



ISSN : 0973-7057

Int. Database Index: 663 www.mjl.clarivate.com

Demographic pattern of prevalence of intestinal protozoan infections with special reference to schedule caste and minorities population of Patna District of Bihar, India

Afsana Begum*

Parasitology Research Lab, Department of Zoology, Patna University, Patna, Bihar, India

Received : 2nd July, 2020 ; Revised : 19th August, 2020

Abstract- Intestinal parasitic infections are endemic to worldwide and remain a major public health problem among most communities in tropical and subtropical countries including India. This study was carried out in the population of some ghettos (slums) of Patna District of Bihar, India during 2010-2011 with the purpose of achieving a better understanding of the incidence and factors associated with intestinal protozoan parasites among the population of selected ghettos. Stool samples from 687 subjects were collected randomly from the population and examined by simple saline preparation technique. In addition, stained preparation by Lugol's iodine solution was also used for the identification of nuclear character of the cysts. (19.6%) of the total examined cases (135/687) were found to be infected with various protozoan parasites. The species specific degree of incidence for the protozoan parasites has been found to be- *Entamoeba histolytica* (8.0 %), *Giardia lamblia* (5.0%) and *Entamoeba coli* (4.3%). About 2.1% of the infected samples contained multiple infections. Samples were collected from two different communities, schedule caste (SC) and Muslims. 70 samples out of 310 were positive for parasitic infections in SC groups which constitute 22.5% of infection rate, in Muslims 65 (17.2%) were harbored with parasitic infections out of 377 samples studied. The present study revealed that the prevalence of intestinal protozoan parasitic infections among the population of the areas of Patna is still so high that required special control measures. Furthermore the study underscored the need for surveillance and intervention program to control and manage these infections.

Key words: Intestinal protozoan parasites, Schedule Caste (SC), Muslims, Prevalence, Ghettos, Patna district

INTRODUCTION

Parasitic infections caused by intestinal protozoan parasites are globally endemic and it represents one of the major health problems in the developing countries with high prevalence rate in many regions including India.¹ These infections remain significant cause of morbidity and mortality along with other manifestations like iron deficiency anaemia, growth retardation in children, and

other physical health problems.² 60% of the world population is infected with abdominal parasites.³ WHO estimated approximately 50 million people around the world suffer parasitic infections each year, resulting mortality rate 40-100 thousand per year.⁴⁻⁶ About 39 Disability Adjusted Life Year (DALY) associated with parasitic infection presents a major health burden.⁷ The most common intestinal protozoan parasites are *Entamoeba histolytica*, *Entamoeba coli* and *Giardia lamblia*. The disease caused by these parasites is known as giardiasis, amoebiasis and they are associated with diarrhoea.⁸ *Giardia lamblia* is the most prevalent parasite

*Corresponding author :

Phone : 8294036786, 7632911275

E-mail : afsana.begum@gmail.com

which causes diarrhoea in developed world as well as in developing countries. Amoebiasis is the third leading cause of death from parasitic disease in worldwide. The prevalence of parasitic diseases depends on environmental, social and economic factors.⁹ Besides this poverty, illiteracy, unhygienic surroundings, lack of safe potable water, moreover some environmental factors such as global warming, subtropical, hot and humid climatic conditions, pollution, urbanization and unplanned reforestation may be the reasons for the transmission of parasitic infections.^{10,11}

In India a wide range (11.40 – 90.70%) of community based prevalence of intestinal parasitic infections has been reported from different geographical provinces and the populations.¹²⁻¹⁴ The prevalence of intestinal parasitic infections varies in different geographical regions.¹⁵ Thus it is important to know the disease burden of the parasitic infections in the community level. Scant information is available in this regard especially in Bihar, whereas a study related to overall prevalence of intestinal parasitic infections have been published in recent past year.¹⁶ So we performed a community based study especially in Schedule Caste (SC) and Muslims. These clusters of populations are regionally or locally known as ghettos (Slum dwellers, a part of a city, especially slum area occupied by a minority group or groups). The main purpose of the study was to evaluate the incidence of the intestinal protozoan parasites in the population under study.

