

Epidemiological Studies in Leprosy in Gudiyatham Taluk[★] Part I

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The domiciliary treatment and leprosy control programme for Gudiyatham taluk was inaugurated in the latter half of 1962 by the Schieffelin Leprosy Research Sanatorium, Karigiri, South India, in collaboration with the Swedish Red Cross who undertook full financial responsibility for the entire programme for an initial period of 5 years. This area was chosen because of the known endemicity of leprosy in this region.

MATERIAL AND METHODS

Gudiyatham taluk is in North Arcot district in Madras State. This taluk occupies an area of 481.04 square miles, stretching from 78°35' to 79°20' North longitude and 12°40' to 13°05' East latitude. It supports a population of 385,228 (in 1961 Census figure (a) Gudiyatham Town=50,384, (b) Taluk excluding Gudiyatham =334,844) with the sex ratio at 982 females per 1,000 males. Nearly 58% of the total population are non-workers according to the 1961 census. (Estimated population of Gudiyatham taluk during mid 1966 may be around 410,000 (a) Gudiyatham=54,000, (b) Rest=356,000.)

The leprosy treatment and control area was divided into 3 administrative blocks; in block 1,

17 clinics; in block 2, 7 clinics; and in block 3, 15 clinics have been opened. A population survey was carried out in the first block before starting any clinics in that area. This was time-consuming and the people suspected of the disease had to wait a few months for initiation of treatment. Therefore, in the other 2 blocks, treatment clinics were opened to begin with, followed by survey and education programmes based on the treatment clinics. While in blocks 1 and 2 the patients are treated only at the clinics, in block 3 treatment is given at schools as well.

Till November, 1966, a total of 197,756 persons have been examined out of a total population of 256,103 surveyed. In the rural areas practically 100% of the population surveyed has also been examined. But in urban areas, there is considerable resistance to the idea of examination by paramedical personnel for evidence of leprosy. The more educated and the higher the social strata, the less likely is the person to permit physical examination.

[★] This work was entirely financed by the Swedish Red Cross, Stockholm.

The block-wise distribution of population surveyed and population examined is given below (Table 1). (These figures include the clinic in Gudiyatham town area also.)

TABLE 1
Population examined in the 3 blocks

| Block | Total Population (covered so far) | Population Examined | % Examined |
|-------|---|------------------------|---------------|
| 1 | 110,522 | 86,710 | 78.4% |
| 2 | 71,925 | 54,909 | 76.3% |
| 3 | 73,656 | 56,137 | 76.2% |
| Total | 256,103 | 197,756 | 77.2% |

This report is mainly concerned with the presentation of data regarding patients suffering from leprosy in each block with reference to their sex, age and type of disease, indicating the prevalence of leprosy (per hundred population examined). Details regarding the prevalence of leprosy at individual centres in each block in

relation to other factors will be reported in a later communication. Tables 2 and 3 accompanying this report include figures from Gudiyatham centre whereas in the subsequent tables the figures for Gudiyatham centre have been excluded since the correct population figures corresponding to the patients attending the clinic have not yet been fully obtained. The patients presented in this report are those who are resident in the area served by the clinics as of November, 1966, and are registered as patients in the clinics.

Persons aged 15 years and less are grouped as children, while those above 15 years are noted as adults in this report.

RESULTS

(a) General Findings

In Tables 2 and 3 the characteristics of patients are shown according to their sex, age and classification. In Tables 4 to 10 the prevalence of the disease in relation to certain population characteristics are indicated.

TABLE 2
Distribution of Patients by Sex and Age (including Gudiyatham)

| Persons | Male | | Female | | Total | | Sex Ratio | |
|----------|-------|-------|--------|-------|-------|-------|-----------|-----|
| | No. | % | No. | % | No. | % | M | : F |
| Adults | 2,528 | 71.0 | 1,696 | 68.2 | 4,224 | 69.9 | 1.49 | : 1 |
| Children | 1,033 | 29.0 | 789 | 31.8 | 1,822 | 30.1 | 1.30 | : 1 |
| Total | 3,561 | 100.0 | 2,485 | 100.0 | 6,046 | 100.0 | 1.43 | : 1 |

Among patients, there appear to be more males than females. However, among children this sex difference is not significant. The actual prevalence according to sex, however, is different in adults and children as will be shown later.

The proportion of adults seen among all patients is around 70% and this pattern is similar in both males and females.

Table 3 is an expanded form of Table 2 showing the break-up figures according to the type of disease.

Taking all patients together, slightly more than half the patients belong to the tuberculoid

type. The picture is, however, different in respect of adults and children as is shown in the table. 47.7% of adult patients have tuberculoid leprosy, whereas the corresponding figure for children is 63.8%. The number of patients with indeterminate type of leprosy among children is more than double the corresponding number for adults. An important feature of this table is the sex-difference among adults regarding the type of disease. Only 19.4% among adult females have lepromatous leprosy, whereas the corresponding figure for adult males is 34.5%. The pattern of leprosy according to the different types is similar among male and female children.

