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Prevalence of Intestinal Parasitic Infection in Relation to Age in the Urban Population from Chandigarh, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Intestinal parasitic infection is a global health problem particularly in the developing countries with different prevalence rates in different regions. The aim of this study was to evaluate the prevalence of intestinal parasitic infection in different age groups in the urban population of Chandigarh, India.
Materials and Methods: The retrospective study included stool samples 504 in number from human subjects from Chandigarh. Unstained wet saline mount preparations of stool sample were done to detect eggs or larvae and iodine wet mount to detect ova/ cysts of tapeworm, Enterobius, Ascaris, Giardia, Trichuris and Hookworm.
Results: A high prevalence rate of intestinal parasitosis (73%) was seen. The age group distribution shows a higher prevalence of intestinal parasitic infection in the young population (age group 21-30 years and 31-40 years). Ascariasis was the most common parasitic infection observed.
Conclusion: The present study reveals a high prevalence of intestinal parasitic infection in the study population and calls for long term control measures to improve their sanitary and living conditions.

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1. INTRODUCTION

Over one quarter of the world's population is suffering from some form of parasitic infection [1]. Infections with intestinal parasites are the most prevalent in tropical and subtropical regions of the developing world where adequate water and sanitation facilities are lacking [2] . Moreover the tropical countries are also affected by high population density, poverty, poor healthcare facilities, low education and hot and humid climate which are suitable for the growth of the parasites. The World Health Organisation (WHO) has reported three major soil transmitted helminths of worldwide health concern as *Ascaris lumbricoides*, *Trichuris trichiura* and hookworm with estimates of 1221-1472 million cases of ascariasis, 750-1050 million cases of trichuriasis and 740-1300 million cases of hookworm infestation worldwide [3]. In addition the waterborne protozoan diseases are one of the main cause of mortality of 1.6 million people per year globally [4]. The protozoan infections cause iron deficiency anaemia, mental illness and growth retardation in children, protein energy malnutrition in children, low pregnancy weight and intrauterine weight gain becoming an important cause of morbidity and mortality. In a tropical country like India institutions like schools, day care centres, hospitals and healthcare centres are not well equipped to fully monitor the specific conditions that promote the appearance and spread of parasitic diseases in urban or rural populations [5].

Furthermore the inability to prevent the parasitic disease by immunization is a major drawback as currently there is no effective vaccine. In India, the overall prevalence rate of intestinal parasitic infection has been reported in a range of 12.5% to 66% with prevalence rate for individual parasites varying from region to region [6,7,8] .

The survey on the prevalence of various intestinal parasitic infections in different geographic regions is henceforth a prerequisite for developing appropriate control strategies. The current control program for intestinal parasitic infection in our area includes mandatory deworming for children besides better hygiene and sanitation standards. Thus, the present study aimed to evaluate the prevalence of intestinal parasitic infection in the general population from Chandigarh, India.

2. MATERIALS AND METHODS

The retrospective study was undertaken in the Department of Microbiology from June, 2014 to June ,2016 of all age groups and includes stool samples of the patients with persistent diarrhea, weight loss, intestinal malabsorption ,anaemia attending the outpatient department of health centre of Panjab University, Chandigarh, India with a total sample size of 504. The procedures followed were in accordance with ethical principles for medical research (Helsinki declaration,2000).

Collection of samples-The fresh stool samples were collected in wide mouthed sterile screw capped labelled containers without preservative. The sample received were subjected to complete examination by both macroscopy and microscopy within 1-2 hr of its collection.

Macroscopy-In gross examination consistency of the sample, color, odor, presence of blood or mucus, structures like proglottids, scolices, adult tapeworm, Enterobius, Ascaris, Trichuris and Hookworms were identified.

Microscopy-Unstained wet saline mount preparations were prepared to detect eggs or larvae and Iodine wet mount was made to detect cysts. Negative samples were re-examined by concentration technique like formal ether sedimentation (Allen-Ridley) and salt flotation technique. Protozoa and helminths were identified according to their morphological details in accordance with the WHO guidelines [9]. The following formula was used to calculate the percentage prevalence of infection.

