

INTESTINAL PARASITES AND MALARIA IN SUKOMENANTI PASAMAN REGENCY, WEST SUMATRA*

W. Patrick Carney¹, Soeroto Atmosoedjono¹,
Hadi Sajidiman² and Arbain Joesoef².

Survey parasit darah dan usus telah diselenggarakan di Kecamatan Sukomenanti, Kabupaten Pasaman, Sumatra Barat. Bahan pemeriksaan berasal dari 168 penduduk laki-laki dan 196 wanita umur antara 2 - 87 tahun.

Di Sumatra Barat cacing yang umumnya terdapat ialah pertama Ascaris lumbricoides, kedua cacing tambang dan ketiga Trichuris trichiura. Survey di daerah Boyolali dan Kresek, Jawa, menemukan lebih banyak T. trichiura daripada cacing tambang. Di daerah Yogyakarta T. trichiura menduduki tempat yang pertama. Angka infeksi yang rendah untuk desa Pasir Tampang (11 per cent) dan Tongar (3 per cent) adalah tidak umum untuk Indonesia, tetapi keadaan demikian juga dilaporkan di lembah Lindu dan Napu, Sulawesi Tengah.

Enterobius vermicularis terdapat hanya pada 2 per cent diantara penduduk yang diperiksa, sesuai dengan keadaan di daerah2 lain di Indonesia. Species dari cacing tambang pada survey ini belum dapat ditentukan.

Infeksi Ascaris lumbricoides terdapat lebih banyak pada penduduk golongan muda, sesuai dengan hasil autopsi oleh Lie dan Tan di Jakarta. Di Jawa Tengah dan Jawa Barat infeksi A. lumbricoides tampak merata pada semua umur.

Entamoeba coli selalu terdapat pada survey di desa2 di pulau Jawa. Tetapi, infeksi E. histolytica (24 per cent) adalah berlainan dengan keadaan di Kresek, Boyolali dan Yogyakarta yang menunjukkan infeksi 12 per cent atau kurang.

Infeksi malaria di Sukomenanti adalah sangat rendah sebagaimana terdapat di Kresek dan Yogyakarta. Keadaan demikian sangat berlainan dengan daerah Margolimbo di Sulawesi Selatan dimana angka infeksi malarianya tinggi.

Information regarding the distribution of human parasites for much of Indonesia is limited. The present study was undertaken in July 1972 to determine the current status of blood and intestinal parasites in an economically vital area of West Sumatra. This study is a continuation of a series of studies by NAMRU-2 and the Communicable Disease Center of the Indonesian Ministry of Health to obtain a better understanding of the distribution of human parasites in Indonesia (Cross et al.

1972; Hadidjaja et al., 1972; Clarke et al., 1973a and 1973b). This paper will present the results on the prevalence of intestinal parasites and malaria in four villages of the Sukomenanti District, Pasaman Regency of West Sumatra. Filariasis data will be reported elsewhere.

DESCRIPTION OF AREA

The villages surveyed were Batang Bui, Tanjung Pangkal, Pasir Tampang and Tongar in the subdistrict Sukomenanti (Fig.). Padang, the capital of West Sumatra, lies approximately 230 Km southeast on the west coast of Sumatra. This study area is situated just north of the equator (Coordinates: 99°30' - 100°00' E and 0°00' - 0°15' N) approximately 10 to 20 Km from the west coast. Three of the villages, Tanjung Pangkal, Tongar and Pasir Tampang, lie adjacent to the Pasaman river or its tributaries flowing from the Bukit Barisan mountains. One village, Batang Bui, is situated on the Ampu river.

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1. U.S. Naval Medical Research Unit No. 2, Jakarta Detachment, apo San Francisco 96356
2. Directorate General of Communicable Disease Control (CDC), Ministry of Health, Jakarta.

