นิพนธ์ต้นฉบับ

Intestinal parasitic infections in students at a school for handicapped children in Khon Kaen Province, Thailand

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Abstract

We conducted a cross-sectional study of intestinal parasitic infections among handicapped school children to obtain data concerning prevalence and associated factors. The results of stool examination showed that 20 of 52 (38.46%) specimens were positive for one or two parasite species. Protozoan parasites were most frequently found (36.54%). The species of intestinal protozoan parasites were *Endolimax nana, Entamoeba coli, Blastocystis hominis* and *Giardia lamblia.* Coinfection with *Blastocystis hominis* and *Endolimax nana* were common. *Taenia* sp. was the only helminthic parasite found. There was no statistically significant correlationship ($p>0.05$) between prevalence and any of the investigated factors (education level, sex, handicap level and hand washing before meal). In this study, all of the handicapped children were shoe wearers. Data from this investigation showed a high prevalence of intestinal protozoan infections among these children, which could directly affect their health status. Therefore, control and prevention strategies for intestinal parasitic diseases in handicapped school children and other school children are needed.

Key words: Intestinal parasitic infections, Handicapped children

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Introduction

Intestinal parasitic infection is generally found among children, with several studies showing high prevalence rates of infection among children at any locations studied. In Thailand, the overall prevalence of intestinal parasitic infections among school children in the central region (including Ang thong, Ayudthaya and Suphanburi province) was 4.24%.[1] In Nakhon prathom province, the prevalence was 12.6%[2], in Kanchanaburi province (western region) this was 22.7%[3] and in Nan province (northern region) the value was as high as 60%.[4] Studies were also conducted in the underprivileged children group living in different residential institutions, which found the infection rate in the range 57.6%-81%.[5,6,7] A high rate of parasitic infection should be recognized as a major health problem, especially in underprivileged children who do not have adequate opportunity to access health services. The school for handicapped children in Khon Kaen Province was one institution where no status of intestinal parasitic disease data was available. Thus, we conducted a cross-sectional study of intestinal parasitic infections to obtain data concerning prevalence and factors associated. The results, which are presented here, should useful for teachers seeking to control intestinal parasitic infections at this institution, and public health officials interested in this topic.

Material and Methods

The school for handicapped children in Khon Kaen Province, Thailand was asked to participate in this study. After they signed and returned consent forms, one sample of stool was collected from each participant. Simple smears of faecal samples were prepared (both normal saline solution and iodine stain) and examined by light microscopy. Information concerning education level, handicapped level, and frequency of hand washing from each subject were also collected. The association between the infection rate and possible related factor was determined by the Chi-squared tests (with Yates correction or Fisher's exact test) at the statistical significance level of 0.05. All statistical analyses were performed using SPSS 11.5 for Windows.

Results

Out of a total of 113 handicapped children, 52 subjects were available to give informed consent and a stool specimen for investigation. The distribution of intestinal parasite infections among these handicapped children is presented in Table 1. The results show that 20 out of 52 (38.46%) specimens were positive for one or two different parasite species. Protozoan parasites were most frequently found (36.54%). The species of intestinal protozoan parasite were *Endolimax nana, Entamoeba coli, Blastocystis hominis* and *Giardia lamblia.* Coinfection with *Blastocystis hominis* and *Endolimax nana* were common. *Taenia* sp. was the only helminthic parasite found in this study. There was not statistically significant correlationship ($p>0.05$) between prevalence and the different factors investigated (education level, sex, handicap level and hand washing before meal (Table 2). In this study, all of the handicapped children were shoe wearers.

Table 1 The distribution of intestinal parasite infections among handicapped school children

Parasitic infection(s)	Number positive (N=52)
Protozoa	**19 (36.54%)**
Entamoeba coli	5 (9.62%)
Blastocystis hominis	3 (5.77%)
Endolimax nana	3 (5.77%)
Entamoeba coli and *Endolimax nana*	2 (3.85%)
Blastocystis hominis and *Endolimax nana*	3 (5.77%)
Blastocystis hominis and *Entamoeba coli*	1 (1.92%)
Blastocystis hominis and *Giardia lamblia*	1 (1.92%)
Giardia lamblia and *Endolimax nana*	1 (1.92%)
Helminth	**1 (1.92%)**
Taenia sp	1 (1.92%)
Total	**20 (38.46%)**

Table 2 Prevalence of intestinal parasites according to education level, sex, handicapped level and hand-washing activity and frequency among handicapped school children

