Original Research Paper

Volume - 11 | Issue - 08 | August - 2021 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Microbiology

PREVALENCE OF INTESTINAL PARASITIC INFECTIONS AMONG SCHOOL GOING CHILDREN BELOW 12 YEARS OF AGE IN KAMRUP METRO, ASSAM.

Dr. Manish Bordoloi Senior Resident Of Microbiology

Dr. Runumi Chowdhury* Assistant Professor Of Microbiology. *Corresponding Author

Dr. Dipa Barkataki Rtd Professor Of Microbiology

ABSTRACT

BACKGROUND: Intestinal parasitic infections constitute global health problems in various developing countries. They are endemic especially in tropical and subtropical countries. Hot and humid climate, environmental and socio-cultural factors enhance parasitic transmission. Children are the prime victims of intestinal parasitism that affects their physical development, school attendance and learning ability.

OBJECTIVE: The study was aimed to determine the prevalence of Intestinal parasitic infection among the school going children between 5-12 years of age in certain slum areas of Guwahati city of Kamrup Metro district of Assam.

METHODS: A community based cross sectional study carried out between June, 2017 to May, 2018 at Gauhati Medical College and Hospital in the Department of Microbiology. Study group consisted of 170 school going children below 12 years of age. Stool samples collected aseptically were examined macroscopically and microscopically using standard Microbiological methods for presence of Intestinal parasites.

RESULTS: Out of 170 school going children, 116 (68.2%) were found positive for Intestinal parasitic infestations. The most predominant Intestinal helminthes were *Ascaris lumbricoides* (66.4%) follwed by *Trichuris trichiura* (29.3%), hookworms (5.1%), *Strongyloides stercoralis* (0.9%) and *Isospora belli* (22.4%).

CONCLUSION: The study reveals that the prevalence of Intestinal parasitic infection among school going children below 12 years of age in the slum areas of Assam is very high. Hence, it is utmost necessary to pay more attention to improve the sanitation, personal hygiene and implementation of health education of the parents for prevention of these parasitic infections.

KEYWORDS :

INTRODUCTION:

Parasitic infections afflict more than half of the world's population and impose a substantial health burden, particularly in underdeveloped nations, where they are most prevalent. Infection with Intestinal parasites is common in the world particularly in the rural developing regions.[1]

About one third of the world, more than two billion people, is infected with intestinal parasites. Approximately 300 million people are severely ill with these worms and of these, at least 50% are school age children.[2] About 43% children were infected with single parasite and 10% with multiple parasites.[2]

In India, prevalence of intestinal parasites reported from different workers show wide variations from 11.3 to 90%.[3] The most important parasites infecting school going children are *Giardia lamblia*; *Entamoeba histolytica*; *Ascaris lumbricoides*; *Trichuris trichiura*; *Anchylostoma duodenale* and *Necator americanus*.[4] The World Health organization (WHO) estimates that infection with *Ascaris lumbricoides*, *Trichuris trichiura* and hookworms (*Anchylostoma duodenale* and *Nicator americanus*) with associated morbidity affect approximately 250, 46 and 151 million people respectively. The majority of these infections occur in developing countries where increased population density and urbanization, poverty, inadequate sanitation and poor health awareness contributes to the increasing prevalence of infections.[5] In Assam, the most frequent Helminths are *Ascaris lumbricoides* (28.6%) followed by *Trichuris trichiura* (10.9%); Hookworm (6.5%); *Entamoeba histolytica* (5.6%) and *Giardia lamblia* (3.3%).[6] There was no significant differences with regard to host sex.

The helminthic infection causes anemia by reducing iron uptake from the intestine, directly sucking blood, and interfering directly and indirectly in iron metabolism, which impacts the quality of life, particularly in school going children.[7]

Apart from causing mortality and morbidity, infection with intestinal parasites has been associated with stunting of linear growth, physical weakness and low educational achievement and negatively affecting resistance to other diseases in school going children[8]. Warm climates and adequate moisture, lack of personal or environmental hygiene, sanitation and education, walking barefoot and poor health or nutritional status could increase the risk of parasitic infections.[9-13] To reduce intensity of infection and protect infected individuals from morbidity, WHO recommends periodic medicinal treatment (De worming)to all at-risk people living in endemic areas. This intervention reduces morbidity by reducing the worm burden.[14]

AIM AND OBJECTIVES:

- To study the prevalence of Intestinal parasitic infections among school going children.
- To know the etiological agents of these parasitic infections.

