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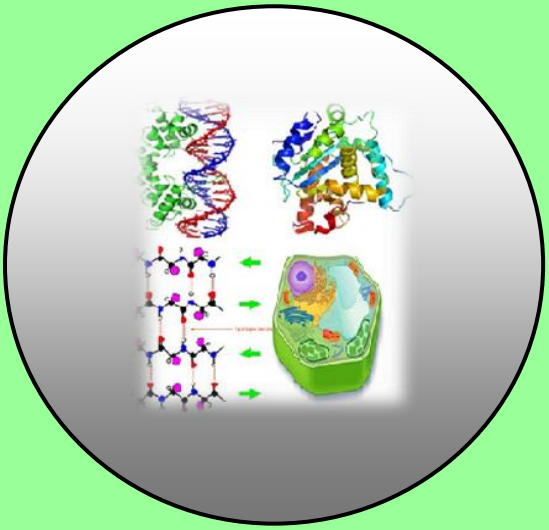

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RESEARCH PAPER

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Prevalence of Common Intestinal Parasites in Patients Attending Tertiary Care Hospital, Lucknow, India

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ABSTRACT

Intestinal parasites constitute major health problems, especially in the tropical and subtropical regions. The of aim of this study was to determine the prevalence of common intestinal parasitic infection in relation to sex and age, as well as the seasons of the year in patients attending the Integral Institute of Medical Sciences & Research Lucknow.

A prospective Study was conducted during the period of 1st January 2015 to 30th June 2015 in the Department of Microbiology Laboratory of Integral Institute of Medical Sciences and Research Dasauli, Kursi Road, Lucknow. A total of 502 samples were collected from patients attending the OPD and IPD of IIMSR with gastrointestinal symptoms.

A total of 502 samples, 97 samples were found to be positive for at least one parasite. Entamoeba histolytica was the most common parasite (9.16%) followed by Blastocystis hominis (3.38%), Giardia lambia (2.98%), Ascaris lumbricoides (2.19%), Ancylostoma duodenale (0.59%). Tichomonas hominis (0.39%) and Hymenolepis nana (0.39%) were present in two of the samples received. Enterobius vermicularis (0.19) was the least common parasite.

Intestinal parasitic infection is quite high and intestinal protozoa are common than helminthes in our study. This study emphasizes the need for health education, good sanitation, personal hygiene, and health awareness.

Keywords: Prevalence, Intestinal parasites, Blastocystis hominis, Giardia lambia, Ascaris lumbricoides, Ancylostoma duodenale, Tichomonas hominis, Hymenolepis nana and Enterobius vermicularis.

INTRODUCTION

Intestinal parasites constitute major health problems, especially in the tropical and subtropical regions **Damen *et al*., 2011.** They are widely prevalent in third world countries

due to poor sanitation, inadequate personal hygiene, low level of education and lack of awareness about safe drinking water **Kang *et al.,* 1998** and **Mehraj *et al*., 2008**.

One quarter of the world's population is infected and about 80% of all deaths annually are due to parasitic diseases **Faten *et al*., 2008**.

In India overall prevalence rate of intestinal parasitic infection ranges from 12.5% to 66% with varying prevalence rate for individual parasite **Kang *et al.,* 1998** and **Ragunathan *et al.,* 2010.** Intestinal helminthes and protozoan infections have been recognized as significant causes of illnesses and diseases worldwide **Nugi *et al.,* 2011**. In India prevalence of the protozoa infections is higher than that of helminths with *E. histolytica* leading with a prevalence of 43.9% **Narayan *et al.,* 2011**.

Amoebiasis, Giardiasis, Ascariasis, Hookworm infection, and Trichuriasis are among the most common intestinal parasitic infection worldwide. These infections are responsible for high levels of morbidity and mortality, nutritional deficiencies including iron deficiency anemia, seizures, portal hypertension, chronic diarrhea and impaired physical development in children **Bethony *et al.,* 2006** and **Rashid *et al.,* 2011**.

The aim of this study was to determine the prevalence of common intestinal parasitic infection in relation to sex and age, as well as the seasons of the year in patients attending the Integral Institute of Medical Sciences & Research.

