INTESTINAL HELMINTH INFECTIONS AMONG CHILDREN OF DISTRICT SHOPIAN OF KASHMIR VALLEY, INDIA

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ABSTRACT

Intestinal helminth infections are amongst the most common infections worldwide. Studies in other districts of Kashmir valley revealed a high prevalence of intestinal helminth infections among the children. The objectives of the current study were to determine the prevalence of intestinal helminth infections aming children of Shopian district and to identify associated socio-demographic and environmental actors, behavioral habits and also related complaints. Stool samples were collected from 352 children and a questionnaire was filled for each case. The samples were processed using both simple smear and zinc sulphate concentration methods, and then microscopically examined for intestinal helminths. Of the 352 children surveyed, 75.28% had 1, or more, helminth parasites. Prevalence of Ascaris lumbricoides was highest (71.8%), followed by Trichuris trichiura (26.4%), Enterobius vermicularis (13.9%) and Taenia saginata (5.3%). Conditions most frequently associated with infection included the age group, water source, boiled or unboiled water, defecation site, personal hygiene, and the extent of maternal education. The study shows a relatively high prevalence of intestinal helminths and suggests an imperative for the implementation of control measures.

Keywords: Helminths, Parasitosis, Children, Kashmir Valley,

I.INTRODUCTION

Intestinal helminth infections are highly prevalent among school-age children both in schools and communities of developing countries [1]. Many helminth parasites remain major contributors to morbidity in developing countries. Among the effects associated with these parasites are growth retardation, intestinal obstruction, hepatic and biliary diseases, impaired cognitive development, and nutritional effects such as iron deficiency anemia[2]. Intestinal parasites are transmitted through the contamination of water, soil, and food by feces, a direct consequence of poor hygienic and living conditions [3]. According to WHO, the level of helminth infection can be viewed as an index of a community's progress towards a desirable level of sanitation [4]. There are a few studies on the prevalence of intestinal helminths in other parts of Kashmir valley [5,6,7], but there is no record in literature regarding the status of helminth infections and their associated risk factors in district

Shopian of Kashmir valley. Therefore, present study was undertaken to determine the prevalence of intestinal helminths and related factors among children of Shopian district in the Kashmir valley, India.

II.MATERIAL AND METHODS

Study Area: Shopian town-the district headquarter is situated at a distance of 51kms from Srinagar & 20 kms from Pulwama district and 2146 meters above the sea level. It has decades of old road connectivity with Anantnag district as well as Kulgam district. Presently district Shopian having two assembly constituencies consists of one Tehsil, one CD block, one municipal Committee with 13 Wards, 43 Patwar Halqas & 231 inhabited villages. As per census of 2011, total population of the district is 2.66 lacs including 15% of ST population. About 95% of the population lives in its rural areas (http://www.shopian.nic.in/index.html).

This study was carried out between May 2013 and November 2013 in all the study sites of district Shopian. Official meetings with the personnel from health services, city councils, and schools, as well as with parents and school children from study sites were conducted in order to explain the protocol of study. In total, 352 children including 228 males and 124 females between the ages of 4-15 yr ([X+/-SD]=9.2±2.3) participated in the study (these children had no apparent disabilities and were not receiving drug therapy for parasitic infections). Written consents were required from both parents in order for the children to participate. Children requiring medical assistance were properly treated or referred for medical attention. The children's ages were obtained through school records.

Collection of socio-economic characteristics of the children's families was under taken with a structured questionnaire. Interviews were administered face to face with mothers in children's schools. The level of education of mothers, sanitation facilities, type of drinking water (tap, well, or stream/pond water) and defecation site (open or modern sanitary latrine) were collected as proxy variables of socio-economic conditions. 5 grams of fresh morning stool samples were collected in nylon containers containing 10 ml of 10% formaldehyde. The containers were labeled, and immediately transported to the parasitological laboratoryfor further processing. Stool specimens were examined using direct smear and zinc sulphate concentration techniques. A computer program (SPSS10.05 for windows) was used for data analysis. Descriptive data was given as a mean ± standard deviation (SD). Student's *t*-test was used for the analytic assessment. The differences were considered to be significant when the *P*-value obtained was less than 0.05. Following the WHO ethical guidelines of 'no survey with out service', all children enrolled in the survey received 1 tablet of 400 mg albendazole as a treatment protocol for STH.

