

Enterobius Vermicularis Infection in Three Refugee Camps In Jordan

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Abstract

Background: Pinworm infection remains prevalent in many parts of the world. It is suspected in children who exhibit perineal pruritus and nocturnal restlessness. The diagnosis is generally made by the cellophane tape test, and the treatment consists of a 100-mg single dose of mebendazole.

Objective: To determine the prevalence of pinworm infection in children with perianal itching and to minimize the reinfection rate by a modified method of treatment.

Method: 812 children, 5-15 years old children were the subjects of this study. Cellophane tape test was used in 707 children and a swab taken through proctoscope in 105 children of the older age group. Mebendazole in a single dose of 100 gm was used in all parasite positive children. Half of the treated children received rectal enemas made of sodium chloride in tap water and received health education to prevent reinfection and spread of the parasite.

Result: 44.8 (55.2%) of the children examined were found to be infected with enterobius vermicularis with the higher prevalence in Jarash camp. The proctoscopic method achieved more significant results than the cellophane tape test (68.6% versus 42.6%) (X^2 : 6.46, $P=0.01$). Similarly, mebendazole treatment together with rectal enemas and health education achieved a higher cure rate than using mebendazole alone (81.6% versus 23.3%) (X^2 : 138.6, $P=0.0001$).

Conclusion: Pinworm infection should be suspected in children who exhibit anal itching and nocturnal restlessness. Following diagnosis, mebendazole should be given and rectal enemas continued for 8 weeks. Health education to the parents and children forms an integral part of treatment.

Keywords: Enterobius Vermicularis, Pinworm, Children in Refugee Camps, Jordan.

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Introduction

Enterobius vermicularis (Pinworm) is a nematode or round-worm, with the largest geographic range of any helminth. ¹ Humans are the only known host, with over 400 million infected people worldwide. ² The most commonly infected group

are school children living in crowded environments such as summer camps and institutions, with hygiene and exposure being important factors. ³ More than 30 percent of children worldwide are infected. ² Enterobiasis may remain asymptomatic or cause perianal pruritus, insomnia, restlessness and irritability,

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particularly in children.⁴ It is not usually considered to be a serious disease, though it may cause serious morbidity such as appendicitis and eosinophilic enterocolitis.⁵ Furthermore, ectopic infection, seen most commonly in females, may result in pelvic inflammatory disease⁶ or urinary tract infection.⁷ Although effective treatment has been established for decades, the control for Enterobiasis is difficult because of reinfection, incomplete treatment and its ease of transmission.⁸

The main objective of the present study was to determine the prevalence of *E. vermicularis*, among three of the refugee camps in Jordan and to inform people about the appropriate diagnosis and treatment of this parasite.

Materials and Methods

This study was conducted between 2000 and 2008 years on 812 children complaining of pruritus ani and presented to several clinics in three refugee camps in Jordan. These include Baqaa, Talebia and Jarash camps. The ages of the children were varying between 5 and 15. Before taking the samples, the children and their parents were instructed on how to use the cellophane tape test. This test consists of touching the tape to the perianal area several times, removing it, and examining the tape under direct microscopy for eggs. The test was conducted right after awakening on at least three consecutive days. Proctoscopic examination was carried on 105 children of older age groups who showed considerable irritability accompanied with abdominal pain and chronic diarrhoea. In many of the examined cases, the female worms were observed at the anal sinuses. Samples were taken from the anal sinuses by cotton swabs. Microscopic examination of the specimens was performed by an experienced medical technologist. After the examination, the children with enterobiasis were treated as follows. They were divided into two groups; both groups received a single dose of mebendazole (100 mg) as a first line of treatment. Half of the children did not receive any other treatment. The other half received a rectal enema once weekly over a period of eight weeks. The enema was made of

three percent sodium chloride in tap water.

The parents and infected children were instructed about measures to prevent reinfection and spread including clipping fingernails, frequent handwashing and bathing. We were able to follow up about 80% of the treated children three months after the beginning of the treatment (Table 3). Symptoms of abdominal pain and chronic diarrhea persist in 45 children two months after the disappearance of pruritus ani, the major symptom of enterobiasis. 32 of these children were supervised by gastroenterologists and after endoscopic and laboratory examinations, 22 children proved to suffer from coeliac disease (gluten sensitive enteropathy).