MATERIALS AND METHODS:

This study was conducted in Gauhati Medical College and hospital, Guwahati, for a period of one year from June, 2017 to May, 2018 in the Department of Microbiology. The study was started after obtaining the approval from the Institutional Ethical Committee.

Study design: Community based cross sectional study.

Study population: All school going children between 5 to 12 Years of age.

Study period: One year from June 2017 to may 2018.

Sample collection area: Schools of certain slum areas in Guwahati city.

INCLUSION CRITERIA: Study subjects were all school going children below 12 years of age.

EXCLUSION CRITERIA: Those children who took anti parasitic drugs, antidiarrheal, antibiotics such as tetracyclines within 10 days of collection of samples.

170 school going children below 12 years of age were examined for the study. Presence of a single parasite in the stool sample was also taken as positive case.

Stool samples were collected using wide bore screw capped container. Children and the parents were strictly instructed to avoid mixing the specimen with dirt, water and urine and close the lid of container tightly. Each stool specimen was examined for parasites by the

standard macroscopic examination and microscopic examination.The consistency of the stool was checked whether it was soft, liquid, semi formed or formed. The colour, odour and pH of the stool sample were noted. Stool was also examined for presence of mucus and blood. Naked eye examination of stool was done for parasitic elements that is whole parasite (adult worms of *Ascaris lumbricoides*) or part of it (segments of tapeworm) was carried out in all samples.

For microscopic examination, saline wet mount, iodine wet mount and modified Acid fast stain was done.[15]The stool samples were also concentrated by floatation technique using saturated salt solution when direct smear fails to reveal any parasites due to less number of organism.[15] All the procedures were done as per standard Microbiological methods.[15]

RESULTS AND OBSERVATION:

A total of 170 school going children between 5 to 12 years of age from schools of certain slum areas of Guwahati city of Kamrup Metro district of Assam, were studied for the prevalence of intestinal parasitic infection.

The observations of the study are documented below:

Of the 170 children enrolled in the study, 116(68.2%) were found to be positive, out of which (26.72%) were seen in the age group 9-10 years followed by 10-11 years (20.68%) and 11-12 years (16.37%). The maximum number of positive cases (57.75%) were male and (42.24%) were female with a male:female ratio of 1.36:1 [Table1(a),(b)]

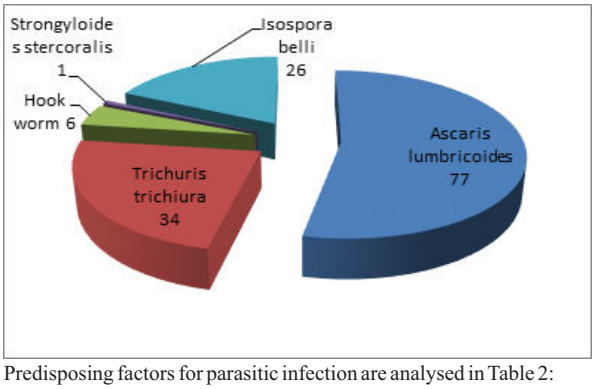
Table 1(a): Prevalence of intestinal parasitosis in different sex

Gender	Parasite positive	Parasite negative	Total
Male	67(57.75%)	29(53.70%)	96
Female	49(42.24%)	25(46.29%)	74
Total	116(68.23%)	54(31.76%)	170

Table 1(b): Prevalence of intestinal parasitosis in different age groups.

Age range	Parasite Positive	Parasite Negative	Total
5 -6 yrs	5(4.31%)	6(11.11%)	11
6 - 7 yrs	9(7.75%)	8(14.81%)	17
7 - 8 yrs	11(9.48%)	6(11.11%)	17
8 - 9 yrs	17(14.65%)	9(16.66%)	26
9 - 10 yrs	31(26.72%)	7(12.96%)	38
10 - 11 yrs	24(20.68%)	9(16.66%)	33
11 - 12 yrs	19(16.37%)	9(16.66%)	28
Total	116(68.23%)	54(31.76%)	170

Fig 1: The etiological agents causing parasitic infections.