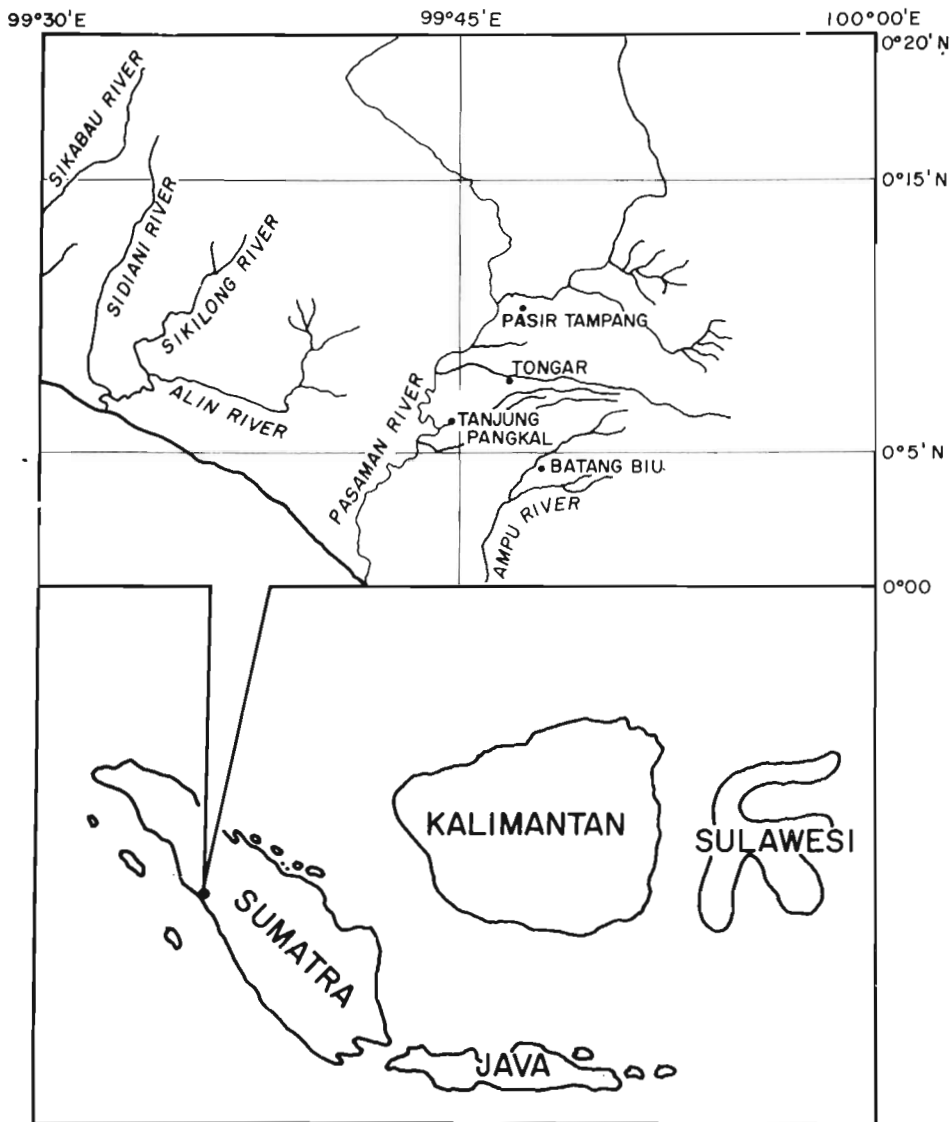


Fig. 1. The Pasaman region of West Sumatra.

The inhabitants of this sparsely populated area are chiefly farmers who cultivate rice over the vast marshland of the Pasaman drainage during the dry season when the water level is low. Clove trees are also tended by more prosperous farmers. Soy beans and peanuts are raised following the rice season.

Inhabitants of Tanjung Pangkal, Batang Bui and Pasir Tampang are indigenous to this area of Sumatra. There have been a number of migrations into the area of Tongar since 1954

when Indonesian repatriates from Suriname, South America arrived. In the 1960s Javanese transmigrated from Yogyakarta (formerly Yogyakarta) and Solo and later from East Java to cultivate the vast marshland of this alluvial plain.

MATERIALS AND METHODS

Blood specimens were obtained from fingertips between the hours of 20:00 and 22:00. Thick and thin smears were made onto glass

microscope slides and air dried for 24 hours. The thin smears were fixed in methanol and both thin and thick preparations were stained in 3-4 per cent Giemsa (pH 6.8 - 7.0) for 1 hour. The thick preparations were dehaemoglobinized while staining. At the time of blood collections the subjects were given cartons and instructed to return the next day and bring with them fecal specimens. One or two grams of feces were obtained, placed into screw-capped bottles containing 15 ml. of 10 per cent formalin and mixed thoroughly. The specimens

most common occurring helminths were *Ascaris lumbricoides* (71 per cent) and hookworm (66 per cent), followed by *Trichuris trichiura* (28 per cent). Trichuriasis was relatively high in two villages: Batang Biu (23 per cent) and Tanjung Pangkal (49 per cent). In Pasir Tampang and Tongar, the trichuriasis rate was much lower, 11 per cent and 3 per cent respectively. *Enterobius vermicularis* was only found in 2 per cent of the stools examined. No tapeworms or trematodes were detected. *Entamoeba coli* (42 per cent) was the most

Table 1. Prevalence of intestinal parasites from four villages in the Sukomenanti District, Pasaman Regency, West Sumatra.

