

PINWORM INFECTION IN NINEVEH GOVERNORATE: ITS RELATIONSHIP TO SOME VITAL VARIABLES- ACCOMPANYING SYMPTOMS

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Abstract

The study deals with determining the incidence of the disease and its relationship to some vital variables in infected people, as well as the incidence of some symptoms (anal itching - urinary incontinence - abdominal pain). 150 samples of varying ages (3-68) years were collected for the period from September 2023 to February 2024. Samples were taken from the Mosul district, the Hatra district, and the Qayyarah district, as well as the Al-Jadaa, Hassan Sham, and Al-Khazir camps, after obtaining official approvals and the approval of the children's guardians, filling out the questionnaire form, and from people who complained of some symptoms of infection. The results of microscopic examination showed that the infection rate was 38%. Pinworm disease did not have a significant relationship ($P>0.05$) with some variables (gender, number of family members, educational level of the parents). The infection rate among females (40.96%) is higher than that of males, and the infection rate increases with the number of family members. The highest rate of parasite prevalence was for the lowest educational level, category (0-2), at 40.49%. This percentage decreased as the educational level of the parents increased. Regarding the accompanying symptoms, the results showed that the highest percentage was for urinary incontinence, followed by anal itching and abdominal pain (54.38%, 47.36%, 28.07%) and that there were significant differences in the incidence of urinary incontinence and anal itching according to age ($P<0.05$).

Keywords: pinworm, urinary incontinence, symptoms, vital variables

Introduction

Parasitic nematodes cause chronic infections for millions of people around the world. Economically poor communities are usually vulnerable to these infections, which are called neglected tropical diseases [1]. Its infection rate may reach about one billion people from all over the world and at all economic and social levels [2]. It is a major factor causing enterobiasis and is a common global parasite among children, especially in temperate and tropical regions. It is expected that the annual infection reaches 200 million people. This worm is usually found in crowded places and institutions such as hospitals, health centers, schools, orphanages, and human acquisition of this parasite is due to direct contact. With an infected person or as a result of eating contaminated food and water, but it rarely occurs through parasite eggs carried in the air [3]. The life cycle of pinworms in humans is usually restricted to the gastrointestinal tract [4]. The female usually lives for two months, but self-infection causes the life cycle to continue [5]. Previous studies considered that (hand hygiene, crowded environment, and economic and social status are factors that play a role in the severity of the disease [6, 7], in addition to the educational level of the parents, and that the prevalence of infection for children with educated parents is lower than for children with educated parents. They come from parents with a low cultural level [8]. The clinical symptoms accompanying the presence of the parasite and its migration at night to the area around the anus to lay eggs are accompanied by irritation of the area, anal itching, and a feeling of loss of appetite and distress,

and these symptoms have not changed to this day [9]. Minor symptoms may appear in people with pinworm disease, or symptoms may not appear in half of those infected [10]. Hussien (2015) mentioned that the infection is accompanied by nocturnal enuresis in children [11]. This phenomenon affects approximately 15-20% of children over five years of age. There is a positive relationship in the majority of children between infection with pinworms and the phenomenon of nocturnal enuresis [12, 13] also explained that infection Pinworms are generally asymptomatic except for anal itching, and there are occasional cases in which the worm migrates to the appendix as well as to the female reproductive system.

Material and Method

Sample Collection

The study was conducted in Nineveh Governorate, which is located in northwestern Iraq. 150 stool samples were collected from people for the period from September 2023 to February 2024 from different areas of the governorate as well as from refugee camps located in the governorate, such as Al-Jada'a camp, Hassan Sham camp, and Al-Khazir, after obtaining official approvals. The ages of the participants varied between 3-68 years of both sexes (males = 67, females = 83). Information related to our study was taken, such as age, number of family members, education level of parents, and symptoms that may be associated with the disease, after obtaining consent from Parents. Sterile, clean plastic containers with a tight lid were used for the purpose of collection and to emphasize the necessity

of defecation in the morning before cleaning the exit area or showering in order to obtain pinworm eggs. The samples collected were examined within a period not exceeding two hours, with the naked eye to search for adult worms and microscopically using a direct wet swab to detect pinworm eggs. Statistical analysis: Data from the questionnaire were analyzed using the SPSS V.26 program, and a probability value of $P \leq 0.05$ was considered Statistically significant. Differences in the prevalence of parasitic infection were determined on the basis of some variables such as sex, level of education of the parents and number of family members using the Chi test. The incidence of some symptoms such as anal itching, abdominal pain, and urinary incontinence among those infected was also determined.