All of the data were processed by statistical software SPSS version 10.0 (SPSS, Chicago, Illinois, USA). The chi-square test was used for the statistical analysis, P value of < 0.05 indicated a significant difference between the 2 results.

Results

In the present study, Cellophane Tape (CT) samples were collected from 812 children whose major complaint was pruritus ani. Of the children examined, 448 (55.2%) were found to be infected with *enterobius vermicularis*. Table (1) shows the number of children with pruritus ani in three refugee camps in Jordan. To determine the difference, the three refugee camps were compared individually and Jarash camp had a higher prevalence of parasites compared to the other two camps (Baqaa and Talibiah) (T: 1.69, $P < 0.05$, t: 1.49, $P < 0.05$).

Whereas there was no statistically significant difference between Baqaa and Talibiah ($t=0.59$, $P > 0.05$).

The positive test for pinworm infection was found to be significantly higher in children in whom the proctoscope was used to obtain samples from the anal sinuses ($X^2= 6.46$, $P= 0.01$) (Table 2). Comparison of the sex distribution in the three camps did not result in any statistically significant difference ($X^2: 4.42$, $P= 0.55$) (Table 3).

The results of the two methods of treatment among the children in the three camps are given in Table (4). A significant difference was found

between the two methods (X^2 : 138.6 $P=0.0001$) and a higher rate of cure was observed in children in whom mebendazole was given together with rectal enemas and proper health education.

Table (1): Comparison of the parasite numbers found in three regions using cellophane tape test and proctoscope.

Regions	Parasite(+)		Parasite(-)		Total	
	No	%	No	%	No	%
Baqaa Camp	224	52.3	204	47.7	428	52.7
Jarash Camp	133	62.7	79	37.3	212	26.1
Talebiah Camp	91	52.9	81	47.1	172	21.2
Total	448	55.2	364	44.8	812	100

Table (2): Comparison of samples taken by cellophane tape and proctoscope from all three camps.

Method	No. infected % Parasite (+)	%	No. non-infected parasite (-)	%
1. Cellophane tape test	378	53.5	329	46.5
2. Swab through proctoscope	70	66.7	35	28.6
3. Total	448	55.2	364	44.8

$X^2 = 6.46$ $P = 0.01$

Table (3): Sex-related incidence of parasitic infection with Enterobius vermicularis in the three refugee camps in Jordan.

Gender	No. infected	%
Male	244	55.2
Female	204	45.5
Total	448	55.2

$X^2 = 4.42$ $P = 0.55$

Table (4): Number of children according to the result of two methods of treatment, three months after beginning of treatment.

Treatment	No. of children negative by re-examination	%	No. of children positive by re-examination	%
1. Mebendazole (one dose of 100 mg)	42	23.3	158	76.6
2. Mebendazole as above plus weekly enema and health education	146	81.6	33	18.4

$X^2 = 138.6$ $P = 0.0001$

Discussion

Pinworm infection should be suspected in children who exhibit perianal pruritus and nocturnal restlessness.² Direct visualization of the adult worm or microscopic detection of eggs confirms the diagnosis, but only 5 percent of infected persons have eggs in their stool.⁹ The cellophane tape test can serve as a quick way to clinch the diagnosis.¹⁰⁻¹² In the present study, careful examination of the infected children

revealed that they complain of anal rather than perianal itching. This was confirmed through proctoscopic examination which showed the presence of worms near the anal sinuses. Swabs taken from the area around the anal sinuses were full of ova. This finding suggests that if the gravid female worm fails to migrate through the anus, they lay eggs within the anal canal. Retro-infection by larvae inside the anal canal seems to be easier than if the eggs were laid around the anus.

