Hymenolepis nana Infection in Thai Children

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Abstract

Stool examination was performed on 2,083 Thai children from orphanages and primary schools. *Hymenolepis nana* infection was found only in children from orphanages with a prevalence of 13.12 per cent. Males had a statistically significant higher prevalence of infection than females. Most infected children were asymptomatic. In symptomatic infected children, the symptoms were mild and non-specific such as pruritus ani, abdominal pain, diarrhea, anorexia, headache, and dizziness. Praziquantel in a single oral dose of 25 mg/kg body weight was effective and well tolerated in *Hymenolepis nana* infected Thai children.

Key word : *Hymenolepis nana*, Praziquantel

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Hymenolepis nana, the dwarf tapeworm, is a small cestode of 15 to 40 mm long[1]. The mature worm lives in the small intestine of man or rat. It is usually transmitted by eggs as a result of fecal contamination although an indirect life cycle utilizing insects as intermediate hosts may occur. It is also able to complete its entire cycle in a single host (auto-infection).

Hymenolepiosis is a common cestode infection of humans. It is the most frequently diagnosed cestode infection in the United States[2] and it was diagnosed in 0.4 per cent of 216,000 fecal specimens submitted to state diagnostic laboratories during 1987[3]. The prevalence of intestinal hymenolepiosis in children was quite high in some countries. It was reported to be 16 per cent in Egyptian

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children[4] and 21 per cent in Zimbabwe[5].

The extent of clinical manifestations depends on the worm burden. Patients whose egg density in stool is greater than 15,000 per gram stool invariably have abdominal cramps, diarrhea, and irritability. Infection is usually self-cleared by adolescence and is infrequent in healthy adults[6]. The current drug of choice for treatment of hymenolepiosis is praziquantel which is more effective than mebendazole[4] or niclosamide[7].

In Thailand, the epidemiology of *H. nana* may differ from other countries. The infection was reported in children living in orphanages[8] but not in the general population[9,10].

This study was carried out to confirm the epidemiology of *H. nana* in Thai children. We also studied clinical manifestations, response to treatment with praziquantel, and adverse reactions of the treatment.

MATERIAL AND METHOD

From April 1997 to June 1998, fecal specimens were collected from Thai children from one male and one female orphanage in Bangkok, one primary school in Bangkok, one primary school in Nonthaburi (a province nearby Bangkok) and three primary schools in Chinat (a province in northern Thailand). Stool examination was done by simple smear and concentration technique[11] to detect *H. nana* ova. Stoll's egg count technique[12] was used to determine the intensity of infection. Clinical manifestations of *H. nana* infection were recorded by using questionnaires and included the presence of symptoms and their severity. Praziquantel in a single oral dose of 25 mg/kg body weight[13] was given to all infected children and parasitological cure was determined by absence of *H. nana* ova in three repeated stool examinations within three weeks after treatment[14]. Adverse reactions of treatment with praziquantel also were recorded.

RESULTS

Fecal specimens were collected from 2,083 children, 282 from orphanages, 533 from a primary school in Bangkok, 1,028 from a primary school in Nonthaburi, and 240 from primary schools in Chinat. There were 1,067 boys (51.22%) and 1,016 girls (48.78%). Their ages ranged from 3 to 18 years old.

Hymenolepis nana was found in 37 children (1.78%), all of them lived in orphanages. When considering only orphanages, the prevalence of *H. nana* infection was 13.12 per cent. Male orphans had a statistically significant higher prevalence of infection than females ($p = 0.00015$) (Table 1). Their ages ranged from 5 to 16 years old. The mean (SD) age was 11.1 (3.0) years old. The density of *H. nana* egg varied from 140 to 972,000 eggs per gram stool and its mean (SD) was 11,610 (19,650.7) eggs per gram stool. Table 2 shows the density of *H. nana* egg found in stool examinations. There was no statistical correlation between the age and density of eggs in stool ($p = 0.23$).

Presented clinical manifestations included pruritus ani (24.3%), abdominal pain (18.9%), diarrhea (16.2%), anorexia (10.8%), headache (8.1%), and dizziness (2.7%). All of these manifestations were mild and infrequent, or in other words, the

Table 1. Prevalence of *Hymenolepis nana* infection in orphanages according to gender.

	Had infection	No infection	Prevalence(%)
Male	24	80	23.08
Female	13	165	7.30
Total	37	245	13.12

Table 2. Density of *Hymenolepis nana* egg in stool.