MATERIAL AND METHODS

A prospective Study was conducted during the period of 1st January 2015 to 30th June 2015 in the department of Microbiology laboratory of Integral Institute of Medical Sciences and Research Dasauli, Kursi Road, Lucknow. A total of 502 samples were collected from patients attending Integral Institute of Medical Sciences and Research hospital. Out of which, 145 samples were collected from the indoor patients and 357 were collected from outdoor patients. All samples were subjected to routine microscopic examination by normal saline and lugol's iodine wet mount preparation, modified Ziehl-Neelsen staining including concentration and flotation technique.

Statistical analysis

Data was analyzed by using SPSS of version 21.0 (IBM). MS. Excel was used for graphical presentation. Results are presented in proportion or percentage form. By the help of MS. Excel Pie chart and Column diagram were drawn.

Inclusion criteria/exclusion criteria

1. Inclusion criteria: Stool samples sent to the clinical microbiology laboratory for Routine microscopic examination, where samples were collected from patients attending the OPD and IPD of IIMS&R.

2. Exclusion criteria

- Non consent patients.
- Unlabelled specimen.
- Specimens contaminated with water, dirt, urine or disinfectant.

RESULTS

A total of 502 samples were collected from patients attending Integral Institute of Medical Sciences and Research hospital. Out of which, 145 samples were collected from the indoor patients and 357 were collected from outdoor patients. Out of all the samples examined 97 samples were found to be positive for at least one parasite **(Table 1 and Fig.1)**.

Table 1. Prevalence of intestinal parasites

Result	Number	Percentage (%)
Infected	97	19.32
Not infected	405	80.67
Total	**502**	**100**

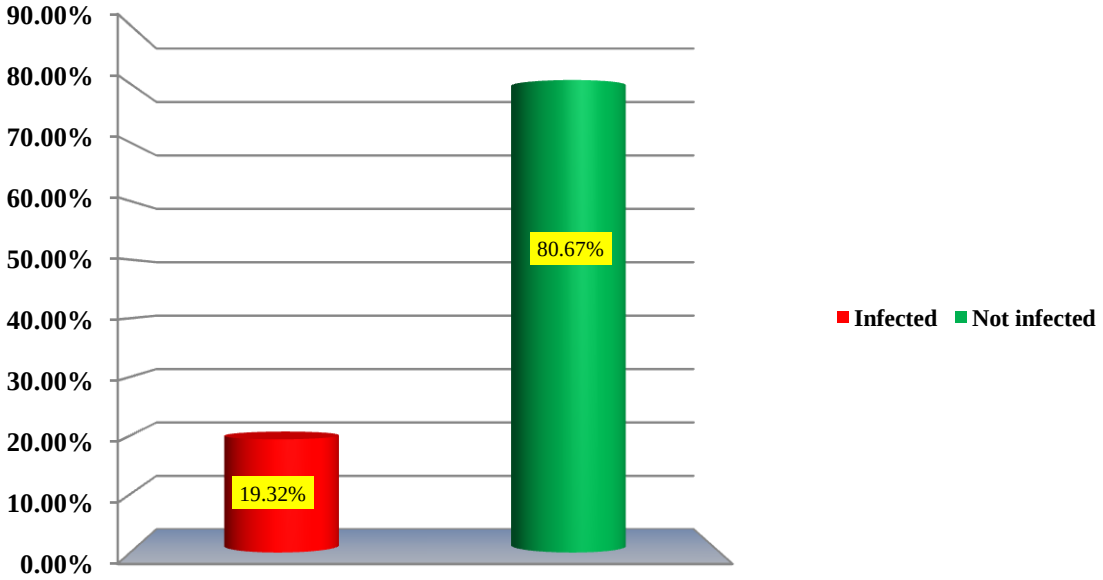


Figure 1. Prevalence of intestinal parasites.

In our study rural population was more affected 78(19.59 %) than urban population 6(5.76%) as mentioned in the **Table 2 and Fig. 2.**

