

## Prevalence of *Hymenolepis nana* Infections in Abu-Ghraib City /Baghdad/Iraq

Huda Thaher AL- Marsome

### ABSTRACT:

#### BACKGROUND:

Intestinal parasitic infestation represents a considerable medical and public health problem in the developing countries and up to 10% of the population of the developing world is infected with intestinal worms<sup>(1)</sup>.

#### OBJECTIVE:

This study was initiated to investigate the prevalence of *H. nana* infection in rural environments in Baghdad and to determine if the prevalence could be linked to the availability of water and sanitation facilities.

#### MATERIAL AND METHODS:

This study included 300 patients in the Abu-Ghraib province. Stool smear were prepared for each sample stool culture for *Shigella spp.*. Hemoglobin estimation was evaluated by Cyanmethemoglobin method.

#### RESULTS:

From 300 patients only 20 ( 6.67 %) were positive for *H.nana* ,the male to female ratio was 14:6 , heamoglubulin range from 10.5 -13 g/dl.The age group 1–5 years had the highest rate (50%) ,While the age group more than 20 years were the lowest (5 %); boys have a higher rate (70%) than girls. Other parasitic species found in fecal sample of these patients in association with *H.nana* infection were *Giardia lamblia*(10%), *Entamoeba histolytica*(5%) while (5%) of patients were infecting with both *Giardia lamblia* and *Entamoeba histolytica*, some of these patients (15%) in microscopic examination revealed PMN cell and the stool culture of them were positive for *Shigella* species.

#### CONCLUSION:

Our data suggested that ,the prevalence of *H.nana* infection was 6.67% in Abu -Ghraib city and diagnosis and treatment of patients are the clue in eradication of *H.nana*.

**KEYWORDS:** *Hymenolepis nana*, Intestinal parasite, Co-infection polymorphnuclear.

### INTRODUCTION :

Intestinal parasitic infestation represents a considerable medical and public health problem in the developing countries and up to 10% of the population of the developing world is infected with intestinal worms<sup>(1,2)</sup>.

*Hymenolepis nana*, a dwarf tapeworm, is the most common human tapeworm infection, with an estimated 50 to 75 million carriers worldwide. This tapeworm is endemic in Asia, Africa, and southern and eastern Europe, and its life cycle involves humans or rodents as the definitive host and arthropods as the intermediate host<sup>(3)</sup>.

*Humans and rodents are infected when they ingest cysticeroid-infected arthropods or embryonated eggs from contaminated food, water, or hands. Upon ingestion, eggs hatch and release a 6-hooked larva called the oncosphere*

(hexacanth), which penetrates the intestinal villi and develops into a cysticeroid larva<sup>(3)</sup>.

Unlike that of all other species of tapeworm, this worm's entire life cycle can be completed in the bowel, that is, autoinfection, so infection can persist for years if left untreated. *H nana* infection is most often asymptomatic; however, symptoms can attend heavy worm burdens. Medical professionals should always be aware that parasite infections can be present in asymptomatic disease<sup>(2,3)</sup>.

The prevalence of intestinal hymenolepiasis in a community may be a useful indicator of the degree of fecal contamination of an environment and/or the level of hygiene practice<sup>(3)</sup>.

Anemia is one of the most commonly recognized disorders. It is estimated to affect half the school-age children and adolescents in developing countries. Iron deficiency anemia

Department of Microbiology, College of Medicine, Al-Nahrain University.

## PREVALENCE OF HYMENOLEPIS NANA INFECTIONS

affects about 1.3 billion people with highest prevalence and morbidity in young children and pregnant women <sup>(4)</sup>

### MATERIEL AND METHODS:

This study included (300) patients, they were (198) males and (102) females .The age range from two to thirty years. All patients were outpatients visitor to the private clinic in Baghdad during March 2010-June 2010, clinical details at presentation were recorded , All of the patients living in Abu-Ghraib city, many of the inhabitants are farmers raising livestock. The patients asked about the toilet facility, the rubbish or fecal material in or surrounding their houses, noting whether water and soap were provided for washing hands and source of water. Stool sample was collected at the first visit in water –tight cardboard containers, sample were examined macroscopically and microscopically by direct and concentration methods for the presence of *H.nana* eggs and for detection of other parasitic stage<sup>(3)</sup>.

Direct macroscopic examination of feces was performed to detect adult worms, segments of tapeworm, larvae, blood and mucus. The stool consistency (i.e. formed, soft, loose or watery) was recorded. Color and odor of the stool were also recorded as these were additional diagnostic indicators of specific intestinal infections <sup>(5)</sup>.

