

## Prevalence of intestinal worm infestations among school children in Kathmandu, Nepal

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### ABSTRACT

Intestinal worm infestation is one of the major childhood health problem in Nepal. This study was done to assess the prevalence of intestinal worm infestations among school children aged 6-16 years in a public high school in Kathmandu Nepal. A total of 142 stool samples from healthy students were collected and reported following formol-ether concentration technique. The overall prevalence of intestinal worm infestation was found to be 17.6% (Boys=22.0% vs girls=13.5%). Children aged 6-8 years were found to be highly infected with intestinal worms (21.4%) followed by 9-12 years old (18.6%). Those between 13-16 years of age were significantly less infected (10.7%) compared to others ( $p<0.05$ ). Ova/ cysts of intestinal parasites detected include *Trichuris trichiura* (32.0%), *Ascaris lumbricoides* (20.0%), *Hymenolepis nana* (16.0%), hookworm (8.0%) and 24.0% cases showed mixed parasitic infections.

**Keywords:** Prevalence, Worm, Infestation, Children, Nepal.

### INTRODUCTION

Intestinal worm infestation is one of the major childhood health problem in developing countries like Nepal.<sup>1</sup> Prevalence in some areas appears very high<sup>2,3</sup> while less elsewhere in the country.<sup>4</sup> Report shows that almost 35% people, mainly children, in Nepal take medicine against worm infestations.<sup>5</sup> Developing countries in Southeast Asian region spent 3.76% of total annual budget for health in year 2010.<sup>6</sup> As worm infestation appears as one of the major economic burden also to the country, Nepal government has initiated National Deworming Program in recent years to control it. However, according to W.H.O., 1100 million people were defecating in the open resulting in high levels of environmental contamination and exposure to the risk of worm infestations in year 2008. So study on such matters appears very much necessary even today.

This study aimed to estimate the prevalence of intestinal worm infestations among children in the public high school in Kathmandu after National Deworming Program, findings of which could be beneficial for health planning authority in Nepal to overcome the existing limitations for achieving ultimate goal in the near future.

### MATERIALS AND METHODS

A total of 142 healthy students (68 boys and 74 girls) studying from class 1-10 in Paropakar High School, Kalimati, Kathmandu were taken as study population. Fecal samples were collected during March- May 2011 in dry and clean screw capped plastic containers according to standard technique and processed partly in

department of Microbiology- Nepal Medical College, Kathmandu and partly in Microbiology lab – Manmohan Memorial Institute of Health Sciences, Lalitpur, Nepal. Following formol- ether concentration technique, deposits were examined microscopically and reported.

### RESULTS

Out of 142 students examined, 25 (17.6%) were found to be infected with intestinal worms (Fig.1). Comparatively girls were found less infected than boys (13.5% vs 22.0%) ( $p<0.05$ ) (Table-1). Children aged 6-8 years were found to be highly infected (21.4%) followed by 9-12 years (18.6%) which are significantly higher compared to that among 13-16 years old children (10.7%) ( $p<0.05$ ) (Table-2). Among various ova/ cysts of intestinal parasites detected, *T. trichiura* was most common (32.0%) followed by *A. lumbricoides* (20.0%), *H.nana* (16.0%) and hook worm (8.0%) while 24.0% cases showed mixed infection with various helminthic as well as protozoan parasites like *G. lamblia* and *E. histolytica* (Table-3).

**Table-1:** Prevalence of intestinal worm infestations among boys and girls.

| Gender | Total (n) | Positive (n) | Positive % | p- value |
|--------|-----------|--------------|------------|----------|
| Boys   | 68        | 15           | 22.0%      |          |
| Girls  | 74        | 10           | 13.5%      | <0.05    |
| Total  | 142       | 25           | 100%       |          |