Prevalence= Number of subjects testing positive X 100/ Number of subjects investigated.

3. RESULTS

A total of 504 stool samples were examined out of which 368 were found to have intestinal parasitic infection with a prevalence rate of 73%. Table 1 shows the prevalence of different intestinal parasites study year wise. In the first year 98 samples were positive, in the second year 139 samples were found positive and in the third year 131 samples were found positive for intestinal parasites. Fig (1) shows the species composition of the various parasites identified. Among the parasites identified Giardia 9(1.79%),

hookworm 1(0.19%), *Ascaris lumbricoides* 277(54.96%), *Entamoeba histolytica* 59(11.70%), Taenia 22(4.36%). Ascariasis was the most common parasitic infection. A significantly high prevalence of intestinal helminthic infection is seen as compared to intestinal protozoan infection though *E.histolytica* was significantly present.

It was seen that out of 368 positive stool samples intestinal parasitic infection was seen in 190 female patients as compared to 178 males. Intestinal parasite distribution in various age groups is given in Table 2. Fig (2) shows the species composition of the parasites according to the age group. Highest prevalence of *Ascaris lumbricoides* was seen in the age group of 21-30yrs (57%) followed by age group 31-40 yrs (54%). *Entamoeba histolytica* was more prevalent in age group 31-40 yrs (15%) followed by age group 21-30 yrs (12%). Taenia was more prevalent in age group 31-40 yrs (7%) followed by age group 21-30 yrs (5%).Giardia however was more prevalent in age group 11-20 yrs (3%) followed by age group below 10 yrs (2%).

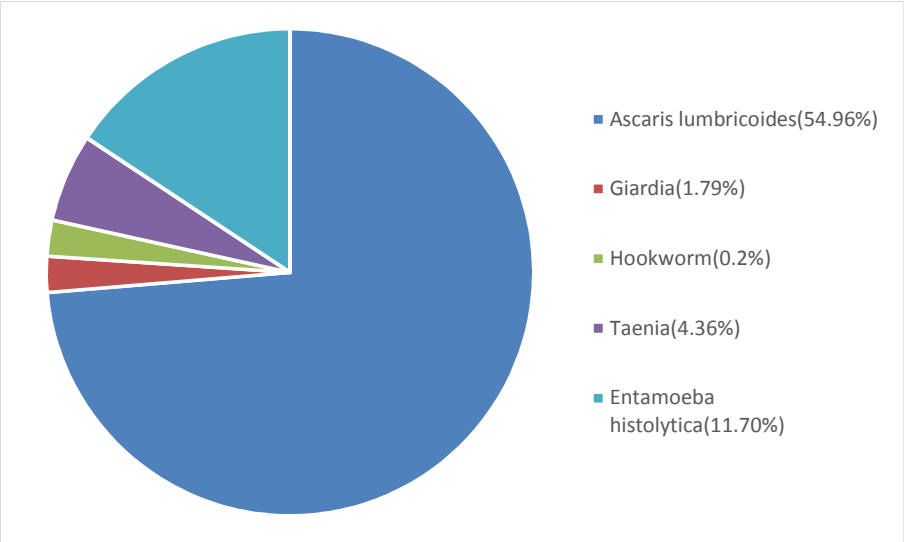

Fig. 1. Characterization of the various parasites identified, *A.lumbricoides* had the highest %

Table 1. Prevalence of different parasites study year wise

Study Year	*A .lumbricoides*	Giardia	Taenia	*E.histolytica*	Hookworm	Total N=368
First year	82	0	7	16	1	106
Second Year	96	3	8	32	0	139
Third year	99	6	7	11	0	123