III.RESULTS

Among 352 children subjected to stool examination, data reveal that 265 (75.28%) cases were positive for intestinal helminths. *Ascaris lumbricoides* was the most prevalent helminth parasite (71.87%) followed by *Trichuris trichiura* (26.42%), *Enterobius vermicularis* (13.92%) and *Taenia saginata* (5.39%). Single type infection was seen in 38.63% of the infected children, where as 38.64% were infected with multiple type of helminth parasites. Prevalence of infection peaked in the age group of 12-15 years (84.91%) followed by the age group of 8-11 years (81.70%) and age group of 4-7 years (50.54%) [P<0.05]. The study reveals that, age group, water source, condition of water, defecation site, personal hygiene, and maternal education were significantly associated with the prevalence of intestinal infections (Table 1) [P<0.05], whereas residence and sex were not significantly associated with it (P>0.05)

IV.DISCUSSION

Results of the present study indicate a prevalence of 75.28% (265 positive cases out of the total of 352 children screened). These figures when compared with studies conducted in other parts of the Kashmir valley and world show that district Shopian is endemic for intestinal helminthiasis. For example Studies conducted in the Kupwara district of Kashmir valley (Wani et al. 2007a), Srinagar city of Kashmir valley [6] and Budgam district of Kashmir valley [7] show that intestinal helminths are endemic in these areas with *Ascaris lumbricoides* the most prevalent helminth parasite. Studies conducted on the frequency distribution of gastrointestinal helminths by Bundy et al. (1988) showed a high overall prevalence of 62% among the urban slum children of Malaysia [8]. Rodriguez et al., (2000) reported a high prevalence of 72% among the school children studying in a public institution in Maracaibo, Venezuela [9]. High prevalence of intestinal helminth infections is probably a consequence of a low standard of living, poor sanitation, lack of personal hygiene, traditional methods of agriculture, indiscriminate defecation, the use of night soil as fertilizers and other occupational work. [6] In the present study not a single case of Hookworm infection was observed. The reason for the absence of Hookworm infection is that climatic factors are not favorable for the survival of hookworm eggs and larvae in the soil as the temperatures remain mostly cool in Kashmir valley.

Age specific prevalence data shows a relationship between age and prevalence of parasites. Highest infection, i.e., 84.91% was seen in the 12-15 age group ($P < 0.05$), followed by 81.7% in the 8-11 age group, and 50.5% in the 4- 7 year age group. Similar age related prevalence variations have been reported by other investigators among school children. For example, Ibrahim (2002) in Gaza, Palestine, showed that most of the positive cases were clustered in the age groups of 9-14 yrs [10]. The reason for this type of distribution is that children in the lower age groups mostly remain indoors and are not exposed to infections. As the age advances, children start to play and so get exposed to infections.

Even though gender was not a significant risk factor for prevalence of intestinal parasitic infections, males were more likely to be infected (78.0%) than females (70.1%). This finding could be partially explained by the difference in gender roles. Males in their early age are likely to adopt work responsibilities in outdoor environments and girls are likely to commence duties in indoors because of social and religious restrictions. The outdoor environments, in farm lands, or in playing fields, are a common place of defecation for males during working or playing hours and, therefore, contamination of soil in these areas would constitute a significant risk for parasite transmission. Singh et al., (1984) reported similar results in their study on rural community of Varanasi, India, where in males exhibited a higher prevalence of intestinal parasitism than females [11]. A study conducted by Ibrahim (2002) on the prevalence of parasites among school children in Gaza, Palestine [10], likewise showed a significantly higher prevalence of infection among males compared to females.

Children that sourced drinking water from rivers or streams and wells were found to harbor a greater prevalence of infection than those who had access to tap water. This pattern of infection has been confirmed in various studies [12, 13]. Curtis et al., (1995) demonstrated that mothers from poor community in Burkina-faso, Africa, with access to tap water in the yard, were more likely to use safe hygiene practices than mothers using wells in the yard [14]. It is possible that poor hygiene practices associated with access to water is a more probable risk factor for increased parasitic infection among children. Also children drinking boiled water were found contracting less infection than those who drank unboiled water from any source. This fact has been confirmed in the study conducted in Srinagar city of Kashmir valley [6].

Even though, it is argued that in highly contaminated environments, faecal transmission in defecation ground may not be a single most important site for geohelminth infection [15], it was found to be a significant univariate risk factor for infection with intestinal helminthiasis, where in a high prevalence was seen in children defecating in open fields, compared to low prevalence among children who defecate in modern septic latrines. In Shopian district children are at particular risk with nearly 70% of children less than the age of 15 years, defecating outdoors in either the open latrines or nearby fields. More over, at this age non supervised children may be more prone to defecating in sites that are already polluted by faeces and therefore be exposed to more frequent and heavy infections than adults [16]. Most of the government schools in both rural and urban areas in Shopian district are with out modern septic lavatory facilities, so regardless of defecation practices, while at home, children have no option but discretely defecate openly. So, the school environment becomes the transmission ground of intestinal helminthiasis and constitutes a significant source of infection.