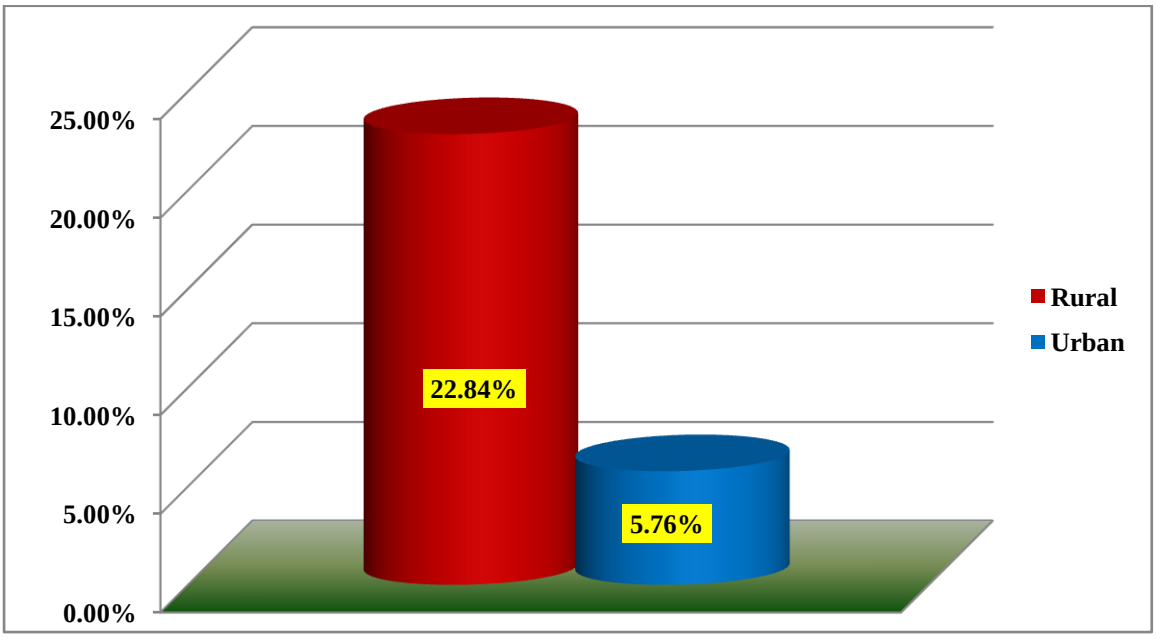


Figure 2. Distribution of parasite in urban and rural areas.

Table 2. Distribution of parasitic infections in urban and rural areas.

Area	No. of samples (n=502)	Positive n (%)
Urban	104	6 (5.76)
Rural	398	91(22.84)

Table 3 and Fig 3 shows that *Entamoeba histolytica* was the most common parasite (9.16%) followed by *Blastocystis hominis* (3.38%), *Giardia lambia* (2.98%), *Ascaris lumbricoides* (2.19%), *Ancylostoma duodenale* (0.59%). *Tichomonas hominis* (0.39%) and *Hymenolepis nana* (0.39%) were present in two of the samples received. *Enterobius vermicularis* (0.199) was the least common parasite.

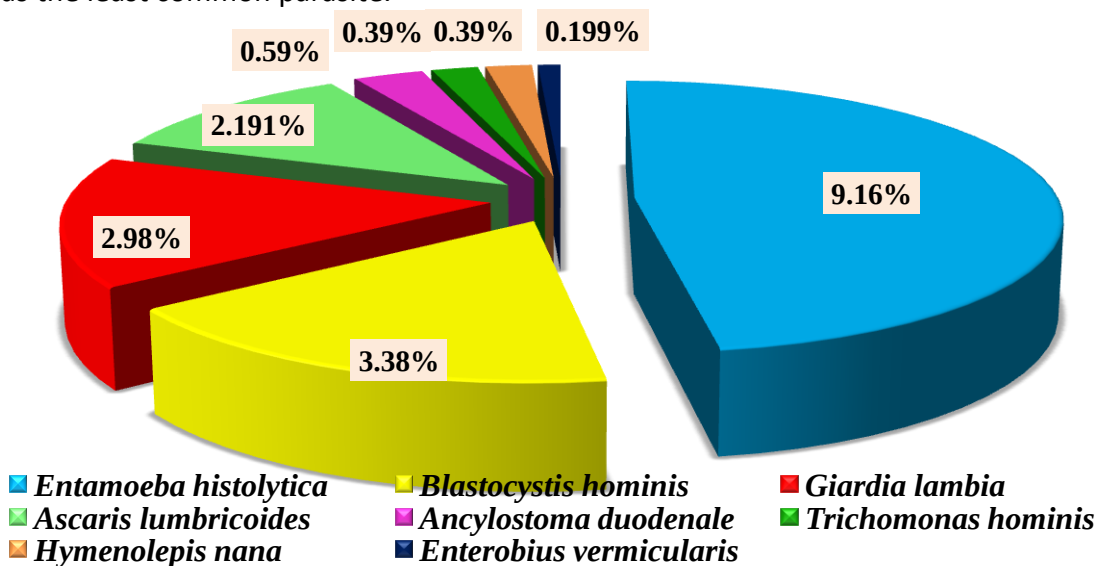


Figure 3. Prevalence of each parasite in total samples.