Table 2. Parasite distribution in varying age group

Age group	Positive (%)	Negative (%)	Total
0-10	39 (76.4)	12(23.5)	51
11-20	47(74.6)	16(25.4)	63
21-30	76(70.3)	32(29.6)	108
31-40	77(78.6)	21(21.4)	98
41-50	48(68.6)	22(31.4)	70
51-60	45(69.2)	20(30.7)	65
61-70	28(73.6)	10(26.3)	38
>70	8(72.7)	3(27.2)	11
Total	368	136	504

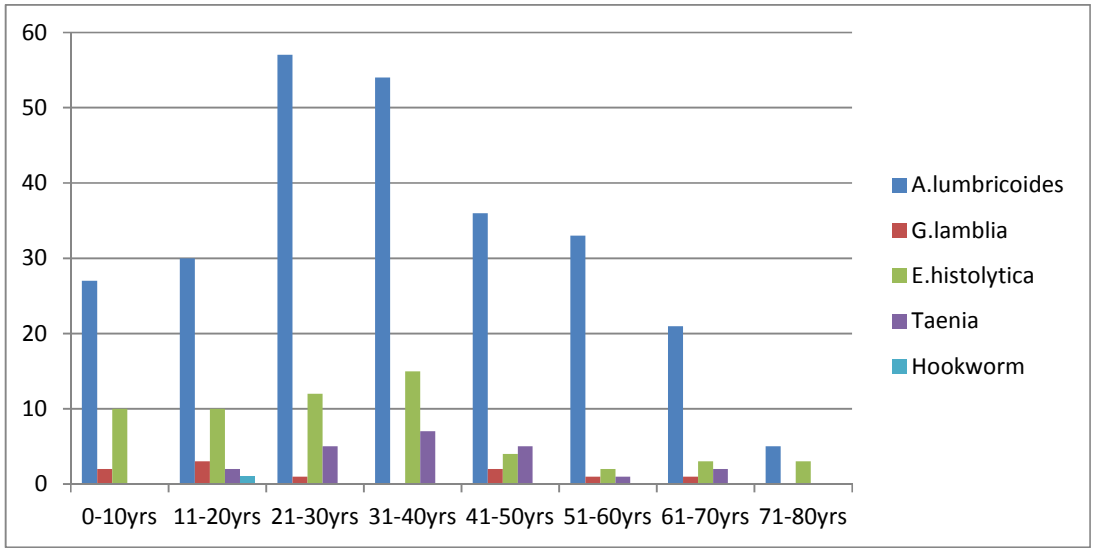

Fig. 2. Parasite distribution in various age groups. The age group 21-30 years followed by 31-40 years had highest intestinal ascariasis

4. DISCUSSION

Intestinal worm infestation is a global health problem and is a matter of concern for the developing world. In the present study intestinal parasitic infection was seen in 368(73%) cases out of total 504 cases. Studies from different parts of India [10-14] and outside India [15-17] have reported a prevalence rate of intestinal parasitic infection of 25% to as high as 75%. The prevalence rate of intestinal parasitosis in our study is high and is suggestive of overcrowding, contamination of water, poor sanitation and migration of people to cities greatly favouring transmission of parasitic infection resulting in high endemicity.

Present study revealed *Ascaris lumbricoides* (54.96%) as the commonest parasite followed by *Entamoeba histolytica* (11.70%), Taenia (4.36%), Giardia (1.79%) and Hookworm (0.2%). It has been seen that *Ascaris lumbricoides* is more prevalent in urban areas and that the higher prevalence can be attributed to overcrowding, lack of adequate water and improper sanitation [18,19]. Recent study by Wani *et al* have reported a high prevalence of ascariasis (71.8%) [20]. The prevalence of ascariasis was 43.2% as reported by Ragunathan *et al* from Puducherry [21] and 45.4% from Lathur in India by Devane *et al* [22]. Studies from outside India have also reported a higher prevalence of *A.lumbricoides*, *T.trichiura* and hookworm. The use of waste water in irrigation has been found to be particularly associated with increased risk of *Ascaris lumbricoides* outside India as well as Indian subcontinent [23-25]. The extended exposure to wastewater with high ova concentrations can be expected to result in a higher intensity of infections. A study conducted by Shuval *et al* reported a significantly higher prevalence of *A.lumbricoides* (29% versus 10%) prevalence in an urban site where farmers used wastewater for irrigation [26].

