

Prevalence *Enterobius vermicularis* infection in children and relationship with nocturnal enuresis in Najaf Province

انتشار الإصابة بالدودة الدبوسية في الأطفال والعلاقة بين الإصابة وسلس البول الليلي بين الأطفال في محافظة النجف

**Zainab Ali Hussein/Nursing Faculty
Kufa University**

Abstract

The current study aims to investigate the prevalence of *Enterobius vermicularis* among children and to evaluate the possible association between *Enterobius vermicularis* and nocturnal enuresis among children 4 to 7 years of age in Iraq- AL-Najaf province for the period from 30 April to the 30 of August 2014. Scotch tape technique were applied on (124) children were diagnosed to have Enterobiasis by using direct microscopic examination for the observation the helminthes eggs in the stool. The overall prevalence rate was high (83.9 %) and to investigate age, gender related factors . The rate of infection in males was (59.4%) higher than females (40.6%), statistical analysis showed significant differences at the level of 0.05 between gender. The rate of infection was the maximum (26.9 %) seen in the age (4) years in comparison to the lower infection rate was found in the age (12) years (1.9%), the statistical analysis showed significant differences at the level of 0.05 between the ages. Enterobiasis had significant relation with nocturnal enuresis and the percentage of children who had pinworm infection and enuresis was (61.5%).

Key words: *Enterobius vermicularis*, enuresis, pinworm, parasite, children

الخلاصة:

تهدف الدراسة الحالية إلى دراسة انتشار الدودة الدبوسية *Enterobius vermicularis* بين الأطفال وتقييم العلاقة المحتملة بين الدودة الدبوسية وسلس البول الليلي بين الأطفال الذين تتراوح أعمارهم بين (4-7) سنوات في محافظة النجف- العراق , للفترة من 30 أبريل إلى 30 أغسطس 2014 . طبقت تقنية اللاصق الشفاف Scotch tape technique على (124) طفل لغرض الحصول على بيوض الدودة والتي تم تشخيصها باستخدام الفحص المجهرى المباشر ، وكانت نسبة الانتشار الكلي عالية حيث بلغت (83.9%) وتم دراسة علاقة الإصابة بالعمر والجنس . كانت نسبة الإصابة في الذكور (59.4%) أعلى من الإناث (40.6%) وأظهر التحليل الإحصائي فروق معنوية ذات دلالة إحصائية عند مستوى (0.05) بين الجنسين . أن معدل العدوى القصوى 26.9% يرى بين الأطفال بعمر (4) سنوات بالمقارنة مع أقل نسبة إصابة وجدت عند الأطفال بعمر (12) سنة وأظهر التحليل الإحصائي وجود فروق معنوية ذات دلالة إحصائية عند مستوى (0.05) بين الأعمار . كان لداء الدبوسيات علاقة كبيرة مع سلس البول الليلي وبلغت النسبة المئوية للأطفال المصابين بالدودة الدبوسية ويعانون سلس البول (61.5%).

Introduction:

Enterobius vermicularis is an intestinal nematode of humans and its principal mode of transmission is direct contact between infected and noninfected persons [1]. Pin worm is the causative agent of enterobiasis, one of the most prevalent worms found in children worldwide. Pinworms, also called threadworms, typically infect the bowel of children in tropical areas (2,3). It is estimated that 200 million people are infected annually. This worm is commonly found in crowded institutions such as day-care centers, schools, hospitals and orphanages (4). *E. vermicularis* is an important helminthic infection among children in rural areas of developing countries. Enterobiasis is frequently asymptomatic. The most typical symptom is perianal pruritus, especially at night, which may lead to excoriations and bacterial super infection (5). The disease is more prevalent in temperate regions and is facilitated by factors such as overcrowding in schools and family groupings, as well as inadequate personal and community hygiene. (3). Human acquire this parasite through direct contact with infected person or ingestion of contaminated food and water, and rarely by inhalation of airborne eggs and it infection usually occurs via ingestion of infectious