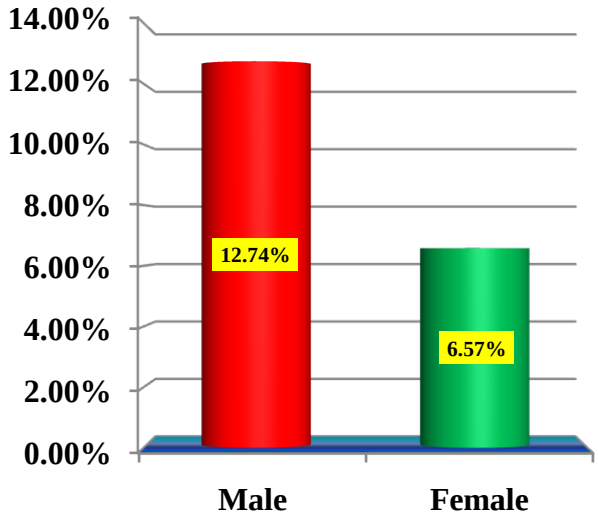
Table 3. Prevalence of each parasite in total samples (n=502).

Name of parasite	No. of parasites	Percentage %
Entamoeba histolytica	46	9.163
Blastocystis hominis	17	3.386
Giardia lambia	15	2.988
Ascaris lumbricoides	11	2.191
Ancylostoma duodenale	3	0.597
Trichomonas hominis	2	0.398
Hymenolepis nana	2	0.398
Enterobius vermicularis	1	0.199
TOTAL	**97**	**19.32**

In the present study, out of 502 samples 64(12.74%) male and 33(6.56%) female patients' were found to be positive for at least one parasite **(Table 4, Fig 4 and 5)**.

Table 4. Gender-wise prevalence of intestinal parasites (n=502).

Name of parasites	Number of parasites (%)	Male n (%)	Female n (%)
Entamoeba histolytica	46 (9.163)	26 (5.179)	20(3.984)
Blastocystis hominis	17 (3.386)	15(2.988)	2(0.398)
Giardia lambia	15 (2.988)	10(1.992)	5(0.996)
Ascaris lumbricoides	11 (2.191)	7(1.394)	4(0.796)
Ancylostoma duodenale	3 (0.597)	2(0.398)	1(0.199)
Trichomonas hominis	2 (0.398)	2(0.398)	0
Hymenolepis nana	2 (0.398)	1(0.199)	1(0.199)
Enterobius vermicularis	1 (0.199)	1(0.199)	0
TOTAL	**97 (19.32)**	**64(12.74)**	**33(6.566)**



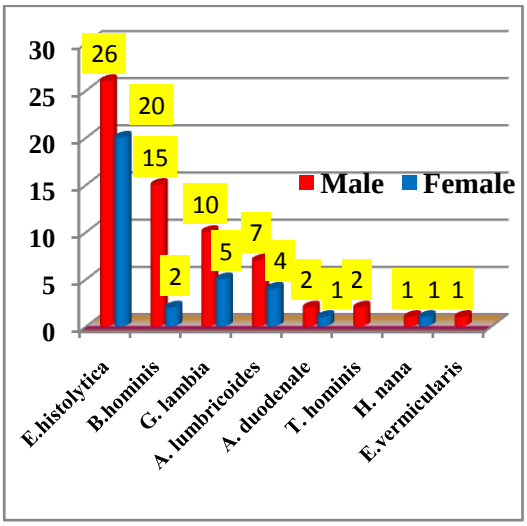


Figure 4 and 5. Gender-wise prevalence of Parasites.

Table 5. Distribution of mixed infection in different age groups (n=502).

There were 2 cases where mixed infection was seen. Patients suffering from mixed infection complained body ache, vomiting and abdominal pain.

Parasite	0-6month M F	7mnth-5 yrs M F	6-20 yrs M F	21- 40 yrs M F	41-60 yrs M F	>60 yrs M F	TOTAL
Blastocystis hominis+ Entamoeba histolytica			1 2	0 2	1 1		**7**
Blastocystis hominis+ Hymenoleis nana			1				**1**
TOTAL	Nil	Nil	**2 2**	**2**	**1 1**	Nil	**8**

Figure 6. Age wise distribution of mixed infection.