Egg count (per gram stool)	Number of children	%
1 - 10000	26	70.3
10001 - 20000	4	10.8
20001 - 30000	3	8.1
> 30000	4	10.8

Table 3. Clinical manifestations of *Hymenolepis nana* infection and its level of correlation to intensity of infection (p-value).

Clinical manifestation	Number of children	%	p-value
Pruritus ani	9	24.3	0.27
Abdominal pain	7	18.9	0.83
Diarrhea	6	16.2	0.38
Anorexia	4	10.8	0.40
Headache	3	8.1	0.97
Dizziness	1	2.7	0.99

infected children were aware of a symptom but it was easily tolerated and none of the children sought medication. There were no statistically significant correlations between intensity of infection and clinical manifestations (Table 3). Two *H. nana* infected children had undernutrition as shown by low weight for age when compared to the standard for Thai children[15]. However, the prevalence of undernutrition in the *H. nana* infected and non-infected children in the same orphanage did not differ significantly.

All *H. nana* infected cases had parasitological cure after treatment with a single oral dose of praziquantel. There were four children (10.8%) who reported diarrhea, two children (5.4%) reported abdominal pain and two children reported headache after treatment with praziquantel. However, all symptoms were mild, resolved spontaneously, and required no treatment. Moreover, two children who reported diarrhea had had diarrhea before treatment with praziquantel.

DISCUSSION

Our study confirms the previously reported prevalence of *H. nana* infection in Thai children [8-10]. Its epidemiology is quite different from other countries[4,5]. It is worth noting that the prevalence of *H. nana* infection was markedly high in orphanages while the prevalence of other helminthic infection was lower (8.7% for hookworm and 2.9% for *trichuris trichiura* infection and there were no cases of ascaris or other taenia infection). Moreover, the overall prevalence of helminthic infection in Thai children is decreasing[9,10,16,17] which also opposed the prevalence of *H. nana* infection in orphanages. Hymenolepiosis, therefore, is a problem in Thai orphanages. The high prevalence of infection in orphanages especially in male orphans may be because of the over crowded environment and poor hygiene which facilitate infection which is transmitted by feco-oral route. Improvement of hygienic behavior and environmental sanitation may therefore be beneficial in controlling infection. Treatment of all infected children is indicated. Mass chemotherapy, the same strategy as controlling pinworm infection, may also be helpful. However, all of these interventions need further studies before making a conclusion about their benefits.

Most *H. nana* infected children were asymptomatic regardless of worm burden. This is in agreement with a study from Zimbabwe[5] but somewhat different from another study[6]. In cases with symptomatic infection, the symptoms were mild and non-specific. These may be due to too small a sample size or may be that Thai orphans have high tolerability to the infection.

Praziquantel, in a single dose of 25 mg/kg body weight, was very effective for treating hymenolepiosis and is quite well tolerated in Thai children. This finding supports previous studies[4,13]. Praziquantel therefore should be the drug of choice for treatment of hymenolepiosis in Thai children.

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การติดเชื้อพยาธิตืดแคระในเด็กไทย

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ได้ทำการตรวจอุจจาระของเด็กไทยจากสถานสงเคราะห์เด็กและโรงเรียนประถมศึกษาจำนวน 2,083 ราย พบว่ามีการติดเชื้อพยาธิตืดแคระเฉพาะในเด็กจากสถานสงเคราะห์เด็ก โดยมีความชุกสูงถึงร้อยละ 13.12 และพบว่าเด็กชายมีความชุกของโรคสูงกว่าเด็กหญิงอย่างมีนัยสำคัญทางสถิติ ส่วนใหญ่ของเด็กที่ติดเชื้อพยาธิตืดแคระไม่มีอาการผิดปกติ ส่วนในรายที่มีอาการผิดปกติ อาการมักจะน้อยและไม่จำเพาะ ได้แก่ คันบริเวณทวารหนัก ปวดท้อง ท้องเสีย เบื่ออาหาร และเวียนศีรษะ การรักษาด้วยยาพราซิควอนเทลในขนาด 25 มิลลิกรัมต่อน้ำหนักตัว 1 กิโลกรัม ครั้งเดียว ได้ผลดีทั้งในแง่ประสิทธิภาพและความยอมรับของผู้ป่วย

คำสำคัญ : พยาธิตืดแคระ, พราซิควอนเทล

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