

## **The role of intrahousehold contact in the transmission of leprosy**

K GEORGE, K R JOHN, J P MULIYIL & A JOSEPH  
*Department of Community Health, Christian Medical College,  
Bagayam, Vellore-2, PO 632 002, North Arcot District, Tamil  
Nadu, India*

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*Summary* This study examines the role of intrahousehold contact in the transmission of leprosy using the case control methodology. The study was done in the leprosy control area of the Community Health and Development (CHAD) Programme of the Christian Medical College. Three age, sex and village matched controls were selected for each case. This study shows that persons with intrahousehold contact with leprosy have a higher risk of acquiring leprosy compared with those who did not (RR 2.509; 95% confidence limits 1.23–5.109).

### **Introduction**

Leprosy control programmes world-wide have aimed at interrupting the transmission of leprosy by reducing the reservoir of the infection by treating the leprosy patient. The question that must be answered is the degree of risk involved in close contact with leprosy patients. All previous studies done on this aspect of leprosy have used the cohort model and were of long duration and consequently expensive. This study which has used the case control model is one of the first of its kind in India.

### **Materials and methods**

The study was conducted in a Survey, Education and Treatment (SET) Unit of the National Leprosy Eradication Programme (NLEP) situated at Asanambut, North Arcot District. This Unit is attached to the Department of Community Health, Christian Medical College, Vellore. Asanambut lies 40 kilometres south-east of Vellore Town, ringed by the hills of the Jawadhi Range. The area is rural and its predominant crops are Paddy, Ragi and flowers. The health care is provided by the Primary Health Centre in Madanur. Leprosy has been carried out in this area since 1971 and the prevalence of leprosy is 38.66/1000 population.

Health care is offered to the leprosy patients by a mobile team consisting of a medical

officer, a non-medical supervisor, the leprosy paramedical worker of the concerned unit, pharmacist, physiotherapist, a smear technician, village leprosy worker, occupational therapist and a shoemaker. The mainstay of the leprosy team is the leprosy paramedical worker (PMW).

Case control methodology was used. Patients detected between July 1983 and December 1984 in the Asanambut SET Unit were chosen as cases for the study. From this list those who had died or permanently left the area by the time the study was done (5 cases) were deleted from the list.

Three controls were chosen for each case from the Survey register of the Asanambut Control Unit. The cases were matched with controls with regard to age, sex and geographical location. After the list of controls were chosen for each case from the Survey register by matching for age, sex and village three controls were chosen by random from the list of controls. The controls were  $\pm 2$  years of the year of birth of the case, of the same sex and from the same village.

From each subject the following information was obtained: basic demographic profile, educational status and occupational status. The duration of disease and date of diagnosis was obtained from patient records. A clinical examination was done on all the subjects for the presence, and if positive, the type of leprosy. The entire household in which the subject was residing was examined clinically for leprosy. Since a 100% coverage was essential, multiple visits up to five times was necessary.

## Results

Table 1 shows the age and sex distribution of cases. This table shows a male:female ratio of 1:12:1. The two groups were examined to assess the comparability of cases and control. There was no major difference in the educational status of cases and control except in the proportion of these who attended middle school. This difference, however, was statistically significant (Table 2). There was no major difference in the occupational status of cases and controls (Table 3).

Table 4 indicates the frequency of BCG vaccination in cases and controls. The controls had a slightly higher incidence of BCG vaccination which might indicate a protective influence of BCG on the occurrence of leprosy. However, the difference was not statistically significant (Table 4).

The frequency of household contact among cases was significantly higher than in

**Table 1.** Age and sex distribution of cases

| Age group    | Male | Female | Total | Percentage |
|--------------|------|--------|-------|------------|
| 0-10         | 10   | 6      | 16    | 22.22      |
| 11-20        | 6    | 7      | 13    | 18.05      |
| 21-30        | 5    | 5      | 10    | 13.88      |
| 31-40        | 5    | 6      | 11    | 15.27      |
| 41-50        | 5    | 5      | 10    | 13.88      |
| 51-60        | 3    | 2      | 5     | 6.94       |
| More than 60 | 4    | 3      | 7     | 9.72       |
| Total        | 38   | 34     | 72    |            |

**Table 2.** Educational status in cases and controls

| Educational status | Cases      | Controls    | Critical ratio |
|--------------------|------------|-------------|----------------|
| Illiterate         | 32 (44.4%) | 83 (38.4%)  | 0.588          |
| Primary School     | 29 (40.3%) | 56 (35.18%) | 0.487          |
| Middle School      | 5 (6.9%)   | 39 (18.05%) | 2.29           |
| High School        | 4 (5.6%)   | 18 (8.33%)  | 0.184          |
| Higher School      | 2 (2.8%)   | 0 (0%)      | —              |

**Table 3.** Occupational status in cases and controls

| Occupation         | Cases      | Controls    | Critical ratio |
|--------------------|------------|-------------|----------------|
| Unemployed         | 1 (1.4%)   | 8 (3.7%)    | 0.119          |
| Student            | 20 (27.8%) | 59 (27.3%)  | 0.03           |
| Landless labourer  | 30 (47.7%) | 76 (35.2%)  | 0.628          |
| Housewife          | 8 (11.1%)  | 26 (12.03%) | 0.071          |
| Skilled labour     | 3 (4.2%)   | 6 (2.8%)    | 0.114          |
| Private enterprise | 2 (2.8%)   | 3 (1.4%)    | 0.112          |
| Land owner         | 8 (11.1%)  | 28 (12.9%)  | 0.14           |
| Govt. service      | —          | 6 (2.8%)    | —              |
| Others             | —          | 4 (1.8%)    | —              |

**Table 4.** BCG status in cases and controls

| BCG status | Cases       | Controls     | Total |
|------------|-------------|--------------|-------|
| Positive   | 3 (4.2%)    | 14 (6.4%)    | 17    |
| Negative   | 69 (95.8%)  | 202 (93.6%)  | 271   |
| Total      | 72 (100.0%) | 216 (100.0%) | 88    |

Odds ratio: 0.627  
 95% confidence limits: 0.076 to 2.427  
 Chi-square: 0.1875  
 p: 0.05

**Table 5.** Frequency of intrahousehold contact in cases and controls

| Intrahousehold contact | Cases      | Controls    | Total |
|------------------------|------------|-------------|-------|
| Positive               | 19 (26.4%) | 27 (12.5%)  | 46    |
| Negative               | 53 (73.6%) | 189 (87.5%) | 242   |
| Total                  | 72         | 216         | 288   |

Odds ratio: 2.509  
 95% confidence limits: 1.23 to 5.109  
 Chi-square: 6.761  
 p: less than 0.01

the controls. There is a 2.5 times greater chance of a household contact acquiring leprosy compared with a person without contact. This difference is statistically significant (Table 5).

## **Discussion**

The data have shown that both cases and controls are comparable with respect to educational status, occupational status and BCG vaccination. The study has shown a significantly higher risk in those exposed to leprosy within the household. The risk was 2.5 times greater in the exposed group compared to those in the unexposed group. This is similar to other studies done in the same district<sup>1</sup> where a similar risk of 2.4 was obtained.

This study has been done using the case control methodology and has obtained results which are comparable to other studies in the area.<sup>1-5</sup> The other studies have used the cohort design and hence have been costly and long-drawn. The case control model offers a quick, cheap and comparable alternative.

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