbidity in children and remains a major cause of high infant and child mortality[7–11]. One hundred million children suffer from moderate to severe PEM in Asia, Africa and Latin America. Intestinal parasites are extremely common among

*Corresponding author: AKM Mamunur Rashid, Associate Professor, Department of Paediatrics, Khulna Medical College, Khulna-9000, Bangladesh.
Email: mamunkmc@yahoo.com

malnourished population especially young children. In 1991 a study among 100 malnourished children, stool microscopy showed intestinal parasites infestation among 70% in patients^[12,13]. As per WHO recommendations, in areas where prevalence of mild to moderate underweight children is greater than 25% and where parasites are known to be wide spread, high priority should be given to deworming programme, data on prevalence of worm and trials of antehelmenthic drugs are vital^[14,15]. This study was carried out to explore the prevalence of parasitic infestation in urban and rural children of Bangladesh and associated factors contributing to it.

2. Materials and methods

A cross-sectional study was carried out in a small area of urban and rural children of Bangladesh. Samples were taken randomly in children of 1–6 years old. The preformed questionnaires were filled up considering the different variables. In the next day stool samples were collected and sent for routine analysis which was reported by experienced clinical laboratory technologists.

The cases included in this study had not taken antihelmenthic drugs during the last 6 months.

The data on each patient were entered in a computer for analysis with the use of SPSS (Statistical Package for Social Science) version 11.5 and *Chi*-square test was performed.

3. Results

A total of 52 children were enrolled in this study. Among them 24 were of urban and 28 of rural group with respective average age of 33 months and 44 months. Male/ female ratio in rural and urban children was 1:1 and 1.4:1, respectively. Mean weight (14 kg) of the children in the two groups was the same. Total family number in urban group was 4 and in rural 5. Average parental income in urban group was 12000

taka whereas in the rural group it was 4000 taka per month. In rural group none of them used sanitary latrine but in urban all of them used sanitary latrine. Mothers' education level in urban group was listed as follows: 2 (8%) below primary level, 6 (25%) below secondary school certificate (SSC) level, 8 (33%) before higher secondary school (HSC) level, and 8 (33%) above HSC. Mothers' education level in rural group was: no education 9 (32%), below primary level 11 (39%), below SSC 8 (29%) and below HSC 0 (0%). Majority (71%) of the mothers in rural group were below the primary level. About 16 (67%) of the mothers in urban group were above the SSC level.

A total of 2 in urban and 10 in rural children had parasites in their stools.

Among the urban children, one had *Enterobius vermicularis* (*E. vermicularis*) (4%) and the other had *Giardia lamblia* (*G. lamblia*) (4%). *E. vermicularis* was found in 7 (25%), *Entamoeba histolytica* in 1 (4%), *Ascaris lumbricoids* (*A. lumbricoids*) in 1 (4%) and *Hymanolepis nana* in 1 (4%) stool samples of the rural group. Exclusive breast feeding practice of less than 6 months was observed in 20 (83%) children of urban group but in rural group that of less than one year was found in 22 (78%) children. Exclusive breast feeding of less than 6 months 20 (83%), less than 1 year 4 (17%), more than 1 year 0 (0%) was found in urban group. In rural group the practice of less than 6 months, less than 1 year and more than 1 year was observed in 13 (46%), 9 (32%) and 6 (21%) children, respectively.

Fathers of above higher secondary level were about 18 in urban group and in rural group 17 received no education. In the urban group, fathers of uneducated or below primary level had not been found, and 4 (17%) of them were below SSC, 2 (8%) below HSC and 18 (75%) were above HSC. 17 (61%) uneducated fathers were found in rural group, 7 (25%) below primary level, 3 (11%) below SSC level and 1 (3%) were found below HSC level. Statistical analysis of different variables was shown in Table 1. Relative intestinal parasitoses in two groups were shown in Figure 1.

Table 1
Statistical analysis using *Chi*-square test among rural and urban children in different variables.

Variables	<i>Chi</i> -square value	<i>P</i> -value	Level of significance
Parasites in the stool after routine analysis	17.308	<0.001	Significant
Use of sanitary latrine	21.305	<0.001	Significant
Exclusive breast feeding	22.654	<0.001	Significant
Level of father's education	17.231	<0.01	Significant
Level of mother's education	3.192	<0.52	Not significant
Weaning practice	11.577	<0.01	Significant

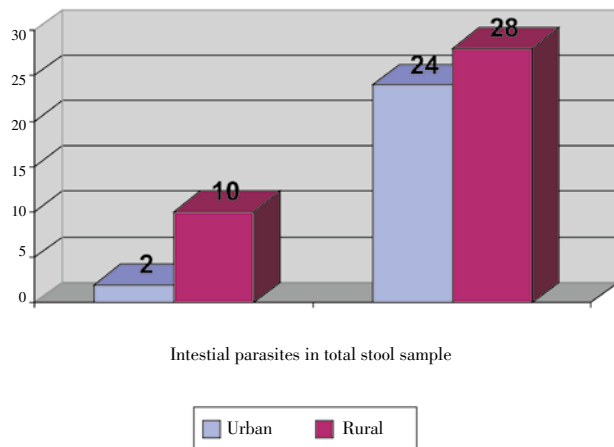


Figure 1. Relative number of intestinal parasites in the stool sample of rural and urban children.