In the present study the prevalence of intestinal parasitic infection was seen more in females then the males. The age group distribution shows a higher prevalence of intestinal parasitosis in the young population. There seems to be age related change in the intensity of infection. In a recent study it has been reported that in endemic areas, the prevalence of intestinal parasitic infection rises at childhood to adulthood and then it decreases as the adult ages [27,28]. This is also seen in our study. The increase in prevalence of infection could be due to overcrowding, lack of adequate water, improper sanitation and even lifestyle habits as the young population is more inclined to eat street food with poor hygiene. This could lower immunity in young population leading to gastrointestinal disorders and increased intestinal parasitic infections. The phenomenon of clustering can hamper attempts to control the infection, as individuals with heavy infection are likely to reintroduce the parasite into the community. The infection is propagated by “seeding” of the soil through eggs present in the

faeces of infected persons, who are re-infected by eggs while working in the contaminated soil. The continuous exposure to eggs present in the contaminated soil leads to progressive accumulation of worms over years [29,30]. It plays a major role in producing heavy infection.

5. CONCLUSION

The present study reveals a high prevalence of intestinal parasitic infection in the study population and calls for long term control measures to improve their sanitary and living conditions. These measures will lead to reduction in soil contamination and morbidity and encourage healthy behaviour and lifestyle habits.

The knowledge of the distribution and extent of intestinal parasitic infection in a given community is a prerequisite for planning and evaluating intervention program and understanding the cause of parasitic burden of the area. Our study results show that regular deworming should be also be made mandatory for young population of age group 21-40 years besides kids. This knowledge of prevalence will strengthen the prophylactic use of broad spectrum anti-parasitic drugs particularly in children and young adults, identifying and treating infected as well as asymptomatic individuals.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Abd El Bagi Me, Sammak BM, Mohamed AE, AlKarawi MA, Al Shahed M, Al Thagafi MA. Gastrointestinal parasite infestation. Eur Radiol. 2004;14:116-31.
2. Savioli L, Albonico M, Engels D, Montressor A. Progress in the prevention and control of schistosomiasis and soil transmitted helminthiasis. Parasitol Inter. 2004;53(2):103-113.
3. WHO. Technical Report Series-972;2012. Research priorities for helminth infections. Technical report of the TDR disease reference group on helminth infections. World Health Organisation; 2012.
4. Efstratiou A,Ongreth JE, Karanis P. Waterborne transmission of protozoan parasites: Review of worldwide outbreaks-An update. 2017;2011-2016.Water Res ;114(suppl C):14-22.
5. Chandrasekhar MR, Nagesha CN. Intestinal heminthic infestation in children. Indian J Pathol Microbiol. 2003;46:492-4.
6. Amin AB, Amin BM, Bhagat AP, Patel JC. Incidence of helmenthiasis and protozoal infections in Bombay. J Indian Med Assoc. 1979;72:225-7.
7. Ramesh GN, Malla N, Raju GS, Sehgal R , Ganguly NK, Mahajan RC ,et al. Epidemiological study of parasitic infestations in lower socio-economic group in Chandigarh (North India). Indian J Med Res. 1991;93:47-50.
8. Singh S, Raju GV, Samantaray JC. Parasitic gut flora in a north Indian population with gastrointestinal symptoms. Trop Gastroenterol. 1993;14:104-8.
9. Montresor A, Crompton DWT, Hall A, Bundy DAP and Savioli L. Guidelines for the evaluation of soil transmitted Helminthiasis and Schistosomiasis at community level. WHO/CTD/SIP/. 1998;98.1:27-28.
10. Singh P, Gupta MI, Thakur TS, Vaidya NK. Intestinal parasitism in Himachal Pradesh, Ind J Med R. 1991;45:201-04.
11. Fernandez MC, Verghese S, Bhuvaneshwari R, Elizabeth SJ, Methew T, Anitha AA. Comparative study of intestinal parasites prevalent among children living in rural and urban settings in and around Chennai. J commun Dis. 2003; 34:34-9.
12. Singh HL, Singh NB, Singh YI. Helminthic infestation of primary school going children in Manipur. JI Commun Dis. 2004;36:111-16.
13. Jad B, Raina S, Grover PS. Prevalence of intestinal parasites among patients of a tertiary hospital in Ambala city, Haryana, India. Int J Res Med Sci. 2015;3 (12):3753-3758.
14. Wani SA, Amin A. Intestinal helminth infections among children of district Shopian of Kashmir Valley, India. J Parasit Dis. 2016;40(4):1422-25.

