PARASITES OF MAN IN SERANG, WEST JAVA

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Survey penyakit menular didesa Cikurai dan Barengkok, Jawa Barat pada bulan Juni 1974 ini adalah merupakan salah satu dari serangkaian survey yang dilakukan oleh Direktorat Jenderal P3.M. Dep. Kes. dan US Namru–2 guna menentukan distribusi dan prevalensi penyakit terutama malaria, filariasis dan penyakit parasit perut. Khususnya didaerah Cikurai dimana dilaporkan adanya Schistosoma incognitum secara hyperenzootik maka perlulah dilihat apakah parasit ini ditemukan pula diantara penduduk setempat.

Dari hasil survey didesa Cikurai dan Barengkok, Jawa Barat ini dilihat bahwa Plasmodium falciparum ditemukan pada 8 atau 3 persen dari sediaan darah 261 penduduk yang diperiksa dan tidak terlihat adanya microfilariae. Parasit perut yang menonjol terlihat pada sediaan tinja dari 335 penduduk yang diperiksa adalah Ascaris lumbricoides, Trichuris trichiura dan cacing tambang masing-masing sebesar 89 persen, 87 persen dan 65 persen : parasit lainnya adalah Entamoeba histolytica, Entamoeba hartmanni, Entamoeba coli, Endolimax nana, Iodamoeba butschlii, Giardia lamblia, Chilomastix mesnili, Enterobius vermicularis, dan Echinostoma sp. Tidak terlihat adanya Schistosoma incognitum pada sediaan tinja dari 335 penduduk yang diperiksa dikedua desa ini.

Recently, *Schistosoma incognitum* was found to be hyperenzootic in the Cikurai area of West Java, (Carney, et al., 1974). Approximately 84 per cent of the rice field rats, *Rattus argentiventer*, from that area were found infected with *S. incognitum*. This study was undertaken in June 1974 to determine whether or not *S. incognitum* was a human parasite in West Java since it was originally described in India from what were thought to be human stool specimens (Chandler, 1926) and to document the endemicity of intestinal parasites, malaria and filariasis in the Serang area of West Java.

DESCRIPTION OF AREA

The villages of Barengkok and Cikurai area located near the north-western tip of Java, (Fig. 1) at an elevation of 60 meters above sea

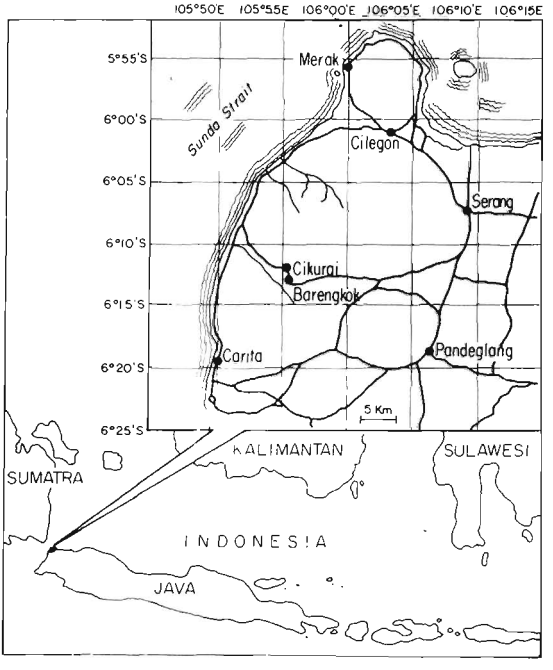

Fig. 1 Map of West Java, identifying villages mentioned in this study.

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Received 3 May 1977.

This study was supported through funds provided by the Indonesian Ministry of Health and by the U.S. Naval Medical Research and Development Command, Navy Department for Work Unit MR041.01—0143. The opinions and assertions contained herein are those of the authors and are not to be construed as official or as reflecting the views of the Indonesian Ministry of Health or the U.S. Navy.

level. Farming is the primary occupation in this area of West Java. The principal crop is wet rice. Rice field dikes (Figs. II – IV) are ideal habitats for *R. argentiventer* and lymnaeid mollusks, *Radix auricularia rubiginosa*, which are responsible for maintaining *S. incognitum* in Cikurai, West Java (Carney, *et al.*, 1977).

Fig. II–IV Typical habitats in the Cikurai vicinity where *Schistosoma incognitum* is maintained in *Rattus argentiventer* and *Radix auricularia rubiginosa*. Farmers in this area are constantly exposed to cercariae of *S. incognitum*.

II Rice fields near Cikurai.