4. Discussion

In our study, parasites are found positive in more rural children, which differs from the study done by Huq and Aneema who found prevalence of intestinal worm alarmingly high both in rural and urban areas^[6]. The study by Ahmed *et al* and Azam *et al*^[7,12], respectively revealed the major isolates, *G. lamblia* and *A. lumbricoid*. Our results of observation were not similar to theirs. We found that *E. vermicularis* is the commonest intestinal parasite detected in both the urban and rural children.

This study clearly showed that the use of sanitary latrines by children can more markedly reduce parasite infestation than those who don't use. Thus, parasites are frequently found in the stools of rural children. This observation is supported by the study of Azam *et al*^[12,13].

More parental income is found in the urban group than that in the rural group, which showed that infestation is higher in low income than that in high income group. This study coincides with the finding of the study by Islam where it is observed that economic conditions play a vital role in the occurrence of intestinal parasitoses^[13].

Parental educational pattern was different in both groups. Both mother and father of the rural group were poorly educated, which might be a factor related to the prevalence of human intestinal parasitic infection in developing countries^[12].

Rural children in Bangladesh are the victims of intestinal parasitoses. It signifies the deficiencies in sanitation, low standard of living, poor parental income and education. Every year national deworming program is carried out both in the urban and rural children, which costs a lot of money. In order to do it economically, this program may only be conducted in the rural children. In addition, we should improve the living standard, income and education of the rural people in developing countries.

Conflict of interest statement

We declare that we have no conflict of interest.

References

- [1] BRAC–ICDDR, B Joint Research Project. *Studies on the inputs of BRAC in Matlab: sanitary latrines, training monthly meetings, legal awareness and credit*. Dhaka: BRAC–ICDDR, B Joint Research Project; 1996, p. 2–8.
- [2] Watkins WE, Cruz JR, Pollitt E. The effects of deworming on indicators of school performance in Guatemala. *Trans R Soc Trop Med Hyg* 1996; **90**(2): 156–161.
- [3] Kuntz RE. Intestinal protozoa and helminthes in school children of Dacca, East Pakistan (East Bengal). *Am J Trop Med Hyg* 1960; **9**: 168–172.
- [4] Kightlinger IK, Seed JR, Linger KMB. The epidemiology of *Ascaris lumbricoides*, *Trichuris trichura* and hookworm in children in the Ranomafana rainforest Madagascar. *J Parasitol* 1995; **81**(2): 159–169.
- [5] Muttalib MA, Islam N, Islam S. Prevalence of intestinal Parasite in rural children of Bangladesh. *Bangladesh Med J* 1996; **5**(1): 67–71.
- [6] Huq MM, Aneema AS. Incidence of intestinal parasites in children of different socioeconomic populaton of Dhaka city. *Bangladesh Med Res Counc Bull* 1976; **11**(1): 1–7.
- [7] Ahmed AK, Malik B, Shaheen B, Yasmeeen G, Dar BJ, Mona AK, et al. Frequency of intestinal parasites infestation in children of 5–12 years of age in Abbottabad. *J Ayub Med Coll Abbottabad* 2003; **15**(2): 28–30.
- [8] Sarker MS, Islam MA. Intestinal parasites. A frequent association and contributing factor of loose motion in malnourished children. *Bangladesh J Child Health* 1993; **17**(1): 10–13.
- [9] Sugunan AP, Murhekar MV, Sehgal SC. Intestinal parasitic infestation among different population group of Andaman and nicobar islands. *J Commun Dis* 1996; **28**(4): 253–259.
- [10] Willet WC, Kilama WI, Kihamia CM. *Ascaris* and growth rates a randomized trial of treatment. *Am J Public Health* 1979; **69**(10): 987–991.
- [11] Kightlinger IK, Seed JR, Kightlinger MB. *Ascaris lumbricoides* aggregation in relation to child growth status, delayed cutaneous hypersensitivity and plant antihelminthic use in Madagascar. *J Parasitol* 1996; **82**(1): 25–32.
- [12] Azam SAS, Bhuiyan MMR, Chowdhury MZ, Miah KA. Intestinal parasites and sanitary practices among the rural children. *J Teach Assoc* 2007; **20**(1): 1–5.
- [13] Islam AFM. Incidence of helminthes infestation and comparative study of pyrantel pamoate with levamisol and mebendazole in hospital patients at Barisal, Bangladesh. *Bangladesh Med Res Counc Bull* 1984; **10**(1): 29–35.
- [14] Thein–Hlaing, Thane–Toe, Than–Saw, Myat–Lay–Kyin, Myint–Lwin. A controlled chemotherapeutic intervention trial on the relationship between *Ascaris lumbricoides* infection and malnutrition in children. *Trans R Soc Trop Med Hyg* 1991; **85**(4): 523–528.
- [15] Pamba HO, Bwibo NO, Chungo CN, Estambale BB. A study of the efficacy and safety of albendazole (Zentel) in the treatment of intestinal helmenthiasis in Kenyan children less than 2 years of age. *East Afr Med J* 1989; **66**(33): 197–202.