The concentration method used in this study was the zinc sulphate floatation method <sup>(3)</sup>.Two types of direct wet film preparation were achieved for each sample at the same time, One slide by using normal saline 0.85% and Lugol's iodine 5%.The presence of egg which is characterized spherical or oval ,hyaline with a smooth ,thin colorless outer shell and an inner membrane containing a hexacanth embryo ,and 4-8 polar filaments emanating from polar thickenings at either end of inner membrane mean the slide is positive .

The mucoid stool samples were cultured on Salmonella –Shigella agar to differentiate lactose from non lactose fermenters .

Blood hemoglobin estimation was performed by taking 20 µ free flowing capillary by prick method and it was thoroughly mixed with 4 ml Drabkin's solution reading was taken after 5 minutes at 540 nm <sup>(5)</sup> Anemia was defined as hemoglobin less than 12g/dl <sup>(2)</sup>.

All results were expressed by percentage and mean.

### RESULTS:

The study were performed in ruler area as the lifestyle and habits of the patients varied with age.

Fecal samples from (300) patients were screened using saline and iodine wet mounts, Male (198) and female (102) of five age groups varying from 1 to ≥20 years. Our data revealed presence of *H.nana* in twenty patients (6.67%) from (300) fecal sample had been examined. Twenty sample positive for *H.nana*, the male to female ratio was 14:6 ( male 70%, female 30% )table(1).

The patients were segregated into age groups of 1-5; 6-10; 11-15; and 16-20 years table (1). Patients below the age of (10) years had higher perecentage(50%) , whereas the older age groups were the lowest .

Overall infected sample showed double and triple infections with other intestinal parasite associated with *H.nana* infection were *Giardia lamblia* (10%), *Entamoeba histolytica* (5%) ,while (5%) of patients were infected with both *Giardia lamblia* and *Entamoeba histolytica* combined with *H.nana* table(2) .Both macroscopic and microscopic of fecal sample revealed gastroenteritis companied with *H. nana* infections (15%) table (2) and with regarding to gastroenteritis the stool culture were positive for *Shigella* species.

According to present study from twenty patients infected with *H. nana* 13 (65%) patients had anemia table (3).

**Table 1: Frequency distribution of study sample (patients infected with *H.nana*) by age and genger.**

	Age group (Years)	1-5	6-10	11-15	16-20	≥20
Gender	Female	3	2	1	0	0
	male	7	4	2	0	1
+ve <i>H. nana</i>		10	6	3	0	1

## PREVALENCE OF HYMENOLEPIS NANA INFECTIONS

**Table 2: Gastroenteritis and other protozoan infection in patients infected with *H.nana*.**

		Number
gastroenteritis		3
Protozoa infection Combined with <i>H.nana</i>	<i>G. lamblia</i>	2
	<i>E. histolytica</i>	1
	Both parasite	1

**Table 3: Hemoglobin distribution in patients infected with *H. nana* according age groups.**

Age group (Years)	1-5	6-10	11-15	16-20	20≤
Hb g/l(Mean)	10.5	10.5	12.5	0	12.5

### Statistical analysis:

Results were expressed as percentage .

### DISCUSSION:

The infection rate with *H. nana* in the stool samples was high (6.6%). The rate of infection in the present study is similar to other studies in Iraq<sup>(1,6,7)</sup>. The results are also in agreement with studies in other parts of the world<sup>(8, 9, 10)</sup>.

This high rate of infection in the present study could be related to a number of factors such as poor health hygiene and toilet training (in this study all patients had only on toilet shared by all the family), overcrowding, low education of children, low socioeconomic status and climatic conditions<sup>(11)</sup>. Another important factor which affects the rate of *H. nana* is the presence of asymptomatic patients in the community who can be considered as the main source of infection through continuously excreting the eggs with their stools<sup>(11,12)</sup>.

The results of *H.nana* infection among different age groups indicate that the highest rate was in the age group 1-10 years (50%), this may be because this group of children are fully independent in toilet use and are more involved in outdoor activities which might lead to *H.nana* transmission. The present results are similar to studies of intestinal parasites done by Bij a yini and his Co-worker(2008)<sup>(13)</sup>, also our result correspond data mentioned by Alam and his Co-worker in Pakistan(2007)<sup>(14)</sup>. In this study the most of patient had been suffering from anemia (the mean hemoglobin were(11.28 g/dl ), that may be due to intestinal parasites not only cause diarrheal diseases but also significant malabsorption<sup>(13)</sup> as we Know anemia in children associated with growth retardation , delayed motor development, poor

cognitive abilities and impaired immune response<sup>(15)</sup>.

The present study revealed that the intestinal *Giardia lamblia* and *Entamoeba histolytica* were the most common intestinal parasite associated with *H. nana* infection. Although other studies have demonstrated the same results<sup>(1,12,16)</sup>, there was no clear reason for this association. However, it may be related to the infective stage of both parasites being resistant to various environmental conditions and remaining viable for a long time also could be due to low socioeconomic status ,bed hygiene and watersourcecontamination<sup>(17)</sup>.