TABLE 3

Distribution of Patients by Classification of Disease, Sex and Age (including Gudiyatham)

| Class | Adults | | Children | | Total | | Total |
|---------------|----------------|---------------|---------------|--------------|----------------|----------------|----------------|
| | Male | Female | Male | Female | Adults | Children | |
| Lepromatous | 872 34.5% | 330 19.4% | 45 4.4% | 23 3.0% | 1,202 28.5% | 68 3.1% | 1,270 20.0% |
| Tuberculoid | 1,065 42.1% | 951 56.1% | 662 64.0% | 500 63.2% | 2,016 47.7% | 1,162 63.8% | 3,178 52.5% |
| Borderline | 311 12.3% | 146 8.6% | 36 3.5% | 40 5.0% | 457 10.8% | 76 4.1% | 533 8.8% |
| Indeterminate | 280 11.1% | 269 15.9% | 290 28.1% | 226 28.8% | 549 13.0% | 516 29.0% | 1,065 18.7% |
| Total | 2,528 100% | 1,696 100% | 1,033 100% | 789 100% | 4,224 100% | 1,822 100% | 6,046 100% |

Table 4 shows the prevalence of leprosy by sex and age in each block. In this and subsequent tables details of Gudiyatham centre are excluded. The lesser prevalence in block 1 as compared with blocks 2 and 3 may be due to the difference in the method of approach which has already been mentioned.

TABLE 4
Prevalence by Sex and Age
(excluding Gudiyatham)

| Block | Men | Women | Male Children | Female Children | Total |
|-------|------|-------|------------------|--------------------|-------|
| 1 | 3.50 | 2.44 | 1.20 | 1.20 | 2.15 |
| 2 | 6.14 | 3.51 | 2.04 | 1.80 | 3.46 |
| 3 | 4.89 | 3.75 | 3.65 | 2.83 | 3.82 |
| Total | 4.34 | 3.07 | 2.13 | 1.85 | 2.91 |

(1)

(2)

(1) Probability < 0.001: statistically significant

(2) Probability > .06: statistically not significant

The over-all prevalence of leprosy in the area covered so far works out to 2.9%. The prevalence among adult males is markedly higher than that among adult females. In children this difference in prevalence is not significant.

Table 5 indicates the prevalence of leprosy according to classification of disease.

TABLE 5
Prevalence by Class of Disease
(excluding Gudiyatham)

| Block | Leprom. | Tubercul. | Border. | Indet. | Total |
|-------|---------|-----------|---------|--------|-------|
| 1 | 0.39 | 1.35 | 0.18 | 0.23 | 2.12 |
| 2 | 0.94 | 1.73 | 0.38 | 0.42 | 3.46 |
| 3 | 0.75 | 1.79 | 0.20 | 1.07 | 3.82 |
| Total | 0.60 | 1.55 | 0.22 | 0.53 | 2.91 |

A little over one-fifth of the total number of patients belong to the lepromatous group with the corresponding prevalence rate of 0.6%.

A frequency distribution of the 37 centres according to over-all prevalence of leprosy is shown in Table 6.

TABLE 6
Distribution of Centres according to Prevalence
of Leprosy (excluding Gudiyatham Centre)

| Prevalence (%) | Number |
|----------------|--------|
| 0-1.99 | 8 |
| 2-2.99 | 13 |
| 3-3.99 | 6 |
| 4-4.99 | 2 |
| 5 and over | 9 |
| Total | 37 |

In Table 7 the frequency distribution of centres according to prevalence of leprosy among adult males is given.

TABLE 7

Frequency Distribution of Centres according to Prevalence of Leprosy among Adult Males (excluding Gudiyatham)

| <i>Prevalence (%)</i> | <i>Number</i> |
|-----------------------|---------------|
| 0-1.99 | 1 |
| 2-2.99 | 6 |
| 3-3.99 | 6 |
| 4-4.99 | 8 |
| 5 and over | 16 |
| Total | 37 |

In Table 8 the frequency distribution of centres according to prevalence of leprosy among adult females is presented.

TABLE 8

Frequency Distribution of Centres according to Prevalence of Leprosy among Adults and Females (excluding Gudiyatham)

| <i>Prevalence (%)</i> | <i>Number</i> |
|-----------------------|---------------|
| 0-1.99 | 4 |
| 2-2.99 | 13 |
| 3-3.99 | 9 |
| 4-4.99 | 3 |
| 5 and over | 8 |
| Total | 37 |

In Tables 9 and 10 similar frequency distributions are given for male and female children.

