

EATING HABITS ASSOCIATED WITH *ECHINOSTOMA MALAYANUM* INFECTIONS IN THE PHILIPPINES

Anchalee Tangtrongchitr¹ and Roberto B Monzon²

¹ Bangkok School of Tropical Medicine, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand, ² Department of Parasitology, College of Public Health, University of the Philippines, Manila, Philippines.

Abstract. A survey of 61 residents belonging to 12 pre-selected families (having at least one member positive for echinostomiasis malayanum) from Barangay Malibago, Echague, Isabela (northern Luzon) suggested that infections with *Echinostoma malayanum* follow a "familial trend". The parasite is endemic because the raw ingestion of *Lymnaea (Bullastra) cumingiana*, the second intermediate host in the Philippines, is a learned habit passed down from one generation to the next.

A questionnaire on eating habits revealed that *Lymnaea (Bullastra) cumingiana* or "birabid" was usually prepared raw or half-cooked after treatment with salt or "bagoong" (salted fish paste). It was abundant in rice fields during the wet months of the year, thus implying a seasonal infection pattern since eating frequency was affected by availability. Those who ate this snail reported a long duration of indulgence with this habit. In contrast, *Pila luzonica* or "kuhol", the second intermediate host of *E. ilocanum*, is subjected to similar eating practices but is rarely ingested raw or "half-cooked".

Other than snails, shrimps, fish (*Tilapia sp.*) and meat are also eaten raw. This suggests that the local population is potentially susceptible to other food-borne helminthiases. Extensive use of mass media and public health education is necessary to awaken the awareness of the people to the potential hazards associated with their traditional eating habits.

INTRODUCTION

The existence of *Echinostoma malayanum* in the Philippines was verified recently by Monzon and Kitikoon (1989) who successfully infected laboratory rats and hamsters with metacercariae obtained from *Lymnaea (Bullastra) cumingiana*, an endemic lymnaeid species. This edible snail was usually eaten raw by human "cathaemasiasis" cases from Isabela Province (Cagayan region, northern Luzon) (Cabrera *et al.*, 1984). Earlier specimens of *E. malayanum* obtained from these patients after chemotherapy were erroneously proposed to be a new species, *Cathaemasia cabrerai* (Jueco and Monzon, 1984). Drug treatment had apparently caused a detachment of the diagnostic collar of spines in the expelled flukes, leading to their misidentification (Monzon and Kitikoon, 1989).

The overall prevalence rate of echinostomiasis malayanum in the municipality of Echague, Isabela was estimated at about 20%, based on rates ranging from 0.0% to 35.7%

in 17 barangays surveyed earlier (Cabrera *et al.*, 1986).

Considering the important role played by the local practices of a population in the epidemiology of many intestinal fluke infections, a more detailed investigation of the eating habits of the people was therefore undertaken. The findings may shed light on the appropriate control measures and help the public health workers predict what other parasitic diseases the population may be at risk to.

MATERIALS AND METHODS

Barangay Malibago was purposely selected among the 64 barangays of Echague, Isabela, because: (1) it was readily accessible by walking and available modes of transportation; (2) it was geographically representative of the town, being extensively surrounded by rice fields; (3) it had the highest prevalence rate for echinostomiasis malayanum among barangays surveyed

earlier (Cabrera *et al.*, 1986); and (4) residents were comparatively more helpful and cooperative.

Twelve families, with at least one member positive for *E. malayanum* (based on an earlier survey), were investigated from March to May, 1985. All family members were requested to submit stool samples which were preserved in vials containing 10% formalin and later subjected to formalin ether concentration technique (FECT) at the Department of Parasitology, College of Public Health, University of the Philippines, Manila.

Questionnaires were employed to collect personal information and data regarding eating habits from all members of the family. Two versions were prepared: one in English and the other in the native dialect, Ilocano. House-to-house interviews were conducted during the day with the help of a local resident who served as interpreter and mediator. For those unavailable for interview, questionnaires were

left for them to answer and collected the following morning.

RESULTS

A total of 76 persons from the 12 pre-selected families were approached for interview and stool examinations. Only 61 (80.3%) completed the questionnaire and 58 (76.3%) submitted stool specimens, of which 37 (69.4%) were positive for *E. malayanum* (Table 1).

Questions regarding eating habits focused on types of snails eaten, general and specific methods of preparation prior to eating, amount usually eaten, occasion and frequency of eating, source of snails and duration of eating habits.

Lymnaea (Bullastra) cumingiana or "birabid" and *Pila luzonica* or "kuhol" were the two most commonly eaten snails by the 61 respondents.

