

## **Prevalence of *Hymenolepis nana* in Human Beings in and Around Multan-Pakistan**

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### **Abstract**

**The present study was conducted to examine the prevalence of *Hymenolepis nana* (cestoda: Hymenolepididae). A total of 936 stool samples were collected from patients, visiting Bhutta Pathology Laboratory Multan. 17 stool samples were found positive showing an overall prevalence of 1.81%. *H. nana* was more prevalent in male patients (2.13%) as compared to females (1.49%) and age wise prevalence showed that the parasite was only present in patients of age group 4-days to 10 years (1.91%).**

**Keywords:** *Hymenolypis nana*, Prevalence, Sex, Age, Multan, Pakistan

### **Introduction**

The genus *Hymenolepis* contains in excess of 400 species, virtually all of which are found in higher vertebrates (Voge, 1973). Two species of *Hymenolepis* are of particular interest. *H. nana* commonly known as a dwarf tapeworm, is parasite of children. It is found in rats and mice. It is cosmopolitan in distribution, but is more common in the warm than in cold climates (Voge and Heyneman, 1957). The adult worm lives in human intestine, often in large numbers. *H. diminuta* is a parasite of rodents, rats in particular, but it has been reported from humans on rare occasions. Both species are widely used as a model system for study of cestode biology (Smyth, 1994; Zeibig, 1997).

*H. nana* differs from almost all other tapeworms in being able to complete its entire life cycle in a single host. In this it radically progressive, having broken away from the age-old tapeworm custom of utilizing intermediate hosts (Voge, 1973). It can, however, still revert to the habits of its ancestors and develops in fleas and grain beetles. When the eggs are ingested by humans, rats or mice, the oncospheres begin to crawl actively inside their shells, and escapes in the lumen of intestine (Zeibig, 1997).

They burrow into the interior of the villi and develop into the interior of the villi tailless cysticercoids in about 4 days. On reaching maturity, these escape into the lumen of the intestine, the scoleces attach themselves, and the worm grow to maturity in about 15-20 days (Marquardt and Demaree, 1985).

Light infections with *H. nana* are asymptomatic, but heavy infections cause abdominal pain, diarrhea, headache and dizziness among other vague symptoms. The method of infection and the development of immunity are interrelated (Menan et al., 1997). If a cysticercoid is ingested, there is little development of immunity, and through autoinfection the number of worms may become quite large. On the other hand, if eggs are ingested, immunity usually develops quickly (Juckett, 1995; Marquardt and Demaree, 1985).

Although investigations have been made on *H. nana* in different parts of Pakistan, but work has not been carried out on this parasite at Multan. Results of the present investigation therefore are expected to be helpful for future research programs on this parasite in this area. The present study was designed to investigate the overall prevalence, the relationship between sex and age of the host with *H. nana*.

### **Materials and Methods**

The study was conducted during February 2000 to January 2001 in order to investigate the overall prevalence of *H. nana*, and relationship between sex and age of the host with the parasite. A total of 936 stool samples were collected from patients visiting Bhutta Pathology Laboratory (Multan, Pakistan). The collected samples were preserved in 5% formalin. The specimen bottles were labeled with, host name, sex and age. Temporary mounts were prepared to examine the parasite as per description of Cable (1985).

### **Results and Discussion**

The overall prevalence of *H. nana* was 1.81% in the present study. Afzal (1981) studied the intestinal parasites in eight school children of Mansehra (Pakistan) and prevalence recorded for *H. nana* was 27.25%. Omar et al. (1991) recorded *H. nana* (3.0%) in the city of Abha, South Western, Saudi Arabia. Ramesh et al. (1991) recorded the prevalence of *H. nana* (12.4%) in Chandigarh (Northern India). Jalili and

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Cerven (1993) reported *H. nana* (6.0%) in the province of Baghlan (Afghanistan). Machado and Costacruz (1998) reported 6.7% prevalence of *H. nana* in the city of Uberlandia, State of Minas Gerais. Azazy and Aitiar (1999) reported 2% prevalence of *H. nana* from urban areas of Sana province (Yemen).

It is obvious from above comparison that the prevalence of *H. nana* recorded during the present study is lower as compared to prevalences recorded in studies conducted by Afzal (1981), Omar et al (1991), Ramesh et al. (1991), Jalili and Cerven (1993), Machado and Costacruz (1998), Azazy and Aitiar (1999). The lower prevalence of *H. nana* recorded during the present study could be explained on the basis that the hosts examined were more resistant to *H. nana* as compared to the hosts examined in other studies. The other factor could be; the hygienic conditions of those particular areas, and the personal hygiene of patients examined during the present study.

Relationship between sex of the host and *H. nana* was calculated and it was observed that out of 469 male patients, 10(2.13%) were infected with *H. nana* and out of 468 female patients, 7(1.49%) were infected with the same parasite. Relationship between sex of the host and *H. nana* had also been studied in different parts of the world. Omar et al. (1991) reported (3.0%) prevalence of *H. nana* in schoolboys between the ages of 5-13 years in the city of Abha. Menan et al. (1997) reported that the male subjects were more infected than female.