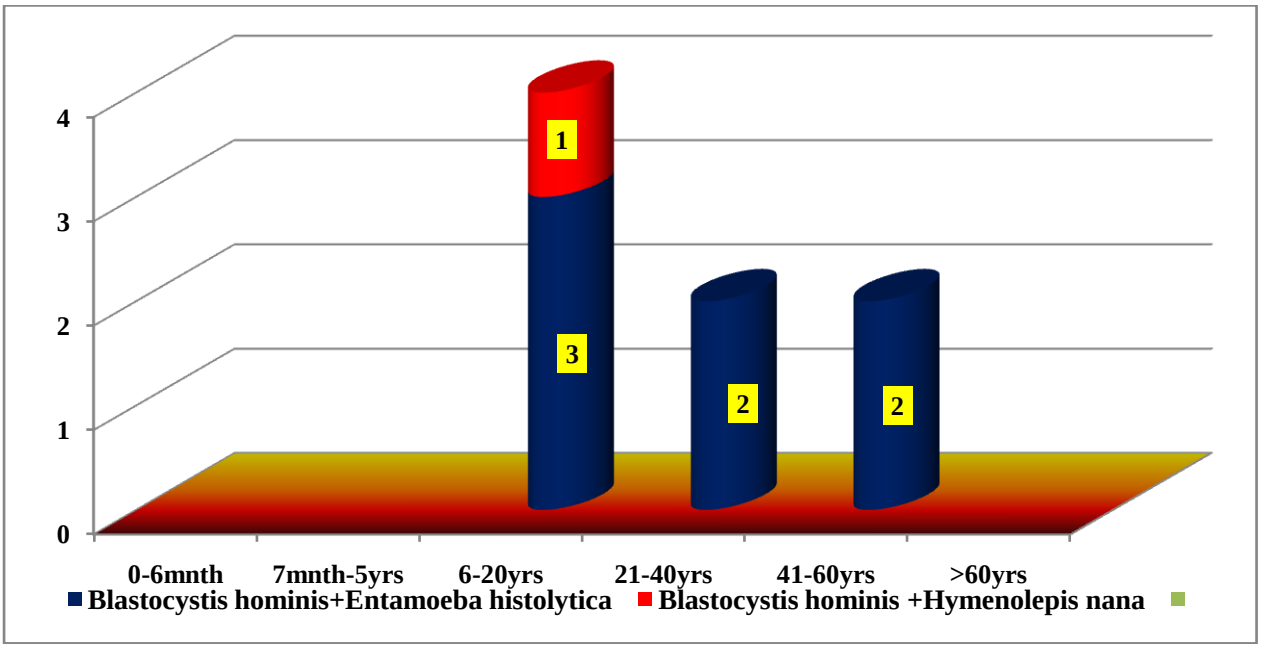


Table 6. Distribution of different intestinal parasites in Males (n=274) of different age group.

PARASITE	0-6 mnth	7mnth-5yrs	6-20yrs	21-40 yrs	41-60yrs	>60 yrs
E.histolytica	2	2	4	8	5	5
B.hominis		2	4	3	6	
G.lambia		3	4	2	1	
A lumbricoides		2	1	3	1	
A. duodenale		1			1	
T.hominis				1	1	
H.nana		1				
E.vermicularis				1		
TOTAL	**2**	**11**	**13**	**18**	**15**	**5**

Among the males of different age group, prevalence of *Entamoeba histolytica* was highest in the age group of 21-40 years. *Blastocystis hominis* was most frequently found in the age group of 41-60 years. Infection by *Giardia lambia* was highest in the age group of 6-20 years. *Ancylostoma duodenale* and *Trichomonas hominis* were present in two male patients. *Hymenolepis nana* was present in a male child of age group 7 month - 5 years, whereas *Enterobius vermicularis* was present in male of age group 21-40 years. There was no association between distribution of different intestinal parasites with different age group of male patients **(Table 6 and Fig 7)**.