Results

Microscopic examination results

The results of the study showed that the number of people infected with this parasite reached 57 out of 150 stool samples, with an infection rate It reached 38% of both genders, as shown in the figure 1.

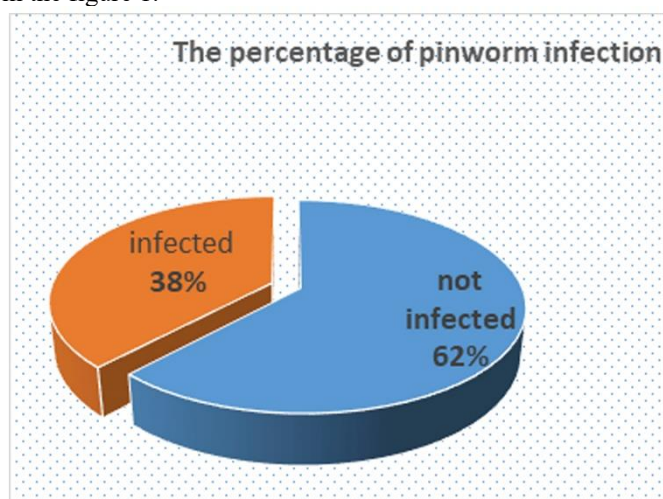


Figure (1): Percentage of pinworm infection

The relationship of infection to some vital variables:

Distribution of pinworm infection by sex

The results of the study, as shown in Table (1), showed that the infection rate in females was 40.96%, which was higher than that in males, 34.32%, and that there were no significant differences at the probability level ($P \geq 0.05$).

Table (1): The relationship between the sex of the infected person and pinworm infection

Sex	The number examined	Infected samples	Percentage of infection
Male	67	23	34.32%
Female	83	34	40.96%
Total	150	57	38%
Statistical analysis	Chi2 = 0.693, P = 0.405 P > 0.05, no significance		

Distribution of pinworm infection according to the number of family members:

The results of the current study recorded the highest percentage of pinworm infection in a family consisting of 9-10 members, where the percentage was 44.44%, and the lowest percentage in a family consisting of 1-4 members. Thus, we notice that the

infection rate increases directly with the number of family members. As shown in the Table (2), There are no significant differences in infection according to the number of family members at the probability level 0.05.

Table (2) The relationship between the number of family members and pinworm infections

number of family members	The number examined	Infected samples	Percentage of infection
4 – 1	31	10	32.25%
8 – 5	101	39	38.61%
10 – 9	18	8	44.44%
the total	150	57	38%
statistical analysis	Chi2 = 0.767, P = 0.681 P > 0.05, no significance		

Distribution of pinworm infection according to the educational level of parents

It was found that the highest prevalence of the parasite was for the lowest educational level (0-2) at a rate of 40.49%, and this percentage decreased as the academic level of the parents increased. There were no significant differences at the 0.05 probability level.

Table (3) Pinworm prevalence rate according to the educational level of the parents

Parents' education level	Total number	Infected samples	Percentage of infection
2-0	121	49	40.49%
5-3	25	7	28%
8-6	4	1	25%
the total	150	57	38%
statistical analysis	Chi2 = 1.668, P = 0.434 P > 0.05, No Significance		

Distribution of the percentage of infection according to accompanying symptoms

The results, as shown in Table (4), showed that the highest percentage of symptoms that accompany pinworm infection is urinary incontinence, at a rate of 54.38%, followed by anal itching, at 47.36%, and then abdominal pain, at a rate of 16%. The results of the statistical analysis showed that there were no significant differences. Significant significance for the accompanying symptoms at the probability level of 0.05.

Table (4): Total percentage of pinworm infection according to accompanying disease symptoms

Symptoms associated with the disease	The number infected	Number of infected people associated with the infection	Percentage of infection
Incontinence	57	31	54.38%
Anal itching		27	47.36%
Abdominal pain		16	28.07%
Statistical analysis	Chi2 = 4.795, P = 0.091 P > 0.05, No Significance		

The relationship between pinworm infection and urinary incontinence, according to age and gender

The results showed significant differences in the phenomenon of urinary incontinence according to age (Table 5). The highest

incidence rate was for the age group (1-6), with a rate of 83.33%. Then the phenomenon decreased with advancing age and noticeably for ages over 12 years until it reached 0% for ages over 19.

