PREVALENCE OF INTESTINAL PARASITIC INFECTION AMONG THAI PEOPLE WITH MENTAL HANDICAPS

Chukiat Sirivichayakul[1], Chanathep Pojjaroen-anant[1], Pataraporn Wisetsing[1], Chutatip Siripanth[2], Pornthep Chanthavanich[1] and Krisana Pengsaa[1]

[1]Department of Tropical Pediatrics, [2]Department of Protozoology, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand

Abstract. The prevalence of intestinal parasitic infection was studied by stool examination in institutionalized and non-institutionalized Thai people with mental handicaps. It was found that the prevalence of infection was much higher in institutionalized (57.6%) than in non-institutionalized people (7.5%). The common parasites found in institutionalized people were *Trichuris trichiura* (29.7%), *Entamoeba coli* (23.1%), *Giardia intestinalis* (8.0%), *Hymenolepis nana* (7.8%), and *Entamoeba histolytica/dispar* (7.1%). Institutionalized mentally handicapped people should be considered as a high risk group for intestinal parasitic infection and a parasitic control measure should be emphasized.

INTRODUCTION

Intestinal parasitic infection is still a common problem in many tropical countries (Muennoo *et al*, 1992; Bangs *et al*, 1996; Kang *et al*, 1998). In addition to the endemicity, mental handicap is believed to be another risk factor for intestinal parasitic infection because most people with mental handicaps are unable to be trained for proper health behavior; this was supported by many studies (Panaitescu *et al*, 1995; Schupf *et al*, 1995; Gatti *et al*, 2000). Moreover, crowded environment in institutionalized people may also predispose to some specific infection such as *Hymenolepis nana* (Sirivichayakul *et al*, 2000). These intestinal parasitic infections, if occur, are important because they may cause malnutrition which may further affect intellectual and mental health in these people. It is therefore necessary to have the baseline data of intestinal parasitic infection in these people which will be used in planning for parasitic control and health promotion in the future.

The present study was conducted in mentally handicapped people, both institutionalized and non-institutionalized, to evaluate the prevalence of intestinal parasitic infection.

Correspondence: Dr Chukiat Sirivichayakul, Department of Tropical Pediatrics, Faculty of Tropical Medicine, Mahidol University, 420/6 Rajvithi Road, Bangkok 10400, Thailand.
E-mail: headtmpd@mahidol.ac.th

MATERIALS AND METHODS

This is a cross-sectional study. Studied populations were mentally handicapped people including adults and children who were staying in three institutions for mentally handicapped people (one for boys, one for girls, and one for young children) or who were attending a day care for mentally handicapped people. One sample of stool was collected in each subject. Light microscopic examination was done in every fecal sample both by simple smear and by formalin-ether concentration method (Ritchie, 1948). Both normal saline solution and iodine stain were used for each specimen. A modified acid-fast staining (Garcia *et al*, 1983) for *Cryptosporidium* and *Cyclospora* and a modified trichrome staining (Weber *et al*, 1992) for microsporidium were also used for detection of respective organisms under light microscope.

RESULTS

A total of 1,086 subjects were recruited in the study including 93 subjects from a day care

Table 1
Demographic data of studied mentally handicapped people.

	Day care (n=93)	Institution for young children (n=261)	Institution for girls (n=295)	Institution for boys (n=437)
Age (years)				
Range	3-25	7/12-12	7-41	7-42
Mean (SD)	11.3(7.5)	5.6(2.5)	19.6(6.5)	18.8(6.7)
Gender				
Male (%)	55(59.1)	141(54.0)	0	437(100)
Female (%)	38(40.9)	120(46.0)	295(100)	0

Day care = day care for mentally handicapped people; Institution for young children = institution for mentally handicapped young children; Institution for boys = institution for mentally handicapped boys; Institution for girls = institution for mentally handicapped girls.

Table 2
Prevalence of intestinal parasitic infection in people attending a day care for mentally handicapped people.

	Species of parasites [n (%)]		
	B. hominis	*G. intestinalis*	*E. nana*
Adults			
Male (n=36)	1 (2.8)	0	0
Female (n=17)	2 (11.8)	0	0
Children			
Male (n=19)	0	1 (5.3)	1 (5.3)
Female (n=21)	0	1 (4.8)	1 (4.8)

for mentally handicapped people, 261 subjects from the institution for mentally handicapped young children, 437 subjects from the institution for mentally handicapped boys and 295 subjects from the institution for mentally handicapped girls. Their demographic data are shown in Table 1.

The prevalence of intestinal parasitic infection in people attending a day care for mentally handicapped people was 7.5% as shown in Table 2. All infected people had only single parasitic infection.

For institutionalized subjects, there were 572 infected subjects (prevalence 57.6%). Three hundred and thirty-three subjects (33.5%) had single infection and 161(16.2%), 57(5.7%), 18(1.8%) and 3(0.3%) subjects were concomitantly infected by 2, 3, 4 and 5 species of parasites respectively (Table 3).

Table 4 shows the prevalence of infection caused by each species of parasites. *Entamoeba coli* was the most common protozoa found in this study followed by *Giardia intestinalis*, *E. histolytica*/*E. dispar* and *Endolimax nana*. There was no *Cryptosporidium*, *Cyclospora*, or microsporidium found in this study. For helminthic infection, *Trichuris trichiura* was found to have the highest prevalence followed by *Hymenolepis nana*, hookworm, *Strongyloides stercoralis* and *Ascaris lumbricoides*.