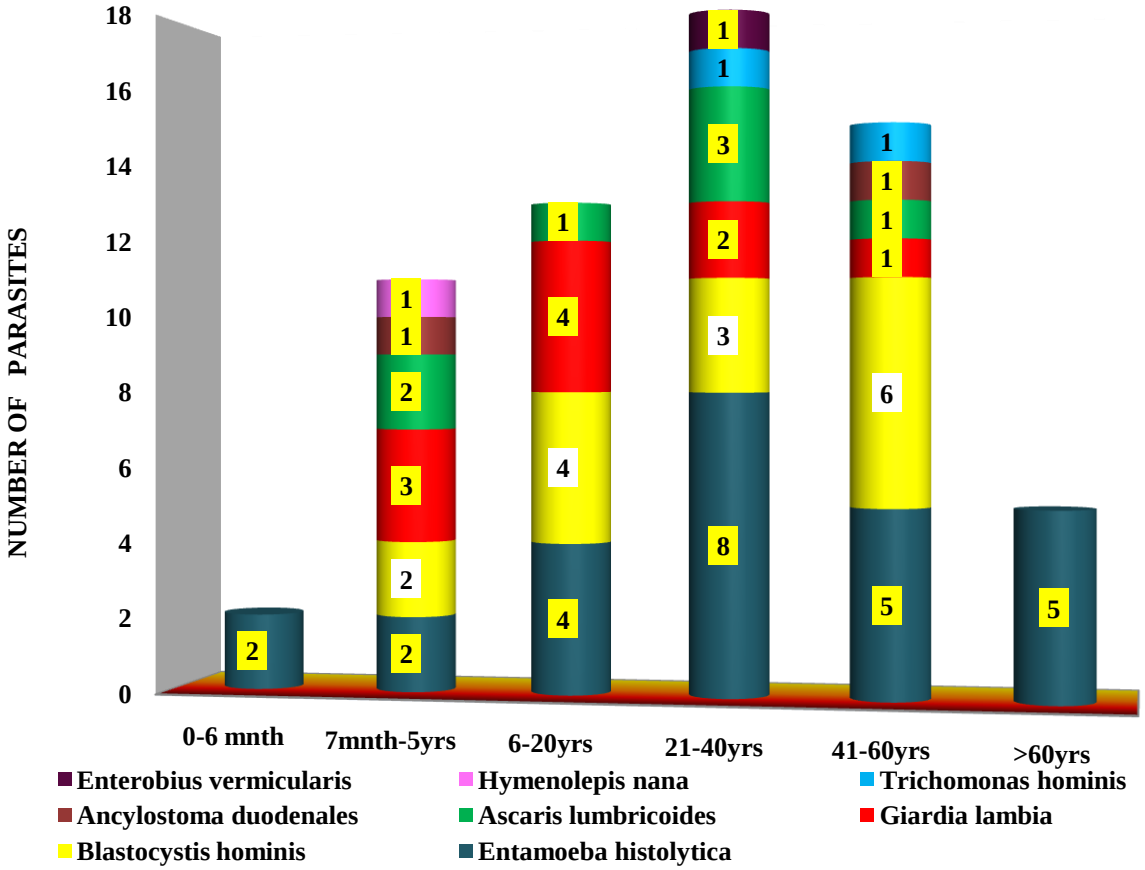


Figure 7.Distribution of intestinal parasites in males of different age group.

Table 7. Distribution of different intestinal parasites in Females (n=228) of different age group.

Parasite	0-6 mnth	7mnth-5yrs	6-20yrs	21-40 yrs	41-60yrs	>60 yrs
E.histolytica			2	11	6	1
B.hominis			1	1		
G.lambia		1	2	1	1	
A.lumbricoides		1		2	1	
A. duodenale				1		
H.nana						1
TOTAL		**2**	**5**	**16**	**8**	**2**

