

SURVEY OF INTESTINAL PARASITES ON PALAWAN, PHILIPPINES

RICHARD B. OBERST and LILY M. ALQUIZA

U.S. Naval Medical Research Unit No. 2, Manila, Philippines.

INTRODUCTION

In September 1986 a general biomedical survey was conducted in Napsan, Palawan, Philippines to update our knowledge and compare the prevalence of intestinal parasites to past studies (Cabrera, 1971; Cross and Basaca-Sevilla, 1984). Cross and Basaca-Sevilla described intestinal parasite surveys from two sites on the island of Palawan conducted in December 1976, June 1982 and January 1983.

Study area : The barangay of Napsan is located at coordinates $9^{\circ}43'$ north latitude and $118^{\circ}28'$ east longitude on the west coast of the island approximately 60 kilometers from Puerto Princesa City (Fig. 1). This village is accessible most of the year by four wheel drive vehicle although isolated during heavy rainfall. The barangay consists of three sitios, Napsan proper, Labtay and Santo Nino spread over a distance of approximately 11 kilometers along the South China Sea. The 3,000 inhabitants are primarily long term residents including minorities belonging to the Tagbanua tribe with a few immigrants from the Visayas. The terrain consists of heavily forrested dense jungle extending into the mountains fairly rapidly.

Water sources in Napsan consist of shallow wells, 20 to 35 feet deep, which are con-

This study was supported through funds provided by the Naval Medical Research and Development Command, Navy Department for Work Unit 3M162770A 870AQ125.

The opinions and assertions contained herein are those of the authors and are not to be construed as official or reflecting the view of the U.S. Navy.

Reprint requests to Publications Office, U.S. Naval Medical Research Unit No. 2, P.O. Box SC # 410 Manila or APO San Francisco, California 96528.

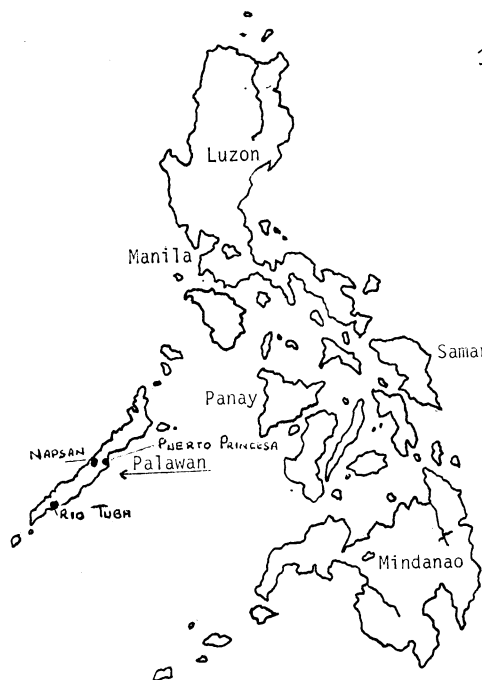


Fig. 1—Map of the Philippines showing the location of Napsan on the island of Palawan.

structed such that surface water easily drains into the well during the rainy season from June until December. Drinking water is also obtained from streams generated by run-off from the mountains.

Many domestic animals including carabao, pigs, chickens, dogs and cats are present in the community. The people, especially the children, go barefooted much of the time or wear very light footwear such as the common rubber sandals.

This study represents a parasitological survey for intestinal parasites in a remote population on the island of Palawan.

MATERIALS AND METHODS

Volunteers were solicited during a concurrent malaria study and were provided stool cartons and instructions on proper submission of the stool specimen. Upon receipt of a properly submitted specimen the name, age and sex of each person was recorded. Wet mounts were prepared on appropriate specimens and examined, at the field site, for trophozoites of intestinal protozoa. A portion of the stool specimen was placed in a screw-capped vial with 10% formalin and mixed thoroughly. These preserved specimens were transported to our laboratory in Manila and examined microscopically both by direct wet preparation and after formalin-ether concentration (Ritchie, 1948).

