

A SURVEY OF MURINE TYPHUS IN  
MULYOREJO VILLAGE, WAY ABUNG III TRANSMIGRATION SCHEME,  
LAMPUNG UTARA, SUMATERA, INDONESIA

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ABSTRAK

Suatu survei serologis terhadap murine typhus telah dilakukan di desa transmigrasi Mulyorejo, Way Abung III, Lampung Utara pada tahun 1982. Dalam survei tersebut dikumpulkan sejumlah 444 sera manusia dan 314 sera hewan liar terutama tikus dan tupai. Pemeriksaan serologis dengan methoda IFAT memberikan hasil seropositif sebanyak 6,5 % pada manusia dan 0,6 % pada hewan. Pada manusia seropositif tertinggi pada kelompok umur 20 - 59 tahun dan lebih tinggi pada laki-laki daripada perempuan.

Vektor murine typhus, *Xenopsylla cheopis*, hanya ditemukan pada *Rattus r. diardii*. Satu species tunggau yaitu *Ascoschoengastia indica* yang pernah ditemukan terinfeksi oleh murine typhus, ditemukan pada tikus rumah dan tikus ladang, *R. tiomanicus* dan *R. exulans*.

Hasil penelitian ini menunjukkan bahwa murine typhus endemik di desa transmigrasi tersebut dan siklus terjadi di dalam lingkungan domestik.

INTRODUCTION

Previous sero-epidemiological studies of human CF and indirect immunofluorescence antibodies against murine typhus, found seropositive cases in Java, Sumatera and Jakarta city<sup>1, 2</sup>. In 1975, a study on murine typhus in two villages at Way Abung III, showed high prevalence of sero-positive cases among the newly translocated transmigrants<sup>3</sup>. In 1982, another survey was conducted in Mulyorejo village of the same transmigration scheme to investigate the prevalence of this disease among the resided transmigrants there including wild animals in the surrounding areas, and the results are presented herewith.

MATERIALS AND METHODS

The topography of the study area was described elsewhere the collection of

rodents and the procedures in obtaining blood samples from rodents and humans followed that by Hadi et. al.<sup>4</sup>.

The preparation of Rickettsial antigen slides and serological examination was in accordance to that of Bourgeois et.al.<sup>5</sup> Sera were screened at a dilution of 1:40 for antibodies of *Rickettsial typhi* and individual samples which failed to give specific fluorescence at this dilution were considered negative. specific fluorescence at this dilution were considered negative.

RESULTS

**Human.** Sera of 444 transmigrants consisting of 228 males and 216 females were serologically tested. *R. typhi* antibodies positive were shown in 7.4 % males and 5.5 % females with a total of 6.5 %. Sero-positive cases by age-group is presented in Table 1.

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Tabel 1 : Rickettsial typhi antibodies positive by age-group.

Age-group in years	Number exam.	R. Typhi antibodies positive	sero-positive %
0 - 9	25	0	0
10 - 19	169	2	1.1
20 - 29	80	7	7.8
30 - 39	94	12	12.8
40 - 49	45	6	13.3
50 - 59	23	2	8.7
> 60		0	0
Total	444	29	6.5

The prevalence of *R. typhi* antibodies was found relatively high between the age-groups from 20 - 59 years old. The 30 - 49 years age group were shown with higher prevalence rates.

**Wild animals.** Sera of 314 wild animals consisting of 11 rodent spp., 3 squirrel spp., and 1 insectivore were tested. Of these 1.7 % of 58 *Rattus r. diardii* (house rat) and 0.8 % of 114 *R. tiomanicus* (field rat) were sero-positives with a total of 0.6 %. The Oriental rat flea (*Xenopsylla cheopis*), a murine typhus vector, was present in 5 *R.r. diardii* with a range of 1 - 7 fleas per infested host. The trombiculid mite, *Ascoschoengstia indica* a suspected vector<sup>6</sup>, was found in 36.2 % of 58 *R.r. diardii*, 0.9 % of 114 *R. tiomanicus* and 5.3 % of 76 *R. exulans* with mite-load of 22.7, 0.2 and 0.008 per animal species respectively.