III. Technicians collecting *R. a. rubiginosa* from banks of rice field dikes.

IV. Villagers digging *Rattus argentiventer* out of burrows in rice field dikes.

MATERIALS AND METHODS

Blood specimens were obtained from finger tips between the hours of 20:00 and 22.00. Thick and thin smears were made onto microscope slides and air dried for 24 hours. 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 in the field. Measured 20 cm blood films were prepared for microfilariae examinations. At the time of blood collections, subjects were given stool cartons and instructed to return the next day with a fecal specimen. One of two grams of feaces were placed in screw-capped bottles containing 15 ml of 10 per cent formalin and mixed thoroughly. Specimens were subsequently examined by direct and formalin-ether concentration methods. Microscopic examination of blood smears and stool specimens were conducted at the NAMRU–2 laboratory in Jakarta.

RESULTS

Intestinal parasites were hyperendemic in the Serang area of West Java. Only 10 persons, less than 3 per cent of 335 who submitted stool specimens for examination, were not infected with one or more intestinal parasite. Sixty per cent of the residents examined harbored three or more intestinal parasites.

Soil transmitted nematodes (table 1) were the most frequently detected parasites. *Ascaris lumbricoides* eggs were found in 298 specimens (89 per cent), *Trichuris trichiura* eggs in 291 specimens (87 per cent) and hookworm eggs in 219 specimens (65 per cent). Both *A. lumbricoides* and *T. trichiura* were more common in Cikurai than in Barengkok. On the other hand, the hookworm infection rate was higher in Barengkok than in Cikurai. *Enterobius vermicularis* was diagnosed once in Cikurai and an egg from an *Echinostoma sp.* was detected once in Barengkok. *S. incognitum* eggs were conspicuously absent in stool specimens from the Serang area. Seven intestinal protozoans were identified specimens examined (table 1) *Entamoeba coli* was the most frequently encountered protozoan (12 per cent). *Entamoeba histolytica* was found in 5 per cent of the residents who submitted specimens. *Iodamoeba butschlii, Endolimax nana, Entamoeba hartmanni, Giardia lamblia* and *Chilomastix mesnili* were detected in 2 per cent or less of the po-

pulation examined. Protozoan and helminth parasites were similarly distributed between males and females. No infection rates varied more than 5 per cent by sex.

When intestinal parasite infection rates were examined according to age (table 2), *E. histolytica* and *E. coli* showed a similar age-infection pattern. Both evidenced peak infection rates in the 30–39 years age group. *A. lumbricoides* and *T. trichiura* were most frequently detected on the 10–19 years age group. On the other hand, the hookworm infection rate appeared to increase with age, peaking in the oldest age group.

Plasmodium falciparum was responsible for 8 malaria parasitemias (3 per cent) which were diagnosed from 261 blood smears examined. Five of the 8 cases were in males and six of the 8 cases were in children less than 20 years of age. No microfilariae were seen in 261 blood smears examined.

Table 1 Prevalence of intestinal and blood parasites in two villages in Serang area of west Java.

Parasites	Village		Serang
	Barengkok	Cikurai	
	(209)*	(126)	(335)
Intestinal			
Entamoeba histolytica	8	0	5
Entamoebe hartmanni	<1	0	< 1
Entamoeba coli	12	12	12
Endolimax nana	1	0	1
Iodamoeba bütschlii	<1	5	2
Giardia lamblia	<1	0	<1
Chilomastix mesnili	<1	0	<1
Enterobius vermicularis	0	1	<1
Trichuris trichiura	82	94	87
Ascaris lumbricoides	86	94	89
Hookworm	71	56	65
Echinostoma sp.	<1	0	<1
Blood	(133)	(128)	(261)
Plasmodium falciparum	2	4	3

* Number examined. * Percentages rounded to nearest whole number.

Table 2 Prevalence of intestinal and blood parasites by age and sex in two villages in the Serang area of West Java,

Parasite	Sex		Age in years					
	Male	Female	0 – 9	10 – 19	20 – 29	30 – 39	40 – 49	50 +
Intestinal	(153) *	(182)						
Entamoeba histolytica	3*	7	5	5	5	9	3	0
Entamoeba hartmanni	1	0	0	0	0	2	0	0
Entamoeba coli	12	12	9	13	15	19	3	18
Endolimax nana	0	2	0	0	3	2	3	0
Iodamoeba bütschlii	1	3	4	0	3	0	0	5
Giardia lamblia	1	0	1	0	0	0	0	0
Chilomastix mesnili	0	1	0	0	0	0	3	0
Enterobius vermicularis	0	1	1	0	0	0	0	0
Trichuris trichiura	86	87	83	94	93	86	86	86
Ascaris lumbricoides	87	91	86	94	93	91	90	82
Hookworm	68	63	53	73	63	74	79	91
Echinostoma sp.	1	0	1	0	0	0	0	0
Blood	(126)	(135)	(66)	(58)	(38)	(37)	(31)	(31)
Plasmodium falciparum	4	2	5	5	0	0	0	6

