www.jmscr.igmpublication.org
Impact Factor (SJIF): 6.379
Index Copernicus Value: 71.58
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v6i4.52

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

# Study of intestinal parasitic infection among primary school children from a tribal community in Nadia district of West Bengal

Authors

**Dr Soma Mondal[1], Dr Sumana Ghosh[2], Dr Kuhu Pal[3], Ms. Suparna Kumar[4]**

[1]Assistant Professor, Department of Microbiology, College of Medicine and JNM hospital, W.B.U.H.S. Kalyani, Nadia

[2]Demonstrator, Dept of Microbiology, College of Medicine and JNM hospital, W.B.U.H.S. Kalyani, Nadia

[3]Associate Professor and HOD, Department of Microbiology, College of Medicine and JNM hospital, W.B.U.H.S. Kalyani, Nadia

[4]Third Prof (Part II) M.B.B.S. student of College of Medicine and JNM hospital, W.B.U.H.S. Kalyani, Nadia College of Medicine and JNM hospital, W.B.U.H.S, Kalyani, Nadia

Corresponding Author

**Dr. Soma Mondal**

Assistant Professor, Department of Microbiology, College of Medicine and JNM hospital, W.B.U.H.S, Kalyani, Nadia

Phone no. 9143007166, Email: *drsomamondal@gmail.com*

**Abstract**

**Objective:** *The study was undertaken to find out the rate of intestinal parasitic infection among tribal children and to find out the contributing factors of the infection.*

**Method:** *A total of 103 students from a primary school (5 to12 years) of a local tribal community were participated in the study. A standard questionnaire was made and it was supplied to the participants. All the stool samples were examined by saline and iodine wet mount method. Data analysis was done by Graphpad Prism, version 5.0 statistical software. The results were expressed as rates and proportions. p value < 0.05 was considered as significant.*

**Result:** *Overall prevalence of intestinal parasitic infection was 22.33% among the study population. Among them 60.86% were male and 39.1% were female. Infection rate was maximum among the age group of 11-12 years (39.1%). Ascaris lumbricoides was the commonest parasite (33.3%) found followed by Entamoeba histolytica and Hook worm, 18.5% each. In the present study we found association of OPC in stool with hand washing before meal (0.03), mother's education (0.04), walking in bare foot (0.01) and hand washing after defecation with soap (0.02) with significant p value.*

**Conclusion:** *Policies need to be strengthened to provide pure drinking water and sanitary latrine in these underprivileged areas. Along with that regular mass deworming programmes and hygiene education is required to control parasitic infections among school children.*

**Keywords**: *Intestinal parasite, tribal community, school.*

## Introduction

Intestinal parasitic infection (IPIs) is one of the common public health problems in India. Many of the children of an endemic region can be expected to have IPIs soon after their weaning and there is a high chance of reinfection later[1]. The prevalence

of parasitic infection of intestine varies from time to time and place to place and it depends on several contributing factors. Among them poverty, low literacy rate, poor hygienic condition, unsafe drinking water, hot and humid tropical climate etc are important contributing factors. Most of the infections are mainly transmitted by water and soil.[2] Untreated cases of IPIs may results in various health problems including iron deficiency anaemia, malnutrition, growth retardation, susceptibility to other infections and even mental and physical problems.[3]

Few Indian studies have reported higher prevalence of IPIs in Kashmir[4-6] ranging from 46.7% to 75.28% and 51.5% in Karnataka [7]. On the other hand a low (6.68%) prevalence of IPIs was found in general population of Chandigarh[8]. We found 27.5% prevalence of IPIs among school going children from Midnapur district of West Bengal in a recent study [9]. However studies in the context among tribal population are very limited particularly in this eastern region of India. In studies from Western India, it was found that overall 51.78% and 37.66% prevalence of IPIs among tribal community[10] and 1 to 5 years old tribal children[11] respectively. Tribal community is one of the most underprivileged communities of our society. Poverty, lack health education, unhygienic living conditions, poor sanitation facilities make them susceptible to various infections including worm infestation. It is very important to monitor the problem from time to time to know the actual burden of the infection in the community. IPIs is a very common preventa-ble health problem of children but if left untreated it may give rise to long term health problems. Our present knowledge about intestinal parasitic infection in tribal community of this part of our country is very limited. The study was undertaken to find out the exact burden of intestinal parasitic infection among tribal children of this area and to find out the contributing factors of the infection. The knowledge will help us to take appropriate measures for improvement of the health of the tribal school going children of the locality.