Factor	No. negative (%)	No. positive (%)	P-value
Education level			
- Primary education to lower secondary education	17 (53.13)	15 (46.88)	p>0.05
- Upper secondary education	15 (75)	5 (25)	
Sex			
- Male	15 (60)	10 (40)	p>0.05
- Female	17 (62.96)	10 (37.04)	
Handicapped level			
- Physical handicap	20 (64.52)	11 (35.48)	p>0.05
- Physical and mental handicap	10 (52.63)	9 (47.37)	
Hand-washing before meal			
- Usually	18 (62.07)	11 (37.93)	p>0.05
- Sometimes	14 (63.64)	8 (36.36)	
- Never	0	1 (100)	

Discussion

Intestinal parasitic infection rates are known to vary geographically according to the factors influencing parasitic transmission. For instance, liver fluke infection is commonly found among rural communities in northeastern Thailand, as raw fish consumption is common practice among the population. Soil-transmitted parasites are prevalent in the southern region of Thailand, because the humidity and amount of rainfall are suitable for their life development and transmission. For intestinal protozoan infection, these are commonly found worldwide particularly in communities with poor food and water sanitation.

In this study, protozoan infection was common among the children whereas helminthic infection was rarely found (only one case with a *Taenia* sp. infection), a finding that is similar to previous study.[5] This is in contrast to a study among children living in some institutions in the Philippines, where helminthic infection was predominant.[6] Protozoan parasites commonly found were *Endolimax nana, Entamoeba coli, Blastocystis hominis* and *Giardia lamblia,* which is consistent with other studies.[2,5,7] However, *Entamoeba histolytica* was not found in this study. Coinfection with *Blastocystis hominis* and *Endolimax nana* was commonly found. This could contribute to diarrhea and is associated with deficient sanitation and low hygiene standards.[8]

It was interesting to find *Taenia* sp. infection in one case. This indicates that this child had a behavior of beef or pork consumption, possibly learned from his/her parents. Hookworm and *Strongyloides stercoralis* infections were not detected, a finding that coincides with their shoe-wearing behaviors. Alternatively, it may be that was not sufficiently sensitive, as simple smear is less reliable than other techniques such as concentration technique and culture technique. In this study, there was no statistically significant correlationship ($p>0.05$) between prevalence and the investigated factors (education level, sex, handicap level and hand washing before meal (Table 2), which might be due to the small sample size of children participating (handicapped children had difficulty with stool collection by themselves due to their physical disability). Result showed a high prevalence of intestinal protozoan infection that indicates contamination of food and drinking water by fecal material, then subsequent human infection with protozoan parasites and other pathogenic organisms. These infections could directly affect the children's health status, therefore control and prevention strategies for intestinal parasites in handicapped school children and other school children are needed.

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บทคัดย่อ

การติดเชื้อปรสิตในลำไส้ในนักเรียนโรงเรียนสำหรับเด็กพิการ ในจังหวัดขอนแก่น

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**คณะเทคนิคการแพทย์ มหาวิทยาลัยรังสิต

การวิจัยครั้งนี้เพื่อศึกษาความชุกของการติดเชื้อปรสิตในลำไส้ตลอดจนปัจจัยที่อาจเกี่ยวข้องกับการติดเชื้อที่โรงเรียนเด็กพิการแห่งหนึ่งในจังหวัดขอนแก่น ผลการศึกษาพบว่าเด็กพิการมีการติดเชื้อปรสิตร้อยละ ๓๘.๔๖ ปรสิตที่พบส่วนใหญ่เป็นโปรโตซัว โดยพบเชื้อโปรโตซัวร้อยละ ๓๖.๕๔ ชนิดของโปรโตซัวที่พบได้แก่ *Entamoeba coli, Blastocystis hominis, Endolimax nana* และ *Giardia lamblia,* ส่วนหนอนพยาธิที่พบคือพยาธิตืด *Taenia* sp. เมื่อศึกษาปัจจัยที่อาจเกี่ยวข้องกับการติดเชื้อได้แก่ ระดับการศึกษา ระดับความพิการและความถี่ของการล้างมือก่อนรับประทานอาหาร พบว่าไม่มีความสัมพันธ์กับการติดเชื้อพยาธิ (ค่าพี > ๐.๐๕) การศึกษาครั้งนี้พบว่าเด็กกลุ่มตัวอย่างทุกคนมีพฤติกรรมสวมรองเท้าเวลาเดินบนพื้นดิน จะเห็นว่าโรคปรสิตในลำไส้ในเด็กพิการยังมีสูงอยู่ ดังนั้นควรมีการเฝ้าระวังโรค การให้ความรู้ การป้องกัน การควบคุมการแพร่ระบาด ตลอดจนการตรวจโรคดังกล่าวเป็นประจำเพื่อการรักษาให้หายขาดเป็นการป้องกันการแพร่เชื้อต่อไป

คำสำคัญ: การติดเชื้อปรสิตในลำไส้, เด็กพิการ