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Intestinal Parasitic Infestations and Its Prevalence among School Going Children and Pregnant Women in Paschim Medinipur District, West Bengal, India

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Abstract:

The greatest single worldwide endemic cause of illness and disease is intestinal parasitic infestation. In India, the commonest intestinal parasitic infestation (IPI) factors among pregnant mothers and children are Ascaris, Hookworm, Trichuris trichiura and Entamoeba histolytica leads to increased prevalence of anaemia along with high infant mortality and morbidity. Five hundred sixty (560) school going children and 80 pregnant women, attending the primary healthcare centres resided in a low socio-economic area of Paschim Medinipur district, West Bengal, India were incorporated in the study and their stool samples were collected for analysis to search out the prevalence of intestinal protozoal and helminthic infection, which was the aim of the study. Direct microscopic observations were performed to study the presence of intestinal parasites including their larvae, ova, trophozoites or cysts in stool samples, if any. Analysis of data established that prevalence of helminthic infections was much higher than the prevalence of protozoal infections for both of the studied groups may be due to water-borne coupled with lassitude to maintain personal hygienic status and poor sanitary conditions in their abode area.

Keywords: Intestine, Parasitic infections, School children, pregnant woman, Protozoa

1. Introduction

Intestinal parasitic including protozoal infections remain a major threat to the health are globally endemic (1, 2). In developing countries people mostly infected with intestinal and liver parasites are rural residents cause chronic conditions lead to serious diseases and the populations face substantial morbidity (2). IPI constitute health burden among pregnant mother and children (3) linked with higher incident of nutritional anaemia, protein-energy malnutrition and growth deficits in children, low pregnancy weight gain and intrauterine growth retardation followed by low birth weight (3, 4). Major parasitic infections reported globally are *Ascaris lumbricoides* (20%), Hookworm (18%), *Trichuris trichiura* (10%), and *Entamoeba histolytica* (10%) (5,6,7). In India overall

prevalence rates range from 12.5% to 66% (4, 8) mainly caused by lack of proper sanitation, access to contaminated and unsafe water, food preparation in unhealthy manner, improper hygiene and impoverished health services (6). Therefore, it is important to monitor the problem from time to time and deal it in the interest of public health. There is a necessity to study the prevalence of the parasitic infections in pregnant women to decrease the risk for both mother as well as child. Present study was carried out to determine the prevalence of intestinal parasitic infections among 5+ to 10+ years old school children and in pregnant women resided in the slum areas of Paschim Medinipur district, West Bengal.

2. Materials and Methods

The cross-sectional study was done from November, 2013 to July 2014. The study population consist of primary school children (n=560) and pregnant women (n=80). Study protocol was explained to the office personnel of the selected primary schools and primary healthcare centres. Participants were selected from the list of students from each of the selected schools, which included names and date of birth. One hundred seventy five girls (175, 31.25%), three hundred eighty five boys (385, 68.75%) and eighty (80) pregnant women were included in this study. Oral consent was taken from parents or husband in order for their child to participate in the study or pregnant women who were visiting the primary health centre. Baseline data were collected using a structured questionnaire and laboratory analysis of faecal samples. Subjects received oral and written notification of test results.

Plastic containers with unique identification numbers were distributed to all the included children and pregnant women, asked to return the containers filled with a fresh morning stool sample (10–40 µgm) on the following day. Information against each identification number like name, sex, age, school grade, pregnancy duration and the result of stool examination for each child or pregnant mother was recorded on the stool examination forms by the field workers. Microscopic examination of the stool specimens from all participants were performed for the presence of intestinal parasite cysts, ova, trophozoites and larvae by direct wet smear preparation performed within 12 hours at the department of Parasitology, Sevayatan School of Medical Technology, Singur, Hooghly. In the laboratory, faecal smears were prepared directly for wet mount in normal saline as well as in Lugol's iodine (Iodine staining) and then were microscopically examined under low and high power in unstained preparation for typical non-bile stained ova, any parasitic movement and stained preparations for nuclear details. Data were analysed using SPSS statistical software (Ver.-19). The results were expressed as rates and percentages.

3. Results

The prevalence rates of intestinal parasites exhibit wide variation from country to country, between geographic areas, communities and ethnic groups even seasonal variations are also known (8). During the study period a total of 560 stool specimens from primary school children and 80 stool specimens from pregnant women were examined.