## DISCUSSION

It was apparent from the results that murine typhus is relatively high in Mulyorejo village of Way Abung III, Lampung Utara in Sumatera. The transmigrants in this surveyed village have resided there 6 - 7 years ago. Evidence of infected cases, suggested that the transmigrants

contracted the diseases locally in the area. Previous survey in adjacent villages, Waspada and Karya Tani of Way Abung III showed 40.7 % and 37.7 % prevalence rates among the villagers. The transmigrants, at the time of surveyed, have just moved into these villages of 1 - 2 months ago which implicated that the high rate of infection among the transmigrants, contracted the disease elsewhere before they were translocated<sup>3</sup>.

The current sero-positive by age-group, revealed that higher infection rates were among the field working group. More males than females were infected in the present study. This was also found in Waspada, Karya Tani villages and Jakarta<sup>2,3</sup>.

Among the wild animals examined, sero-positive were 2.1 times higher in house rats than in field rats. The flea vector, *X. cheopis* was found in the house rats only. This indicates that the cycle of infection is more indoors than outdoors. *A. indica*, a suspected vector, was prevalence among house rat and field rat species examined. This parasite was found with natural infection with murine typhus<sup>6</sup>, but experimental transmission of the virus by means of this mite has still

to be demonstrated. Its potential therefore as a vector should not be ruled out<sup>7</sup>.

The study concludes that murine typhus is endemic in the study village. The host vector relationship is more associated to domestic than in the field environments.

### SUMMARY

A serological survey of antibodies against murine typhus in human and wild animals was carried out in Mulyorejo village, Way Abung III transmigrasi scheme, Lampung Utara in 1982. A total of 444 human and 314 wild animals sera were collected.

Using the IFA test the prevalence of murine typhus antibodies for human and wild animals were 6.5 % and 0.6 % respectively. The sero-positive in human were higher among the age-group from 20 - 59 years old, and higher rate in males than of females.

The murine typhus vector, *Xenopsylla cheopis*, was found infesting the house rat, *Rattus r. diardii* only. A trombiculid mite, *Ascoshengastia indica*, was prevalence in house rat, and also in the field rats, *R. tiomanicus*, *R. exulans* examined.

The results of the study, revealed that murine typhus is endemic in the village studies and that the cycle of infection suggests it is associated in domestic than in field environments.

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### REFERENCES

1. Van Peenen, P.F.D., C. Koesharjono, R. See, A.L. Bourgeois and G.S. Irving (1977). Antibodies against murine typhus in sera from Indonesians. *Trans. Roy. Soc. Trop. Med. Hyg*, 71 (4) : 297 - 299.
2. Dennis, D.T., T.R. Hadi, R.J. Brown, S. Sukaeri, B. Leksana and R. Cholid (1981). A survey of scrub and murine typhus in the Ancol Section of Jakarta, Indonesia. *Southeast Asian J. Trop. Med. Pub. Hlth*. 12 : 574 - 580.
3. Gandahusada, S., D.T. Dennis. E.E. Stafford, T. Hartono, Soepadijo, C. Rasidi dan G.S. Irving (1981). Infectious disease risks to transmigrant communities in Indonesia : a survey in Lampung province, Sumatra. *Bull. Penelit. Kesehat*. 9 (1) : 15 - 24.
4. Hadi, T.R., Supalin, Sustriayu Nalim dan Annie Chang (1984). Ekologi penyakit scrub typhus di unit desa transmigrasi Mulyorejo, Way Abung III, Lampung Utara. Suatu penelitian pendahuluan. *Bull. Penelit. Kesehat*. 12 (2) : 11 - 18.
5. Bourgeois, A.L., J.G. Olson, and C.M. Ho (1977). Epidemiological and serological study of scrub typhus among chinese military in the Pescadores Islands of Taiwan. *Trans. Royal Trop. Med. Hyg*. 71: 338 - 342.
6. Gispen, R. 1950. The virus of murine typhus in mites (*Schoengastia indica*, Fam. Trombiculidae). *Docum. Neerl. Indones. Morb. Trop*. 3 (2) : 225 - 230.
7. Gispen, R. dan R. Warsa 1951, Endemic typhus in Java. II. The natural infection of rats and rat ectoparasites identify of shop typhus and murine typhus. *Docum. Neerl. Indones. Morb. Trop*. 3 (2) : 155 - 162.

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