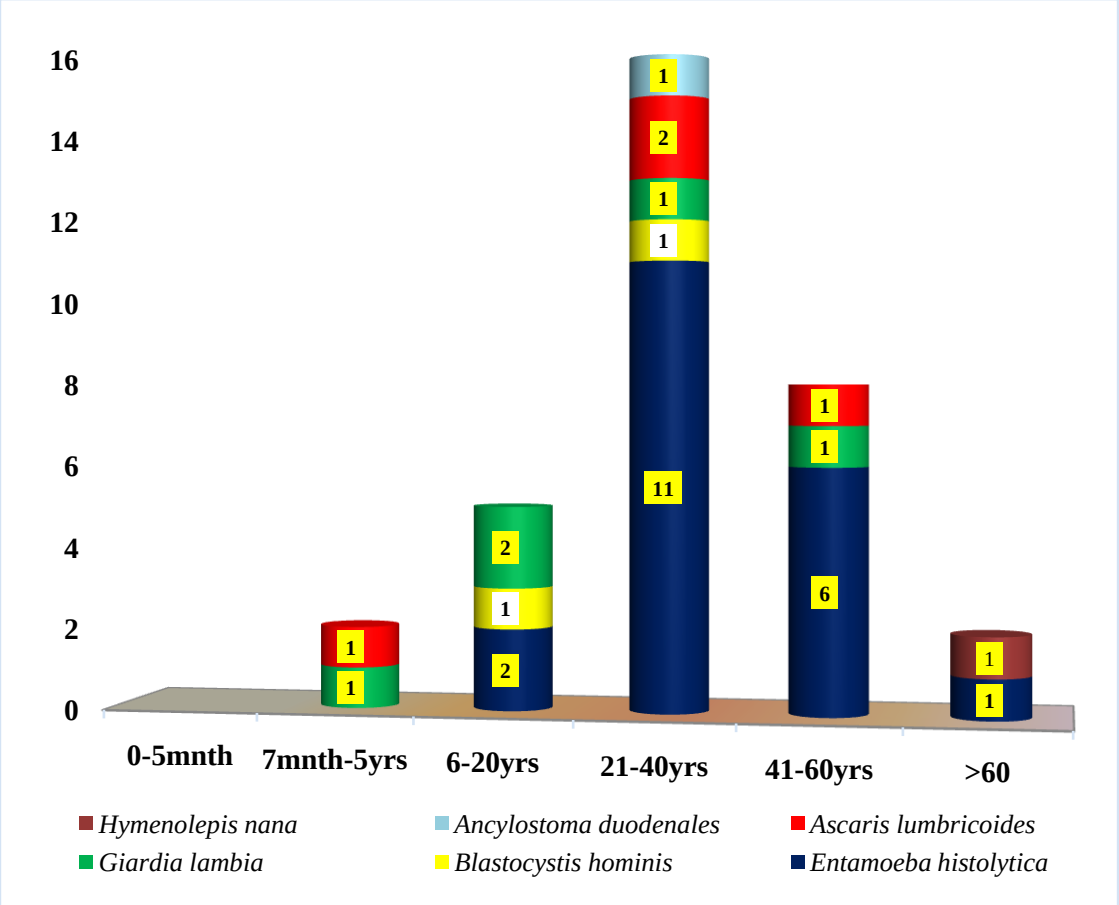


Figure 8. Distribution of intestinal parasites in females of different age group.

In case of female patients, the rate of *E. histolytica* infection was comparatively lesser in extreme of ages. Highest rate of infection was seen in the age group of 21-40 yrs. Similar to male patients, female patients too showed most *G. lambia* infection in the age group of 6-20yrs.*Ascaris lumbricoides* was seen in four female patients and its infection was highest in the age group of 21-40 yrs. Only one female patient showed hookworm and *Hymenolepis nana* infection. No infection by *Trichomonas hominis* was seen in female patients. **(Table 7 and Fig 8)**.

DISCUSSION

In our study, intestinal parasite infection rate is 19.32% (5.76 in Urban and 22.84 in Rural), but still it seems alarmingly high in comparison to international scenario **(Chhetri 1997 and Rai 1995)**.

Our study is comparable to study done by Nitin in which overall prevalence of intestinal parasites was 11.5%, (5.4% in Alambhagh and 20.8% in Mati Lucknow) **(Nitin S *et al.*, 2007)**.

In another study conducted at urban slum of Lucknow, prevalence of intestinal parasites was 11.25% **(Khanna A,** and **Gupta P, 2013)**. In different areas of India, prevalence of intestinal parasites was comparable to our study such as study done by Ahir in Gujrat shows intestinal parasitic infections rate 13.40%, **(Ahir *et al.*, 2015)**. Prevalence of intestinal parasites in **Western UP** was reported as 16.8% (**Kumar *et al.*, 2013)**.

Bansal (2004) and **Khurana (2005)** reported, prevalence of parasitic infection ranging from 14.6% - 19.3%. Prevalence rate of parasite differs from various other studies. **Hegde *et al*.,** in **1986** reported overall prevalence 90.62% in Maharashtra. In **1986 Patel *et al*.,** found 75% prevalence in Bombay, and in **1966 Tondon *et al*., in** Bombay reported overall prevalence 38.1%, **Rashid *et al*.,** in **2011** reported 22.3% in Bareilly, **Aher** in **2011** reported prevalence 30.4%, **Kaur** in **2002** found overall prevalence 46.5% in Delhi. **Narayan,** in **2011** reported 24.78% in Bellary, **Dudeja,** in **2012** found overall prevalence 26.1% in Southern Delhi, **Pandey *et al*., 2013** in Bihar reported overall prevalence 92.32%.

