Leprosy surveys in urban slums—possibilities for epidemiological investigations*

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Summary Rapid industrialization and a population explosion in urban areas like Bombay have promoted the growth of a large number of slums where some 40% of the city's population is living in an overcrowded, unhygienic environment. This has led to many acute and chronic public health problems, one of the gravest of which is leprosy. Intensive surveys of 8 slums, in which 31,950 subjects were screened for leprosy, revealed a range of prevalence between 5.9 and 22.8/1,000 with an average rate of 11.9/1,000, thus indicating slums as hyperendemic foci. The average smear-positive case prevalence rate was 1.1/1,000 and this shows a high quantum of infection in the slum communities. Contrary to general belief, these urban slums are stable in nature, housing a population coming from different parts of India. Various epidemiological investigations relating to leprosy under urban conditions therefore seem to be possible if our experience is indicative.

Introduction

Rapid industrialization and a constant influx of population into urban areas like Bombay, Calcutta and Madras have created environmental problems related to overcrowding, housing, water shortage, sewerage etc., leading in turn to a variety of public health problems in the form of diseases such as typhoid, infectious hepatitis, malaria, tuberculosis and leprosy. Since these problems could not be tackled on preventive grounds they are now acute and chronic. Leprosy has emerged as one of the major health problems in Bombay, where, in

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a population of 8 million people, it has been estimated that about 40% live in the slums of the city.

Earlier school surveys¹ clearly pointed out the existence of endemic foci for leprosy in different parts of Bombay, especially in the northern suburbs, and it was thought that the source of infection in the community could be mostly in the slums. One subsequent study² indicated the possibilities of subjecting slum dwellers to scientific screening for evidence of leprosy even under conditions prevailing in overpopulated cities such as Bombay. One such investigation³ showed the existence of a hyperendemic slum focus with a prevalence rate of smear-positive cases of 3/1,000. Based on these studies, the urgent need to survey these slum pockets in order to contain the infection was stressed, but further studies are necessary to collect epidemiologically significant data to plan effective public health measures against this disease. However, it is generally believed, wrongly, that the urban slum population is unstable and therefore unsuitable for epidemiological investigations. In this study we have attempted to collect data on slum dwellers, on place of origin, period of residence in slums etc., and relate these to prevalence rates of leprosy.

Materials and methods

Intensive house-to-house surveys were conducted for leprosy in 8 slums located in H and T wards of the Municipal Corporation of Greater Bombay. The surveys were done by trained and well-experienced paramedical workers. In 3 slums (Mount Mary, Khar-East, and Anandnagar) a special effort was made to collect data on place of origin, period of residence, etc. The data from these 8 slums were analysed for the present study.

Results

Table 1–5 show the information gained from the surveys, and the following points emerge:

Table 1: (i) Intensive examination of the population with a coverage of 81% was quite possible. (ii) In none of the slums was the prevalence rate less than 1/1,000, at which level public health measures against leprosy should be implemented.⁴ (iii) The overall prevalence rate of 11.9/1,000 is a clear indication of hyperendemicity. (iv) The prevalence rate of smear-positive cases ranged between 0.5 and 3/1,000 (mean 1.1/1,000) thus showing different levels of intensity of infection in these slum communities.

Table 1. Prevalence rate (PR) of leprosy in different slums

Slum	Enumerated population	Examined population	Total cases	PR/1,000	Smear +ve cases	PR of +ve cases
Danpada group	4,292	3,614	34	9.4	2	0.55
Ambedkar Road						
KM Colony	4,586	3,712	34	9.2	5	1.3
Madlapada group	3,925	3,248	74	22.8	10	3.0
Kherwadi	10,720	8,597	117	13.6	7	0.8
Khar-East	3,216	2,583	18	6.9	2	0.8
Mount Mary	4,703	3,803	36	9.5	5	1.3
Khotwadi	5,526	4,415	26	5.9	4	0.9
Anandnagar	2,377	1,978	43	21.7	1	0.5
Totals	39,345	31,950	382	11.95	36	1.1

Table 2. Duration of residence of slum dwellers

Residence (years)	Population enumerated	%
0-5	2,559	25
6-10	2,210	22
Over 11	5,427	53
Totals	10,196	100

Table 2: An analysis of the enumerated population of 10,196 living in 3 slums whose information on this aspect was available (Mount Mary, Khar-East and Anandnagar) showed that 75% of the inhabitants had been living in these slums for over 6 years, which can be considered as a criterion for stability of the population.

