

INTESTINAL PARASITES IN SEMBALUN LAWANG, LOMBOK*

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Survey tinja telah dilakukan diantara penduduk di-Kampung Sembalun Lawang, Distrik Aikmal, Lombok Timur, pada bulan Agustus 1973 untuk mengetahui angka parasit usus dan demam keong di-daerah tersebut.

Dari 146 penduduk yang diperiksa tinjanya ditemukan 99 persen mengandung sekurang-kurangnya satu jenis parasit usus, 85 persen dengan dua jenis atau lebih dan 40 persen dengan tiga jenis atau lebih. Tidak ditemukan bibit penyakit demam keong diantara penduduk di-daerah ini.

Angka infeksi dari parasit usus tersebut masing-masing adalah *Ascaris lumbricoides* 96 persen, *Trichuris trichiura* 84 persen, cacing tambang 25 persen, *Entamoeba coli* 18 persen, *Enterobius vermicularis* 10 persen, *Iodamoeba bütschlii* 3 persen, *Entamoeba histolytica* 1 persen dan *Giardia lamblia* 1 persen.

Pada umumnya tidak banyak perbedaan angka infeksi dari parasit usus ini diantara golongan umur dan kelamin kecuali untuk cacing tambang dimana infeksi pada golongan laki-laki lebih banyak dari pada golongan perempuan.

Since 1968 parasitological surveys have been conducted throughout the Indonesian archipelago to update information on the prevalence and distribution of blood and intestinal parasites in Indonesia's rural population. The present study was undertaken in August 1973 to determine intestinal parasite burdens of residents of Sembalun Lawang, Aikmel District, East Lombok.

Sembalun Lawang, situated in a high mountains valley near Mount Rinjani (1550 m in elevation), is very isolated, being reached by a six hour trail from Pesugulan. Pesugulan itself

is three and one half hours by jeep from Mataram, the capital of the province (Fig.).

Residents of Sembalun Lawang (3,476) are all indigenous to Lombok. Most practice a modified Moslem religion (Islam Waktu Tiga). Wet rice farming is limited but dry rice farming is common. Cultivation of garlic (white onion) for export to other areas affords supplementary income.

Diet consists of rice, chicken, eggs, some vegetables and on rare occasions meat from goats or cattle. Pork is religiously prohibited. As in other rural areas of Indonesia, health and sanitary facilities are lacking; rivers and ditches are used for bathing, washing, fetching drinking water and defecating.

MATERIALS AND METHODS

A census of the population was obtained. stool cartons were distributed, and residents instructed to return the next day with a fecal specimen. One or two grams of feces were placed into screw-capped bottles containing 15 ml of 10 percent formalin, and mixed thoroughly. Specimens were subsequently examined by