MATERIALS AND METHODS

A cross sectional study (2010- 2011) was carried out in the some ghettos of Patna district of Bihar, India for the prevalence of intestinal protozoan parasitic infections. SC and Muslim communities reside in these areas which are socio- economically very poor and backward. A total no. of 687 stool samples was randomly collected, out of which 310 samples were from SC and 377 samples from Muslims. Data was collected using a pre structured questionnaire to obtain the socio- demographic profile and a sterile, dry leak proof, clean glass container with and without 10% formalin bearing necessary code. Other details regarding age, sex, religion, and food habits, living status, source of drinking water and laboratory facilities were also recorded. First of all a macroscopic examination of all the collected samples was carried out for color, consistency and presence

of mucus and blood. For microscopic examination, Saline wet mount and Lugol's iodine wet mount were prepared as per standard protocol for the identification of eggs, cysts and trophozoites of intestinal parasites.¹⁷

RESULTS

The result of the overall survey has been summarized in Fig 1. Out of a total 687 fecal samples examined 135 (19.6%) of individual were found to be infected with intestinal protozoan parasites. In sex related incidence of infections, males showed slightly higher rate (20%; 84/420) than females, (19.1%; 51/267). Out of 310 samples of SC, 70 (22.6%) samples were found infected. Regarding sex wise, males (25.7%; 50/194) showed higher infection rate than females (17.2%; 20/116). Out of 377 samples of Muslims 65 (17.2%) samples were found infected. Gender wise females (20.5%; 31/151) showed higher infection rate than males (15%; 34/226) (Table 1). Species wise *Entamoeba histolytica*, (8.0%) was most prevalent followed by *Giardia lamblia* (5.0%) and *Entamoeba coli* (4.3%) multiple infections (2.1) (Table 2).

DISCUSSIONS

Intestinal parasitic infections are devastating and prevalent in tropical and subtropical countries and constitute a major health problem in many developing countries predominantly due to poor sanitation and inadequate personal hygiene. Intestinal parasitic infections including protozoan infections remain a major threat to health, because chronic conditions may lead to serious disease and have been described as constituting the greatest single worldwide cause of illness and disease.¹⁸ The present study showed that out of 687 individuals 135 (19.6%) were harbored with various species of parasites and three species (Table 3) of parasites were detected. In this study 310 samples were collected from SC category and 377 from Muslims out of which 70 (22.5%) and 65 (17.2%) samples respectively found to be infected. These results were consistent with a wide range of (11.5% - 97.4%) prevalence of parasitic infection has been reported from different geographical regions and populations of India.¹⁹⁻²¹ The high rate of infection may be correlated with various factors such as behavioral, biological, environmental socio economic and health system. Beside this poor sanitation, lack of safe drinking water, open air defecation, barefooted

Begum- Demographic pattern of prevalence of intestinal protozoan infections with special reference to schedule caste and minorities population of Patna District of Bihar, India

walking in the field pattern of setting of life style, warm and humid climate and lack of health education in the study area. In sex related incidence of infection in overall prevalence and in SC groups males (20% and 25.7%) showed slightly higher infection rate than females (19.1% and 17.2%). These results are similar to those reported in previous study¹⁴, but they are not in line with those obtained by other authors who found that the females show high infection rate.²²⁻²⁴ High rate of infection in males may be attributed to their maximum daily life activities, greater exposures to worldly environment and also for their careless living habits. In Muslims communities' females (20.5%) show higher infections rate than males (15%). Higher prevalence among females in Muslims may be due to their prolonged contact with prevailing unhygienic surroundings, low literacy rate, lack of knowledge of proper hygiene and carelessness about health, most of the Muslims localities are situated in sub hygienic areas and lack of awareness also contribute for the prevalence of infections. With respect to the different species of protozoan *Entamoeba histolytica* showed a relatively higher incidence than *Giardia lamblia* and *Entamoeba coli*. This result is similar to those reported in other parts of

India including Bihar^{6,19,22} but they are not in consistent with those reported by other authors who found that *Giardia lamblia* was the most prevalent protozoan species.²⁵ The high rate of protozoan in our study could be due to the existence of resistant cysts of the parasites in the study area. Therefore the present study confirms that occurrence of protozoan infections are quite high in the study population. The remoteness of the rural settings, characterized by the absence of required infrastructure like safe drinking water, toilets, medical facilities and basic sanitation and inadequate environment constitute the main determining factors that predisposed this population to parasitic infections. This therefore highlights the need to educate members of the community and encourage hygiene practice especially those in the study areas, on the method of preventing transmission and spread of these intestinal protozoan parasites. However mild the infection may be, it does hamper the nutritional status, working ability and consequent economic and educational development of the individual concerned. This becomes much more imperative when the majority of population of the country is younger ones.

