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Prevalence of *Enterobius vermicularis* in Children of District Mardan, Pakistan

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Abstract:

This study was conducted from October 2013 to March 2014 to find out the prevalence rate of *Enterobius vermicularis* in children of district Mardan. Direct stool smearing method was applied for the examination of the collected samples. Samples were mixed with normal saline solution and 2-3 slide smears were obtained and examined under the microscope. During this period a total of about 370 children were examined for the presence of *E. vermicularis*. Out of which 126 were infected and the overall prevalence rate of *E. vermicularis* was recorded about 34.05%. Similarly, the prevalence rate was recorded under different parameters in consideration of gender, age and month. It was concluded that a high rate of infestation with *E. vermicularis* was found in district Mardan. Thus, it can be controlled and minimized by good living condition, hygiene, health education, and clean water supply.

Keywords: Prevalence, Parasite, *Enterobius vermicularis*, Children, Mardan.

INTRODUCTION

Parasitic ailments are one of the main public health issues for the individuals living in emerging countries, especially children who are most harshly affected because parasites directly contribute towards malnutrition. High worm loads and repeated infections with intestinal parasites can cause chronic diarrhea and severe anemia resulting in a damaging impact on fitness, growth and learning power of children (Unicef., 1998; Sakti *et al.*, 1999). Additionally, about 150,000 children die yearly due to intestinal obstruction and related abdominal problems instigated by large adult worms. The high occurrence of infections with intestinal parasites in emerging countries is associated to poverty, poor personal and environmental hygiene, poor living conditions, insufficient health services, poor hygiene, and water supply facilities (Cook., 1996; Montresor *et al.*, 1998).

The helminth parasite, *E. vermicularis*, is an intestinal nematode and generally known as pinworm (Roberts and Janovy, 2009). *Enterobius* infection is the representative contact-borne contagious helminth. *Enterobiasis* generally happens by ingestion of eggs via contaminated food or hands. Mature threadworms live in the lumen of terminal ileum or caecum. It is particularly more prevalent among children in crowded societies and

unhygienic environments. One estimate put the total number of infected people at one billion (Nagar, 1987; Cook, 1994). The majority of cases are symptomless; sometimes children suffer from irritability and loss of appetite, catarrhal inflammation, insomnia, bed-wetting, grinding of the teeth, diarrhea, pruritus vulvae, nightmares, pruritus ani, nausea, recurrent cellulitis, and endometritis. In addition, the main symptom of the infection is anal itching. Infrequently, pinworms enter into submucosa that can be fatal (Lee *et al.*, 2011). Furthermore, *enterobiasis* harmfully disturbs physical growth and school success, mostly among young children (Celiksoz *et al.*, 2010). The aim of this survey was to find out the prevalence rate of *E. vermicularis* in children of district Mardan.

MATERIAL AND METHODS

Study area

The present survey was conducted in district Mardan during the period from October 2013 to March 2014 (Figure 1). The mean temperature in the study area was 15 °C during the observation period. The study includes a total of 370 children, both male, and female.

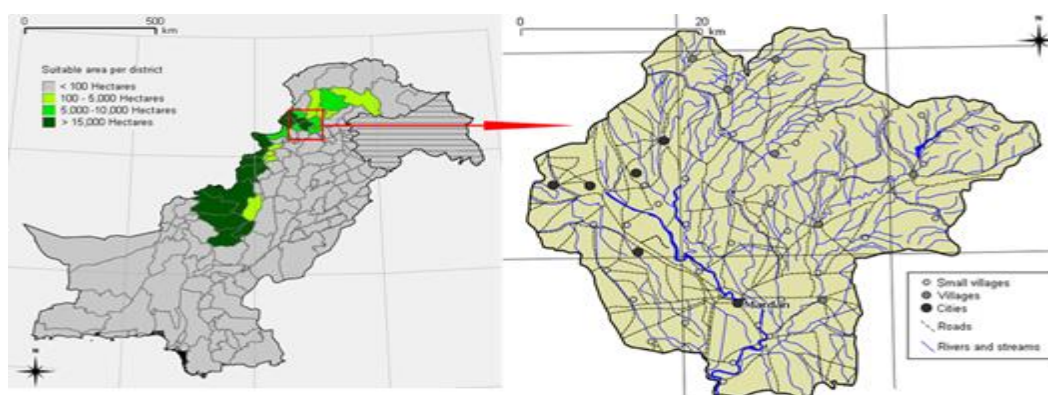


Fig. 1. Map of District Mardan

Collection of stool samples

During the survey, the primary schools were visited by the permission of the teaching staff, the stool samples were randomly collected from the students under the age of 8 years in disposable autoclaved large glass jar. Some of the samples were collected from children at home. Parent of each child was provided with a clean disposable labeled Glass jar with instruction to collect a morning specimen on the following day. These samples were sealed firmly and carefully transported to the parasitology laboratory of the department of Zoology, Abdul Wali Khan University, Mardan.