Parasite	Batang Biu	Tanjung Pangkal	Pasir Tampang	Tongar	Total
<i>Entamoeba histolytica</i>	13*	23	37	42	24
<i>Entamoeba hartmanni</i>	6	9	9	13	9
<i>Entamoeba coli</i>	40	44	49	39	42
<i>Endolimax nana</i>	34	19	37	30	28
<i>Iodamoeba butschlii</i>	18	11	20	18	15
<i>Giardia lamblia</i>	1	2	0	0	1
<i>Ascaris lumbricoides</i>	66	76	69	73	71
<i>Trichuris trichiura</i>	23	49	11	3	28
Hookworm	64	68	74	63	66
<i>Enterobius vermicularis</i>	0	1	0	7	2
Total number examined	122	140	35	67	364

* Percentages expressed to the nearest whole number.

were subsequently examined by direct and formalin-ether concentration methods. The microscopic examination of the blood smears and stools was made at the NAMRU-2 Laboratory in Jakarta.

RESULTS

A total of 364 stool specimens from four villages in the Sukomenanti District, Pasaman Regency of West Sumatra were examined. Table 1 lists the prevalences of intestinal parasites from the four villages surveyed. The

common protozoan. The prevalence rates of other intestinal protozoans were *Entamoeba histolytica* (24 per cent), *Entamoeba hartmanni* (9 per cent), *Endolimax nana* (28 per cent), *Iodamoeba butschlii* (15 per cent) and *Giardia lamblia* (1 per cent).

Most parasites were similarly distributed among the 168 males and 196 females examined (Table 2), although *T. trichiura* infections were more frequent among females (31 per cent) than males (24 per cent) and *E. nana* was also more common among females (32 per cent) than males (23 per cent).

Table 2. Prevalence of intestinal parasites by sex from four villages in the Sukomenanti District, Pasaman Regency, West Sumatra.

Parasite	Males	Females
<i>Entamoeba histolytica</i>	24*	25
<i>Entamoeba hartmanni</i>	8	9
<i>Entamoeba coli</i>	44	40
<i>Endolimax nana</i>	23	32
<i>Iodamoeba butschlii</i>	14	17
<i>Giardia lamblia</i>	1	1
<i>Ascaris lumbricoides</i>	70	72
<i>Trichuris trichiura</i>	24	31
Hookworm	68	65
<i>Enterobius vermicularis</i>	2	1
Total number examined	168	196

* Percentages expressed to the nearest whole number.

In Table 3 prevalences of intestinal parasites are listed by age. *Ascaris lumbricoides* and *T. trichiura* were highly prevalent in all groups, but more prevalent in younger groups. Likewise, hookworm was highly prevalent in all groups but more prevalent in older groups. *Entamoeba*

coli infections increased with age while *E. histolytica* infections, fairly constant throughout all groups, peaked in the 40–49 year group. *Endolimax nana* infections were most prevalent in the 20–29 year group.

Table 3. Prevalence of intestinal parasites by age from four villages in the Sukomenanti District, Pasaman Regency, West Sumatra.

Parasite	Age in years					
	0–9	10–19	20–29	30–39	40–49	50
<i>Entamoeba histolytica</i>	22*	20	27	23	34	29
<i>Entamoeba hartmanni</i>	7	10	9	6	15	3
<i>Entamoeba coli</i>	26	39	52	45	60	45
<i>Endolimax nana</i>	14	31	39	31	26	32
<i>Iodamoeba butschlii</i>	7	19	18	15	19	13
<i>Giardia lamblia</i>	1	1	0	3	0	0
<i>Ascaris lumbricoides</i>	78	78	76	71	58	52
<i>Trichuris trichiura</i>	38	34	12	23	23	19
Hookworm	58	70	58	63	68	87
<i>Enterobius vermicularis</i>	3	0	0	3	0	6
Total number examined	73	109	33	65	53	31

* Percentages expressed to the nearest whole number.