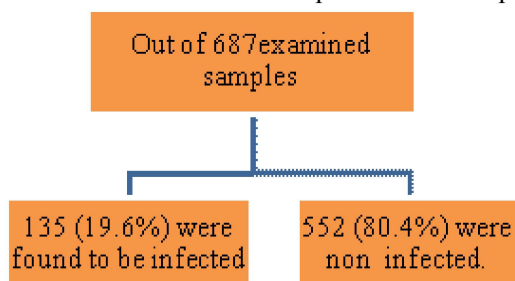
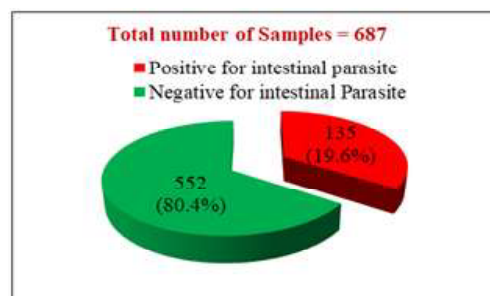


Figure 1.



Pie Chart with reference to Figure 1

Table 1. The incidence of intestinal protozoan parasitic infections of the population studied.

Variables	Total No. of samples Studied	No. of infected samples	Prevalence (%)
(i) Overall	687	135	19.6
Male	420	84	20.0
Female	267	51	19.1
(ii) Schedule Caste	310	70	22.5
Male	194	50	25.7
Female	116	20	17.2
(iii) Muslims	377	65	17.2
Male	226	34	15.0
Female	151	31	20.5

Table 2. Species wise prevalence of protozoan infections out of 687 samples studied.

Parasites	No. of infected samples (135)	Prevalence (%)
<i>E. histolytica</i>	55	8.0
<i>G. lamblia</i>	35	5.0
<i>E. coli</i>	30	4.3
Multiple infections	15	2.1

ACKNOWLEDGEMENT

The author is extremely thankful to her guide, Prof. M. Haque and the Head, Department of Zoology, Patna University, Patna, Bihar for their constant encouragement & guidance.