**Material and Methods**

The study was conducted in the department of Microbiology, College of Medicine and JNM Hospital, WBUHS, Nadia between July and December of 2016. It is a type of epidemiological, laboratory based and cross sectional study. We have selected a nearby tribal school for the present study. Institutional ethical clearance and permission from the school authority was taken prior to the study. All students were communicated about the impact of parasitic infection and were taught in detail so that they understand about the harmful effect of parasite in health. Assent and consent were taken from the study population. A standard questionnaire was made and it was supplied to the school children. A total of 103 primary school children between the age group of 5 to 12 years from a local tribal community participated in the study. Children/ Parents not willing to participate in the study were excluded from the study. Questions regarding their habits of hand washing before eating, habits of walking in bare foot, eating mud, type of toilet used by them (open air, sanitary), method of purifying their drinking water etc were asked and noted. Children were asked about the occupation of the head of the family/father (fixed salary or labour), number of siblings of the child, mother's education etc. Weight of the every child was measured at the time of interview with minimal clothing.

At the time of interview, students were explained how to collect their stool samples. Leak proof clean, dry plastic containers were given to them and stool samples were collected next day from them. All the samples were immediately transported to the laboratory and examined within 2 hours of collection. Macroscopic examination like colour, consistency, presence of mucus and blood and presence of parasitic structures in stool was noted. All the samples were examined by saline and iodine wet mount method under 10 X followed by 40 X objectives with a good quality binocular microscope. Saline wet mount and iodine wet mount will be done to detect protozoal

trophozoites, helminthic ova and cysts respectively[12]. Infected children were immediately referred to our hospital for treatment and follow up. Finally all the data was analysed using appropriate statistical software. Data analysis was done by Graphpad Prism version 5.0 statistical software. The results were expressed as rates and proportions. Two sided Fisher's exact test was applied to study the association between prevalence of intestinal parasites and the demographic factors.

**Results**

A total of 103 stool samples were examined, out of them 23 stool sample were positive for OPC . In the present study we found the overall prevalence of intestinal parasitic infection was 22.33% among the study population. Among 23 infected children, 60.86% were male and (39.1%) were female. We found IPIs is more common in the age group of 11-12 years (39.1%). Age and sex wise distribution of the cases given in the table 1. In the present study we have found that helminth infections are more common (65.2%) compared to protozoal (34.7%) infections. We found seven different types of parasite in the stool of the study population. *Ascaris lumbricoides* was the commonest parasite found followed by *Entamoeba histolytica*, Hook worm, *Trichuris trichuria*, *Giardia lamlia*, *H. Nana* and *Taenia spp.* as shown in Table 2.

Out of 23 positive stool samples, 4 samples showed mixed infection (17.3%) and overall 13% infection was due to combination of *A. lumbricoides* + *T. trichuria* as shown in Table 3. In the present study we found association of OPC in stool with the following contributing factors like hand washing before meal (0.03*), mother's education (0.04*), walking in bare foot (0.01*) and hand washing after defecation with soap (0.02*) with significant p value as depicted in Table 4.