Examination of the collected samples

Direct stool smearing method was applied for the examination of the collected samples. The samples were mixed with normal saline solution from each of the sample 2-3 slide smears were obtained and examined under the microscope. The scotch tape method is very efficient for the detection of *E. vermicularis* eggs. But during this study, the scotch tape method was not used regarding the ethical, legal and social issues and values of the communities inhabiting the area under study. All the results obtained are based on the direct stool smearing method (Garcia *et al.*, 2018). Precautionary measures i.e. gloves, mask etc. were strictly followed in order to get the accurate possible results.

RESULTS AND DISCUSSION

A total of 370 samples (children) were examined out of which 126 children were infected with *E. vermicularis*. The overall prevalence rate was about (34.05%). The rate of infection in males 32.18% while in female was 37.22%. The prevalence rate was higher in children aged 1-4 years (39.05%) as compared to 4-8 years (37.63%) (Table 1).

Table 1. Prevalence of *E. vermicularis*

Children	Observed		Infected	
	n	%	n	%
Total	370	100	126	34.05
Gender	Male	233	63	32.18
	Female	137	37	37.22
Age	1-4 years			39.05
	5-8 years			37.63

From October 2013 up to March 2014, the prevalence rate was (21.24%, 35.59%, 34.54%, 34.92%, 43.85% and 38.57%) respectively (Figure 2).

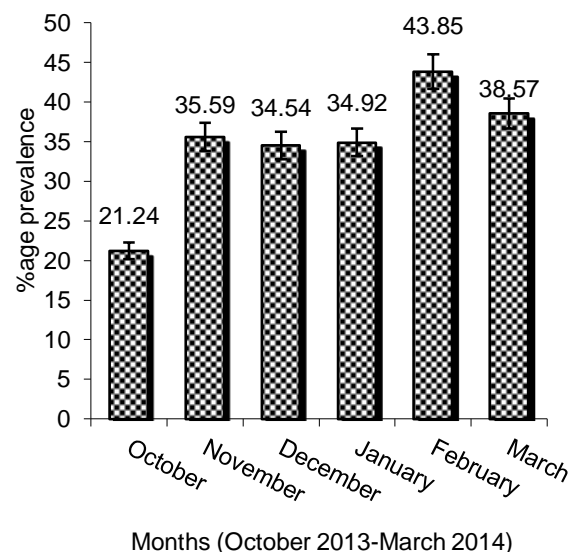


Fig. 2. Month-wise prevalence of *E. vermicularis*

The present survey demonstrated the prevalence of *E. vermicularis* in children of district Mardan during 6 months. The overall prevalence noted in this study (34.05%), is greater than previous studies, 1.3% (Chaudhry *et al.*, 2004), 4% (Ahsan-ul-Wadood *et al.*, 2005), 4.19% (Shaikh *et al.*, 2009), 12% (Muhammad *et al.*, 2012). This difference could be due to the poor living condition, poor hygiene, low socio-economic status, lack of health

education, poor sanitation, polluted water supply and warm climate of district Mardan, K.P.K, Pakistan.

The reports on the prevalence of *E. vermicularis* among children have been published from the different parts of the globe and vary considerably, depending on the age groups and areas (WHO., 1998; Kang *et al.*, 2006). *E. vermicularis* infection among children of Turkey, the Republic of Korea, Thailand, Romania, and Argentina were reported 9, 18.5, 25, 42.8 and 43.4 %, respectively (Park *et al.*, 2005; Bunchu *et al.*, 2011; Neghina *et al.*, 2011; Guigard and Freye, 2000; Koksai *et al.*, 2010). A valuable point is that poor personal hygiene raises the risk for pinworm infection and there is an important connection between the level of personal hygiene and rate of *enterobiasis* (Noor Hayati and Rajeswari, 1991). Generally, children are considered as the main targets, because of this fact that children's activities contribute more to the growth of *E. vermicularis* infection compared to adults (Afrakhteh *et al.*, 2015).

CONCLUSION

It can be concluded from the present study that the prevalence rate of *E. vermicularis* in children of the district Mardan is high and should not be neglected due to being a highly transmittable infection. It mostly affects the health of children and causes great loss. The current study suggested to improve the poor living condition, hygiene, health education, and contaminated water supply to decrease intestinal worm infestation among children and the community.

CONFLICT OF INTEREST

All the authors have declared that no conflict of interest exists.

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