RESULTS

Stool specimens were obtained from 365 persons ranging in age from 1½ months to 70 years. Twelve persons failed to provide information on sex or age when the specimen was submitted. One hundred and fifty-five of the remaining 353 people were males and 198 females. One hundred and forty-seven (41.6%) of the specimens received were from persons less than 10 years old.

Upon examination of the specimens, 305 (84%) were found to contain at least one parasite. The parasites found are shown in Table 1; 38% had one parasite, 30% with 2 parasites, 32% with multiple infection.

The *Ascaris lumbricoides*, hookworm, and *Trichuris trichiura* were common with the commensal protozoans, *Entamoeba coli* and *Endolimax nana* found in 28% and 22% of the stool samples respectively. Table 2 shows the distribution of parasites by age and sex. *Giardia lamblia* was predominant: 17 of 22 cases, in those below 10 years of age with an equal distribution between males and females. *Ascaris lumbricoides* also seemed to occur

Table 1

Intestinal parasites based on a single stool sample from 365 persons in Napsan, Palawan.

Parasite	No. persons positive	Percent
<i>Ascaris lumbricoides</i>	127	34.8
Hookworm	127	34.8
<i>Entamoeba coli</i>	101	27.7
<i>Trichuris trichiura</i>	92	25.2
<i>Endolimax nana</i>	81	22.2
<i>Iodamoeba butschlii</i>	27	7.4
<i>Giardia lamblia</i>	26	7.1
Didymozoid	25	6.8
<i>Blastocystis hominis</i>	23	6.3
<i>Entamoeba histolytica</i>	4	1.1
<i>Entamoeba hartmanni</i>	4	1.1
<i>Enterobius vermicularis</i> *	2	0.5
<i>Balantidium coli</i>	2	0.5
<i>Strongyloides stercoralis</i>	1	0.3

*No cellophane tape test was performed.

more frequently among the younger age group. This age group had the lowest prevalence of hookworm. Table 3 shows a comparison of this survey with results of 2 other studies on Palawan and the composite results of surveys of 30,000 people throughout the Philippine island (Cross and Basaca-Sevilla, 1984).

DISCUSSION

This survey of intestinal parasites consisted of single stool specimen examination. If we had examined a series of specimens on each person the results would undoubtedly have shown a greater number of positive cases and a higher percentage with multiple parasites. The number of persons with *Enterobius vermicularis* certainly would have been higher had the cellophane tape method been used. This survey does provide information on the magnitude of a continuing problem with intestinal parasites in the rural Philippines and

Table 2
Distribution of intestinal parasites in Napsan, Palawan by age and sex, September 1986.

Parasite	Males							Females							Both (353)
	0-9 (76)	10-19 (35)	20-29 (9)	30-39 (11)	40-49 (8)	50+ (15)	Total (155)	0-9 (71)	10-19 (50)	20-29 (23)	30-93 (23)	40-49 (15)	50+ (16)	Total (198)	
<i>Entamoeba coli</i>	17*	11	22	73	13	33	21	17	34	48	30	40	19	28	25
<i>Endolimax nana</i>	17	20	33	18	50	40	23	8	22	35	22	13	38	19	21
<i>Iodamoeba butschlii</i>	5	9	11	27	—	13	8	4	10	4	9	7	—	6	7
<i>Giardia lamblia</i>	10	6	—	—	—	—	6	13	4	4	—	—	—	6	6
<i>Ascaris lumbricoides</i>	42	29	33	27	38	20	35	37	36	48	60	27	31	35	35
<i>Trichuris trichiura</i>	24	26	22	27	38	13	24	25	30	30	17	7	31	25	25
Hookworm	24	63	33	55	75	53	41	10	32	35	30	33	56	26	33
Didymozoid	3	3	33	9	—	20	6	3	8	9	4	7	25	7	7
<i>Blastocystis hominis</i>	8	11	—	—	—	7	7	3	4	9	13	7	—	5	6

Other parasites found: *E. histolytica* (4)**, *E. hartmanni* (4), *E. vermicularis* (2), *B. coli* (2), *S. stercoralis* (1).

Number of persons in each group shown in parenthesis. Number of stools examined = 353; Number positive for parasites = 295 (84%)

* Percentages to the nearest whole number.

