

✓ Transmission of Leprosy Within Households¹

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In leprosy control programs, great emphasis is still placed on contact surveillance, and rightly so despite findings that leprosy becomes noninfectious even at a dosage of one milligram per day after three to four months of regular treatment with sulfones (^{1, 17}). Factors known to have some role in transmission, such as the degree of intra-familial or extrafamilial contact and the susceptibility of the host, are not amenable for accurate assessment. However, we need to know more on these aspects of epidemiology if we are to understand several puzzling features of leprosy. Data on attack rates among contacts serve a useful role in understanding the variables that influence transmission of leprosy as well as in evaluating leprosy control programs. Most studies on contacts have indicated the number found to have developed leprosy without relating this to age at exposure, period of follow-up or the type of leprosy in the index case (^{7, 14}). Without such information, the rates have very limited value and can often be misleading. Studies based on prospective observations are too few and findings reported to date remain inconclusive. In a study of 1,520 individuals exposed to lepromatous leprosy in the Philippines, Doull *et al* (⁶) emphasized the strong relationship between the age at exposure and sex in the transmission of the disease. No definitive findings on these lines have been reported for India. An earlier paper based on studies carried out in Gudiyatham Taluk, South India, estimated the annual incidence rate of leprosy at 0.8 per 1,000 population (¹⁰). Further analysis of data collected during 1962 to 1970 has provided information on secondary attack rates. The main findings are presented and discussed

in this paper in relation to specific characteristics of the index cases and contacts.

MATERIALS AND METHODS

Gudiyatham Taluk is situated in the north-western part of North Arcot District in Tamil Nadu, South India, lying between 78° 35' to 79° 20' eastern longitude and 12° 40' to 13° 05' northern latitude. It has an area of 510 square miles and a population of approximately 400,000 (1961). The climate of the taluk is warm throughout the year with a low relative humidity. The average rainfall is 800-900 millimeters per year.

Nearly two thirds of the housing is poor, with mud walls, roofs made of grass, leaves, etc., and consists of a single room only. The average number of persons per room was 3.2.

Two population surveys of the entire area were carried out, one during 1962-1965 and the other in 1968-1970. In this paper, "family" and "household" are used synonymously, being defined as those partaking food from a common kitchen and sleeping under the same roof. All families in which a leprosy patient was identified were followed up by trained paramedical workers, at least once every three months. The families with leprosy patients were classified according to the number of patients at commencement of follow-up of contacts and by type of leprosy case in the family. The contacts were classified according to age at registration of index case(s) and by sex.

All members of the family who were without any clinical signs of leprosy, including those temporarily away at the time of registration, were taken as contacts and were considered at risk. They remained so regardless of removal of the patient from the family. Those born or moving into the family were also considered to be at risk and were included under contacts.

Altogether 5,088 families were available for this study, of which 4,422 (87%) had only a single leprosy patient. Of the 23,285 contacts from these families only 22,652 (97.3%) could be clinically examined and confirmed as having or not having leprosy. Those not

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TABLE 1. *The number of person-years of follow-up among contacts classified according to age and sex in families having single and multiple index cases with or without lepromatous or borderline type of leprosy.*

No. and type of index cases ^a Age and sex of contacts	Single			Multiple			All		
	LL/BB	TT/I	Total	LL/BB	TT/I	Total	LL/BB	TT/I	Total
CHILDREN:									
Both sexes	7822.0	24515.0	32337.0	1793.5	2769.0	4562.5	9615.5	27284.0	36899.5
Male	5358.0	13716.5	19074.5	1212.5	1530.0	2742.5	6570.5	15246.5	21817.0
Female	2464.0	10798.5	13262.5	581.0	1239.0	1820.0	3045.0	12037.5	15082.5
ADULTS:									
Both sexes	9275.5	25997.0	35372.5	2228.5	2759.0	4987.5	11504.0	28756.0	40260.0
Male	6465.0	14866.0	21331.0	1517.5	1567.0	3084.5	7982.5	16433.0	24415.5
Female	2810.5	11131.0	13941.5	711.0	1192.0	1903.0	3521.5	12323.0	15844.5
ALL PERSONS:									
Both sexes	17097.5	50512.0	67609.5	4022.0	5528.0	9550.0	21119.5	56040.0	77159.5
Male	11823.0	28582.5	40405.5	2730.0	3097.0	5827.0	14553.0	31679.5	46232.5
Female	5274.5	21929.5	27204.0	1292.0	2431.0	3723.0	6566.5	24360.5	30927.0

^a LL/BB = lepromatous and borderline on lepromatous side; TT/I = tuberculoid and indeterminate.