Among the 467 blood smears collected parasitemias were detected in 4 individuals, one from each village surveyed. All cases were *Plasmodium falciparum* in males less than 20 years of age.

DISCUSSION

The Pasaman area of West Sumatra is a sparsely populated alluvial plain of rich marshland that has not been under intensive cultivation. Living standards are very low and sanitation is poor among the indigenous inhabitants and recent transmigrants. Because of the vastness of this cultivated plain along the Pasaman river, the area has been designated to receive transmigrant farmers from overpopulated areas of Central and East Java during the next five years. This study was undertaken to establish the prevalence rates of common intestinal and blood parasites among the present population. High prevalence rates were expected because of the lack of sanitary facilities, and findings reported here in are generally in agreement with recent observations elsewhere in Indonesia (Cross et al., 1970; Sri Oemijati, 1970; Cross et al., 1972; Clarke et al., 1973a and 1973b). Most intestinal parasites were common in all age groups and equally prevalent in both sexes, indicating early exposure and frequent re-exposure throughout life.

In West Sumatra *A. lumbricoides*, hookworm and *T. trichiura*, in this order of frequency, were the most common helminths found. Conversely, in recent surveys in the Boyolali and Kresek areas of Java *T. trichiura* was always more prevalent than hookworm (Cross et al., 1970 and Clarke et al., 1973b) and in Yogyakarta it was the most prevalent helminth found. The very low prevalence of *T. trichiura* in the villages of Pasir Tampang (11 per cent) and Tongar (3 per cent) was unusual for Indonesia. However, similar low infection rates with *T. trichiura* recently were reported in the Lindu and Napu Valleys of Central Sulawesi (Hadidjaja et al., 1972 and Carney et al., 1974).

Enterobius vermicularis was found in only 2 per cent of the sampled population of West

Sumatra. These results were consistent with recent stool surveys throughout Indonesia where the direct and formalin-ether concentration methods of stool examination were utilized. However, these are not recommended procedures for the detection of *E. vermicularis* eggs. Lie and Tan (1959) reported a 25% infection rate from autopsies in Jakarta.

The species of hookworm reported in this survey are not known. *Necator americanus*, *Ancylostoma duodenale*, *A. ceylanicum* and *A. caninum* were reported from human autopsies in Jakarta (Lie and Tan, 1959).

The age distribution of *A. lumbricoides*, with more infections in younger groups, was similar to the results of Lie and Tan (1959) from autopsies in Jakarta. In Central and West Java *A. lumbricoides* infections were equally distributed among all age groups (Cross et al., 1970; Clarke et al., 1973a and 1973b).

The high prevalence rates of *E. coli* were consistent with recent surveys of other rural areas on the island of Java. However, the relatively high infection rate with *E. histolytica* (24 per cent) contrasted with infection rates of 12 per cent or less in Kresek, Boyolali and Yogyakarta areas of Java (Cross et al., 1970; Clarke et al., 1973a and 1973b). *Endolimax nana* and *I. butschlii* infection rates were likewise relatively high in comparison to the above-referenced surveys on Java, where less than 10 per cent of the population harbored these parasites.

The low rate of malaria parasitemias reported in the Sukomenanti District was in agreement with recent surveys of cultivated coastal rice plains on Java in the vicinity of Kresek (Clarke et al., 1973b) and Yogyakarta (Clarke et al., 1973a) where a sparsity of human malaria was noted and is in contrast to the high prevalences reported for villages in the Margo-lembo area of South Sulawesi (Cross et al., 1972).

SUMMARY

A survey for blood and intestinal parasites was carried out in the Sukomenanti District,

Pasaman Regency of West Sumatra, Indonesia. A total of 364 stool specimens were obtained from 168 males and 196 females ranging in age from 2 to 82 years.

Ascaris lumbricoides, hookworm, *Entamoeba coli*, *Trichuris trichiura*, *Endolimax nana* and *Entamoeba histolytica* were the most common parasites encountered. Other intestinal parasites noted infrequently were *Enterobius vermicularis*, *Entamoeba hartmanni*, *Iodamoeba butschlii* and *Giardia lamblia*. Parasitemias due to *Plasmodium falciparum* occurred in less than 1 per cent of the population sampled.

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