TABLE 9

Frequency Distribution of Centres according to Prevalence of Leprosy among Male children (excluding Gudiyatham)

| <i>Prevalence (%)</i> | <i>Number</i> |
|-----------------------|---------------|
| 0-1.99 | 20 |
| 2-2.99 | 4 |
| 3-3.99 | 5 |
| 4-4.99 | 2 |
| 5 and over | 6 |
| Total | 37 |

TABLE 10

Frequency Distribution of Centres according to Prevalence of Leprosy among Female children (excluding Gudiyatham)

| <i>Prevalence (%)</i> | <i>Number</i> |
|-----------------------|---------------|
| 0-1.99 | 21 |
| 2-2.99 | 5 |
| 3-3.99 | 3 |
| 4-4.99 | 2 |
| 5 and over | 6 |
| Total | 37 |

(b) *Intrafamilial Study in Block 1—some preliminary results*

While analysing epidemiological data in relation to disease, it is useful to consider the family as one unit. This would also help in the study of genetic factors, if any, pertaining to the transmission and susceptibility to the disease.

There were about 15,210 families examined in block 1 as of November, 1966. Out of these, 1,504 families have at least *one* leprosy patient, giving an over-all prevalence of 10%.

The distribution of families which have leprosy patients is shown according to the number of patients in each family (Table 11).

TABLE 11

Distribution of families according to number of patients

| <i>No. of Patients</i> | <i>No. of Families</i> | <i>%</i> |
|------------------------|------------------------|----------|
| 1 | 1,216 | 80.90 |
| 2 | 228 | 15.00 |
| 3 | 43 | 2.90 |
| 4 | 14 | 1.00 |
| 5 | 2 | 0.14 |
| 6 | 1 | 0.06 |
| Total | 1,504 | 100.00 |

The average number of members in families which have a leprosy patient is shown in Table 12.

TABLE 12
Average family size

| No. of Patients | 1 | 2 | 3 and over | All |
|---------------------|---|---|------------|-----|
| Average Family Size | 5 | 6 | 7 | 5 |

There were a few wherein all the members had leprosy. The number of such families is shown in Table 13.

TABLE 13
Families where all members are patients

| Family Size | Patients | No. of such Families |
|-------------|----------|----------------------|
| 1 | 1 | 35 |
| 2 | 2 | 12 |
| 3 | 3 | 2 |
| 4 | 4 | 2 |
| 5 | 5 | 1 |

There were 304 families with at least *one* lepromatous leprosy patient. This indicates that 22.2% of the patient families have at least *one* lepromatous patient, giving a prevalence of 2.1% of all families.

Similarly, there were 998 families with at least *one* tuberculoid patient; thus 68.4% of patient families have at least *one* tuberculoid patient, or a prevalence of 6.6% of all families.

Further analyses will be reported later.

COMMENTS

The different methods of approach in the 3 blocks may make the comparative study of the epidemiology of leprosy in this area somewhat difficult at this stage. Nevertheless, the present programme gives a fair idea of the different characteristics of the patients in relation to similar features in the population of the project area.

The difference in the incidence of leprosy between male and female members of the population is significant only in the adult population. Among children, i.e., those below 15 years of age, however, the incidence of leprosy among males and females is almost the same.

50% of all leprosy patients in this area have tuberculoid type of leprosy; 20% lepromatous type; 20% indeterminate and 10% borderline. However, there is a marked difference in the distribution of leprosy according to classification among adults and children; and among adult males and adult females.

In all the blocks, the prevalence of lepromatous leprosy among adult males is significantly higher than that among females. Sex ratio in the entire population is 982 whereas among patients it is 740. Unknown causes, such as hormonal influences, in determining susceptibility to *M. leprae* may be worth exploring.

The over-all prevalence of leprosy in this area is 2.91% and prevalence of lepromatous type is 0.60%. The over-all prevalence of leprosy among males (adults and children) is higher (3.24%) than that among females (adults and children 2.46%).

10% of the families in the project area have at least *one* leprosy patient among them.

Among the families with at least *one* leprosy patient in the family, 22.2% have at least *one patient with lepromatous leprosy*, giving a prevalence of 2.1% of all families in the project area.

68.4% of patient families have at least *one tuberculoid leprosy patient*, giving a prevalence rate of 6.6% of all families in the project area.

SUMMARY

1. The over-all prevalence of leprosy in the Gudiyatham taluk is 2.9%.

2. The prevalence rate for lepromatous leprosy is 0.6%, and forms 20% of total number of leprosy patients.

3. There is significant difference in the prevalence of leprosy between men and women, but not so among children.

4. The pattern of leprosy among children is different from

5. Preliminary analysis of intrafamilial incidence of leprosy shows a 10% prevalence among all families. The pattern according to type of leprosy is similar to that observed earlier according to individuals.

ACKNOWLEDGEMENTS

This work could not have been undertaken but for the munificent financial support by the Swedish Red Cross. We would like to express our gratitude to the authorities of the Swedish Red Cross for their continued encouragement and financial support.

We would like to record our deep appreciation of the valuable work done by Dr. and Dr. (Mrs.) Valentine Macaden, whose diligence and hard work laid the foundations of this programme.

We acknowledge with gratitude their magnificent contribution to this programme. We are grateful to the many paramedical workers who have worked in the field and without whose steady and loyal service this programme would not have been possible.

We thank Mrs. L. Furness and Mr. P. L. N. Reddy for secretarial assistance; Mr. Chelladurai for statistical assistance, and Mr. Anandaraj for help with the medical records.