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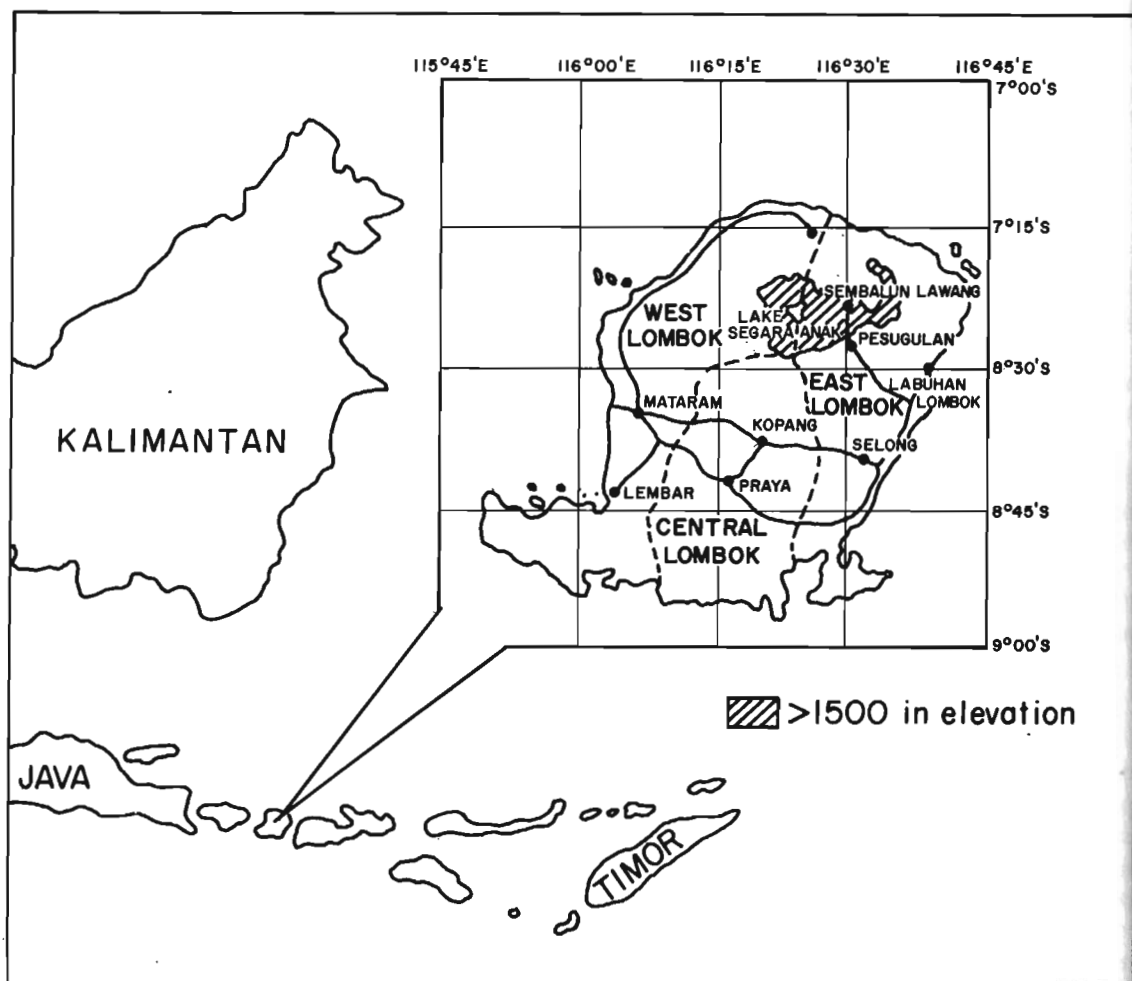
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direct and formalin-ether concentration methods. Microscopic examinations were made at the NAMRU-2 laboratory in Jakarta, Indonesia.

RESULTS

Of 146 persons examined from the village of Sembalun Lawang, 99 percent were infected with at least one species of intestinal parasite, 85 percent had 2 or more parasites and 40 percent harbored 3 or more species of parasites.

Ascariasis and trichuriasis were the most commonly encountered helminthiasis: 92 and 84 percent, respectively. Hookworm were found in only 25 percent of specimens examined and 10 percent of the specimens demonstrated

Enterobius vermicularis eggs (Table 1).

Table 1 Prevalence* of intestinal parasites by sex in Lombok, West Nusa Tenggara.

Parasite	Male	Female	Total
<i>Entamoeba histolytica</i>	2	1	1
<i>Entamoeba coli</i>	16	21	18
<i>Iodamoeba butschlii</i>	3	2	3
<i>Giardia lamblia</i>	0	1	1
<i>Ascaris lumbricoides</i>	94	91	92
<i>Trichuris trichiura</i>	92	78	84
Hookworm	45	9	25
<i>Enterobius vermicularis</i>	8	11	10
Total number examined	64	82	146

* Percentages expressed to nearest whole number.

Entamoeba coli (18 percent) was the most frequently diagnosed protozoan. *Entamoeba histolytica*, *Iodamoeba butschlii* and *Giardia lamblia* were less prevalent, being found in 3 percent or less of the samples (Table 1).

Variation in prevalence according to sex (Table 1) was most striking in the hookworm data where 45 per cent of males and only 9 percent of females were infected. Likewise, trichuriasis rates were higher in males (92 percent) than females (78 percent). Other variations in infection rates by sex were less than 5 percentage points.

Ascariasis was highly prevalent in all age groups with a peak (100 percent) in the 20–29 year age group and a low (84 percent) in the 40–49 year age group. Conversely, trichuriasis rates were lowest (75 percent) in the 20–29 year age

group and highest (88 percent) in the 40–49 year age group. Hookworm rates varied from a low of 13 percent in children 9 or younger to 36 percent in the adults of 50 years or more (Table 2).