TABLE 2. *Secondary attack rates (per 1,000 person-years) by type of leprosy.*

Type of leprosy	Attack rate per 1,000 person-years	Percentage of total
LL	0.6	9.5
TT	4.3	63.8
BB	0.7	9.7
I	1.1	16.8
Neural	0.01	0.2
All types	6.8	100.0

examined were found randomly distributed in terms of number and type of index cases as well as by age-sex of the contacts.

For each contact included in the study up to March 1970, the number of years of follow-up was determined. Those present at registration were given a half-year of follow-up for that year. Likewise, new entrants, those deceased or moved away, were given a half-year for the year in which the event occurred. The number of years of follow-up for the contacts included in the analysis is shown in Table 1.

Those suspected of having leprosy were referred to clinics for further examination and their diagnosis confirmed by doctors. Every new case was seen and examined by one of us (A. B. A. K.). Skin smears for acid-fast bacilli were obtained from eight stan-

dard sites and all of those with negative skin smears were subjected to skin biopsy from a representative skin lesion for histopathologic confirmation of the diagnosis according to the Ridley and Jopling classification (¹³). Data for each contact was transferred to punch cards for analysis.

The secondary attack rate is defined as the number of new cases discovered in the contacts of leprosy patients per 1,000 person-years, which is the equivalent of observing 1,000 persons per year.

RESULTS

The secondary attack rate for all contacts considered together was 6.8 per 1,000 person-years. Specific secondary attack rates and percentage distribution by type of leprosy were computed and are shown in Table

TABLE 3. Secondary attack rates (per 1,000 person-years) of leprosy by sex of contacts.

Type of leprosy	Attack rate per 1,000 person-years		Percentage of total	
	male	female	male	female
LL	0.6	0.7	8.2	11.8
TT	4.6	3.9	65.1	61.5
BB	0.8	0.5	11.2	7.2
I	1.1	1.2	15.5	19.0
Neural	—	0.03	—	0.5
All types	7.1	6.3	100.0	100.0

TABLE 4. The secondary attack rates (per 1,000 person-years) by age at exposure of contacts.

Age at exposure (years)	Type					All types
	LL	TT	BB	I	Neural	
0-14	0.3	5.3	0.4	1.7	0.1	7.8
0-4	0.1	3.2	0.1	1.0	—	4.4
5-9	0.3	8.0	0.3	2.4	—	11.0
10-14	0.7	5.9	1.0	2.1	0.1	9.8
15 & over	1.0	3.4	0.9	0.6	—	5.9

TABLE 5. The secondary attack rates (per 1,000 person-years) of each type of leprosy by age at exposure and sex.

Sex	Age at exposure (years)	Type of leprosy					All types
		LL	TT	BB	I	Neural	
Male	0-14	0.2	5.9	0.6	1.6	—	8.3
	0-4	0.1	3.5	0.2	0.7	—	4.5
	5-9	0.3	8.5	0.3	2.4	—	11.5
	10-14	0.4	6.9	1.5	2.4	—	11.2
	15 & over	0.9	3.5	1.0	0.6	—	6.1
Female	0-14	0.3	4.0	0.1	1.6	0.1	6.1
	0-4	—	2.8	—	1.5	—	4.3
	5-9	0.2	7.2	0.2	2.6	—	10.2
	10-14	1.0	4.5	0.3	1.7	0.3	7.8
	15 & over	1.1	3.2	0.8	0.6	—	5.7

2. Nearly two-thirds were of the tuberculoid type of leprosy and another one-sixth were of indeterminate type. Lepromatous and borderline cases each constituted about ten percent of the total new cases.