Table (5): The total percentage of pinworm infection and its relationship to urinary incontinence, distributed by age

Age group (years)	Number examined	Infected samples	Percentage of infection
6 – 1	12	10	83.33%
12 – 7	33	20	60.60%
18 – 13	6	1	16.66%
>19	6	0	0%
Statistical analysis	Chi ² = 15.163, P = 0.002 P < 0.05, Significant		

As shown in Table (6), the results indicate that the phenomenon of urinary incontinence in males is 60.86% higher than in females (50%) and that there are no significant differences for this phenomenon according to gender at the 0.05 probability level.

Table (6): The total percentage of pinworm infection and its relationship to urinary incontinence, distributed by gender

Sex	The number examined	Infected samples	Percentage of infection
Male	23	14	60.86%
Female	34	17	50%
Total	57	31	54.38%
Statistical analysis	Chi ² = 0.653, P = 0.419 P > 0.05, No Significance		

Discussion

Microscopic examination is considered a primary method used in diagnosing pinworm disease. Although it is widely used in most laboratories, it is considered less sensitive compared to other methods of diagnosis, such as the polymerase chain reaction (PCR) method. In our current study, according to the microscopic examination of samples, the infection rate reached 38% of the examined samples, and the result is considered close. As [14] recorded, the parasite infection rate was 37.12%, similar to what was recorded by [12]. The total infection rate was 37.89%. On the other hand, it is less than the results of previous studies, such as those conducted by [15,24], in which an infection rate of 81.5% was recorded in Wasit Governorate. There is a convergence and difference in the overall rate of pinworm infection. This may be attributed to the difference in places. The environmental conditions from which the samples were collected, in addition to the significant difference in health, economic, and cultural conditions. The difference in the method used in the examination also plays a significant role in the difference in the overall rate of infection. Given the small number of eggs the worm sheds, the microscopic examination method may not accurately reveal the presence of these eggs. The other reason may be that the worm lays a small number of eggs in the anus. Therefore, there are few eggs in the stool.

Regarding infection by gender, the results agree with [16] in their study conducted in Diwaniyah, with a rate of 48.1% for females and 39.8% for males, as well as with the results of [17,25] in the Kurdistan region, expressly. In Erbil Governorate, the rate for females was 28.85%, which was higher than that for males, 25.31%. However, it differed with Khazaal *et*

al., 2020 [18]. The infection rate for males was 4.38%, which was higher than the rate for females, 3.37%. We notice a similarity in the infection rate for males and females. This may be due to the fact that the sexes live together under the same conditions, especially in the camps, where their cultural and economic level is similar and their opportunities are fairly equal in obtaining food contaminated with the parasite. The results showed a direct relationship between the infection and the number of family members. It agreed with the results of [5]. The percentage reached 63.15% in a family of 10-13. [5] confirmed in their study that children who had positive results for the infection had a more significant number of siblings compared to those whose results were negative for disease; it becomes clear from the results that the number of family members plays a vital role in the spread of pinworm due to the transmission of infection between family members, especially families who live in camps where all family members are in one room in which there is no element of health and personal hygiene available. In addition to eating food from one plate and with their hands, which may be contaminated with pinworm eggs. The cultural level may play a role in limiting the spread of the parasite. This agreed with what [8,26] recorded in his study, in which he confirmed that the spread of infection in children of educated parents is lower than in children of parents with a low cultural level. This may be because educated people have awareness. More incredible culture of health and personal hygiene and realize its importance. Regarding the symptoms associated with the infection, it was found that the highest percentage was for urinary incontinence, which agrees with what was recorded by [16], where the phenomenon rate was 61.5%. This was also supported by [19,20] in their study that they conducted in Baghdad on an orphanage, with a percentage of 58.82. In our research, we found significant differences in this phenomenon according to age. The process of involuntary urination in children has many physiological reasons related to the child's nature, such as deep sleep, difficulty waking up, or lack of capacity in his bladder compared to adults. Psychological and emotional factors also affect this phenomenon, such as family disintegration and the child's exposure to cruelty and violence, in addition to significant differences in anal itching according to age as well [21,22,23].

Conclusion

Pinworm disease is considered a common intestinal disease, and microscopic examination is the most commonly used to detect the parasite, as it gives fairly similar results. Many factors play a role in increasing the infection, especially the environment in which the person lives, such as the educational level of the parents and the number of family members. The infection may be accompanied by urinary incontinence and anal itching. Abdominal pain, but there are cases found without symptoms.

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