Entamoeba histolytica was only detected in the 20–39 year age group with 8 percent of 20–29 year old residents infected (Table 2). Cases were equally distributed without regard to sex (Table 1). *Entamoeba coli* infections were more common in females (21 percent) than males (16 percent) and infection rates varied from a low of 4 percent in children 9 years of age or less to a high of 28 percent in adults 40–49 years of age. There were no significant variations in the age and sex distribution of *Iodamoeba butschlii* or *Giardia lamblia* infections.

Table 2 Prevalence* of intestinal parasites by age in Lombok, West Nusatenggara.

Parasite	Age in Years					
	0 – 9	10 – 19	20 – 29	30 – 39	40 – 49	50 –
<i>Entamoeba histolytica</i>	0	0	8	3	0	0
<i>Entamoeba coli</i>	4	17	8	26	28	14
<i>Iodamoeba butschlii</i>	0	3	0	3	6	0
<i>Giardia lamblia</i>	0	0	0	3	0	0
<i>Ascaris lumbricoides</i>	96	93	100	94	84	93
<i>Trichuris trichiura</i>	88	87	75	82	88	79
Hookworm	13	30	25	26	22	36
<i>Enterobius vermicularis</i>	17	13	0	6	12	7
Total number examined	24	30	12	34	32	14

* Percentages expressed to nearest whole number.

DISCUSSION

The Sembalun Lawang area was chosen for this parasitological survey because it is an isolated region high in the mountains of Lombok. The island of Lombok lies just east of Bali in the Nusa Tenggara Barat Islands. On the island of Sulawesi which is directly northeast of Lombok high mountain areas such as this are the only known foci of schistosomiasis japonicum transmission in the Indonesian archipelago (Carney, *et al.*, 1974a). Significantly, no schistosome eggs were found in the sample populati-

on from Sembalun Lawang. However, common intestinal parasites were highly endemic.

In similar high mountain regions of Sulawesi infection rates of *Ascaris lumbricoides* and *Trichuris trichiura* were considerably lower (13–33 percent compared with 92 percent) for *A. lumbricoides* and (6–9 percent compared with 84 percent) for *T. trichiura*. On the other hand, infection rates of hookworm were generally much higher in Sulawesi at similar altitudes (33–73 percent compared with 25 percent). However, the species composition and prevalence of intestinal protozoans in inha-

bitants of Sembalun Lawang were similar to those obtained from analogous areas in Sulawesi where similar techniques were employed (Carney, *et al.*, 1974a, 1974b); Hadidjaja, *et al.*, 1972). A single stool examination using the formalin-ether concentration method is not considered a true index for protozoan infection. Thus, these data should be regarded primarily as distributional reports and comparable only if similar techniques were employed.

The prevalence of *A. lumbricoides* and *T. trichiura* closely resembled results obtained from recent studies near sea level in South Sulawesi (Cross, *et al.*, 1972), in South Sumatra (Carney, *et al.*, 1975), in Central and West Java (Clarke, *et al.*, 1973a, 1973b). The relatively low hookworm rate (25 percent) contrasted with results of most recent surveys throughout the Indonesian archipelago with the exception of the high mountain area of Boyolalli in Central Java (Cross, *et al.*, 1970).

Enterobius vermicularis eggs were detected in 10 percent of the specimens. Since the technique used is not recommended for detecting pinworms, this report serves as a documentation of *E. vermicularis* in the indigenous Lombok population, but not as an indication of the true infection rate.

Although no exotic parasitoses were revealed, this report apparently is the first documentation of common intestinal parasites of man on the island of Lombok.

SUMMARY

Stool specimens from 146 (64 males, 82 females) residents of Sembalun Lawang, East Lombok, were examined for intestinal parasites and 99 percent were found infected with at least one parasite. *Ascaris lumbricoides* (96 percent), *Trichuris trichiura* (84 percent), hookworm (25 percent) and *Entamoeba coli* (18 percent) were the most commonly found intestinal parasites, followed by *Enterobius vermicularis* (10 percent), *Iodamoeba butschlii* (3 percent), *Entamoeba histolytica* (1 percent) and *Giardia lamblia* (1 percent). Most parasites were more or less evenly distributed between age groups and sexes except hookworm infections which were higher in males (45 percent) than females (9 percent) and lowest in the younger age group.

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