**Table 1:** Age and sex wise distribution of the positive cases

| Age (in years) | Sex | | Total |
|---|---|---|---|
| | Male | Female | |
| 5-6 | 5 | 1 | 6 (26%) |
| 7-8 | 3 | 3 | 6 (26%) |
| 9-10 | 0 | 2 | 2 (8.6%) |
| 11-12 | 6 | 3 | 9 (39.1%) |
| **Total** | **14 (60.86%)** | **9 (39.1%)** | **23 (100%)** |

**Table 2** Distribution of parasites among positive cases

| Parasites Detected ( n= 27) | Number of parasites detected from positive samples. |
|---|---|
| *Ascaris lumbricoides* | 9 (33.3%) |
| Hook Worm | 5(18.5%) |
| *Entamoeba histolytica* | 5 (18.5%) |
| *Giardia lamblia* | 3(11.1%) |
| *Trichuris trichiura* | 3 (11.1%) |
| *H. nana* | 1 (3.7%) |
| *Taenia spp.* | 1(3.7%) |

**Table 3:** Mixed infection detected from positive stool samples

| Name of the parasites | Mixed infection (%) |
|---|---|
| *A. lumbricoides + T. Trichuria* | 3 /23 (13.04%) |
| *A. lumbricoides + E. Histolytica* | 1/23 (4.3%) |
| **Total** | **4/23 (17.3%)** |

**Table 4:** Analysis of different associated factors with OPC positive stool samples

| Variables | | Positive samples (n = 23) | Negative samples (n= 80) | Total | p value |
|---|---|---|---|---|---|
| **Lower socioeconomic status** | Yes | 22 | 75 | 97 | 1.0 |
| | No | 1 | 5 | 6 | |
| **Mother's education** | Primary | 3 | 29 | 32 | 0.04 |
| | Illiterate | 20 | 51 | 71 | |
| **Number of siblings** | ≥2 | 18 | 59 | 77 | 0.78 |
| | <2 | 5 | 21 | 26 | |
| **Use of Purified water** | Yes | 15 | 67 | 82 | 0.07 |
| | No | 8 | 13 | 21 | |
| **Hand washing before meals** | Yes | 13 | 64 | 77 | 0.03 |
| | No | 10 | 16 | 26 | |
| **Eating undercooked/raw vegetables** | Yes | 8 | 20 | 28 | 0.42 |
| | No | 15 | 60 | 75 | |
| **Habit of Pica** | Yes | 4 | 10 | 14 | 0.50 |
| | No | 19 | 70 | 89 | |
| **Bare foot walking** | Yes | 13 | 22 | 35 | 0.01 |
| | No | 10 | 58 | 68 | |
| **Type of Latrine** | Open air | 18 | 58 | 76 | 0.78 |
| | Sanitary | 5 | 22 | 27 | |
| **Hand washing after defecation** | Soap water | 4 | 36 | 40 | 0.02 |
| | Only water | 19 | 44 | 63 | |

## Discussion

In the present study we found 22.33% prevalence of IPIs among tribal school children. The finding is similar to the findings of Mahajan *et al*[13] (26.8%) and Chatterjee [9] *et at* (27.5%) . We also found 51.7 % prevalence of IPIs among Bhil tribe in Rajasthan[10] and 37.6% among 1-5 yrs of tribal children[11] of north Maharashtra. In few other studies incidence of parasitic infection has been reported below 24% from rural and urban areas of Central and Northern states of India.[14,15,16] A very high prevalence of IPIs (46.7% to 75.2%) was found by Wani et al [4-6] in Kashmir valley. It is well clear that the prevalence and the type of parasite detected from a particular geographic area is depends on various factors for example Hook worm infection is not so common in Kashmir because its environmental and weather condition is different from other part of India. In the present study we found that *Ascaris lumbricoides* was the commonest parasite detected from stool samples. *Ascaris lumbricoides* was found to be the predominant parasite infecting human in several other studies.[17-18] In few studies, we found that cyst of *Giardia lamblia* was the commonest finding from stool samples. Prevalence of 32.41% was noted for *Giardia lamblia* in the study of Mane et al.[11] In the present study we found 17.3% mixed infection by 2 different parasites among them 13% was due to the combination of *Ascaris* and *Trichuris* and similar type of finding was also noted in a different study[19]. Prevalence of soil-transmitted helminths infection of 39% and a marked predominance of hookworm (38%)[19] infection was seen in a study from South India and no infections with *Trichuris trichiura* was detected in the same study. This could be due to the geographical distribution of these helminths as *Ascaris and Trichuris* are more commonly found in urban areas and hookworm infections are predominant in rural settings[20.] In the present study we found male (60.86%) are more commonly infected compared to female (39.1%) and the finding is similar to the findings of two other studies where we found the infection rate in male was (56.52 %)[10] and (53.24 %)[11] respectively. It may be due to their more outdoor activities IPIs is more common in boys. On the