The young children in the institution for mentally handicapped young children had significantly higher prevalence of *G. intestinalis* and *S. stercoralis* infections but lower prevalence of *E.*

Table 3
Prevalence of intestinal parasitic infection according to the number of infecting species in institutionalized mentally handicapped people.

Species of infecting parasite (n=261)	Young children (n=295)	Girls (n=437)	Boys (n=993)	Total
0	146 (55.9)	116 (39.3)	159 (36.4)	421 (42.4)
1	71 (27.2)	98 (33.2)	164 (37.5)	333 (33.5)
2	29 (11.1)	51 (17.3)	81 (18.5)	161 (16.2)
3	14 (5.4)	22 (7.5)	21 (4.8)	57 (5.7)
4	1 (0.4)	6 (2.0)	11 (2.5)	18 (1.8)
5	0	2 (0.7)	1 (0.2)	3 (0.3)

Young children = institution for mentally handicapped young children; Girls = institution for mentally handicapped girls; Boys = institution for mentally handicapped boys.

Table 4
Prevalence of intestinal parasitic infection [n (%)] according to the species of parasite in institutionalized mentally handicapped people

Parasite	Young children (n=261)	Girls (n=295)	Boys (n=437)	Total (n=993)
E. coli[a]	42 (16.1)	80 (27.1)	107 (24.5)	229 (23.1)
G. intestinalis[b]	36 (13.8)	17 (5.8)	26 (6.0)	79 (8.0)
E. histolytica / *E. dispar*	15 (5.8)	26 (8.8)	29 (6.6)	70 (7.1)
E. nana[a]	13 (5.0)	27 (9.2)	20 (4.6)	60 (6.0)
C. mesnili	3 (1.2)	6 (2.0)	5 (1.1)	14 (1.4)
B. hominis	3 (1.2)	1 (0.3)	4 (0.9)	8 (0.8)
I. belli	1 (0.4)	0	0	1 (0.1)
T. trichiura[b]	20 (7.7)	104 (35.3)	171 (39.1)	295 (29.7)
H. nana	25 (9.6)	20 (6.8)	32 (7.3)	77 (7.8)
Hookworm[a]	5 (1.9)	15 (5.1)	30 (6.7)	50 (5.0)
S. stercoralis[b]	13 (5.0)	4 (1.4)	2 (0.5)	19 (1.9)
A. lumbricoides[b]	0	0	11 (2.5)	11 (1.1)
O. viverrini	0	0	1 (0.2)	1 (0.1)

[a]statistical significant difference among groups ($p<0.05$).
[b]statistical significant difference among groups ($p<0.005$).

coli, *T. trichiura* and hookworm infections than those in institution for mentally handicapped boys or girls. In addition, *E. nana* had significantly high prevalence in people in institution for mentally handicapped girls while *A. lumbricoides* had high prevalence in institution for mentally handicapped boys.

DISCUSSION

This study confirmed that the prevalence of intestinal parasitic infection in institutionalized mentally handicapped people was very high. The prevalence was 57% even after only single stool examination and could be expected to be higher

if a three-consecutive stool examination had been done. This finding agrees with previous studies (Kyronseppa and Pettersson, 1976; Kawatu *et al*, 1992; Schupf *et al*, 1995; Gatti *et al*, 2000) that intestinal parasitic infection is a serious problem in this population.

The prevalence of parasitic infection in institutionalized mentally handicapped people was much higher than in non-institutionalized people. Comparing to our unpublished data during the year 1997-1998 which we found a much higher prevalence of intestinal parasitic infection in orphanages (prevalence 48.2%) than in rural school children (prevalence 9.2%), it is probably correct to conclude that institutionalization (usually with very crowded and unhygienic environment) is a significant risk factor for intestinal parasitic infection.

The effect of mental handicaps on poor health behavior and finally on the risk of parasitic infection was not clearly shown in this study. It is possible that in non-institutionalized people, the parent or care-taker prepares a clean environment for them and therefore masks the effect of poor health behavior. In contrast, in institutionalized people, there is a synergistic effect of crowded and unhygienic environment and poor health behavior and thus also masks the effect of poor health behavior.

The very high prevalence of *T. trichiura* comparing to other soil-transmitted helminthes is very interesting. There was no clear explanation for this finding. Some authors suggested that this parasite might be transmitted by some abnormal behaviors such as PICA (Stephenson *et al*, 2000). However, examination of the soil around the ward for trichuris egg revealed negative result. Moreover, some infected people had severe mental abnormality that prohibits them from possible infected environment.

The higher prevalence of some infections such as *E. coli*, *T. trichiura*, *A. lumbricoides*, and hookworm in older institutionalized people may be explained by the more risky activities in older people as well as by the cumulative exposures to infection in those who have stayed for a longer time in the institution. The higher prevalence of giardiasis in younger children may be explained by the development of immunity in older people (Oyerinde *et al*, 1977).

The occurrence of *H. nana* infection in institutionalized people supports previous study (Sirivichayakul *et al*, 2000) that this parasite is prevalence in people living in crowded and unhygienic environment. It is also expected that the prevalence of *Enterobius vermicularis* should be high in institutionalized mentally handicapped people but stool examination is not a good method for diagnosis of *E. vemicularis* infection.

Intestinal parasitic infections especially from *T. trichiura*, *A. lumbricoides* and hookworm have an important impact to nutritional status including anemia. These will affect physical growth and psychomotor development (Adam *et al*, 1994; Oberhelman *et al*, 1998) and finally aggravate the severity of mental handicaps and other related condition. The treatment and control of these infections should be settled as the first priority to improve health and also to prevent spreading of these parasites to environment.

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