15. De Siva NR, D Silva HJ, Jayapuri VP. Intestinal parasitosis in Kandya area, Sri Lanka, South East Asia J Trop Med Pub Health. 1994;25:469-73.
16. RiveroRodrvquez Z, ChourioLozano G, Ziaz I, Chong R, Rucson G. Intestinal in School Children at a public institution in Maracaibo Muncipality , Venezuela, Invest Clin J. 2000;41:37-57.
17. Lege SM, ErkoB. Prevalence of intestinal parasite among school children in rural areas close to south East of Lake Langano, Ethopia J Health Dev. 2004;18: 116-20.
18. Crompton DW, Savioli L. Intestinal parasitic infections and urbanization. Bull World Health Organ. 1993;71:1-7.
19. Brooker S, Clements AC, Bundy DA. Global epidemiology, ecology and control of soil transmitted helminth infections. Adv Parasitol. 2006;2:221-61.
20. Wani SA, Amin A. Intestinal helminth infections among children of district Shopian of Kashmir Valley, India. Journal of Parasitic Dis. 2016;1-4.
21. Ragunathan L, Kalivardhan SK, Ramadass S, Nagaraj M, Ramesh K. Helminthic infections in school children in Puducherry, South India. J Microbiol Immunol Infect. 2010;43:228-32.
22. Devane MS, Suryawanshi NM, Deshpande KD. A prevalence study of intestinal parasitic infections in a rural hospital. Int J Rec Trends Sci Technol. 2012;2:1-3.
23. Blumenthal UJ, Cifuentes E, Bennet S, Quigley M,Ruiz Palacios G. The risk of enteric infections associated with wastewater reuse: the effect of season and degree of storage of wastewater. Trans R Soc Trop Med Hyg. 2001;95:131-137.
24. Cifuentes E. The epidemiology of enteric infections in agricultural communities exposed to wastewater irrigation :perspectives for risk control. Int J Environ Health Res. 1998;8:203-213.
25. Habbari K, Tifnouti A, Bitton G, Mandil A. Geohelminthic infections assosciated with raw wastewater reuse for agricultural purposes in Beni- Mellal, Morocco. Parasitol Int. 2000;48:249-254.
26. Shuval H, lampert Y, Fattal B. Development of a risk assessment approach for evaluating wastewater reuse standards for agriculture. Water Sci Technol. 1997;35(11):15-20.
27. Khan H. Gastrointestinal diseases: frequency of symptoms. Prof Med J. 2008;15(2):459-64.
28. Galgamurwa LS, Iddwela D, Dharmaratne SD. Prevalence and intensity of Ascaris lumbricoides infections in relation to undernutrition among children in a tea plantation community, Sri Lanka; a cross-sectional study.BMC pediatr. 2018;18:13.
29. Alemu A, Atnafu A, Addis Z, Shferaw Y, Teklu T, Mathewos B, et al. Soil trassmitted helminths and *Shistosoma mansoni* infections among school children in Zarima town, northwest Ethiopia. BMC Infect Dis. 2011;11:189.
30. Lang Bang D, Dhodapkar R, Parija SC, Premarajan KC, RajKumari N. Prevalence of intestinal parasites among rural and urban population in Puducherry, South India-A community based study, J Family Med Prim Care. 2019;18:1607-12.

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