

# Prevalence of Intestinal Parasitic Infestations Among Children

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## Abstract

**Background:** To find out the prevalence of parasitic infestation amongst children.

**Methods:** A total of 1624 stool samples were collected for examination of prevalence of different helminths from the patients complaining for different GIT problems. Helminths for which tests were performed included *Hymenolepis nana*, *Giardia lamblia*, *Entamoeba histolytica*, *Enterobius vermicularis*, *Ascaris lumbricoides*, Hook worm and *Taenia*. Each sample was screened depending upon the shape and morphology of the eggs and larvae of different helminths under microscope.

**Results:** Out of 1624, 280 (17.24%) stools for positive for parasitic infestation. *H. nana* was the commonest found parasite. Majority presented in age group 4-6 years. Mean age of the respondents was 5±2.8 years

**Conclusions:** *Hymenolepis nana* infection was observed in 6.0% respondents visiting Holy Family Hospital majority of the respondent were in early school going age.

**Keywords:** Parasitic infestation, Helminths, *Hymenolepis nana*, *Entamoeba Histolytica*, *Ascaris Lumbricoides*

## Introduction

Intestinal parasitic infections are a major health problem in developing countries. Geographic and socioeconomic factors as well as unpredictable factors such as natural disasters contribute to the problem. Weather combined with poverty, malnutrition, high population density, unavailability of potable water and low health status, provide optimum conditions for the growth and transmission of intestinal parasites. Insufficient research into infectious and parasitic diseases, lack of attention in developing countries to the problem and lack of follow-up treatment leading towards increase rates of parasitic infestation. The prevalence of infections varies in different parts of the world. Studies have shown that the prevalence of intestinal parasitic infection is higher in younger people, especially children.. Intestinal parasites are micro-organisms that live in the intestines and

infections caused by these parasites are called as intestinal infestation. These parasites mainly belong to the Amebas, Amebic dysentery, Nematodes, Hookworms, Pinworms, Protozoa, Roundworms, Tapeworms. Infection by intestinal parasites is very common and effects millions of people worldwide. Most of the infections are caused by roundworm, whipworm, hookworm and tapeworm. Studies done in Asia in recent years show that there is high prevalence of parasitic infestation and there is a need of controlling the factors causing these diseases. A study done in India from 2012-2013 indicated that total prevalence if intestinal infection was 49.38%.<sup>1</sup> In 2011 it was found to be 17.6% among school going children in Nepal.<sup>1,2</sup>

## Patients and Methods

This was a cross-sectional descriptive study, done in a government hospital of Rawalpindi. A total of 1624 stool samples from 1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2014 were collected for examination of prevalence of different helminths from the patients complaining for different GIT problems. Helminths for which tests were performed included *H.nana*, *Giardia lamblia*, *Entamoeba histolytica* cysts and Trophozoites, *Enterobius vermicularis*, *Ascaris lumbricoides*, Hook worm eggs and *Taenia* eggs. An informed written consent was taken from the patients participating in the study. Stool samples were taken for routine examination. By making a thin smear of sample using 0.85% saline and 5% Lugol's iodine on the glass slide each sample was examined first under low resolution power 10x then under high power of 100x by using electron microscopic. Each sample was screened depending upon the shape and morphology of the eggs and larvae of different helminths. By using 95% confidence interval prevalence was found by using WHO formula. Chi square test was used to test the association of prevalence with age and gender.

$$\text{Prevalence} = \frac{\text{No of subjects testing positive}}{\text{No of subjects tested}} \times 100$$

## Results

Out of 1624, 280 (17.24%) stools for positive for parasitic infestation. *H. nana* was the commonest found parasite (Table 1). Majority presented in age group 4-6 years (Table 2). Mean age of the respondents was 5±2.8 years

**Table 1: Stool R/E for the different helmenths**

Infesting agent	Positive No (%)	Negative No(%)	p-value
<i>H.nana</i> eggs	96 (5.9)	1526 (94)	0.006
<i>Giardia lamblia</i>	51 (3.1)	1573 (96.9)	0.000
<i>Entamoeba Histolytica</i> cysts and trophozoites	40 (2.3)	1584 (97.3)	0.000
<i>Enterobius vermicularis</i>	28 (1.7)	1596 (98.3)	0.005
<i>Ascaris lumbricoides</i>	33 (2)	1591 (98)	0.000
Hook worm eggs	16 (1.1)	1604 (98.9)	0.000
Hook taenia eggs	17 (1.2)	1603 (98.8)	0.040

**Table 2:Parasitic infestations in children-Age distribution**

			Age distribution (years)				Total
			1- 3	4-6	7-9	10-12	
Gender distribution	Female	Count	160	320	192	96	768
		% within gender distribution	20.8%	41.7%	25.0%	12.5%	100.0%
	Male	Count	331	314	147	64	856
		% within gender distribution	38.7%	36.7%	17.2%	7.5%	100.0%
Total	Count	491	634	339	160	1624	
	% within gender distribution	30.2%	39.0%	20.9%	9.9%	100.0%	

