

# HELMINTHIC INFECTIONS OF URBAN AND RURAL SCHOOLCHILDREN IN PENANG ISLAND, MALAYSIA: IMPLICATIONS FOR CONTROL

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**Abstract.** The intestinal parasites of schoolchildren from an urban and a rural area on Penang island, Malaysia were compared. Examination of stool samples for helminth eggs showed that helminths found were *Trichuris*, *Ascaris* and hookworms. The results indicate that there is no significant difference ( $p < 0.05$ ) between rural and urban schoolchildren as regards to the prevalence of the three species of helminths. An extensive control program targetted at schoolchildren to monitor the helminth problem on the island is suggested.

## INTRODUCTION

Parasite surveys and published reports from Malaysia have indicated that soil-transmitted helminths such as *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworm species are common infections in the country (Lie *et al*, 1971; Sulaiman *et al*, 1977; Rahman, 1994). The government of Malaysia has emphasized the control of intestinal parasites in its master plan for the nation's health services and schoolchildren has been recognized as an important starting entity in its control program. The present paper presents data on intestinal parasites of urban and rural school children from the island of Penang, Malaysia, carried out within the framework of the Ministry of Health local services.

## MATERIALS AND METHODS

Stool samples were collected from 168 schoolchildren, 72 attending primary rural schools in Balik Pulau, and 96 from primary urban schools of Georgetown. Children from both areas were divided into two age-groups, 7-9 years and 10-12 years, with similar number of males and females for each group. Participating children were given glass bottles, and the next day fecal samples of approximately 10 g each were collected. In the laboratory, each sample was mixed thoroughly and a portion was fixed in 10% aqueous formaldehyde solution. Samples were examined by the modified Kato-Katz procedure (WHO, 1985). An indirect measure of helminth intensity was obtained by counting eggs per gram (epg) of feces.

## RESULTS

The main species of helminth observed were *Ascaris lumbricoides*, hookworm, and *Trichuris*. *Strongyloides* sp was infrequently observed and was not considered in this study. Almost all samples were positive for *Trichuris*, while *Ascaris* and hookworms were less dominant. The overall prevalence of the species for the two groups of children is shown in Table 1. Generally, the prevalence rate for *Trichuris* is significantly higher ( $p > 0.05$ ) when compared to those of *Ascaris* and hookworm. The lowest prevalence ( $p > 0.05$ ) is observed for hookworm. The prevalences in females and males were similar ( $p > 0.05$ ) for all species. Maximum egg counts were 1,433, 671 and 717 for *Ascaris*, hookworm and *Trichuris* respectively.

## DISCUSSION

In Penang Island, there were no significant differences between the rural and urban schoolchildren, as regards to the prevalence of, or intensity of infection by helminths. The prevalences in males and females were similar and there were no significant differences between the 7-9 and 10-12 year-old age groups.

*Trichuris* was the most prevalent helminth; in the urban schoolchildren the prevalence was a 100%. However, in comparison with the other helminths, intensities of the worm were not very high, but chronic infections with *Trichuris*, more so when combined with other helminths like *Ascaris* and hookworms may cause morbidity amongst school children.

Table 1

Intestinal helminths in children from rural (Balik Pulau) and urban (Georgetown) areas in Penang Island.

	Balik Pulau			Georgetown		
	7-9 years	10-12 years	Totals	7-9 years	10-12 years	Totals
No. examined	46	52	98	44	50	94
<b><i>Ascaris</i></b>						
Prevalence (%)	36.9	29.9	33.4	45.5	30.2	37.9
Intensity (egg/g stool)*						
Mean	997	713	-	1,147	883	-
Range	672-1,487	224-1,320	-	557-1,433	624-1,222	-
<b><i>Hookworm</i></b>						
Prevalence (%)	23.9	15.4	19.7	11.4	26.0	18.7
Intensity (egg/g stool)						
Mean	217	387	-	175	154	-
Range	74-411	199-671	-	83-340	92-308	-
<b><i>Trichuris</i></b>						
Prevalence (%)	93.4	90.4	92.0	100	100	100
Intensity (egg/g stool)						
Mean	337	118	-	422	276	-
Range	110-543	67-382	-	118-717	120-445	-

\*The mean intensity is for infected children and not the study population.

Hookworm transmission tends to be very dependent on the local rainfall and humidity (Pawlosky *et al.*, 1991). The island of Penang has a tropical monsoon type of climate, whereby generally certain months of the year are wetter than at other times. The study was carried out during the drier period of the year and was reflected by the considerably low prevalences obtained. Iron deficiency caused by hookworms is an increasing problem in other tropical parts of the world (Idris *et al.*, 1993; Meakins *et al.*, 1981; Stephenson *et al.*, 1990), and larger worm burdens during the rainy season would pose a bigger threat to school children of Penang Island.

The results of the present study implied the need of an extensive control program master plan to be drawn up by the health authorities of Penang Island targetted primarily at schoolchildren. Health education and personal hygiene should be given more emphasis in the school curriculum and periodic

mass treatment of the children with a single dose of broad-spectrum should be carried out on a regular basis. Post-treatment reinfection of children should also be incorporated into the control program.

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