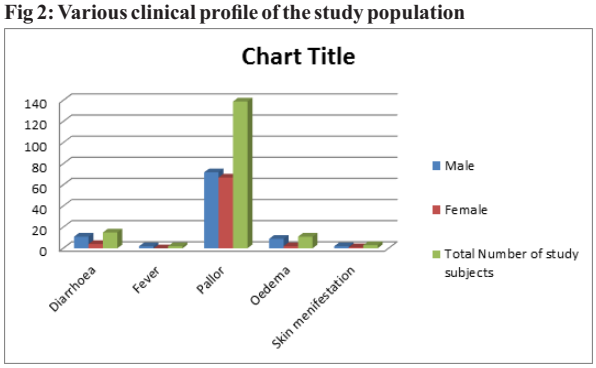


Predisposing factors for parasitic infection are analysed in Table 2:

Table 2: Predisposing factors for parasitic infection

Predisposing factors		Number	Parasite Positive	Parasite Negative
Socio-economic status (by modified kuppuswamy scale,2017)	Upper class	5	1(0.8%)	4(7.4%)
	Upper middle class	8	5(4.3%)	3(5.5%)
	Lower middle class	13	9(7.7%)	4(7.4%)
	Upper lower class	119	84(72.4%)	35(64.8%)
	Lower class	25	17(14.6%)	8(14.8%)
	Total	170	116(68.2%)	54(31.8%)
Educational Status of mother	Graduate	2	2(1.7%)	0(0%)
	Intermediate	12	7(6.0%)	5(9.2%)
	Matriculate	18	15(12.9%)	3(5.5%)
	High school	26	15(12.9%)	11(20.3%)
	Primary school	63	45(38.8%)	18(33.3%)
	Illiterate	49	39(33.6%)	10(18.5%)
	Total	170	116(68.2%)	54(31.8%)
Drinking water source	Municipal supply	65	46(39.6%)	19(35.1%)
	Tube well	42	27(23.2%)	15(27.7%)
	Concrete well	36	25(21.5%)	11(20.3%)
	Kutcha well	16	13(11.2%)	3(5.5%)
	others	11	5(4.3%)	6(11.1%)
	Total	170	116(68.2%)	54(31.8%)
Toilet practice	Unsanitary	74	61(52.5%)	21(38.8%)
	Sanitary	96	55(47.4%)	33(61.1%)
	Total	170	116(68.2%)	54(31.8%)

Fig 2: Various clinical profile of the study population



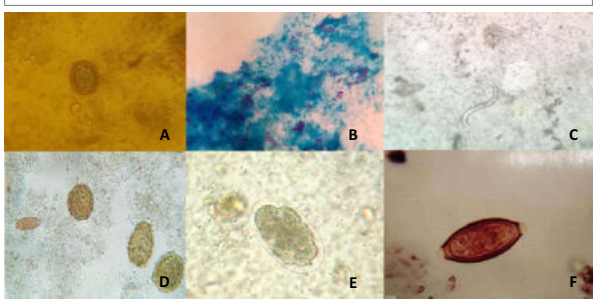


Figure 3: Microphotographs of parasitic ova, cysts and larvae; A:Fertilised egg of *Ascaris lumbricoides*; B: Oocysts of *Cryptosporidium parvum*; C: Larvae of *Strongyloides stercoralis*; D: Ova of *Trichuris trichiura* and fertilized egg of *Ascaris lumbricoides*; E: Ova of hook worm species; F: Ova of *Trichuris trichiura*.

DISCUSSION:

Intestinal parasitic infections are the most common infections among school going children, particularly in developing countries[16]. The occurrence of parasitic infections by above mentioned parasites at high rates is an indicative of faecal pollution of soil and domestic water supply around homes due to poor sanitation, ignorance of the mode of transmission of these parasites, an improper toilet practice and poor personal hygiene among the study population[17].

In the present study, majority of the cases 26.72% were under 9- 10 years of age followed by 20.68% and 16.37% were under the age group of 10 - 11 years and 11- 12 years respectively[Table1(b)]. Similar results were found in a study done by Osazuwa,F.et al (2011) that 25.9% parasite positive cases were from the age group 6 -10 years[18].A study done by Nahed karam et al (2017) observed that 58.3% of the study group were taken from the age range from 9-11 years, which is higher than the present study[16].

The sex ratio of 1.36:1 of the current study population showing a higher number of males (57.75%) than females (42.24%) [Table1(a)]. Similar study carried by Darlan,D.M.et al (2018) found number of males (54.5%) and females (45.5%) out of 132 children[19]. Osazuwa,F.et al (2011) found 51.25% males and 48.73% females with male:female ratio 1.2:1[18].

