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ORIGINAL ARTICLES

EPIDEMIOLOGICAL SURVEY OF LEPROSY IN MAHARASHTRA STATE (INDIA)*

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INTRODUCTION

The epidemiology of leprosy is shrouded in mystery. Till recently, only sketchy reports of a few sample surveys were available to indicate the approximate prevelence rates etc. Now, though a fairly accurate data on the pattern of leprosy in different areas is available, which incidently shows great variation from region to region and also within the same region, the factors responsible for these variations are still not well understood. From time to time many explanations have been suggested to understand these factors, but the explanations are as varied as the pattern of the disease.

The analysis presented in this paper is based on the results of surveys conducted by the various leprosy control units working in the rural areas of the State for nearly 3 years under the National Leprosy Control Programme, and no epidemiological studies were preplanned. The figures represented here are those that were actually present at the time of the survey and all the surveys conducted till the end of 1961 have been taken into consideration.

EPIDEMIOLOGICAL DETAILS

The prevalence rate of leprosy in the State is approximately 0.8 percent with lepromatous rate of approximately 25 percent, the child rate of 13.5% and the male rate varying between 52 and 78 percent.

The map (not printed) along side shows the prevalence of leprosy in different areas of the State. It shows that with Bombay City as the starting point, the prevalence of leprosy increases as we go away from it except in the South and to a limited extent in the South East of Bombay. The extreme South Eastern and Eastern parts have higher prevalence rates.

It further shows that the prevalence rate in the Western coast, north of Bombay is much high as compared to the western coast, south of Bombay.

* Based on the paper read at the IV All India Conference of Dermatologists and Venereologists 1962 (Bombay).

The average district wise prevalence rate together with lepromatous rate, male rate and child rate is shown in Table I below :—

TABLE I

Prevalence Rate of Leprosy in the various districts to-gether with Lepromatous Rate, Male Rate and Child Rate.

Sr. No.	Name of the District	Prevalence of Leprosy	Lepromatous Rate	Male Rate	Child Rate
1.	Ratnagiri	1.96	43.00	67.80	8.2
2.	Poona	2.06	58.98	60.00	7.5
3.	Dhulia	2.12	50.62	61.25	7.98
4.	Kolaba	2.24	41.37	78.43	6.77
5.	Kolhapur	4.05	43.87	77.42	8.87
6.	Nasik	5.12	31.89	60.00	13.67
7.	Aurangabad	5.39	45.00	58.50	10.90
8.	Buldhana	5.18	31.47	59.70	10.00
9.	Nagpur	5.60	27.37	57.73	12.79
10.	Ahmednagar	6.12	41.69	65.32	10.91
11.	Thana	6.56	45.09	60.81	5.25
12.	Jalgaon	7.65	25.73	66.27	18.9
13.	Satara	8.01	35.62	76.31	13.07
14.	Amravati	10.02	15.76	70.31	15.31
15.	Wardha	10.12	29.47	65.01	14.12
16.	Parbhani	10.13	22.24	53.48	15.88
17.	Bhir	10.16	21.84	71.49	14.73
18.	Osmanabad	10.18	31.6	59.68	9.9
19.	Akola	10.56	16.26	62.18	14.38
20.	Yeotmal	10.58	20.54	64.28	10.96
21.	Sangli	15.10	35.60	73.58	12.77
22.	Bhandara	15.08	29.5	55.89	14.47
23.	Nanded	17.28	25.5	52.13	25.33
24.	Sholapur	18.02	17.5	68.47	20.85
25.	Chanda	18.07	18.18	56.23	18.62

Note :—A child is one who is below 15 years.

This table shows that the lepromatous rate is inversely proportional to the prevalence rate and the child rate is directly proportional to the prevalence rate and not lepromatous rate. This ratio is shown in Table II below :—

TABLE II

Prevalence rate	Less than 5/1000	Between 5-10/1000	More than 10/1000
Lepromatous Rate	40–60%	25–45%	15–35%
Child rate	6–9%	5–18%	10–25%

It shows that the largest proportion of cases are above the age of 10 years. The peak is in the age group 25 to <30 years. It also shows that though the graph is steadily rising from the lower age group to higher age group, there is a slight fall in the age group 15 to <20 years.

Another interesting feature observed in these studies, is that the multiple case families are less than 20% throughout the states and this analysis will be reported separately.

In one of the centres (Vairag, Dist:-Sholapur), where the prevalence rate is roughly 3 percent and the lepromatous rate 19 percent, a detailed epidemeological analysis of data was undertaken. A part of it has already been reported earlier.

In the area covered by that centre, there were 1276 leprosy patients distributed in 1123 families. Of these families 172 families were multiple case famalies giving a percentage of 15 and in the rest of the families, there was only one case in each family. The distribution of these families according to the type of leprosy in the Index case is shown in Table III below :—

TABLE III

Type of disease	Total No. of families with type of the the disease in the index case	No. of multiple case families with type of disease in Index case	% of multiple case families
Lepromatous	203	47	23%
Non-Lepromatous	920	125	13%
TOTAL	1123	172	15%

It shows that there are more multiple case families in leprous households with lepromatous cases than those households having non-lepromatous cases but it is limited only to 23%. It has already been shown in an earlier paper that, of these multiple case families more than 80% are only two case families and less than 20% of them have 3 or more patients in them.

These 1123 families in the area had between them 5376 contacts. Of these contacts only 153 were found to be suffering from leprosy at the time, giving an infection rate of only 2.8% which is nearly the same as the prevalence rate of leprosy in the area. The 172 multiple case families had between them 935 contects. Of these contacts only 153 were suffering from leprosy, giving a percentage of 16 only.