The rate for females (6.3), though less, was not significantly different from that of males (7.1). Secondary attack rates by type of leprosy among males and females and their percentage distributions are indicated in Table 3. The differences observed between males and females for each type of

leprosy were not statistically significant.

The secondary attack rates by age at exposure are shown in Table 4. Risk of acquiring leprosy increased significantly when exposure occurred after 0-4 years of age, the maximum being seen in the age group of 5-9 years. The risk for children (less than 15 years) was significantly higher than that for adults ($p < 0.01$).

The secondary attack rates of each type of leprosy by age at exposure and sex are shown in Table 5. Among boys, the maxi-

TABLE 6. *Percentage distribution of types of leprosy among child and adult contacts by sex.*

Type of leprosy developed	Children		Adults	
	male	female	male	female
LL	2.8	4.8	14.9	20.0
TT	70.7	65.7	58.1	56.7
BB	6.6	1.9	16.9	13.3
I	19.9	26.7	10.1	10.0
Neural	—	1.0	—	—
Total	100.0	100.0	100.0	100.0

TABLE 7. *Secondary attack rates (per 1,000 person-years) of leprosy according to number of patients in a family.*

Type of leprosy	Attack rate per 1,000 person-years		Percentage of total	
	One patient	Two patients and more	One patient	Two patients and more
LL	0.5	1.7	8.3	13.8
TT	3.9	7.0	65.4	57.7
BB	0.6	0.8	10.5	6.9
I	0.9	2.6	15.5	21.6
Neural	0.01	—	0.3	—
All types	6.0	12.1	100.0	100.0

TABLE 8. *Secondary attack rates (per 1,000 person-years) of leprosy by sex and number of patients in the family.*

Type of leprosy	Attack rate per 1,000 person-years				Percentage of total			
	One patient		Two patients and more		One patient		Two patients and more	
	male	female	male	female	male	female	male	female
LL	0.4	0.6	1.5	1.8	7.0	10.5	12.3	16.3
TT	4.3	3.4	6.9	7.2	68.0	61.2	54.8	62.8
BB	0.8	0.4	0.7	1.1	12.9	6.6	5.5	9.3
I	0.8	1.2	3.4	1.3	12.1	21.1	27.4	11.6
Neural	—	0.04	—	—	—	0.7	—	—
All types	6.3	5.6	12.5	11.4	100.0	100.0	100.0	100.0

imum risk was observed in the age group of 5-14 years, whereas for females the risk was the highest for the age group of 5-9 years, dropping significantly after that. Furthermore, it was observed that significant differences existed between children and adults in males but not in females.

Percentage distributions of type of leprosy among children and adults by sex are displayed in Table 6. Significantly fewer children had bacilliferous type of leprosy. Among adults the pattern for secondary

cases compared well with that seen in prevalence surveys.

The secondary attack rates almost doubled when there were multiple index cases in the family. The findings are presented in Table 7. The significantly higher rates were noted for all types of leprosy except the borderline type. Proportionately, there were more lepromatous and indeterminate types when there were multiple index cases.

The secondary attack rates among males and females in relation to the number of in-

TABLE 9. Secondary attack rates (per 1,000 person-years) of leprosy in children and adults by number of patients in the family.

Type of leprosy	Attack rate per 1,000 person-years				Percentage of total			
	One patient		Two patients and more		One patient		Two patients and more	
	children	adults	children	adults	children	adults	children	adults
LL	0.2	0.8	0.7	2.6	3.2	14.2	4.4	27.6
TT	4.8	3.2	9.4	4.7	71.4	58.6	62.3	51.1
BB	0.4	0.8	0.2	1.4	6.0	15.7	1.4	14.9
I	1.3	0.6	4.8	0.6	19.4	11.0	31.9	6.4
Neural	—	0.03	—	—	—	0.5	—	—
All types	6.7	5.4	15.1	9.3	100.0	100.0	100.0	100.0

TABLE 10. Secondary attack rates (per 1,000 person-years) and percentage of total in relation to type of leprosy in the index case.