Table 3: (i) Analysis of 382 leprosy patients showed that 272 (71%) had been living in the slums for over 11 years and 346 (90%) for over 6 years. (ii) We were struck by the fact that 32 (89%) smear-positive cases had lived in the slums for more than 11 years and 35 (97%) over 6 years.

Table 4: (i) People from practically all the states of India were living in these slums. (ii) 34% of the 10,196 enumerated population came from the Ratnagiri district of Maharashtra state and 28% from the remaining parts of the same state; 15% were from Uttar Pradesh. The remaining population came from other states. (iii) The overall prevalence of leprosy among those coming from various districts of Maharashtra was 16.2/1,000 (10.5/1,000 for those exclusively from Ratnagiri). The Uttar Pradesh group showed a prevalence rate of 7.4/1,000.

More detailed analysis pertaining to 382 leprosy patients regarding their

Table 3. Duration of residence of leprosy cases

Residence (years)	Total cases	%	Smear +ve cases	%
0-5	36	10	1	3
6-10	74	19	3	8
Over 11	272	71	32	89
Totals	382	100	36	100

Table 4. Place of origin and prevalence rate (PR) of leprosy

Place of origin of population	Enumerated population	Examined population	Cases	PR/1,000
Ratnagiri district	3,509 (34%)	2,199	23	10.5
Other districts of Maharashtra	2,880 (28%)	2,478	53	21.3
Maharashtra State as a whole	6,389 (63%)	4,677	76	16.2
Uttar Pradesh	1,490 (15%)	1,084	8	7.4
Other states	2,317 (22%)	2,016	13	6.4

Table 5. Multiple case families

Families with leprosy cases	— 321
Multiple case families	— 44 (13.7%)
Families with associated Smear-positive case	— 16 (5%)

place of origin also showed that 94 (25%) were from Ratnagiri district 46 (12%) from Bombay proper. From Maharashtra as a whole there were 228 patients accounting for 60%.

Table 5: (i) 13.7% of the families were associated with more than one case. (ii) 5% had a smear-positive case in the family.

Discussion

For the first time, figures on a large scale on the prevalence of leprosy in some of the slums in Bombay are available. All these figures clearly point out that these slums are hyperendemic for leprosy with a high quantum of infection in the slum community, for which not only the slum dwellers but also non-slum

dwellers of all strata are constantly exposed. This stresses a need for an immediate implementation of public health measures to contain the infection.

This study also shows that the slums could be surveyed, with a minimum coverage of 80%, with proper planning and employing trained paramedical teams.

The reason for variable prevalence rates in different slums could not be explained. One possible factor could be the varying genetic stock, since about 95% of the slum dwellers came from different states, where prevalence rates of leprosy are also variable. The prevalence rate among those from Ratnagiri was almost 10 times the estimated prevalence rate of 1.67/1,000 in the district proper.⁵ A possible explanation could be that, due to low endemicity, the Ratnagiri population has no chance of developing natural immunity, and once they become exposed to a hyperendemic situation in Bombay they may be more likely to contract the disease. However, statistically planned immuno-epidemiological studies on a larger scale in both Ratnagiri and Bombay may provide an explanation.

Contrary to the general belief, the urban slum population is stable, with minimal migration, so that long-term epidemiological studies can be undertaken easily.

The fact that 90% of the leprosy cases had been living in the slums for more than 6 years shows that some of them must have contracted the disease after their arrival. The period of residence of 97% of the smear positive cases for more than 6 years indicates their contribution towards the pool of infection in the community, and transmission of the disease.

The prevalence rates of deformities which were calculated for Mount Mary and Khar-East, 2.4 and 1.1/1,000 respectively, also helps to illustrate the overall gravity of the deformity problem in the slums, thus helping to plan a better service.

Many of the other factors related to the leprosy problem in slums are the subject of another study, which will be presented at a later date.

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