other hand in two different studies from Nepal it was found that IPIs is more common in girls[21,22].

In the present study we found that the infection was more common in age group of 11-12 years of ages. In another study maximum number of occurrence IPIs in the age group of 6–10 years (69.23 %) [10] was noted. Among the different risk factors in the present study we found that low level of maternal education is significantly associated with parasitic infection, it may be due their lack of awareness about hygiene. We have found similar finding that low maternal education level to be associated with parasitic infections ($p<0.001$) in a different Indian study[11] and also in a study done among Mexican rural children[20]. This may be due to lack of awareness regarding health and hygiene habits among less educated mothers. Apart from mother's education in our study we observed significant association between worm infection and hand washing before meal, hand washing after defecation with soap and walking on bare foot. It is seen that those who regularly wash their hands before every meals are less prone to develop worm infection. Habit of hand washing with soap after defecation has protective role against IPIs. Similar findings can be observed in a different study where significant associations observed between worms infection and use of types of latrine ($p=0.000$), hand washing after defecation ($p=0.000$), regular hand wash before meals ($p=0.000$) and regular use of foot wears ($p=0.000$)[23] Lower socioeconomic status was not an important risk factor found in our study and it is contrary to the study of Mane[11]. In the present study most of them are from low socioeconomic status whether they are infected of not.

Most of the parasites are soil transmitted and mainly transmitted by fecooral route. The quality of drinking water used for drinking and other domestic purpose is an important source of intestinal parasitic infection. Major contributory factors of IPIs included several social, domestic as well as peridomestic factors related with poverty, hygiene and education. The major limitation of the study is small sample size. If similar study can be performed with large population a better result can be obtained in future.

## Conclusion

Intestinal parasitic infection is a very common health problem of tribal community of rural Bengal .Time to time campaigns in tribal school and nearby localities to create awareness about health and hygiene will be helpful to limit the infection in the community. Policies need to be strengthened to provide pure drinking water and sanitary latrine in these underprivileged areas. Along with that regular mass deworming programs and hygiene education is required to control parasitic infections among school children.

## Source of support

We acknowledge ICMR for selecting our project for Short term studentship (STS) programme 2016

## Reference

1. Awasthi S, Bundy DAP, Savioli L. Helminthic infections-A clinical review. BMJ 2003; 327: 431-3.
2. Jasti A, Ojha SC, Singh YI. Mental and behavioral effects of Parasitic infections: a review. Nepal Med Coll J. 2007; 9(1): 50-6.
3. Le HT, Brouwer ID, Verhoef H et al. Anemia and intestinal parasite infection in school children in rural Vietnam. Asia Pac J Clin Nutr . 2007; 16 (4): 716-23.
4. Wani SA, Ahmad F, Zargar SA, Ahmad Z, Ahmad P, Tak H. Prevalence of intestinal parasites and associated risk factors among school children in Srinagar City, Kashmir, India. J Parasitol 2007; 93(6):1541-3.
5. Wani SA, Ahmed F, Zargar SA, Dar PA, Dar ZA, Jan TR. Intestinal helminthes in a population of children from Kashmir valley. Ind J Helminthology 2008; 2: 1-5.
6. Wani SA, Ahmad F, Zargar SA, Amin A, Dar ZA, Dar PA. Intestinal helminthiasis in children of Gurez valley of Jammu and Kashmir State, India. J Global Infect Dis 2010; 2:91-4.