Type of leprosy developed	Type of leprosy in index			
	LL & BB		TT & I	
	Rate per 1,000	% of total	Rate per 1,000	% of total
LL	1.3	13.5	0.4	7.1
TT	5.7	59.7	3.8	66.3
BB	1.3	13.9	0.4	7.1
I	1.2	12.9	1.1	19.2
Neural	—	—	0.1	0.3
All types	9.5	100.0	5.8	100.0

dex cases in the family are shown in Table 8. Significantly higher rates for lepromatous, tuberculoid and indeterminate types were noted among males, while for females this was so only in the tuberculoid type. On the whole, significantly higher rates were observed in both males and females when multiple cases existed in the household. Regardless of the number of index cases, the male-female differences were not statistically significant.

The secondary attack rates among children and adults in terms of number of index cases in the family are indicated in Table 9. Significantly higher rates were noted in tuberculoid and indeterminate types for children and only in lepromatous type for adults. However, the overall rate was significantly higher in both children and adults when there were multiple cases. The significantly higher risk for children as compared with adults was maintained regardless of the multiplicity of index cases.

Secondary attack rates varied significantly in terms of type of leprosy in the in-

dex case. The findings are presented in Table 10. Attack rates were significantly enhanced when there was lepromatous or borderline type of leprosy in the family. This was true for the specific attack rate of each type of leprosy as well. Among secondary cases, lepromatous and borderline types occurred more frequently when the index case was a bacilliferous type, viz. lepromatous and borderline. Also, proportionately, there were more lepromatous and borderline cases when there was an index case of lepromatous or borderline type.

The secondary attack rates in terms of number of index cases and type of leprosy in the index cases were computed and are shown in Table 11. For contacts exposed to any type of leprosy, significant increases were noted when there were multiple cases. There was a higher risk when there was a bacilliferous type of leprosy in the single index case family, but such enhanced risk was not seen in multiple case families.

DISCUSSION

Compared to an annual incidence rate of

TABLE 11. *Secondary attack rates (per 1,000 person-years) of leprosy by number of patients and type of leprosy existing in the family.*

Type of leprosy	Attack rate per 1,000 person-years				Percentage of total			
	One patient		Two patients and more		One patient		Two patients and more	
	LL & BB	TT & I	LL & BB	TT & I	LL & BB	TT & I	LL & BB	TT & I
LL	1.0	0.3	2.5	1.1	11.9	6.4	16.9	10.5
TT	5.0	3.6	8.5	6.0	60.6	68.1	57.6	57.9
BB	1.4	0.4	1.0	0.7	16.9	7.1	6.8	7.0
I	0.9	1.0	2.7	2.5	10.6	18.0	18.7	24.6
Neural	—	0.02	—	—	—	0.4	—	—
All types	8.3	5.3	14.7	10.3	100.0	100.0	100.0	100.0

0.8 per 1,000 in the total population, the incidence rate among the contacts was observed to be nearly ten times higher. Such enhanced risks were observed consistently when studied by the number of patients within a family, for both sexes and in various age groups.

Earlier papers have documented the higher prevalence rates among males when compared to females in adults but not in children (¹¹). The secondary attack rates, however, showed a significant increase in risk by sex in children but no such difference occurred in adults. This is similar to what was found in Philippine studies (⁶). This finding reiterates the differences in susceptibility to leprosy among males and females, especially in the younger age group. Immunologic and endocrine studies in an epidemiological setting may help in elucidating the mechanisms responsible for such striking observed differences in host responses in males and females that result in such a characteristic sex-ratio in prevalence of leprosy.

The risk of acquiring leprosy was significantly related to the age at exposure. The maximum incidence was observed for those in the age group of 5-9 years followed closely by those exposed at ages 10-14 years. Our findings are lower than those found in Philippine studies (⁶). Since the index case in the family must have harbored leprosy for at least a year or more when detected and registered, the age-group at greatest risk might be somewhat younger. Allowing for an incubation period of 5-10 years, the manifestation noticed during early adulthood agrees with that noted in incidence surveys carried out in this area (¹⁰). This finding also agrees with the prevalence curve which

increases with age up to 15-19 years for males and 10-14 for females (¹¹). Although there were many children in the age group of 0-4 years who had been exposed to leprosy, the attack rates in this group were low. It should be noted, however, that registered patients were generally under treatment and those born subsequently in the family were, perhaps, not being exposed to a great deal of infection. More definitive evidence may be obtained as we follow these children for a longer time.