In the present study, maximum number of cases were come from Upper lower class (72.4%) followed by Lower class (14.6%) and the educational status of mothers were from Primary school level (38.8%) followed by Illiterate (33.6%) (Table2). Similar study carried by Gyang,V.P.et al (2016) which is in correlation with the present study, observed that highest prevalence of parasite positive cases (42.7%) where most of the parents were unemployed and their educational level were primary school (59.1%)[20]. In another study carried by Tripathi,K.et al (2014) reported that highest prevalence of parasite positive cases (86%) were from families with education level only primary school[21]. From the above studies it is observed that low socio-economic and low education status plays an important role for parasitic infection.

In our study, we found maximum children with positive parasitic infection using water from municipal supply (39.6%) (Table2). Similar correlation was found by Okyay etal (2014) in their study (68.6%) of the study group uses municipal water supply[22]. Tripathi, K. et al(2014) showed that 71% parents used open well as a source of drinking water. As these open well come in contact with open drain on canal that provide optimum conditions for parasitic infections[21].

Children using unsanitary toilets seem to be infected (52.5%) then those using sanitary toilet (47.4%) (Table2). Tripathi,K. et al (2014) found that majority of the school children(73.33%) used unsanitary toilet practice (open field defecation) which was almost similar to the present study[21].

Figure1 depicts the etiological agents causing parasitic infection in our study population..The commonest intestinal parasite detected was Ascaris lumbricoides (66.3%) followed by Trichuris trichiura (29.3%), Hook worm (5.1%), Strongyloides stercoralis (0.8%) and Isospora belli (22.4%). Prevalence of Isospora belli is a significant finding of the study as this parasite is mostly seen in immunocompromised host. Probably malnutrition, anaemia, diarrheal diseases prevalent among the study group, predisposed them for parasitic infection. Study done by Osazuwa, F. et al.(2011)[18] and Gyang,P.V. et al.(2016)[20] found that the overall prevalence of intestinal parasite was Ascaris lumbricoides which is similar to our study.

Study done by Oyewale, F. et al (2002) observed that 94% rate of infection with intestinal helminths among school children commonest being the Trichuris trichiura(84%) followed by Ascaris lumbricoides (75.3%) and hookworm (7.6%)[23]. In the present study the lower prevalence of hookworm infection is due to use of sanitary toilet practice in 96 out of 170 children in the study. The causes of higher prevalence of ascaris lumbricoides were due to the low social economic status of the family and unhygienic practices of the children. From the current study we found that intestinal parasites were more commonly detected among the children from the family of low social economic status with less educated Mothers. It was found that majority of the children lie between 9 to 11 years of age. Highest prevalent parasites among the helminth were Ascaris lumbricoides followed by Trichuris trichiura and hookworm. Among protozoa only isospora belli was found less frequently.

As seen in Fig 2, the most common presenting symptom was Pallor (81.76%) in the study population which is due to Anaemia. Hence further studies is required to see the prevalence and correlation of Anaemia with parasitic infection.

CONCLUSION

The present study reveals that the prevalence of intestinal parasitic infection in school going children between 5 to 12 years of age from certain slum areas of Guwahati city of Kamrup Metro is very high. The three intestinal helminths Ascaris lumbricoides, Trichuris trichiura and Hookworms are the commonest isolated parasites with Strongyloides stercoralis in less number. Among protozoa, Isospora belli was found. In the present study majority of parasite positive cases showed presence of anemia. Social economic factors like limited income, poor hygienic condition, poor sanitation and low maternal education also play an important role in causation of intestinal parasitoses.

Considering more prevalence of Intestinal parasitic infection in school going children, there is a need to initiate interventional measure to every primary school children and parents to pay more attention to the sanitation and personal hygiene to reduce the presence of undernutrition, anemia and parasitic infection

AUTHORS'DISCLOSURE:

1. Conflict of interest: the authors declare that there was no conflict of interest
2. Informed consent: written informed consent of the study group was taken
3. Funding : authors self funding only and no external funding was taken for the study