## Discussion

The overall prevalence of *H. nana* was 6% in the present study. Relationship between sex of the host and *H. nana* was calculated and it was observed 4.0% of the male patients were infected with *H. nana* and 2.0% females were infected with the same parasite. *Hymenolepis nana* is Dwarf tapeworm previously known as *Vampirolepis nana*, *Hymenolepis fraterna*, and *Taenia nana* are a common cestode (helminths) which infects humans. This is mostly present in the temperate regions and children are more affected than adults.<sup>3</sup> This is due to the poor personal hygiene and sanitation. This is most commonly known intestinal infection worldwide specially in developing countries including Pakistan.<sup>4</sup> In 1965 CDC reported 48 cases of *H.diminuta*. Prevalence of *H.nana* varies from country to country like in India, Morocco, Libya, Ecuador and in Thailand the prevalence was found to be 9.9%, 7.2%, 0.1% ,11.3% and 13.1% respectively.<sup>5-9</sup> Regions

with high prevalence are Sicily, Argentina and southern areas of the former Soviet Union having prevalence of 46%, 34% and 26% respectively but a reduction in the prevalence was seen from 1987 to 2010 in USA from 0.4% to 0.1%.<sup>10,11</sup>

Prevalence in endemic areas can reach from 5-20%.<sup>12</sup> *H. nana* prevalence in endemic area is reported to be 5-20% and remarkably high i.e 55% in remote communities of northwest Australia.<sup>13</sup> In Bat Dambang (Cambodia) prevalence was found to be 2.4% among middle school students.<sup>14</sup> A study comparing two population of schools in Turkey was conducted between Shantytown schools and Apartment schools. Main public health concerns among children were intestinal worms, anemia and stunted growth. Results showed a high prevalence of *H.nana* infection among Shantytowns schools (13.6% in males, 15.0% in females) as compared to Apartment schools (2.2% in males, 8.4% in females).<sup>15</sup>

*H.nana* infection was found to be 25% among the children ranging from 6-10 years in age in rural Mexico, 2006. Main reasons behind that were absence of parents knowledge and socioeconomic factors.<sup>16</sup> Park et al and his co-workers conducted a survey in Zimbabwe and prevalence rate of parasites was found to be 18% in rural towns and 24% in urban areas in Zimbabwe.<sup>17</sup> Urban younger children were more effected than older rural children. In Peru six communities were tested and *H.nana* prevalence was found to be 6.6% of overall 91.2% intestinal pathogenic infections.<sup>18</sup> The results compared to the results of the previous studies show that there is drastic change in the prevalence from a study in Mansehra done in 1981(27.25%) by Afzal et al to now in 2015.<sup>19</sup> In 1991 (3.0%) in South Western South Arabia by Omar et al, in 1991 (12.4%) in Chandigarh (Northern India) by Ramesh et al, 6.0% in 1993 in Baghlan (Afghanistan) by Cerven, in the years 1998 (6.7% in city of Uberlandia, State of Minas Gerais) and 1999 (2% in areas of Sana province (Yemen) Tasaware et al (2004) gave results in Multan Pakistan and the prevalence was found to be 1.81% so results showed less prevalence than the present study.<sup>20-25</sup>

Present study showed prevalence of *E. Histolytica* 2.3% which is very low than the previous studies done in same year but in the different city and in the previous years. Ejaz et al conducted a study in 2011 and results showed the prevalence of 52.1% amoebiasis (*E. Histolytica*) which does not support the results of present study.<sup>26</sup> Tasawar et al study was also not in support of present study, her results showed prevalence of 21.69%.<sup>27</sup> similar studies were done by Alam et al showing a prevalence of 22.1%.<sup>28</sup>

Prevalence of the Giardia lamblia was found to be 3.1%. Haq et al conducted a study in the afghan refugees from the year 2007-2009 and study was published in 2015. The study showed the prevalence of H.nana 41.8% and Giardia lamblia 48.7%.<sup>29</sup> Abbas et al reported 1.9% prevalence in the study.<sup>30</sup> Gender distribution of the H.nana showed that boys were more prone to develop infestation than the girls. Reasons behind were more outdoor activities of boys as compared to the girls.

Overcrowding of the children in the government schools should be avoided by making more sections of the same level. These measures would help in reducing the occurrence of the intestinal parasites and adverse effects associated with them. Levels of prevalence can be reduced by children targeted treatment programs and school based de-worming programs. Elimination of rats should be taken into account. Grains, cereals, and flour must be stored properly in household kitchens.

## Conclusion

H.nana infection was mostly observed in school going age group. It's more prevalent in boys than girls of the same age.

2. Appropriate steps should be taken at the district level for provision of safe drinking water schemes and improvement in the local sanitary condition

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