This study highlights the significant increase in attack rates among those exposed to bacilliferous types of leprosy as compared to those exposed to the nonbacilliferous types. However, the attack rates among those exposed to tuberculoid and indeterminate types of leprosy were still significantly higher than those observed for the general population and the danger of acquiring leprosy from such cases cannot be ignored. It could be argued that those exposed to tuberculoid or indeterminate types of leprosy within the family were perhaps exposed to a lepromatous case earlier, either within the family or outside. This argument may be acceptable to some extent but still does not explain the consistently enhanced risk observed in relation to age, sex and multiple cases. The late Kinnear Brown (⁴) cautioned that lepromatous cases were not the only infectious type of leprosy and we concur with his statement.

The new cases among child contacts have been predominantly of the tuberculoid or indeterminate type. The rates of change of types of leprosy, especially from the nonbacilliferous type to the bacilliferous type, needs further investigation. The observation

that there was more lepromatous type of leprosy when the contacts were exposed to a lepromatous or borderline type of index case provides further proof that there is some genetic basis in susceptibility to specific types of leprosy although not fully explaining the response of the host. Further investigation is required on these aspects (8).

It is true that the contacts need not necessarily acquire the disease from the index case in the family since the prevalence of leprosy in the general community is fairly high, and opportunities for contact exist as much outside the family as within (12). However, the strikingly higher rate among contacts of multiple cases within the family as compared to those exposed to a single patient in the family gives ample proof of the grave risks of familial contact. Whether this is due to genetic factors or is the result of close contact with greater inoculum of the infective agent needs further intensive study (15).

The present study provides estimates of the transmissibility of leprosy when index cases and those secondarily registered are under some form of treatment. The contacts have already been exposed to leprosy during the untreated phases and, thus, the secondary attack rates provide an indication of the risks of acquiring leprosy from a familial case. These attack rates will eventually serve as sensitive and critical indicators of leprosy control programs. Incidence rates among contacts are also useful in formulating valid epidemiologic models of transmission of leprosy (9). Lack of such data on incidence rates produces false assumptions or at best statements too simplistic to be accepted as facts. Several studies are now in progress which are testing various prophylactic measures against leprosy (3, 5, 7, 16). In most studies, contacts of leprosy patients are randomly divided into multiple groups and given some prophylaxis. Attack rates of leprosy in the various groups are then compared. Before inferences are made on the effectiveness of prophylaxis, it will be necessary to distinguish between cases of leprosy that have occurred before the prophylactic action could take effect and those cases that have arisen despite prophylaxis. Great caution is especially needed when the observation period for such investigations is short. Some baseline information on the secondary attack

rates in relation to common demographic measures and type of leprosy are minimum requirements for a proper interpretation.

We now seem to have enough data on cross-sectional prevalence surveys (2, 3), but they can provide only a partial picture of the epidemiology of leprosy. The need now seems to be to obtain more data on incidence rates both in the general population and among contacts on the basis of prospective observation using acceptable statistical techniques in design and analysis. Further papers based on analysis of the data from Gudiyatham Taluk will examine more closely the transmission of leprosy between marriage partners and between parents and children.

SUMMARY

As part of the leprosy control program, population follow-up studies were carried out during 1962 to 1970 in Gudiyatham Taluk, an administrative unit in South India (population: 400,000). More than 97% of the 23,285 contacts from 5,088 families having a leprosy patient were clinically examined using accepted methodology and confirmed as having or not having leprosy. New cases developing among household contacts of leprosy (secondary attack rates) were determined and studied in relation to characteristics of the index case and that of contacts. The secondary attack rate is defined as the number of new cases discovered in the contacts of leprosy patients per 1,000 person-years, which is equivalent to observing 1,000 persons per year.

Nearly two-thirds of all new cases were of the tuberculoid type of leprosy and another one-sixth of indeterminate type. Lepromatous and borderline cases each constituted about ten percent of the total new cases. The total secondary attack rate was 6.8 per 1,000 person-years. Compared to an annual incidence rate of 0.8 per 1,000 in the total population, this incidence rate among the contacts is nearly ten times higher. Such enhanced risks are observed clearly and consistently when studied by the number of patients within a family for both sexes and in various age-groups. The rate for females (6.3 per 1,000 person-years) though less, was not significantly different from that of males (7.1 per 1,000 person-years). The differences observed between males and females for

each type of leprosy were also not statistically significant.