Table 8. Prevalence of Intestinal Parasites in India

City	Number of individuals tested	Most prevalent intestinal parasites identified	%	Reference
Lucknow	524	*Ascaris lumbricoides*	15.8	**Khanna *et al*., 2013**
Latur	211	*Ascaris lumbricoides*	45.4	**Davane *et al*.,2012**
Delhi	127	*Giardia intestinalis* *Entamoeba histolytica*	23.4 23.4	**Kaur *et al* 2002**
Meerut	692	*Entamoeba histolytica*	42.2	**Deepesh *et al*., 2013**
Gujarat	291	*Entamoeba histolytica*	45.2	**Ahir, *et al*., 2015**
Ahmednagar	624	*Giardia lambia*	13.5	**Aher, 2011**
Bareilly	320	*Ascaris lumbricoides*	9.68	**Rashid *et al* 2011**
Amalapurm	200	*Entamoeba histolytica*	63.2	**Padmaja *et al*., 2014**
Delhi	2907	*Entamoeba histolytica*	20.2	**Dudeja *et al*., 2012**
Bellary	230	*Entamoeba histolytica*	43.8	**Narayan *et al*., 2012**

Our study is in contrast to study done by **Davane *et al*.,** in **2012** where they reported low infection rate (6.63%). This variation is probably due to difference in time, place, method used, health awareness, and living standards.

In our study E. histolytica prevalence rate is 9.16%.Similar results were found in the study conducted by **Khanna,** and **Gupta,** in **2013 (**11.38%). whereas **Pandey *et al*.,** in Bihar reported 14.25% and **Dudeja *et al*,** in Southern Delhi estimated *Entamoeba histolytica* prevalence rate 20%.The second most common isolate in our study was *Blastocystis hominis* 3.38%, whereas the study done by **Kumar *et al*.,** in western UP showed higher result 1.73%. Giardia lamblia prevalence was 2.9% in our study which is significantly lower than study done by **Khanna,** and **Gupta,** (6.3%). Similar result 2% was found in the study of **Dudeja *et a.,*** in **2012**.

Among the helminthes *Ascaris lumbricoides* was the most common finding (2.19%). Its prevalence rate was much lower than **Khanna** and **Gupta** in Lucknow in 2013 (15.8%). **Rashid *et al*.,** from Bareilly reported prevalence of A. *lumbricoides* to be 9.68%.

Ancylostoma prevalence rate in our study is 0.59% which is comparatively similar to the study done by **Narayan,** in **2011** (1.75%) in Bellary, but significantly lower 9.7% than other study done by **Khanna** and **Gupta** in **2013** in Lucknow. *Trichomonas hominis* was found in two male patients which is similar to study done by **Dudeja *et al*,** in **2012**.

The highest rate of parasitic infection was found in the age group of 21-40 yrs (males 18, females 16).

Similar result was shown by **Dudeja *et al*,** in **2012** interestingly, we have found two cases of *E. histolytica* infection in infants (0-6 months). When mother's milk is the only prescribed food for infants, this finding indicates the lack of awareness among mothers, which can be attributed to the lower socio-economic status of the area.

In **2002 Ibrahim** Studies done on *Trichomonas hominis,* indicated it to be a possible pathogen. Hence we have included *Trichomonas hominis* in the list of enteric parasites (0.39).

CONCLUSION

Intestinal parasitic infection is quite high and intestinal protozoa are common than helminthes in our study. This study emphasizes the need for health education, good sanitation, personal hygiene, and health awareness. The occurrence of helminthes infections at high rates is indicator of faecal pollution of soil and domestic water supply around homes due to poor sanitation and improper sewage disposal in these areas. Improvement of safe water supply and sanitation facilities by the construction of toilets could significantly reduce the burden of parasitic diseases in our area.

ETHICAL CLEARANCE

The study was approved by the Institutional Ethics Committee. To adhere to ethical norms for using human subjects for medical research, all patients and/or their guardian/parents were informed about the objectives and goals of the present study. Physician and laboratory personnel explained the results of the test and in case of positive results; the study population received an appropriate treatment.

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