Table 1

Distribution of 12 families surveyed in the study according to family size, number completing questionnaire and prevalence for *Echinostoma malayanum*.

Family no.	Family size	Completed questionnaires	No. positive/ No. examined (stool exam)	Prevalence rate
1	7	7	3 / 6	50.0 %
2	6	6	5 / 6	83.3 %
3	7	5	2 / 3	66.7 %
4	7	3	2 / 3	66.7 %
5	6	6	5 / 6	83.3 %
6	5	4	4 / 5	80.0 %
7	2	2	1 / 1	100.0 %
8	9	4	1 / 6	16.7 %
9	8	7	6 / 7	85.7 %
10	8	6	3 / 7	42.9 %
11	4	4	1 / 1	100.0 %
12	7	7	4 / 7	57.1 %
Total	76	61	37 / 58	69.4 %
%	100.0 %	80.3 %		

FOOD - BORNE PARASITIC ZONOSIS

Table 2

Snail-eating habits among 61 residents of Barangay Malibago, Echague, Isabela.

Habit	<i>L. (B.) cumingiana</i> ("birabid")		<i>P. luzonica</i> ("kuhol")	
	No. cases	%	No. cases	%
1. General way of eating snail				
cooked	16	26.2	52	85.2
"half-cooked"	30	49.2	0	0.0
raw	6	9.8	2	3.3
do not eat	7	11.5	0	0.0
no answer	2	3.3	7	11.5
2. Specific method of preparation				
with salt	40	65.6	2	3.3
with "bagoong"	6	9.8	0	0.0
"half-boiled"	2	3.3	0	0.0
no answer	13	21.3	59	96.7
3. Amount eaten in one sitting				
1 to 3 tbsp	2	3.3	2	3.3
4 to 6 tbsp	0	0.0	1	1.6
1/3 to 1/2 cup	25	41.0	25	41.0
1 cup	20	32.8	21	34.4
1 plate	12	19.7	10	16.4
no answer	2	3.3	2	3.3
4. Occasion of eating				
meal time	13	21.3	13	21.3
seasonal	33	54.1	33	54.1
no answer	15	24.6	15	24.6
5. Frequency of eating				
not so often	11	18.0	11	18.0
once a week	2	3.3	2	3.3
everyday (during season)	10	16.4	10	16.4
no answer	38	62.3	38	62.3
6. Source of snail				
rice fields	53	86.9	53	86.9
rivers or streams	4	6.6	4	6.6
no answer	4	6.6	4	6.6
7. Duration of eating snail				
1 to 10 years	27	44.3	27	44.3
11 to 20 years	11	18.0	12	19.7
21 to 30 years	7	11.5	7	11.5
31 to 40 years	9	14.7	9	14.7
no answer	7	11.5	6	9.8

Among those who ate *Lymnaea (Bullastra) cumingiana*, only 26.2% cooked the snail completely while 49.2% and 9.8% ate it "half-cooked" or raw, respectively. This snail was usually prepared with salt (65.6%) or "bagoong" (salted fish paste) (9.8%); the usual serving at one sitting was 1/3-1/2 cup (41.0%) to as much as 1 plate (19.7%). Eating frequency was determined by seasonal availability of the snails (54.1%) which were usually collected from rice fields (86.9%). Most reported eating the snail for 1 to 10 years (44.3%) while some responded, as long as 40 years (14.8%) (Table 2).

In contrast, *P. luzonica* was usually eaten well cooked (85.3%) and rarely raw (3.3%); hardly anyone elaborated on the method of preparation. Serving size at one sitting was also 1/3 to 1/2 cup (41.0%) to as much as 1 plate (16.4%). Eating frequency was also affected by seasonal availability (54.1%) of this species in the rice fields (86.9%). A long history of eating the snail was also noted (Table 2).

Lastly, some respondents (42.6%) revealed that, other than snails, they also ate raw shrimp, fish (*Tilapia sp.*) and meat. A few (13.1%) said that they did not eat raw food at all and a surprisingly large number (44.3%) did not answer the question (Table 3). These non-respondents may have been ashamed to admit that they ate raw food or they were probably non-eaters of raw food.

DISCUSSION

Many residents of the Cagayan region, comprising the three provinces of Cagayan, Isabela and Nueva Vizcaya (from north to south), are of Ilocano descent. Compared to the rest of the Filipino population, Ilocanos are noted for their different eating habits. It is therefore not surprising that this region is also endemic for many food-borne helminthiases. A wide variety of plant and especially animal life are consumed uncooked, thus providing an excellent opportunity for the transmission of parasites. Snails in particular may be eaten partially cooked or raw (Cross and Bhaibulaya, 1983).