The risks for children (less than 15 years) are significantly higher than those for adults. Among boys, the maximum risk was observed in the age-group 5-14 years, whereas for females the risk is highest in the age-group 5-9 years, dropping down significantly after that. Furthermore, it was observed that significant differences existed between children and adults only in males but not in females.

The secondary attack rates almost doubled when there were multiple index cases in the family. Regardless of the number of index cases, the male-female differences were not statistically significant.

Attack rates were significantly enhanced when there was a bacilliferous type of leprosy (lepromatous or borderline) in the family. This was true for the specific attack rates of each type of leprosy too. However, a significantly higher proportion of lepromatous and borderline types is also seen when there is a bacilliferous type of leprosy present.

The study reiterates the differences in susceptibility to leprosy among males and females, especially during younger ages. Further immunological studies are necessary to determine the differences in host responses in males and females that produce such a characteristic sex-ratio in prevalence of leprosy. There is still a great need to obtain more data on incidence rates both in general population and among contacts on the basis of prospective observation using acceptable statistical technics in design and analysis.

RESUMEN

Como parte del programa de control anti-leproso, se llevaron a cabo estudios de seguimiento de población durante 1962-1970 en Gudiyatham Taluk, una unidad administrativa en India del Sur (población: 400.000).

Se examinaron clínicamente más del 97% de los 23.285 contactos de 5.088 familias en las cuales había un enfermo de lepra, utilizando metodología aceptada, confirmando si tenían o no lepra. Se determinaron los casos nuevos que se estaban desarrollando entre los contactos domiciliarios de enfermos con lepra (tasas de ataque secundario) y se estudiaron en relación con las características del caso índice y las de los contactos. La tasa de ataque secundario se define como el número de casos nuevos descubiertos entre los contactos de pacientes con lepra por 1000 personas-

año, que es equivalente a observar 1000 personas por un año.

Casi dos tercios de los casos nuevos fueron del tipo tuberculoide de lepra y un sexto más del tipo indeterminado. Los casos lepromatosos y borderline constituyeron alrededor del diez por ciento de los casos nuevos. La tasa de ataque secundario total fue de 6,8 por 1000 personas por año. Comparado con una incidencia anual de 0,8 en la población en general, esta tasa de incidencia entre los contactos es casi diez veces mayor. Estos riesgos aumentados se observan clara y consistentemente cuando se estudian de acuerdo con el número de pacientes dentro de una familia, para ambos sexos y en varios grupos estarios. La tasa para las hembras (6,3 por 1000 personas-año) aunque menor, no fue significativamente distinta de la de los varones (7,1 por 1000 personas-año).

Las diferencias observadas entre hembras y varones para cada tipo de lepra no fueron estadísticamente significativas.

El riesgo para los niños (menos de 15 años) fue significativamente mayor que para los adultos. Entre los varones, el mayor riesgo se observó en el grupo etario de 5-14 años, mientras que para las hembras el riesgo es mayor en el grupo etario de 5-9 años, cayendo en forma significativa después de eso. Aún más, se observó que las diferencias significativas entre niños y adultos se observaban sólo entre los varones, pero no en las hembras.

Las tasas de ataque secundario casi se duplicaron cuando habían múltiples casos índices dentro de la familia. A pesar del número de casos índice, las diferencias entre varones y hembras no fueron estadísticamente significativas.

Las tasas de ataque aumentaron significativamente cuando había una forma de lepra bacilífera (lepromatosa o borderline) en la familia. Esto fue verdad también para las tasas de ataque específicas para cada tipo de lepra. Sin embargo, también se observa una proporción significativamente mayor de formas lepromatosa y borderline cuando hay una forma bacilífera de lepra presente.

Este estudio reitera la diferencia en susceptibilidad a la lepra entre varones y hembras, especialmente durante las edades más tempranas. Se necesitan más estudios inmunológicos para determinar las diferencias en la respuesta del huésped en hembras y varones que producen una tasa relacionada con el sexo tan característica en la prevalencia de la lepra.

