

Diagnostic study of *Hymenolepis nana* in patients of Wasit Province

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H.nana, Lugols iodine, Feces, Human

ABSTRACT

This study was carried out at Wasit Province / Iraq in cooperation with AL-Karamah Teaching Hospital. Samples were collected from many places at Wasit Province. It included 120 stool samples from Iraqi patients, and 30 healthy subjects as a control. The study conducted during period from October to December, 2021 to investigate the prevalence of *Hymenolepis nana*. Only 12 stool sample were positive for *H.nana*. These samples were collected from the urban and rural areas of Wasit Province. All samples were examined microscopically using the direct wet smear, concentration method. The result showed that the percentage of *H.nana* infection among patients and control were 12 (10%) and 0 (0%), respectively. With regard to parasitic infection, the highest infection rate was recorded for the group (4-15) years old. Also the males reported higher 66.66% than the females 33.33% in this study without significant differences. According to the residence, rural areas were reported 75% and 25% of urban areas with significant differences.



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1. INTRODUCTION

Hymenolepis nana generally known as the dwarf tapeworm, is one of the most common tapeworms of humans, in which the parasite can cause hymenolepiasis. This zoonotic tapeworm has a cosmopolitan distribution with socio-economic and medical significance which may occur in many countries, worldwide [1], [2]. Hymenolepiasis is the most common intestinal tapeworm infection of humans with an estimated 50 to 75 million infection worldwide, caused by *Hymenolepis nana* which is commonly known as dwarf tapeworm, this tapeworm is endemic in Asia, Africa and southern and eastern Europe [3], [4]. Human become infected with *H.nana* when they ingest infective eggs, most commonly by direct fecal-oral exposure. The eggs pass into the ileum and hatch in the intestine liberating oncospheres that enter mucosal villi and develop into cysticeroids, there rupture into lumen and grow into adult tape worm [5]. Adult worms are vary in length from approximately 15-40 mm and 1 mm wide, the scolex bears a retractable rostellum with a single row of 20-30 hooks and has four suckers [6]. Development of cysticeroid larvae in the intestine of human causes little or no pathological changes, large number of worms in heavy infections may cause mechanical irritation of the intestine, and various allergic manifestations such as anal and nasal pruritus by releasing toxic metabolites [7]. Morbidity is uncommon, only occurring when parasite burden is very high. Death has not been reported in association with this infection [8]. *Hymenolepis nana* is common in children because of the lack in awareness, hygiene, and malnutrition [9]. In addition, external autoinfection with *H. nana* is more

familiar in children than adults [10]. Diagnosis is based on the demonstration of the characteristic eggs in the feces by direct smear, the eggs can readily be concentrated by the salt flotation and formalin-ether sedimentation methods [11], [12]. This study aimed to estimate overall prevalence of *Hymenolepis* spp. infections in children in Wasit Province and to identify factors associated with infection including gender, age, school-related, parent's jobs, and different localities in Wasit Province included city center and villages regions.

2. Materials and Methods

2.1 Materials

Normal saline, Lugol's iodine, Formalin, Ether, Sodium chloride, glass slide, cover slide, microscope, centrifuge, stick wood, plastic container.

2.2 Methods

2.2.1 Samples collection

A total of 120 feces samples were collected from suspected people of *H.nana* from different areas of Wasit province during October to December, 2021. These feces samples were examined microscopically by two ways:

- A. Direct wet smear method by Lugols iodine.
- B- concentration method.

3. Results and Discussion

The total number of samples were 120 feces samples collected from people who attended AL-Karamah Teaching Hospital in Wasit province. The results appeared that 12 (10%) of feces samples were positive for *H.nana* examined by microscope 40X who showed egg form as shown in figure (1).



Figure 1. egg of *H.nana*

The study showed that the rate of infection with *Hymenolepis nana* was 10% among diarrheal cases for *H.nana* . and 0.0% among control subjects.

Table 1. Percentage of infection with *H.nana* under study

Groups	Number of Examined Sample	Positive samples No. (%)
Diarrheal Groups	120	12 (10%)
Control Groups	30	0 (0%)
Total	150	12 (10%)

Table 1 shows the number of examined samples and positive samples for two groups, diarrheal groups that recorded 12(10%) from 120 samples, control groups did not recorded any infection from 30 samples.

The present study agreed with [14] that recorded 13 patients infected with *H. nana* in Kalar city in Iraq and agreed with [15] that recorded 20 patients infected with *H.nana* in Abu Ghraib city in Baghdad, Iraq. The present study disagreed with [16] that recorded 164 patients in Erbil city. The present study also dis- agreed with [17], [18].

Table 2. Distribution of *H. nana* patients according to the gender

Groups	Number of Examined Sample	Positive samples No. (%)
Male	80	8(6.7%)
Female	40	4(3.3%)
Total	120	12(10%)

Table 2 shows the number of examined samples for both genders, Male recorded 8(6.7%) from 120 samples and female recorded 4 (3.3%) from 120 samples. The present study agreed with [19], [20], while it disagreed with [21- 23] that recorded high infections with *H.nana* (31%).

Table 3. Distribution of *H. nana* infection according to the residence and gender

Groups	Number of Examined Sample	Positive samples No.(%)	
		Male	Female
Rural	90(75%)	7	2
		Male	Female
Urban	30(25%)	1	2
		Male	Female
Total	120	8	4

Table 3 shows the infections in Rural and Urban areas of Wasit province, the present study recorded 7 infections in male and 2 infections in female in rural areas while 1 infection in male and 2 infections in female were appeared in urban areas. These results agreed with [24] that recorded 2infection in female and 1 infections in male and it disagreed with [17] who recorded high infections.