The data presented in Table 1 suggest that echinostomiasis malayanum follows a "familial trend", ie, the presence of one infected member in the family implies that others are also infected, presumably because the habit of eating raw snails is encouraged by older members and is thus passed down from generation to generation. This hypothesis is supported by the finding that 88.5% of the respondents reported a history of eating this snail for a duration ranging from 1 to 40 years (Table 2). Prevalence rates among the 12 pre-selected families were also quite high, ranging from 16.7% to 100.0% (average = 69.4%).

It is evident that the method of food preparation employed is one of the most important

Table 3

Foods (other than snails) eaten raw by 61 residents of Barangay Malibago, Echague, Isabela.

Raw food eaten	No. of cases	%
shrimp	13	21.3
shrimp and <i>Tilapia sp.</i>	8	13.1
shrimp and meat	3	5.0
shrimp, <i>Tilapia sp.</i> and meat	1	1.6
meat	1	1.6
none	8	13.1
no answer	27	44.3
Total	61	100.0

factors in the epidemiology of this disease. Most (49.2%) claimed they ate *L. (B.) cumingiana* "half-cooked" while only 9.8% said they ate it raw. However, the term "half-cooked" is subjective and open to individual interpretation; for some, this meant a simple dousing with warm or boiling water after treatment with salt and spices, which may not be sufficient to kill all the metacercariae. Thus, the presence of even a few viable metacercariae makes infection possible.

The findings also suggest that infection is acquired intermittently, mostly during the wet months when snails are abundant in rice fields. However, the potential for acquiring infection during these few months is quite high since large quantities are frequently eaten (Table 2).

Pila luzonica is the second intermediate host of *E. ilocanum* in the Philippines (Tubangui and Pasco, 1933). However, *E. ilocanum* cases are comparatively rare since most prefer to eat this species boiled in coconut milk and chili rather than raw due to its tough leathery texture. With regards to other aspects of its consumption, *P. luzonica* is very similar to *L. (B.) cumingiana*.

The probable presence of other food-borne helminthiases should not be discounted since other animals are eaten raw by the local population (Table 3). Although the ingestion of raw shrimps has not yet been linked so far to any helminthic disease in the Philippines, the potential exists. This practice is reminiscent of the "jumping salad" (Cross and Bhaibulaya, 1983) prepared by native Ilocanos. Heterophyiasis and taeniasis are also potentially transmissible from the ingestion of raw fish (*Tilapia* sp.) and meat, respectively.

We recommend that the strong influence of mass media and the educational sector be

harnessed in order to make local residents aware of the potential harm in their traditional practice of eating various animals raw. Alternative methods of food preparation should be encouraged to enable them to derive nourishment from these sources safely.

ACKNOWLEDGEMENTS

The authors wish to thank Mr Boy Barit and Ms Larina Medina, residents of Echague, Isabela, for their assistance in the field.

REFERENCES

- Cross JH, Bhaibulaya M. Intestinal capillariasis in the Philippines and Thailand. In: Croll NA, Cross JH, eds. Human Ecology and Infectious Diseases. New York: Academic Press, 1983: 104-36.
- Cabrera BD, Jueco NL, Monzon RB, Cabrera BGG. Cathaemasiasis, a new parasitic disease entity in man (a case report). *Acta Med Philipp* 1984; 20: 160-2.
- Cabrera BD, Monzon RB, Sripawit A. Epidemiological aspects of human cathaemasiasis in the Philippines (a newly discovered parasitic infection). *Trans Natl Acad Sci Technol Repub Philipp* 1986; 8:175-82.
- Jueco NL, Monzon RB. *Cathaemasia cabrerai* sp.n. (Trematoda: Cathaemasiidae) a new parasite of man in the Philippines. *Southeast Asian J Trop Med Public Health* 1984; 15:427-9.
- Monzon RB, Kitikoon V. *Lymnaea (Bullastra) cumingiana* Pfeiffer (Pulmonata: Lymnaeidae): second intermediate host of *Echinostoma malayanum* in the Philippines. *Southeast Asian J Trop Med Public Health* 1989; 20:453-60.
- Tubangui MA, Pasco AM. The life history of the human intestinal fluke, *Euparyphium ilocanum* (Garrison, 1908). *Philipp J Sci* 1933; 51:581-606.