The distribution of these leprosy cases by age groups to-gether with other healthy cantacts in these multiple case families is shown below in Table IV. This table also gives the percentage of contacts who have developed leprosy as compa-

red to the total number of contacts in that age group related to the type of index case.

TABLE IV

Index case	Secondary cases				Healthy contacts			
Age Group	0-<5	5-<15	15 & over	Total	0-<5	5-<15	15 & over	Total
Non-Lepromatous	8 (7.5%)	57 (24%)	32 (11%)	97 (15%)	98	180	252	530
Lepromatous	8 (25.8%)	26 (22.4)	22 (14.6%)	56 (18%)	23	90	139	252
Total	16 (11.6%)	83 (23.5%)	54 (12.0%)	153 (16%)	121	270	391	782

(Figures in brackets are the percentages)

The above table IV shows that in multiple case families large number of patients arise from amongst children as compared to the adults. Amongst children, larger percentage of patients arise in 5 to < 15 years age group in non-lepromatous households whereas there is larger percentage in 0< 5 in lepromatous household though equally large percentage is in 5-< 15 age group. Taking all ages together there is not much difference between lepromatous and non-lepromatous households.

Table V below compares the total cases amongst contacts with those in the community and shows that of all the 16 cases (i. e. 100%) in 0-< 5 age group in the community are from amongst the contacts whereas in 5-< 15 age group, it is 33% from amongst the contacts and in adults it is only 5% from amongst the contacts.

TABLE V

Age groups	0-<5	5-<15	Adults
Total cases in the Community	16	253	1006
Cases amongst the contacts	16	85	53
	(100%)	(33%)	(5%)

Table VI below compares the age group wise ratio of leprosy cases from amongst the contacts with that in the community and shows that in the contacts, the chances of developing leprosy is high in the children as against the adults in the community.

TABLE VI

Age group	0-<5	5-<15	15 & over
Ratio of cases amongst contacts	10.5%	54.6%	34.90%
Ratio of cases in the community	1.3%	19.9%	78.8%

DISCUSSION

In Maharashtra State, the pattern of leprosy varies from region to region but it has a pattern peculiar to it's own i.e. the prevalance rate incteases in a fan like manner from one point. The other peculiarity is that the child rate is not related to the lepromatous rate, inspite of the fact that lepromatous cases are highly infectious and the children are more susceptible. It is related to the total prevalence rate. Lepromatous rate is also inversely proportional to the prevalence rate.

The study of contacts developing leprosy shows that the infection rate amongst household contacts is nearly the same as the prevalence rate of leprosy in the area and the majority of the contacts escape the infection inspite of the fact that there is constant and prolonged contact and more than 80% of the leprous families are single case families.

Even multiple case families, majority of the contacts are free from leprosy and more than 80% of these multiple case families .have only one more case in the family.

It is a well known fact now, tnat leprosy is a self healing disease particularly in childaen, in whom about 60–70 percent of the cases heal without any treatment. Even considering this, it was expected that in highly endemic areas the child rate should be much higher than what is revealed by survey. The child rate also should have been very high amongst the household contacts but this also is not seen. Even in multiple case families, majority of the contacts escape infection.

The difference is revealed only on comparing the ratio of cases amongst the contacts and that in the whole community. In this comparison, it is clear that more cases are seen in children than in adults and this difference is more marked in contacts of lepromatous cases than the contacts of non–lepromatous cases.

From this it is presumed that a contact with a leprosy case, even an infectious case, for a prolonged period is not the main thing to get the disease. Contact is essential and that too with an infectious case but after the contact there are many other factors which may come into play before infection develops into disease. This should be particularly true, in view of the fact that in less endemic areas, the lepromatous rate is high and also to the fact that the distribution of leprosy in the various parts of Maharashtra is in the fan shaped pattern.

It should therefore be our endeavour to find out these factors, if possible.

One thing is very clear from the above study. It is that the house hold contacts, if they develop the disease, it is more during childhood than in the adult age. From this, one may presume that the large number of leprosy patients of adult age in the community did not have the opportunity to contact leprosy either from known cases or from unknown cases during childhood. It is not true to say that adults are comparitively immune. It is the opportunity to contact with leprosy case that decides the age and possibly the sex. Unless there is a case

in the household, children below 10 years usually do not get that opportunity and hence the low child rate in the community and the difference between the child rates amongst the contacts and that in the general community. The opposite is the case in adults.

The children from amongst the contacts, who escape the disease and enter adult hood, usually remain free from the disease possibly due to the development of immunity.

It is also inferred that there is no familial diathesis that may be responsible for the development of leprosy in house hold contacts, because of the less number of multiple case families and also even in these families large number of contacts escape the disease. However a personal and possibly a tribal or communal susceptiblity may be playing an important role, deciding the final fate rather than simple contact with leprosy case, however prolonged or intimate it might not be.

It also suggests that a household contact is not very essential in keeping the disease alive. Extra household contact, particularly in bigger children and in adults, play an equally important role. This is more important with a very large number of unknown leprosy cases in the community.

It seems therefore very desirable to study the various factors that are responsible in keeping the disease alive and also to detect the unknown cases to bring them under treatment, if leprosy is to be controlled.

The study of the various factors can be done by detailed epidemeological studies in many differant areas and comparing their results.

SUMMARY

1. The epidemeological pattern of leprosy in Maharashtra State is discussed.
2. The child rate amongst the household contacts and that in the community is discussed.
3. That only contact with leprosy cases, even infectious only, is not the deciding factor in successful transmission of leprosy.
4. The possible role of factors other than simple contact with leprosy cases for the successful transmission of leprosy is stressed.
5. A suggestion has been made to have epidemeological studies in different areas and to compare their results to understand the various factors responsible for successful transmission of leprosy.

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