egg by anus to mouth transfer by finger can also occur by touching contaminated surfaces such as clothing, bed linen and bathroom fixtures followed by ingestion or even through inhalation or aerosolized eggs from the aforementioned surface (6&7). Infection by this parasite is usually asymptomatic; however, in prolonged infection they can cause anal itching and abdominal disturbances which influence the growth of children (7). Adult pin worm that live in the intestines feed off of nutrients ingested by the human, they reproduce sexually and after they mate, the males die, then females proceed to crawl down the intestinal tract and out the anus where the female lays her eggs in the perianal skin, this may cause itching around the anus disturbed sleep (8). Nocturnal enuresis (bedwetting) is a socially disruptive and stressful condition which affects around 15-20% of children older than five, and up to 2% of young adults. Although there is a high rate of spontaneous remission, the social, emotional and psychological costs may be harmful. Enuresis is an important childhood problem that has been associated with a wide variety of child disorders, and with the socio-environment of the family (9,10).

Materials and Methods:

The current study was performed in Najaf / Province from 30 April 2014 - 30 August 2014 to find the prevalence of enterobiasis and enuresis among children. A total of 124 children were included in this study & from (124) children (56 females and 68 males) range from 4 -12 years on children at home each of them have a good toilet training. Questionnaire about enuresis was constructed and data on age, gender anal itching, and inflammation was gathered. Data collection was done in cooperation with children nurses. For parents of each child a special clean plastic cup labeled was distributed with instruction to collect a morning specimen on following day as described by (11). These samples were sealed firmly and transported to laboratories of the AL-Sadar hospital to make general stool examination by using direct wet mount. The sample is placed on a microscope slide and examined as soon as possible (11). Methods for children examined for *Enterobius vermicularis* infection using the cello tape technique or Scotch tape carried out depending on asking mothers of children to examine their children once in the morning before the child goes to toilets and take bathes, by pressing a tape on their perianal areas 2-3 times for each test, then sticking the tape to labeled glass slide, the labeled slides were collected every morning and transferred to the laboratories and examined under the microscope, under the power 10 X, 40X respectively (12). Nocturnal enuresis rates were investigated in children with *Enterobius vermicularis* to search for the association. Experimental data were presented in terms of observed numbers and percentage frequencies, and then Statistical analysis was done using SPSS program version 17 for windows 7 with statistical significance (p) value of <0.05, (13).

Results:

Total positivity rate of enterobiasis among children from 4 -12 years was 83.9% & the number of positive sample were 104 out of 124 child examined (figure 1).

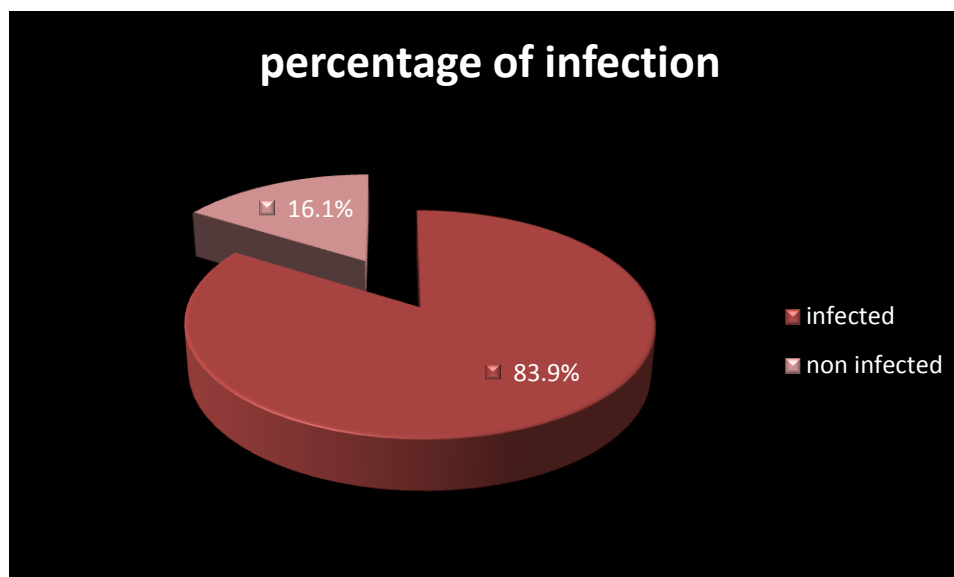


Figure 1: percentage of Infection with Enterobiasis

The results showed that the infection rate in males 59.4% (62/104) was higher than females 40.6% (42/104) , statistically there was significant difference between sexes (table 1).