REFERENCES

1. Harrison's principles of internal medicine. 17th ed. Section 17th part 7. 2005; Vol.64. McGraw Hill; pp. 1270-1320.
2. Mehraj V, Hatcher J, Akhtar S, Rafique G, Beg M.A. Prevalence and factors associated with intestinal parasitic infection among children in an urban slum of Karachi. PloS one. 2008; 3(11), pp. e3680.
3. Marothi.Y, Singh.B . Prevalence of intestinal parasites at Ujjain, Madhya Pradesh, India: Five-year study. African Journal of Microbiology Research. 2011. 5 (18), pp. 2711-2714
4. Chatterjee K.D. Parasitology. 13th ed. Calcutta; CBS Publisher and Distributor. 2012; pp. 159.
5. Montresor A, Crompton DWT, Hall A, Bundy DAP, Savioli L. Guidelines for the Evaluation of Soil-Transmitted Helminthiasis and Schistosomiasis at a Community Level. World Health Organization, Geneva. 1998; WHO/CTD/SIP/98..
6. Mahanta, J. Narain, K. Srivastava, V. K. Intestinal parasitic infestation in a rural population of Upper Assam. Journal of Parasitic Diseases. 1996; 20(1), pp 57-58.
7. Chajhlana, Sunil Pal Singh and Mahabhasyam, Ramakrishna Narashimha and Varaprasada, Maruti Sarma Mannava. Nutritional deficiencies among school children in urban areas of Hyderabad, Telangana, India. International Journal of Community Medicine And Public Health. 2017; 4(2). pp. 607-612.
8. Raj SM, Sein KT, Anuar AK, Mustaffa BE. Effect of intestinal helminthiasis on school attendance by early primary schoolchildren. Transactions of the Royal Society of Tropical Medicine and Hygiene. 1997 Apr 1;91(2):131-2.
9. Alelign T, Degarege A , Erko B. Soil-transmitted helminth infections and associated risk factors among schoolchildren in Durbete Town, Northwestern Ethiopia; Journal of Parasitology Research. 2015; 2015; Publisher –Hindawi; pp.1-5.
10. Vandemark L.M., Jia T.-W, Zhou X.-N, Social science implications for control of helminth infections in Southeast Asia; Advances in Parasitology. 2010; 73; pp. 137–170.
11. Alemu A., Atnafu A, Addis Z. Soil transmitted helminths and Schistosoma mansoni infections among school children in Zarima town, Northwest Ethiopia. BMC Infectious Diseases. 2011; 11;article. 189.
12. Ostan I,Kilimcioglu A.A, Girginkardesler N, Ozyurt B.C,Limoncu M. E., and Ok U. Z. Health inequities: lower;socio-economic conditions and higher incidences of intestinal parasites,BMC Public Health. 2007; 7; article.342.
13. WHO.Prevention and control of schistosomiasis and soiltransmitted helminthiasis, World Health Organization Technical Report Series. 2002; 912; pp.1–57.
14. WHO,fact-sheets, Soil-transmitted Helminth Infections, Year 2017.
15. Parija S.C. Textbook of Medical Parasitology, 4th edition. 2016. P.332 -335
16. El-Sehry N. K. M, Fouda, L.M, Hassan L.E, Prevalence of parasitic Infections and its Effect on the Health Status of Primary School Children,IOSR Journal of Nursing and Health Science. 2017; 6(4), pp.41-52.
17. Rodriguez-Morales AJ, Barbella RA, Case C, Arria M, Ravelo M, Perez H et al. Intestinal Parasitic Infections Among Pregnant Women in Venezuela. Infectious Diseases in Obstetrics and Gynecology, 2006, 1-5.
18. Osazuwa F, Ayo Q.M, Paul I. A significant association between intestinal helminth infection and anaemia burden in children in rural communities of Edo state, Nigeria; North American journal of medical sciences. 2011; 3 (1); pp.30.
19. Darlan D.M, Ananda F.R,Sari M.I, Arrasyid N.K, Sari D.I. Correlation between iron deficiency anemia and intestinal parasitic infection in school-age children in Medan. IOP Conference Series: Earth and Environmental Science. 2018; 125(1);pp. 012059.
20. Gyang V.P. et.al.Intestinal parasitic infections: current status and associated risk factors among school aged children in an archetypal African urban slum in Nigeria. Journal of Microbiology, Immunology and Infection. 2017. pp. 1-8.
21. Tripathi K, and Nema S, and Bankwar V, and Kumar D.A. Intestinal Parasitic infections and Demographic status of school children in Bhopal region of Central India. IOSR Journal of Pharmacy and Biological Sciences. 2014; 9(5); pp.83-87.
22. P, Ertug S, Gultekin B, Onen O, Beser E. Intestinal parasites prevalence and related factors in school children, a western city sample-Turkey. BMC public health. 2004; 4(1); pp.64.
23. Oyewole F, Ariyo F, Sanyaolu A, Oyibo W.A, Faweya T, Monye P, Ukpong M, Okoro C. Intestinal helminthiases and their control with albendazole among primary school children in riverine communities of Ondo state, Nigeria. Southeast Asian journal of tropical medicine and public health.2002; 33(2); pp.214-217.