** No. found.

Table 3

Comparison of results intestinal parasite surveys conducted in the Philippines.*

	Iwahig Penal Colony Palawan	Rio Tuba Palawan	Napsan Palawan	Summary of others
Sample size	1,123	1,151	365	30,000
Percentage with parasites	77	71	84	
<i>A. lumbricoides</i>	9	18	35	44
<i>T. trichiura</i>	63	35	25	65
Hookworm	55	26	33	35
Didymozoid	1	—	7	1
<i>E. histolytica</i>	7	6 persons	4 persons	5

* This includes 2 studies on the island of Palawan previous to our study and a summary of numerous studies throughout the Philippines (Cross and Basaca-Sevilla).

comparable to the studies of Cross and Basaca-Sevilla.

Despite the smaller sample size of our survey, the results are similar to those of the two previous surveys conducted on Palawan with a few exceptions. Our study demonstrated a 7-13% higher overall prevalence of intestinal parasites among the population. This might be explained by the comparatively higher proportion of persons in the younger age group particularly with the high number of *Ascaris lumbricoides* infections. This would also account for the significantly higher percentage of *A. lumbricoides* infections in the overall population. The number of *A. lumbricoides* infections among this population, however, was closer to the average for the 30,000 samples reported by Cross and Basaca-Sevilla from many areas of the Philippines. Our study, as well as that conducted in Rio Tuba located in southern Palawan, is probably more reflective of the overall situation in Palawan than that conducted at the Iwahig penal colony near Puerto Princesa City. The population at Iwahig represent all areas of the Philippines.

The sites at Rio Tuba and Napsan are quite similar to the overall situation in the Philip-

pinas as well described by Cross and Basaca-Sevilla (1984). The prevalence of *E. histolytica* was very low, at approximately 0.5% in Rio Tuba and 1.1% at Napsan compared to 5.0% overall. The prevalence of *Trichuris trichiura* is also lower in both sites. It is possible that these two parasites are found in lower numbers in rural Palawan because of the relatively uncrowded conditions. The distribution of hookworm at Napsan is more in males than in females and was especially noticeable in ages below 20 years while the didymozoid infections were higher in Napsan than the overall results in the Philippines.

Parasitic diseases continue to be a public health problem especially the soil-transmitted helminths. The fact that education concerning standard practices of sanitation, especially in rural areas, is not available perpetuates the problem. Treatment for common intestinal parasites is virtually non-existent since disease is not acute and debilitating. However the cost can be stated in terms of increased anemia, malnutrition, and suffering resulting in lost work time. Heavy worm burdens can serve to aggravate malnutrition in a community subsisting on a minimum diet. The anemia caused by malaria can be severe when com-

pounded by intestinal parasites. It is hoped that with improved general conditions basic improvement in sanitation will come.

SUMMARY

A biomedical survey for intestinal parasites was conducted in Napsan on the island of Palawan, Philippines in September 1986. A total of 353 stool specimens were obtained from 155 males and 198 females ranging in age from 1½ months to 70 years. *Ascaris lumbricoides*, 34.8%, hookworm 34.8% and *Trichuris trichiura* 25.2% were the most common helminths encountered, while *Entamoeba coli* 27.7% and *Endolimax nana* 22.2% were the common protozoans. This study demonstrated a 7-13% higher overall prevalence of intestinal parasites among the population on Palawan compared to previous studies in the rural Philippines.

REFERENCES

- CABRERA, B.D., (1971). A review of the parasitic diseases of the gastrointestinal system in the Philippines. *In: Proc. 7th SEAMEO-TROPED Seminar: Infectious Diseases of the Gastrointestinal System in Southeast Asia and the Far East.* (ed). J.H. Cross, SEAMEO-TROPED p. 39.
- CROSS, J.H. and BASACA-SEVILLA, V., (1984). Biomedical Surveys in the Philippines. A special publication of the U.S. Naval Medical Research Unit No. 2, Manila, Philippines, NAMRU-2-SP-47:1.
- RITCHIE, L.S., (1948). An ether sedimentation technique for routine stool examination. *Bull. U.S. Army Med. Dept.*, 8 : 326.