Table(1) Distribution of cases according to gender

Sex	Investigated children	No. of infected	Infected %	p value
Males	68	62	*59.6	0.001
Females	56	42	40.4	
Total	124	104	100	

* significant difference $P < 0.05$ between Males and Females .

The result of table (2) showed the age related prevalence of *Enterobius vermicularis* , the maximum infection rates 26.9 % , 23.1 and 16.3 were seen in age group 4 , 5 and 6 years respectively in comparison to the lower infection rate was found in the group age 12 years (1.9%), The statistical analysis showed significant differences at the level of 0.05 between the age groups.

Table 2: Distribution of enterobiasis according age groups

Age group (Year)	Total cases	No. infected	%	p value
4	30	28	*26.9	0.012
5	27	24	23.1	
6	19	17	16.3	
7	11	9	8.7	
8	14	9	8.7	
9	9	7	6.7	
10	6	5	4.8	
11	5	3	2.9	
12	3	2	1.9	
Total	124	104	100	

* significant difference $P < 0.05$ between ages.

Total enuresis rate was 61.5% (64/104), and 66.1% (41/62) of the boys and 54.8% (23/42) of girls . There was a statistically significant ($P < 0.05$) in the relationship between enterobiasis and nocturnal enuresis table (3).

Table (3) Association of enterobiasis with Nocturnal enuresis

Nocturnal enuresis	No. cases	Positive cases	percentage	Negative cases	percentage
Males	62	41	66.1	21	33.9
females	42	23	54.8	19	45.2
Total	104	64	*61.5	40	100

* significant relationship $P < 0.05$ between enterobiasis and nocturnal enuresis

Discussion:-

The present data showed that the overall prevalence rate of enterobiasis among children was 83.9% shows in figure(1) this results considered higher than the previous results by Kitvatanachai *et al.* (14) who got total infectivity rate 15.95 % in Thailand orphanages. and In comparison to the other researchers used the same method, this ratio was greater than reported in Mosul (15) which was 15%; in Al-Khalis, Dyala (16) which was 9.4%; in Manisa-Turkey (17) which was 10.3%; in Izmir-Turkey (18) which was 10.1%, and the result was in disagreement with lower than in Krkuk (19) which was 31.2%; in Erbil (20) which was 29.8%; in Turkey (21) which was 71.3%, while other epidemiological studies reported 84.3% in Baghdad orphanages (22) and 94% in Turkish orphanages (23), the main reason for these high rates of *E.vermicularis* infection among children may be related to the direct contact between infected children, especially when this parasites confirmed previously as most prevalent parasite in overcrowded areas or in families with many members (24). The high rate of infection may be related to the low socio-cultural status of the families whose children were infected, low personal hygiene, the direct life cycle of the parasite and crowding with large numbers of children were playing every day together and this has facilitated the spreading of the infection (13). This result is in agreement with AL-Qadhi *et al.*(22). Which study the enterobiasis and its relationship with enuresis they found the infection rate for enterobiasis was (84.31%) ,higher in male than female & significant relationship between enterobiasis and nocturnal enuresis were investigated, the percentage of children who had pinworm infection and enuresis was 58.82%. The result in table (1) showed that the infection rate in males 59.6% was higher than females 40.4%, although there was significant relation between gender and infection rate of enterobiasis this results was agreed with Kadhim (24), in Baaquba observed the rate of infection in male (37%) was higher than female (32%). The result is disagreement with Lee *et al.* (12) obtained a total rate 35.3% (38.7% of female and 31% of males) the non significant differences can be explained as both gender were lived in the same place and had the same chance in playing and eating as well as sharing the same toilets , so the exposure to infectious agent may not varied very much between genders while the high rate of infection in male than in female may be related to that males are spending their times outside home more than females so they have more chance to contact with infected children, thus acquiring the infection (4 & 24). The result in table (2) showed the age related prevalence of *Enterobius vermicularis* , the maximum infection rates occur in age groups (4, 5, 6) years 26.9% , 23.1 and 16.3 respectively. This result is agreement with AL-Qadhi *et al.*(22) & Mohammad *et al.*(25).They showed the age related prevalence of *Enterobius vermicularis* .Recent studies have provided more information about nocturnal enuresis & we tried to determine the potential association between enuresis and *Enterobius vermicularis* in children.