REFERENCES

1. **Shrihari N, Kumudini TS, Mariraj J, Krishna S. 2011.** The prevalence of intestinal parasitic infections in a tertiary care hospital - A retrospective study. *J Pharm Biomed Sci.* **12**:1-3.
2. **WHO. 1998.** Guidelines for evaluation of soil transmitted helminthiasis and schistosomiasis at community level, schistosomiasis and intestinal parasite unit, WHO, Geneva, WHO/CTD/SIP/98.1
3. **Kang G, Mathew MS, Rajan DP, Dainel JD, Mathan MM, Mathan VI, and Muliyl J P. 1998.** Prevalence of intestinal parasites in rural Southern Indians. *Tropical Med. Int. Health.* **3(1)**: 70-75.
4. **World Health Organization. 1997.** Amoebiasis. *WHO Weekly Epidemiol Rec.* **72**:97-100.
5. **Petri WA, Jr., Haque R, Lyerly D, Vines RR. 2000.** Estimating the impact of amoebiasis on health. *Parasitol Today.* **16**:320-21.
6. **Dhanabal J, Selvadoss PP, Muthuswamy K. 2014.** Comparative study of the prevalence of intestinal parasites in low socioeconomic areas from South Chennai, India. *J. Parasitol Res.* 630968.
7. **Manochitra K, Padukone S, Selvaratthinam AP, Philips A, Parija SC. 2016.** Prevalence of intestinal parasites among patients attending a tertiary care center in South India. *Int. J. Curr. Microbiol. Appl. Sci.* **5**:190-7.
8. **Davis AN, Haque R, Petri WA. 2002.** Jr Update on Protozoan parasites of the intestine. *Curr. Opin. Gastroenterol.* **18**:10-4.
9. **Davane MS, Suryawanshi NM, Deshpande KD. 2012.** A prevalence study of intestinal parasitic infections in a rural hospital. *Int. J. Recent Trends Sci. Technol.* **2**:1-3
10. **Padmaja N, Swaroop PS, Nageswararao P. 2014.** Prevalence of Intestinal Parasitic Infections among School Children in and around Amalapuram. *J. Pub. Health Med. Res.* **2(2)**:36-8.
11. **Bethony J, Brooker S, Albonico M, Geiger SM, Loukas A, et al. 2006.** Soil-transmitted helminths infections: ascariasis, and hookworm. *Lancet.* **367**:1521-32.
12. **Sehgal, R, Reedy, G. V., Verweij, J. J., Rao, A. V. 2010.** Prevalence of intestinal parasitic infections among children and pregnant women in a low socio-economic area, Chandigarh, North India. *RIF.* **1(2)**: 100-3.
13. **Marothi, Y. and Singh, B. 2011.** Prevalence of intestinal parasites at Ujjain, Madhya Pradesh, India: five year study. *African J. Microbiol. Res.* **5(18)**: 2711-2714.
14. **Choubisa, S. L., Jaroli, V. J., Choubisa, Pallavi. 2012.** Intestinal parasitic infection in Bhil tribe of Rajasthan, India. *J. Parasit. Dis.* **36(2)**:143-148, Springer.
15. **Kucik CJ, Martin GL, Sortor BV. 2004.** Common intestinal parasites. *Am. Fam. Physician.* **69**:1161-1168.
16. **Rituparna B, Bhattacharya P, Paul UK, Bandyopadhyay A. 2017.** Prevalence of intestinal parasites in a tertiary care hospital in rural Bihar. *Int. J. Sci. Stud.* **4(12)**:89-93
17. **Panikar, C. K. J. 2007.** Text book of medical parasitology, 6th Edn. Medical Publisher. (P) LTD, Jaypee Brothers, New Delhi.
18. **Curtale F, Pezzotti P, Sharbani AL, et al. 1998.** *Health Policy Plan.* **(13)**: 423-32.

Begum- Demographic pattern of prevalence of intestinal protozoan infections with special reference to schedule caste and minorities population of Patna District of Bihar, India

19. **Fernandez, MC, Verghese S, Bhuvanewari R, Elizabeth SJ, Mathew T, et al. 2002.** A comparative Study of the intestinal parasites prevalent among children living in rural and urban setting in and around Chennai *J. Commun. Dis.* **34**: 35-9.
20. **Singh C, Zargar SA, Masoodi I, Shokat A, Ahmad, 2010 B.** Predictors of intestinal parasitosis in school children of Kashmir: a prospective study. *Tropical Gastroenterology.* **31(2)**: 105-7.
21. **Bisht D, Verma A k, Bharadwaj, H.H.D. 2011.** Intestinal parasitic infection among children in a semi-urban Indian population. *Trop. parist.* **1(2)**: 104-107.
22. **Misra, S. Duttary B and Shroff, B. 2013.** The prevalence of Intestinal Parasitic Infection in the Urban slums of a city in Western India (Gujarat), *Journal of Infection and Public Health.* **6(2)**:142-149
23. **Kumar R, Priyanka P, Yasmin T, et al. 2014.** Prevalence of intestinal parasitic infections in patients attending a tertiary care hospital in eastern Bihar. *J. Evolution of Med and Dental Sci.* **23(3)**:6740-6746.
24. **Mareeswaran, N. Savitha AK, Gopalkrishnan S. 2018.** Prevalence of intestinal parasites among urban and rural population in Kancheepuram district of Tamil Nadu. *Int. J.Comm Med Public Health.* **5(6)**: 2585-2589.
25. **Atul, A., Kulkarni, S. 2011.** Prevalence of intestinal parasites in school going children in rural community, *IJBR.* **2(12)**:605-607