4. References

- [1] Cheng T, Liu GH, Song HQ, Lin RQ, Zhu XQ. The complete mitochondrial genome of the dwarf tapeworm *Hymenolepis nana*—a neglected zoonotic helminth. *Parasitology Research*. 2016; 115(3): 1253-62.
- [2] Sharma S, Lyngdoh D, Roy B, Tandon V. Differential diagnosis and molecular characterization of *Hymenolepis nana* and *Hymenolepis diminuta* (Cestoda: Cyclophyllidea: Hymenolepididae) based on nuclear rDNA ITS2 gene marker. *Parasitology research*. 2016; 115(11): 4293-8.
- [3] Mirdha BR, Samantrai JC, *Hymenolepis nana* a common cause of pediatric diarrhea in urban slum dwellers in india. *J Trop Pediatr* 2002; 48:331-4.
- [4] Centers for Disease Control and Prevention (CDC). Notes from the field: identification of a *Taenia* tapeworm carrier – Los Angeles County, MMWR Morb Mortal WklyRep 2014. 64 (3):74.
- [5] Chatterjee (1952). Human parasites and parasitic disease. Physician, R.G.Kar. Mcd. Coll. Belgachia, Calcutta.:537-547.
- [6] Schantz, Peter M. —Tapeworms (Cestodiasis). *Gastroenterology Clinics of North America* 2006; 25(3): 637-653.
- [7] Parija SC. Textbook of Medical Parasitology, Protozoology and Helminthology. Pashupati Printers, New Delhi, second edition; 2004.
- [8] Crompton DW. How much human helminthiasis is there in the world? *J Parasitol*. 1999; 85(3): 397-403
- [9] Mirdha R., Samantray J.C. 2002. *Hymenolepis nana* : A Common Cause of Paediatric Diarrhoea in Urban Slum Dwellers in India. *Journal of Tropical Pediatrics*, 48, 331–334.
- [10] Sadaf H.S., Khan S.S., Kanwal N., Tasawer B.M., Ajmal S. 2013. A Review on Diarrhoea Causing *Hymenolepis nana*-Dwarf Tapeworm. *International Research Journal of Pharmacy*, 4, 32–35.
- [11] Kremer M and Molet B. Interêt de la technique de Kato en coprologie parasitaire. *Anna. Soc. Belge Med. Trop* 1975; 55(5): 427-430.
- [12] Beaver PR and Jung EC. *Clinical Parasitology*, Ninth Edition. Philadelphia: Lea and Febiger. 1984.
- [13] Sastry, A.S;Bhat,S.(2014). *Essentials of medical parasitology*. First Edition. Jaypee Brothers Medical Publishers (P) Ltd.5-6.
- [14] Bajalan, M. M. M. (2010). Epidemiological study of *Hymenolepis nana* in children in Kalar city/Sulaimani province. *Dyala journal for pure sciences*, 6(4), 1982-1993.
- [15] AL-Marsome, H. T. (2012). Prevalence of *Hymenolepis nana* infections in Abu-Ghraib City/Baghdad/Iraq. *Iraqi Postgraduate Medical Journal*, 11(4).
- [16] Al-Daody, A. A. K., Younes, M. R., Ali, W. R., & Hamad, K. M. Prevalence of *Hymenolepis nana*

in Erbil City-North of Iraq. methods, 8, 9.

- [17] Willcocks, B., McAuliffe, G. N., & Baird, R. W. (2015). Dwarf tapeworm (*Hymenolepis nana*): Characteristics in the Northern Territory 2002–2013. *Journal of paediatrics and child health*, 51(10), 982-987.
- [18] Taher, J. H. (2017). Epidemiological Study of dwarf tapeworm *Hymenolepis nana* in Najaf province/Iraq. *Al-Kufa University Journal for Biology*, 9(2).
- [19] Al-Daoudy, A. A. K., Younes, M. R., Ali, W. R., & Hamad, K. M. Prevalence of *Hymenolepis nana* in Erbil City-North of Iraq. methods, 8, 9.
- [20] Al-Hanoon, Z., & Mukhlis, S. (1982). Prevalence of intestinal parasites among secondary school students in Mosul-Iraq. *J. Faculty Med. Baghdad*, 24(2), 225-230.
- [21] Al-Hanoon, Z., & Mukhlis, S. (1982). Prevalence of intestinal parasites among secondary school students in Mosul-Iraq. *J. Faculty Med. Baghdad*, 24(2), 225-230.
- [22] AL-Marsome, H. T. (2012). Prevalence of *Hymenolepis nana* infections in Abu-Ghraib City/Baghdad/Iraq. *Iraqi Postgraduate Medical Journal*, 11(4).
- [23] Elliott, G. F. (1956). Algues calcaires codiacées fossiles d'Iraq, nouvelles et peu connues. *Bulletin de la Société géologique de France*, 6(7-9), 789-795.
- [24] Nabeel, M., & Al-Tameemi, M. (2019, September). Comparative Study morphological and Molecular for infected Rodent with two cestoda *Hymenolepis nana* & *H. diminuta* In Al-Diwaniyah City, South Of Iraq. In *Journal of Physics: Conference Series* (Vol. 1294, No. 6, p. 062058). IOP Publishing.