

A study on the prevalence of Soil transmitted helminths among lettuce leaves sold in local markets in Penang, Malaysia

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Introduction

A SURVEY was carried out to determine whether lettuce leaves locally grown and sold in the local markets if eaten raw (as it is usually) plays any role in the transmission of soil transmitted helminths. Many of the local vegetable farmers in Malaysia, and particularly in Penang, use night soil for manuring their plants. Human faeces obtained from village latrines and other sources mixed in urine and water are usually poured on to the plants which helps in their robust growth. The faecal material obviously contain undeveloped helminth eggs such as *Ascaris lumbricoides*, *Trichuris trichura* and hookworm. When left for some period, it is possible that these eggs will continue to mature and become infective stages and eventually when the lettuce leaves are eaten raw, especially without much of washing, infection of the person with one of these helminths may occur. It is in this context a study was undertaken to see how many of the lettuce leaves sold in the local markets contain eggs or larval stages of some of the common soil transmitted helminths prevalent in Malaysia.

Methods and Materials

Lettuces were bought in various local markets in Penang and the location of growth was traced through the sellers. The lettuces were brought to the laboratory and immediately placed in a large beaker and the leaves carefully separated. At any one time 1 kati* of leaves was used. The separated leaves were then chopped into small pieces and washed in 500 c.c. of 0.95% saline. After washing, the leaves were transferred to a filter funnel. A

small beaker was placed under the funnel to collect the running saline solution. This saline solution is added to the saline solution in the beaker and left for about 20 minutes for sedimentation to take place. The top layer of saline solution was discarded and the remaining saline solution with the suspension was centrifuged at 2,000 rpm. for 5 minutes. The supernatant is discarded and the residue carefully collected. The residue was diluted with 25 ml saline 0.95% in a test tube. Examination for eggs of helminths was done by putting a drop of the diluted residue on a clean slide and covered with 22 x 22 mm coverslip.

The egg count was graded as very light (†), light (††), moderate (†††) and heavy (††††).

† = 1 - 2 eggs/slide

†† = 2 - 5 eggs/slide

††† = 5 - 10 eggs/slide

†††† = >10 eggs/slide

Results

The results are shown below in Table 1.

The results show that lettuce collected in every market carried eggs of *Ascaris lumbricoides* and lettuce collected in markets of Glugor, Jelutong, Sungai Dua and Bayan Lepas had hookworms, while Jelutong, Glugor, Penang Road, Sungai Nibong, Bayan Lepas and Teluk Kumbar had *Trichuris trichura*. There were also other eggs especially that of *Toxocara* and some unidentified larvae noted.

Table 1

Showing the market location in Penang where the lettuce was bought, the farming area where it was grown and the intensity of helminth infection on examination.

Markets in Penang	Locality grown in Penang	<i>Ascaris lumbricoides</i>	Hook worm	<i>Trichuris trichura</i>	Others
Jelutong	Batu Uban	++++	†	††	eggs*
Pulau Tikus	‡	+++			larva
Glugor	Batu Uban	††	††	††	larva
Penang Road	‡	+++		†	larva
Tanjong Tokong	Tanjong Tokong	+++			
Tanjong Bunga	Tanjong Tokong	††			
Teluk Bahang	Tanjong Tokong	††			
Sungei Dua	Batu Uban	†	††	††	larva
Sungei Nibong	Sungai Nibong	++++			
Bayan Lepas	Sungai Nibong	†	††	††	
Teluk Kumbar	‡	+++		††	larva
Balik Pulau	Balik Pulau	††			

* eggs of *Toxocara*

‡ not sure where it was grown

Discussion

In Malaysia, the infection rate with *Ascaris lumbricoides*, *Trichuris trichura* and Hookworm is still extremely high, particularly among children living in farms where night soil is used for growing vegetables (Lie *et al*, 1971). In Malaysia it has been a practice to use human excreta and other animal excreta as manure for the healthy growth of vegetable plants. The farmers, mostly who come from the low economic group, cannot normally afford expensive manures or fertilisers. Thus, in place of such commercially obtainable fertilizers they use human

excreta as a manure. There is no doubt that human excreta form an excellent fertilizer culminating in the production of healthy and big size vegetables. The use of human excreta obviously helps in the dissemination of soil transmitted helminths as indicated from the results of the study and it must be clearly understood that this forms one of the many ways by which soil transmitted helminths are acquired by the local populace. Heavy infection with *Ascaris lumbricoides* in lettuce leaves is certainly due to the adhesive nature of the *Ascaris* eggs which are very difficult to be washed off.



Small man-made pool to store water for the plants in the lettuce growing areas.



Specially built tanks to store the night soil temporarily before being used as manure.



Spray can used in spraying the faecal solution on plants.



A farmer in the act of spraying faecal solution on to the plants.

During our investigations we also found many larvae of various species of nematodes. Some of these larvae were of free living nematodes, but yet some we feel were of parasitic nature. Heyneman, D. & Lim Boo Liat (1967) has shown that they were able to obtain infective larvae of *Angiostrongylus cantonensis* from locally grown lettuce and other leafy vegetables. They noted snails and slugs which crawl on these leaves tend to leave behind mucus containing infective larvae of *A. cantonensis*. Again, it is possible that some of the larvae we observed were those of hookworm. Hookworm eggs hatch quite rapidly under tropical conditions and hence they may remain viable in droplets of water on the leaves and is possible, of course, that people may become infected with hookworm through oral penetration of the larvae.

In the present study it was found that 100% of the lettuce samples carried *Ascaris lumbricoides* eggs, 50% carried *Trichuris trichura* eggs and 33.3% hookworm eggs. On a few occasions we also found eggs of *Toxocara canis* on the leaves. These eggs were not infective but every possibility exist that at some stage when the leaves are left too long, the eggs may mature. Dogs in Malaysia are commonly infected with *Toxocara canis*, the causative agent for visceral larval migrans, an important zoonotic infection of man. Although todate only one case of visceral migran due to *Toxocara canis* has been reported from Malaysia (Hong Fang Lee & Danaraj, 1972) there is no doubt that the infection with this parasite is more prevalent than is thought of.

It is clear from our studies that a large number of lettuce leaves grown locally and manured by night soil contain eggs of soil transmitted helminths. People in Malaysia do eat a lot of raw vegetables and they prefer to eat them fresh rather than frozen or stored. In a multi-racial country like Malaysia where the food habits, social habits, cultural habits and agricultural habits vary so much, the transmission of soil transmitted helminths through leafy vegetables obviously is one way of dissemination of the parasite and for its high prevalence in the community particularly in the rural areas. This preliminary study serves us as an indicator to the presence of eggs and larvae in leafy vegetables and also to the extent contamination of vegetables had occurred. Further studies need to be undertaken to seek possibilities of stopping the contamination of vegetables via public health education and the usage of proper agricultural methods. It is possible that the faeces used as manure can be treated before using and also the leafy vegetables washed in chemical solutions which kills the eggs.

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