* Number examined. * Percentage rounded to nearest whole number

DISCUSSION

No eggs of *S. incognitum* were detected in the 335 specimens examined. Thus, *S. incognitum* which is hyperenzootic to the Serang area does not appear to be a human parasite in Java. These results further collaborate Rao and Ayyar's (1933) suggestion that the faeces in which Chandler (1926) had found eggs of *S. incognitum* could have been from a pig and not man. Concurrent human infections have not been found in Central Sulawesi, where *S. incognitum* is enzootic (Carney, *et al.*, 1977) nor in other enzootic areas of Asia. This seems incongruous since *S. incognitum* is noted for lack of specificity with respect of its definitive host (Sinha and Srivastava, 1965). Further study of residents in the Serang area, however, remains warranted. It would be especially interesting to follow the population immunologically to determine immune responses to apparent constant cercarial challenge. Similarily, the zoonotic potential of *S. incognitum* is also unsettled. Attempts to elucidate the zoonotic potential of *S. incognitum* in India have yielded conflicting results (Sinha and Srivastava, 1965, Dutt, 1965, 1967 and Ahluwalia, 1972). Rhesus monkeys were infected but eggs were never found in the faeces up to 47 days post exposure. Ahluwalia (1972) concluded that rhesus monkeys were poor hosts. However, in view of the above studies and those of Murrell, *et al.*, (1973) caution should be exercised in assessing the zoonotic potential of a schistosome by studies in experimental animals or by the presence or absence of eggs in the faeces, as done in this study. Extensive disease, especially in the liver, can occur in the absence of eggs in the stools.

Soil transmitted helminths are highly endemic in rural areas of Java (Table 3). Infection rates in the Serang area compared closely with those reported in other low land areas of Java, namely Kresek, West Java and Yogjakarta, Central Java.

The low rate of malaria parasitemias reported herein for the Serang area of West Java agreed with other studies that have recently been conducted throughout Java. In Central Java, Cross, *et al.*, (1970) reported no malaria parasitemias in the Boyolali area and Clarke, *et al.*, (1973b) identified only 2 cases in 1384 blood specimens from the Yogjakarta area. On the other hand, Clarke, *et al.*, (1973a) detected malaria parasitemias due to both P. *vivax* and P. *falciparum* in 2 per cent of 849 blood smears from Kresek area of West Java.

Surprisingly, no microfilaremias were detected in the 261 blood smears examined. In a 1960 survey of Kresek, West Java, Lie, *et al.*, (1960) described a highly endemic focus (22 per cent) of Malayan filariasis. However, in 1970 when this same area was restudied, Sri Oemijati, *et al.*, (1972) reported only a 2 per cent infection rate and suggested that changes in agricultural practices were responsible for the 10 fold reduction in Malayan filariasis.

Table 3 Comparison of common intestinal parasite infection rates throughout Java,

Parasite	Central Java		West Java	
	Bojolali (Cross et al., 1970)	Yogjakarta (Clarke et al., 1973b)	Kresek (Clarke et al., 1973a)	Serang This paper
	(1135) *	(744)	(603)	(335)
Ascaris lumbricoides	73 #	85	90	89
Trichuria trichiura	45	91	91	87
Hokworm	23	52	67	65
Entamoeba histolytica	7	13	10	5
Entamoeba coli	19	36	40	12

* Number examined. # Percentages expressed to nearest whole number.

SUMMARY

Stool specimens from 335 residents of the Serang area of West Java were examined. Although *Schistosoma incognitum* is hyperenzootic in rice field rodents of that area, no human cases were diagnosed by a single stool examination. Intestinal parasites were hyperendemic. *Ascaris lumbricoides* (89 per cent), *Trichuris trichiura* (87 per cent), and hookworm (65 per cent) were the most common intestinal parasites. *Entamoeba coli* (12 per cent) and *Entamoeba histolytica* (5 per cent) were less frequently diagnosed.

Other intestinal parasites found in two per cent or less of the population were *Enterobius vermicularis*, *Echinostoma sp.*, *Iodamoeba butschlii*, *Endolimax nana*, *Entamoeba hartmanni*, *Giardia lamblia* and *Chilomastix mesnili*. *Plasmodium falciparum* was found in 3 per cent of 261 blood smears examined but no microfilariae were detected.

ACKNOWLEDGEMENTS

We thank the following individuals who contributed to this study. Mr. R. See, NAMRU–2, Taipei, Mr. B. Ibrahim and M. Sjahrul, NAMRU–2 Detachment, Jakarta and Mr. Sunario, Filariasis Division, CDC, Ministry of Health, Jakarta. For administration support we thank Drs. P F. D. Van Peenen and Kurt Sorensen, NAMRU–2 and Dr. J. Sulianti Saroso, Head, National Institute of Health Research and Development Ministry of Health, Jakarta.

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