7. Shubha DS, Fatima F. A coprological survey for assessing intensity of parasitic infection in school children: Cross-sectional study. Trop Parasitol 2011; 1:88-93.
8. Singh R, Singla P, Sharma M, Chaudhary A, Chaudhary U. Prevalence of Intestinal Parasitic Infections in a Tertiary Care Hospital in Northern India: Five year retrospective study. Int.J. Curr. Microbiol. App. Sci. 2013; 2(10): 112-117
9. Chatterjee K , Dash SS, Das B, Ray S, Ghosh D , Ray R. Intestinal Parasitic Infestations and Its Prevalence among School Going Children and Pregnant Women in Paschim Medinipur District, West Bengal, India. The International Journal Of Science & Technoledge . 2015; 3 (9): 203-5
10. Choubisa S.L. , Jaroli V.J., Choubisa P, Mogra N.[3.] Intestinal parasitic infection in Bhil tribe of Rajasthan. India J Parasit Dis. 2012 ; 36(2): 143–48.
11. Mane M, Kadu A, Mumbre S, Deshpande M, Gangurde N. Prevalence of intestinal parasitic infections and associated risk factors among pre-school children in tribal villages of North Maharashtra India. Int J Res Health Sci. 2014; 2(1):133-9.
12. Chatterjee K.D. "Parasitology" 13th edition 2009 ; p 260-61
13. Mahajan M, Mathur M, Talwar V, Revathi G. Prevalence of intestinal parasitic infections in East Delhi. Indian J Community Med 1993;111:177-9.
14. Khurana S, Aggarwal A, Malla N. Comparative analysis of intestinal parasitic infections in slum, rural urban populations in and around Union Territory, Chandigarh. J Commun Dis. 2005; 37(3): 239- 43
15. Dambhare DG, Bharambe MS, Garg BS. Intestinal parasitic prevalence and related factors among school children in the rural area of Central India. J Commun Dis; 42(4):281 - 86
16. Marothi Y, Singh B. Prevalence of intestinal parasites at Ujjan, Madhya Pradesh, India : five year study. African J Microbiol Res. 2011; 5 (18) : 2711-14
17. Kiran T, Shashwati N, Vishal B, Ashok kumar D. 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): 83-87.
18. Bora D, Meena VR, Bhagat H, Dhariwal AC, Shivlal. Soil transmitted helminthes, Prevalence in school children of Pauri Garhwal district, Uttaranchal State. J Commun Dis 2006; 38: 112-4.
19. Kaliappan SP, George S, Francis MR, Kattula D, Sarkar R, MinzS, Prevalence and clustering of soil-transmitted helminth infections in a tribal area in southern India Trop Med Int Health. 2013; 18(12): 1452–62.
20. Albonico M, Chwaya HM, Montresor A, et al. Parasitic infections in Pemba Island school children. East African Medical Journal. 1997;74:294–98.
21. Sah R.B., Baral R, Shah U, Jha N. A Study of Prevalence of Intestinal Helminthic Infections and Associated Risk Factors among the School Children of Biratnagar Submetropolitan, Eastern Region of Nepal. Int. J. Curr. Res. Med. Sci.2016; 2(4): 8-15
22. Rijal B, Oda Y, Basnet R, Parajuli K, Gurung CK, Sherchand JB. Gender variation in the prevalence of parasitic infection and level of awareness in adolescents in rural Nepal. American Journal of Tropical Medicine and Hygiene 2001; 32: 575-80.
23. Tripura A, Reang T, Tripura K, Roy A. A study of knowledge and practice on intestinal helminthiasis among rural tribal mothers of under five children in Mohanpur block, west district of Tripura: a north eastern state of India. Journal of Evolution of Medical and Dental Sciences 2013; l2 (47): 9081-87.