Total positivity rates for *Enterobius vermicularis* was 61.5% (64/104) in children had enuresis. In a study conducted by Erdemir et al (23), *Enterobius vermicularis* was present in 61% in the enuresis children (14). In another study, Zeyrek et al (26), investigated the frequency of *Enterobius vermicularis* in 50 children with enuresis nocturnal complaints among the ages 5-15. *Enterobius vermicularis* was identified in 33 cases (66%) in their study. And agreement with In Krkuk (19), noted nocturnal enuresis in 60.68% in out of 142 infected children. While Out-Bassey et al. (27), they found the prevalence of enterobiasis and its relationship with enuresis among (799) randomly selected children aged (5-14) years in Kalabar-Nigeria, they found that 60 children were infected by *E. vermicularis*, among them 35 (58.33%), children were suffering from enuresis. Other similar results were reported also by (28).

References

1. Kang , S. ; Jeon , H.K. ; Eom , K.S. and Parl ,J.K.(2006). Egg positive rate of *Enterobius vermicularis* among preschool children in Cheongju , Chungcheongbul-do , Korea , Korean J.Parasitol. ;44(3):247-249.
- 2-Neva, F.A. &Brown, H.W.(1994). Basic clinical parasitology. 6th ed. Norwalk, Conn.:Appleton & Lange.
- 3.Goldmann, D.A.& Wilson ,C.M.(1997). Pinworm infestations. In: Hoekelman RA. Primary pediatric care. 3d ed. St. Louis: Mosby, :1519
- 4- Gülnaz Ç and Nizami D.(2006). The relationship between *Enterobius vermicularis* infection and nocturnal enuresis, Turkey. Eur J Gen Med., 3(1):16-20.
- 5 - Lohiya,G.S; Figueroa, L. T; Crinella, F.M. and Lohiya.S.(2000). Epidemiology and control of Enterobiasis in a development Center. West .J.Med.1725:305-308.
- 6- Kim, B.J.; Lee, B.Y.; Chung, H.K.; L Y S, K.H.; Chung, H.J. and Ock, M.S.(2003). Egg positive rate of *Enterobius vermicularis* of primary school children in Geoge Island. Korean J Parasitol,41(1):75-77.
- 7- Katz, D. E. and Taylor, D. N.(2001).Parasitic infection of the gastro intestinal tract.Gastro.Clin Am. 30:795-815.
- 8- Kuick, C.J.; Martin, G.L. and Sortor , B.V.(2004).Common intestinal parasites. Am.Fam.Physiscian.; 69:1161-1168.
- 9- Van Hoecke, E.; Baeyens, D.;Vande Walle, J.;Hoebeke ,P.and Roeyers ,H. (2003).Socioeconomic status as a common factor underlying the association between enuresis and psychopathology. J Dev Behav Pediatr ,24: 109-14.
- 10- Yeung , C.K. (2003).Nocturnal enuresis (bedwetting). Curr Opin Urol; 13(4):337- 43.
- 11-Pin worm infection. Centres for Disease Control and Prevention. (2006).Avalible at:www.cdc.gov/NCIDOD/dpd/parasites/pinworm/factsht-pinworm.htm.Accessed October
- 12-Lee, K.J.; Bae, Y.T.; Kim ,D.H.; Deung, Y.K.; Ryang, Y.S.; Kim ,H.J.; ImK,I .and Yong, T.S.(2002). Status of intestinal parasites infection among primary school children in Kampongcham, Cambodia. Korean J Parasitol, 40(3):153-155.
- 13- Daniel, W.W. (2005).Biostatics a foundation analysis in health sciences. 8th edit. Wiley & Sons, Inc., Georgia state., U.S.A., 284PP.
- 14- Kitvatanachai , S. ; Marujiwat , K. ;Petabut , N. and Thawornpol , K.(2000). *Enterobius vermicularis* infection among children living in orphanages in Bangkok and Pathum Thani Province,Thailand.
- 15-Al-Izzi, N.S.(1998). Prevalence of intestinal parasitic infections in preschool children in Mosul city. J. Fac. Med. Baghdad, 40(4): 478-480.
- 16-Al-Bayaty, N.Y.(2000). The prevalence of intestinal parasites and head fleas among school children of Al-Khals district, Diyala. M.Sc thesis, College of Education-Ibn Haitham. Baghdad Univ,P81.