According to Washburn et al. (1965) the heterogeneous nature of the sex chromosomes in males causes sex differences in parasite resistance. According to this deleterious recessive alleles, normally masked in the homogenous sex, would show their effects in the heterogametic sex, which has only one fully functional chromosome. Sex steroids may directly affect parasites growth, development and may influence immune response. Circulating levels of immunoglobulins, including IgG, IgM, and IgA are greater in females than in males (Eidinger and Garrett, 1972; Daniels and Belosevic, 1994). According to the results of present study, the prevalence of *H. nana* was 1.19% in age group of 4 days-10 years (n=887) and the parasite was absent in all other age groups. The results of the present study are supported by Chung et al. (1991), Kaminsky (1991), Meloni et al. (1993), Alnasser and Alborono (1995) and Menan et al. (1997). According to all these researchers the parasitic infection is higher in children as compared to young and elderly humans. This could be explained on the basis that as age of host increases the immunity against parasitic diseases also increases.

## References

Afzal, A. Prevalence of intestinal parasites in eight school children of Mansehra (Pakistan). M. Sc. Thesis. Dept. Zool. Univ. Peshawar, Pakistan. 1981.

- Alnasser, M. N. and Alborono, M.K. Prevalence of intestinal parasites in Saudi children, A community-based study. *J. Trop. Pediat*, 1995. 41: 47-49.
- Azazy, A.A. and Aitiar, A.S. A study on intestinal and blood parasites among School children in Sana province, Yemen. *Saudi Med. J.*, 1999. 20: 422-424.
- Cable, R.M. An Illustrated Laboratory Manual of Parasitology 5<sup>th</sup> Ed. Surject Publications Delhi. 1985, pp: 225-269.
- Chunge, R.N., Karumba, P.N., Naglkerke, N., Wamwea, M., Mutiso, N., Andala, E.O. and Kinoti, S. N. Intestinal parasites in a rural community in Kenya cross sectional surveys with emphasis on prevalence, incidence and duration of infection and polyparasitism. *East African Med. J.*, 1991. 68: 112-123.
- Daniels, C.W. and Belosevic, M. Serum antibody responses by male and female C<sub>57</sub>B<sub>6</sub> mice infected with Guard moors. *Clin. Exp. Immunol.*, 1994. 97:424-429.
- Eidinger, D. and Garrett, T.J. Studies on the regulatory effects of the sex hormones on antibody formation and stem cell differential. *J. Exp. Med.*, 1972. 136: 1098-1116.
- Jalili, N.A. and Cerven, D. The parasitic infections of soldiers of a division in the province of Baghlan (Afghanistan) recorded during 1988. *Biologia*, 1993. 49: 615-618.
- Juckett, G. Common Intestinal helminths. *American Family Phys.*, 1995. 52: 2039-2048.
- Kaminsky, R.G. Parasitism and diarrhea in children from 2 rural communities. *Trans. Roy. Soc. Trop. Med.*, 1991. 35:70-73.
- Machado, E.R. and Costacruz, J.M. *Stongyloides stercoralis* and other enteroparasites in children at Uberlandia city, state of Minas Gerais, Brazil. *Memorias Do. Inst. Oswaldo Cruz.*, 1998. 93: 161-164.
- Marquardt, W.C. and Demaree, R.S. *Parasitology*. McMillan publishing Company, New York Collier McMillan Publishers, London. 1985. pp: 494-496,
- Meloni, B.P., Thomson, R.C.A., Hopkins, R.M., Reynold J.A. and Gracey, M. The prevalence of *Giardia* and other intestinal parasites in children. *Medical Journal (Australia)*, 1993. 158: 157-159.
- Menan, E.I.H., Nebavi, N.F.G., Adjetey, T.A.K., Assavo, N.N., KikiBarro P.C. and Kone. M. Profile of intestinal helminthiasis in children of school age in the city of Abidjan. *Bull. De. La. Soc. De. Pathol. Exolique*, 1997. 90: 51-54.
- Omar, M.S. Abuzeid, H.A.H. and Mahfouz, A.A.R. Intestinal parasitic infection in school children of Anha (Asir). *Acta. Trop.*, 1991. 48: 195-202.
- Ramesh, G.N., Malla, N., Raju, G.S., Sehgal, R., Ganguly, N.K., Mahajan, R.C., and Dilwari, J.B. Epidemiological study of parasitic infections in lower Socioeconomic group in Chandigarh (Northern India). *Indian J. Med. Res.*, 1991. 93: 47-50.

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Symth, J.D. Animal Parasitology. Cambridge University Press, 3<sup>rd</sup> Ed. Cambridge. 1994. pp: 401-404.

Voge, M. and Heyneman, D. Development of *Hymenolepis nana* and *Hymenolepis nana*. University of California Publications in Zoology, 1957. 59: 549-580.

Voge, M. Parasites of Laboratory Animals. Iowa State University, Press. Ames, Iowa, 1978. pp: 17-35,

Washburn, T.C., Medaris, D.N. and Childs, B. Sex differences in susceptibility of infections. Pediatrics, 1965. 35: 57-64.

Zeibig, E.A. Clinical Parasitology: A practical approach. 1st Ed. W.B. Saunders Company, Philadelphia. 1997. pp: 1-189.