Intestinal parasites were detected by direct smear screening in 154 of 560 (27.5%) primary school children. Double intestinal parasites were found in stool samples from in 47 (8.39%) and mixed infections with 3 parasites were seen in stool samples of 9 children (1.61%). Overall, the protozoan infections (23.57%) were lower than the helminthic infections (27.5%). *Giardia intestinalis* (13.75%) and *Entamoeba coli* (6.43%) were the commonest intestinal protozoa parasites identified. Among the helminths, *H. nana* (3.93%), *Taenia sp.* (6.07%) and *Hookworm* (11.96 %) were the common ones. There was no significant difference in prevalence of intestinal parasites according to age and gender of the school children.

Intestinal parasites were detected by microscopy in 31 out of 80 pregnant women (38.75%) enrolled in this study. Among these, 10 (12.5%) were infected with at least two types of parasite and 5 (6.25%) with more than 2 parasites. Overall, the protozoan infections (32.5%) were lower than the helminthic infections (37.5%) among pregnant women.

The most common pathogenic protozoan parasite associations in pregnant women and children harbouring double infections were between *Giardia intestinalis* and *Entamoeba coli*. The results of microscopy for all faecal parasites are summarised in Table 1.

	Intestinal Parasitic Infestations	School Children (N=560, 100%)	Pregnant Women (N=80, 100%)
Protozoa	<i>Giardia intestinalis</i>	77 (13.75%)	6 (7.5%)
	<i>E. histolytica/E. dispar</i>	19(3.39%)	4(5.0%)
	<i>Entamoeba coli</i>	36(6.43%)	10(12.5%)
	<i>Trichomonas hominis</i>	0	2(2.5%)
	<i>Blastocystis hominis</i>	0	3(3.75%)
	<i>Iodamoeba sp.</i>	0	1(1.25%)
Helminths	<i>Hymenolepis nana</i>	22 (3.93%)	3 (3.75%)
	<i>Ascaris lumbricoides</i>	19 (3.39%)	7 (8.75%)
	<i>Taenia sp.</i>	34 (6.07%)	8 (10%)
	<i>Hook worm</i>	67 (11.96%)	9 (11.25%)
	<i>Trichuris trichiura</i>	9 (1.61%)	2 (2.5%)
	<i>Strongyloides stercoralis</i>	3 (0.54%)	1 (1.25%)

Table 1: Prevalence of intestinal parasitic infestations using microscopic study of stool of pregnant women and school children in study areas of Paschim Medinipur district, India

4. Discussion

Intestinal parasitic infection is a global bio-burden for human population. The patterns of intestinal parasite infections i.e. soil-transmitted helminths and intestinal protozoa in the rural areas of Paschim Medinipur district has been studied here. Parasitic infections are governed by behavioural, biological, environmental, socioeconomic and health systems factors. As the socio-economically vulnerable people live in rural areas so they suffer most from parasitic infection (4). In target areas of Paschim Medinipur district, the prevalence of intestinal parasitic infections is around 27.5% for primary school children and for pregnant women it is 38.75% mainly due to protozoan and helminthic infections. This is in contrast with the few reports conducted in other parts of India (8, 9, 10), where a higher prevalence of helminthic infections than protozoan infections was reported. In India, reports on the prevalence of intestinal parasitic infections in pregnant women are lacking whether the highest prevalence of IPI (91%) in school going children was reported in rural settings in South India (10) supports our present findings. Poor socioeconomic and poor sanitation condition, lack of safe drinking water or contamination of drinking water with sewage water and faecal matter, open air defecation, Barefooted movement in the field, settlement, nature of soil and climate as well as lack of proper health education are the major regulating factors of IPI. The route of infection is either from person-to-person or by eating or drinking contaminated food and water. Drinking water collected from hand pumps in the study area are located near drainage and water level is high which could be easily contaminated with surface run off and seepage resulting in high prevalence of the parasites. The climate of our study area is warm and moist as well as the populations belong to low socioeconomic group. *Ascaris* is prevalent in warm moist climate and poor sanitation system in overcrowded areas allow eggs to be present abundantly in soil those remain viable in the soil for long duration (4). Dispersion of *Ascaris* eggs takes place by the human habit of open air defecation as there is no facility of latrines in the houses. The disease develops due to IPI is related to chronic effects on health and nutritional status of the host impairs physical and mental growth of children, educational achievement and economic development (7). The sanitary condition and personal hygiene of the studied subjects are very poor. The prepared food and drinking water remains open and contaminated with dusts containing cysts of the parasites. Deficient in washing hands with soap before eating and dirt present beneath their nails also helps in spreading IPI. The present study confirms that pregnant women and children from a rural setting are at high risk of intestinal parasitic infections.

5. References

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