- 17-Gündüz, T.M.; Demirel, M. Inceboz, T.Tosun ,S. and Yerwli ,K. (2005). Prevalence of intestinal parasitosis in children with gastrointestinal symptoms associated with socio-economic conditions in Manisa region. *Türkiy Parazitoloji Dergisi*, 29(4):264-267.
- 18-Aksoy, Ü.; Akisü, Ç.;Delibaş, S.B.;Özkoç, S.; Şahin, S. and Usluka, S. (2007).Demografic status and prevalence of intestinal parasitic infections in schoolchildren in Izmir, Turkey. *Turkish J Ped*,49:278-282.
- 19-Ganem, A.H.(1996). *Enterobius vermicularis*, its impact on children aging 1-5 years in Krkuk city. DP, College of Medicine, Tikrit Univ , P17-21.
- 20-Hama, A.A .(2007). Intestinal parasites in relation to malnutrition among primary school children in Erbil province with evaluation of some anti-parasitic drugs. M.Sc Thesis, College of Science. Salahadin Univ. Erbil,P76.
21. Ozcelik , S. ; Poyraz , O. ; Saygi , G. and Ozturkcan ,S. (1995).Prevalence of intestinal parasites in children of the orphanage in Sivas , Turkey.*Indian Ped*. 32:230-232.
22. AL-Qadhi, B. N. ; AL-Warid,H.S.and AL-Qadhi,M.N.(2011). Enterobiasis and its relationship with enuresis among one of orphanage care children in Bagdad- Iraq. *Iraqi journal of science*,52(3): 394-399.
- 23- Erdemir, F. Ozcelik, S.and Saygi, G.(1992). Distrubution of symptoms among the primary School Pupils with or without Enterobiasis. *Turkish Parasitology* ,16: 53-9.
- 24-Kadhim, J.O. (2007) .Epidemiological study of Enterobiasis among pupils of some primary school of Baquba District/Diyala. M.Sc Thesis, College of Education. Diyala univ., 2007, P81.
- 25- Mohammad, A.K. and Omer, M.A.(2011).Prevalence of enterobiasis (*Enterobius vermicularis*) and its Impact on Children in Kalar Town/Sulaimania- Iraq .*Tikrit Medical Journ al* ,172: 67-77.
- 26- Zeyrek, D.and Zeyrek, F.Y.(2001). *Enterobius vermicularis* incidence in the children with enuresis nocturna. *Dicle Medical* , 28:163-5.
- 27- Out-Bassey ,I.B.; Ejezie, G.C.; Epoke, J. and Usech, M.F.(2005). Enterobiasis and its relationship with anal itching and enuresis among school-age children in Calabar, Nigeria. *Ann. Trop. Med. Parasitol*, 99:611-616.
- 28 - Culha , G. and Duran , N.(2006).The relationship between *Enterobius vermicularis* infection and nocturnal enuresis.*Eur.J.Gen.Med.*;3(1):16-20.