Hay todavía gran necesidad de obtener más datos sobre tasa de incidencia tanto en la población en general como entre los contactos, en base a observaciones objetivas, utilizando técnicas estadísticamente aceptables de diseño y análisis.

RÉSUMÉ

Dans le cas d'un programme de contrôle de la

lèpre, on a procédé à des études longitudinales de la population du Gudiyatham Taluk, un district administratif de l'Inde Méridionale de 1962 à 1970. La population de ce district s'élève à 400.000 personnes. Plus de 97 pour cent des 23.285 contacts, appartenant à 5.088 familles comportant un malade de la lèpre, ont été examinés cliniquement en suivant une méthodologie reconnue. Ils ont été classés comme ayant ou n'ayant pas la lèpre. Parmi les contacts domiciliaires de malades de la lèpre, le nombre de nouveaux cas apparaissant a été déterminé, en vue de calculer les taux d'attaque secondaire. Ces taux d'attaque ont été mis en relation avec des caractéristiques du cas index, et avec les caractéristiques des contacts. Le taux d'attaque secondaire est défini comme étant le nombre de nouveaux cas découverts parmi des contacts de malades de la lèpre, pour 1.000 personnes-années, ce qui correspond à l'observation de 1.000 personnes pendant une année.

Environ les deux-tiers de tous les nouveaux cas appartenaient au type tuberculoïde de la lèpre; un sixième présentait le type indéterminé. Les cas lépromateux et borderline ont constitué respectivement environ dix pour cent des nouveaux cas. Le taux d'attaque secondaire pour l'ensemble était de 6,8 pour mille personnes-années. Par contre, dans la population totale, le taux annuel d'incidence s'élevait à 0,8 pour mille. Ceci montre que le taux d'incidence parmi les contacts était environ dix fois plus élevé. Une telle augmentation du risque est observée de façon tout à fait nette, et répétée, lorsque l'on prend en considération le nombre de malades dans un même famille, dans les deux sexes, et dans différents groupes d'âge. Le taux observé chez les femmes (6,3 pour mille personnes-années), quoique moins élevé n'était pas significativement différent que celui observé chez les hommes (7,1 pour mille personnes-années). Les différences notées entre hommes et femmes pour chaque type de lèpre n'étaient pas davantage significatives.

Les risques calculés chez les enfants âgés de moins de 15 ans, étaient significativement plus élevés que ceux constatés chez les adultes. Chez les garçons, le risque le plus élevé a été observé dans le groupe d'âge 5-14 ans, alors que chez les filles, le risque était au plus haut dans le groupe d'âge 5-9 ans, et tombait significativement ensuite. En outre, ce n'est que dans le sexe masculin, et non dans le sexe féminin, que des différences significatives ont été relevées entre les enfants et les adultes.

Les taux d'attaque secondaire étaient presque doublés lorsqu'il y avait plusieurs cas index dans la famille. Sans égards au nombre de cas index, les différences notées entre hommes et femmes n'étaient pas statistiquement significatives. Les taux d'attaque ont été significativement augmentés lorsqu'il existait un cas de lèpre bacillifère (lépromateux ou borderline) dans la famille. Ceci

était également vrai pour les taux d'attaque spécifiques de chaque type de lèpre. Néanmoins, une proportion significativement plus élevée de cas lépromateux et borderline est constatée, lorsqu'il y avait un type bacillifère de lèpre dans la famille.

Cette étude souligne à nouveau les différences de susceptibilité à la lèpre dont font preuve les hommes et les femmes, et ceci spécialement au cours des âges les plus jeunes. Des études immunologiques supplémentaires sont requises pour déterminer les différences de terrain chez les hommes et chez les femmes, qui pourraient rendre compte des différences respectives de prévalence de la lèpre dans les deux sexes. Il reste des plus nécessaires de récolter plus de données sur les taux d'incidence, tant dans la population générale que parmi les contacts de malades de la lèpre, en recourant à des observations prospectives, et en utilisant des techniques statistiques satisfaisantes tant pour le protocole des études que dans l'analyse des résultats.

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