In this study gastroenteritis was positive for *Shigella* species this might be given an inclination that bacillary dysentery may be associated with *H. nana* infections<sup>(1,12,16)</sup>.

The high rate of infection could possibly be due to impoverished sanitary conditions, lack of safe water supply and poor maintenance of personalhygiene.

### CONCLUSION:

That there is a need for identification and confirmation of the factors responsible for the spread of the disease in Abo-Ghraib city through a prospective study designed and development of a comprehensive health education program and treatment of the infected persons to eliminate this infection from the community.

### REFERENCES:

1. Al-Sa'eed ,ATM; Saeed, AY and Mohammed, JB..Prevalence of gastrointestinal parasites among the population in Dohuk–Kurdistan region Iraq. *Zanco—journal for medical sciences* (special issue), 2001;5:14–9.

## PREVALENCE OF HYMENOLEPIS NANA INFECTIONS

---

2. Chakma ,T.;Rao, PV. and Tiwary ,RS..Prevalence of anaemia and worm infestation in tribal areas of Madhya Pradesh. *Indian Med Assoc*, 2000;98:570-71.
3. Arora,D.R. and Arora, B.. Medical parasitology. Second Edition .Satish,CBS,NewDelhi. 2006:124-27.
4. Vinod, K. CS; Anand, K. H. ;Sunita V. and Indu ,Kapu..Prevalence of Anemia and Worm Infestation in School Going Girls at Gulbarga, Karnataka. *Indian Pediatrics* , 2003;40:70-72.
5. Cheesbrough, M, ed.;District laboratory practice in tropical countries. Part 1. Cambridge, Cambridge University Press, 1998:192–205.
6. Mahdi ,NK. And Jassim, AH.. Intestinal parasitic infections of primary school children in three regions of southern Iraq. *Medical journal of Basra University*, 1987;6:55–61.
7. Al-Jeboori, T. and Shafiq ,MA. Intestinal parasites in Baghdad: a survey in two districts ,*Journal of the Faculty of Medicine Baghdad*, 1976;18:161–70.
8. Ghauri ,AS. And Maqbool ,A..The pattern of intestinal infestation in Sargodha Area: A comparative study.*Pak J Pathol* , 1992;3:99-101.
9. Farag, AM.. Intestinal infection with *Entamoeba histolytica* and *Giardia lamblia* regular patients to Yafrin general hospital, Libya. , *Journal of Dohuk University*, 1999;2:403-13.
10. Legesse, M. and Erko, B.. Prevalence of intestinal parasites among school children in a rural area close to the southeast of lake Langano, Ethiopia. *Ethiop J Health Dev.*, 2004;18:116-20.
11. Al-Shammari, S. K. T, El-Khwasky, F, G. A.: Intestinal parasitic diseases inRiyadh, Saudi Arabia: prevalence, socio demographic and environmental associates., *Trop Med Int Health*, 2001;6:184-89.
12. Amare, M., Gebre-Selassie S., Tesfaye K.,: Prevalence of intestinal parasitic infections among urban dwellers in southwest Ethiopia. *Ethiop.J.Health Dev.* , 2007;21:12-17.
13. Bijayini ,B. R. Mirdha ,K. M., Shinjini B. S. :Parasites in Patients wit Malabsorption Syndrome: A Clinical Study in Children and Adults.,*Dig Dis Sci*, 2008;53:672–79.
14. Maqbool Alam, Abdul Latif Khattak, Mohammad Talha, Issue Number : 1, Issue Month : March Pakistan Armed Forces Medical Journal ANEMIA AND INTESTINAL PARASITIC INFESTATIONS IN SCHOOL CHILDREN IN SKARDU 2007.
15. de Onis, M., de Onis, M., Onyango, AW,, Borghi ,E., Garza, C., Yang, H . WHO Multicentre Growth Reference Study Group. Comparison of the World Health Organization (WHO) Child Growth Standards and the National Center for Health Statistics/WHO international growth reference: implications for child health programmes. *Public Health Nutrition*. 2006; 9:942–47.
16. Peter R. M. and Barbara A. P. ,:Epidemiology of *Hymenolepis nana* Infections in Primary School Children in Urban and Rural Communities in Zimbabwe e, *The Journal of Parasitology*, 1994; 80: 245-50.
17. Garg, PK. Perry ,S.,Dorn, M., Hardcastle, L,, Parsonnet, J. Risk of intestinal helminth and protozoan infection in a refuge population.,*Am J Trop Med Hyg*, 2005;73:386–91.