**Table-2:** Prevalence of intestinal worm infestations among different age- grouped children.

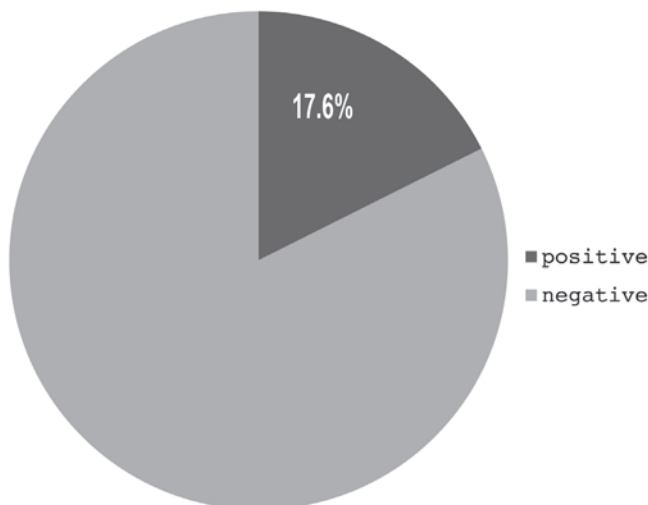
| Age group | Total (n) n | Positive (n) n | Positive % | p- value |
|-----------|-------------|----------------|------------|----------|
| 6-8 yrs   | 28          | 6              | *21.4%     |          |
| 9-12 yrs  | 86          | 16             | *18.6%     |          |
| 13-16 yrs | 28          | 3              | 10.7%      | <0.05    |

\*p>0.05

**DISCUSSION**

The prevalence of intestinal worm infestations among school children found in the study (17.6%) is comparatively much lower than that reported earlier in Nepal, while it seems higher than that in other countries.<sup>7-16</sup> These differences in prevalence might be related to time and place differences. Less prevalence compared to that in previous studies might be due to continued health education, public awareness programs and regular deworming programs being conducted by government in the community. But still, higher prevalence compared to that in developed countries indicates high soil contamination with intestinal worms and proves need for more effective programs against intestinal helminthiasis in Nepal.

Intestinal worm infestation was found to be significantly high among boys (22.0%) compared to girls (13.5%) in the study (p<0.05) which contrasts with findings of previous studies elsewhere in the globe.<sup>17-20</sup> Although intestinal worm infestation is gender independent,<sup>21-23</sup> difference in prevalence among boys and girls found in the study might be related to personal hygiene. First author observed that orphan girls included in the study were staying compulsorily in hostel, which has good provision for strict hand washing with soap-water under supervision of hostel warden before having meal and



**Fig.1:** Prevalence of intestinal worm infestations among school children.

**Table-3:** Type of worms detected

| Worms                        | Positive (n)/25 | Positive % |
|------------------------------|-----------------|------------|
| <i>Trichuris trichiura</i>   | 8               | 32.0%      |
| <i>Ascaris lumbricoides</i>  | 5               | 20.0%      |
| <i>Hymenolepis nana</i>      | 4               | 16.0%      |
| Hookworm                     | 2               | 8.0%       |
| Mixed (Helminths + Protozoa) | 6               | 24.0%      |

which might not be same for boys, not compulsorily staying in hostel. Moreover, the genderwise prevalence seems almost equal when excluding orphan girls in the study. This emphasizes the importance of personal hygiene, especially hand washing with soap-water before meals, to control intestinal worm infestations among children which correlates with the report of study on intestinal parasitosis in eastern Nepal.<sup>24</sup>

Agewise, prevalence of intestinal worm infestation was found to be highest among primary school children, mainly aged 6-8 years (21.4%) followed by 9-12 years of age (18.6%), which is significantly higher than that among secondary school children aged 13-16 years (10.7%) (p<0.05). This finding is almost similar to report of another study among school children in Nepal<sup>25</sup> and which might be related to level of awareness regarding hygienic practices among students. Secondary school children, comparatively being more knowledgeable and aware compared to primary school children, might be less infected with intestinal worms.

Among various parasites, *T.trichiura* was found highly prevalent (32.0%) followed by *A. lumbricoides* (20.0%), *H.nana* (16.0%) and hookworm (8.0%) while 24.0% cases showed mixed infection including protozoan parasites (*Giardia lamblia* and *Entamoeba histolytica*), which is similar to finding of study in Lucknow-India, bordering to Nepal.<sup>26</sup> This indicates high soil contamination with helminthic parasites and water contamination as well in Kathmandu.

The high prevalence of intestinal worm infestations among school children found in the study after National Deworming Program shows lack of effective implementation of health policies so as to achieve the goals in very near future. Recommending schools for compulsory use of anthelmintic drugs for their students in every 6 months along with maintenance of hygienic practices might help parasite control program to achieve the goal effectively.

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