Compared to the other two camps, the higher prevalence infection in Talebiah camp is difficult to explain. It may reflect a younger age group in whom the cellophane tape test is easier to perform.¹⁴ In the three camps, high prevalence of pinworm infection is largely attributed to the low socioeconomic conditions, inferior sanitary and environmental conditions and poor personal and community hygiene. Moreover, the pinworm has a simple and rapid life cycle without a maturation of eggs in soil like many of other helminths. It is transmitted by person-to-person infection directly or through contaminated food or materials.¹¹

Compared to the proctoscopic method, the low positive results of infection using the cellophane tape test obtained in the present study could be largely attributed to the parents who might not be familiar with performing the procedure correctly which has led to the underestimation of infection rate.^{15, 16}

The most striking result of the present study is the significant difference between the two methods of treatment. This finding indicates that the administration of mebendazole alone is not adequate to eradicate the worm or its larvae. The frequent use of the rectal enemas seems mandatory. Other measures to prevent reinfection and spread should include clipping fingernails, frequent hand washing and bathing.

The association of pinworm infection and celiac disease in 22 children is difficult to explain. It is well known that patients with coeliac disease commonly pass loose stool.¹⁴ This could account for the easy migration of the gravid female pinworm towards the anal canal through less solid contents of colon, causing more frequent irritation.

In conclusion, pinworm infection is still an important public health problem in our region. Screening and treatment of infected people as well as improving sanitary conditions and interventions, including health education on personal hygiene to the children and to the parents will help the health authorities in a strategy of control programs for pinworm infection.

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الإصابة بدودة إنتروبيوس فيرميكولاديس (الدودة الشعرية) في ثلاثة مخيمات للاجئين في الأردن

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الملخص

الهدف: التحقق من انتشار الإصابة بالدودة الشعرية بين الأطفال الذين يشكون من حكة شرجية، ووصف العلاج المناسب الذي يقلل من تكرار الإصابة.

الطرق: تم أخذ عينات من 812 طفلاً تراوحت أعمارهم بين خمس سنوات وخمس عشرة سنة، وذلك باستخدام شريط السلوفان (في 707 أطفال) أو بأخذ عينة من داخل الشرج باستخدام المنظار (في 105 أطفال).

تم علاج الأطفال الذين ثبتت إصابتهم بالدودة الشعرية بجرعة واحدة تعادل 100 ملليغرام من دواء مبندازول، وكذلك تم إعطاء نصف الأطفال المصابين حقنة شرجية من محلول كلوريد الصوديوم بمعدل حقنة أسبوعياً لمدة 8 أسابيع، وتلقى هؤلاء الأطفال إرشادات صحية تساعد على الإقلال من تكرار الإصابة.

النتائج: أظهرت النتائج إصابة 448 (55,2%) من الأطفال الذين تم فحصهم باستخدام شريط السلوفان أو بأخذ عينة من داخل الشرج، وبمقارنة الإصابة في المخيمات الثلاثة تبين أن أعلى الإصابات كانت في مخيم جرش مقارنة بمخيمي البقعة والطالبية ($P < 0.05$)، وبينت النتائج أيضاً أن أخذ العينة باستخدام المنظار حققت نتائج أعلى من استخدام شريط السلوفان ($P = 0.01$) ولم تظهر النتائج أية فروق ذات دلالة إحصائية بين الأطفال الذكور والإناث ($P = 0.55$)، أما نتائج العلاج فقد أظهرت فرقاً واضحاً بين الأطفال الذين أعطوا علاج المبندازول وحده والأطفال الذين تلقوا العلاج إضافة للحقن الشرجية بمادة كلوريد الصوديوم، إضافة إلى التثقيف الصحي ($P = 0.001$).

الاستنتاج: تشير نتائج البحث إلى انتشار الإصابة بالدودة الشعرية بين الأطفال الذين يشكون من حكة شرجية، وأهمية أن يتضمن العلاج إضافة إلى الدواء التقليدي (المبندازول) إجراء حقن شرجية بالماء المذاب به كلوريد الصوديوم، إضافة إلى التثقيف الصحي للأطفال وعائلاتهم.

الكلمات الدالة: الدودة الشعرية (إنتروبيوس فيرميكولاديس)، أطفال مخيمات البقعة والطالبية وجرش.