It is also evident from the present study that children with better personal hygiene had a lower prevalence of intestinal parasitic infections than those living in less hygienic conditions ($P<0.05$). In our study, it was also found that maternal education was a significant risk factor for the prevalence of infection; apparently, this factor extensively contributes to controlling risk factors for intestinal infections. Maternal education has been found to be the most important risk factor for parasitism in other studies as well [17, 18]

The present study reveals that intestinal helminths are highly abundant among children of Shopian district. This situation strongly calls for the institution of control measures, including treatment of infected individuals, improvement of sanitation practices, and provision of clean water. The impact of each measure would be maximized through a health education program directed at children and their mothers in particular, and to communities in general.

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REFERENCES

[1] Poudyal AK, Jimba MJ et al (2006) Targeting newly enrolled low age school age children for the control of the intestinal helminth infections in rural Nepal. Trop Doctor 36: 16-19.

[2] Ramdath DD, Simeon DT et al (1995) Iron status of school children with varying intensities of *Trichuris trichiura* infection. Parasitol 110: 347-51.

[3] Gamboa MI, Basualdo JA et al (1998) Prevalence of intestinal parasites with in three population groups in Laplata, Argentina. Eur J Epid 14: 55-61.

[4] WHO (1981) Intestinal protozoan and helminth infections: Report of a WHO scientific group. WHO Tech Rep Ser 666**,** Geneva, Switzerland**,** 118p.

[5] Wani SA, Ahmad F et al (2007a) Helminthic infestation in children of Kupwara District: A prospective study. Indian J Med Microbiol 25 (4): 398-400.

[6]Wani SA, Ahmad F et al (2007b) Prevalence of intestinal parasites and associated risk factors among school going children in Srinagar City of Kashmir valley. J Parasitol 93 (6): 1541-1543.

[7] Wani SA, Ahmad F et al (2007c) Epidemiology of Gastrointestinal helminths in the school going children of District. Budgam, (J & K) INDIA In: Advances in Fish and Wildlife Ecology and Biology (Ed. Kaul B. L.) 219- 225.

[8] Bundy DAP, Kan SP, Rose R (1988) Age related prevalence, intensity and frequency distribution of gastro-intestinal helminths in urban slum children from Kuala Lumpur, Malaysia. Trans R Soc Trop Med Hyg 82**:** 289-294.

[9] Rodriguez ZR, Lozano CG et al (2000) Intestinal parasites in schoolchildren at a public institution in Maracaibo municipality, Venezuela. Inves Clinica 41(1): 37-57.

[10] Ibrahim AH (2002) Prevalence of intestinal parasites among school children in Deir-El-Balah town in Gaza strip, Palestine. Ann Saudi Med 22: 273-275.

[11] Singh DS, Hotchendani RK, et al (1984) Prevalence and pattern of intestinal parasitism, a rural community of Varanasi. Indian J Preven Soc Med 15 (1-2): 1-8.

[12] Norhayati M, Oothuman P, Fatmah MS (1998a) Some risk factors of *Ascaris* and *Trichuris* infection in Malaysian aborigine (Orang asli) children. Med J Malaysia 53: 401-7.

[13] Narain K, Raj guru SK, Mahanta J (2000) Prevalence of *Trichuris trichiura* in relation to socio-economic and behavioral determinants of exposure to infection in rural Assam. Indian J Med Res 112: 140-146.

[14] Curtis V, Kanki B et al (1995) Putties, pits and pipes; explaining hygiene behaviour in Burkina-faso. Soc Sci Med 41**:** 383-93.

[15] Feachem RG, Guy MW et al (1983) Excreta disposal facilities and intestinal parasitism in urban Africa: preliminary studies in Bostwana, Ghana and Zambia. Trans R Soc Trop Med Hyg 77: 515-21.

[16] Hominick WM, Dean CG et al (1987) Population biology of hookworms in West Bengal: analysis of numbers of infective larvae recovered from damp pads applied to the soil surface at defecation sites. Trans R Soc Trop Med Hyg 81: 978-86.

[17] Toma A, Miyagi I et al (1999) Questionnaire survey and prevalence of helminthic infection in Baru, Sulawes, Indonesia. South Asian J Trop Med P Health 30:68-77.

[18] Phiri K, Whitty CJ, et al (2000) Urban/rural differences in prevalence and risk factors for intestinal helminth infections in Southern Malawi. Ann Trop Med Parasitol 94: 381-387