

A SEROLOGIC SURVEY OF RICE-FIELD LEPTOSPIROSIS IN CENTRAL LUZON, PHILIPPINES

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INTRODUCTION

Human leptospirosis was first reported from the Philippines in 1932. Although several series of cases have been described since then (Bounds and Kingery, 1946; Manaloto *et al.*, 1986), the prevalence of leptospirosis in the Philippines has not been well studied. We therefore surveyed three agricultural communities in Central Luzon for the presence of leptospiral antibody. The findings of the serological surveys are reported herein.

MATERIALS AND METHODS

Blood specimens were collected from asymptomatic villagers aged 14 and above

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from October 1985 to March 1986. Three rice farming villages were surveyed: Libertad, Aglipay, Nueva Ecija; Barrio Putol, Santa Maria, Bulacan; and Sitio Alpha, Meycauayan, Bulacan. Sera were assayed for leptospiral antibodies using the standard microagglutination test (Galton *et al.*, 1965) with a battery of 24 serovars: *L. interrogans ballum*, *canicola*, *icterohemorrhagiae*, *bataviae*, *grippotyphosa*, *pyrogenes*, *autumnalis*, *pomona*, *wolfii*, *australis*, *tarrasovi*, *georgia*, *alexi*, *cynopteri*, *mankarso*, *celledoni*, *djasiman*, *borecana*, *shermani*, *javanica*, *butembo*, *amana*, *hardjo* and *fort bragg*. A serum dilution of 1:100 or greater which caused agglutination of 50% or more leptospires was considered positive.

RESULTS

A total of 155 sera were tested; 63 (40.6%) showed leptospirosis antibody titers of at least 1:100. Males had a significantly higher positivity rate than females (48% vs. 31%; $p < 0.01$ by Chi square with Yates's correction). There were no significant differences in antibody prevalence between the 3 villages: Libertad 41%; Putol 38%, and Alpha 44%. The relatively small sample size did not permit comparison of age-specific

prevalence rates, but none of the 9 sera from patients aged 66 or above tested was positive (Table 1).

The antigen eliciting the greatest antibody response was *L. interrogans* serovar *shermani* (Table 2). However, there was considerable cross-reactivity, and serology cannot be relied upon to establish the serotype of infecting strains (Feigin and Anderson, 1975).

Table 1

Leptospirosis seropositive distribution by age group.

Age (years)	No. examined	No. positive (%)
14-25	42	18 (43)
26-35	43	18 (42)
36-45	26	7 (27)
46-55	23	11 (49)
56-65	12	9 (75)
66-75	6	0 (0)
76+	3	0 (0)
Total	155	63

Table 2

Results of seropositive cases.

<i>Leptospira interrogans</i> serovar eliciting greatest response	Antibody titer (Reciprocal of highest positive dilution)					No. of cases
	1,600	800	400	200	100	
<i>shermani</i>	2	1	8	11	1	23
<i>pyrogenes</i>		1	1	1		3
<i>hardjo</i>				1		1
<i>fort-bragg</i>			1			1
						28*

*In 35 cases, the highest titers were shared by more than one serovar.

DISCUSSION

Rice cultivation frequently provides optimum conditions for the spread of leptospires (Brewer *et al.*, 1960). Crops attract rodents, the infected urine of which can then contaminate the stagnant, flooded fields in which rice farmers work. In the sole previous leptospirosis survey conducted in the Philippines (Basaca-Sevilla *et al.*, 1981), only 9% of the residents of an agricultural penal colony had antibodies. However, many of these individuals were not lifelong rice farmers and serology was performed with the macroscopic slide agglutination test, a technique less sensitive than the microscopic agglutination test for detecting antibodies in retrospect (Wolff and Bohlander, 1966).

Our report demonstrates that there is frequent contact between adult Filipino agricultural workers and pathogenic leptospires. Rice farming was the principal activity in the 3 communities investigated, although there were minor differences in the degree of contact with flooded fields, the presumed source of infection. Antibody prevalence rates were about 40% in each of the villages,

a figure similar to that reported in rice farmers in other countries (Babudieri *et al.*, 1955). The higher prevalence rates in males is presumably related to greater exposure to contaminated water and the lower antibody levels in the oldest age group are consistent with findings from other studies (Brewer *et al.*, 1960).

This report highlights the fact that like other Asian countries, notably Thailand (Bunnag *et al.*, 1965), leptospirosis is prevalent in the Philippines and is likely to be an important and underdiagnosed cause of both mild and severe febrile illness. In a recently completed study in a Manila hospital (Watt *et al.*, pers. comm.), a large number of patients with Weil's syndrome were seen, suggesting that urban leptospirosis is common. The flooding that regularly accompanies the rainy season in Manila provides an ideal setting for the transmission of leptospirosis; urban serosurveys would provide valuable information on the extent of its transmission.

SUMMARY

Although human cases of leptospirosis have been reported from the Philippines, there is a lack of data on its prevalence. We therefore surveyed three rice-farming villages for the presence of leptospiral antibody. Out of 155 sera tested, 63 (43.6%) tested positive using the standard microagglutination test. Antibodies were more frequent in men than women (48 vs. 31%, respectively, $p < 0.01$), and less common in the elderly. Exposure to leptospires occurs frequently in rice farmers, and leptospirosis is likely to be an underdiagnosed cause of both mild and severe febrile illness in the Philippines.

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