Epidemiology of leprosy in urban Agra

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Introduction

A recent survey conducted in Agra has shown that the leprosy caseload in rural areas of the
district is high.1 Since a similar situation may be expected in the urban population, a sample
survey of the urban region of the entire district has been undertaken to find the case load
(Prevalence and New Case Detection rate; NCDR) and any risk factors associated with the
disease.

Materials and methods

The present work was undertaken during May 2000 and June 2001 and covered the urban
areas of all the sub-districts (Tahsil). The aim was to cover all households. The survey team
comprised trained paramedical workers and highly experienced medical doctors. Details on
household characteristics (house type/cleanliness in and around the house, exposure to
sunlight, toilet facility etc.) and the occupant’s (age/sex, education/occupation, BCG status)
were recorded with the outcome of clinical examination. Persons with leprosy requiring
treatment and without a history of leprosy treatment were taken as new cases, while those
with a history of inadequate treatment were regarded as prevalent cases.

A total of 60,179 persons, from more than 120 smaller localities in semi-urban and slum
areas, were examined in the door-to-door survey. Chi-square (χ²) test was used to compare
prevalence and adjusted odds ratios are computed using logistic regression.
Table 1. NCDR and prevalence/10,000 by Tahsil in urban Agra, 2000–2001

<table>
<thead>
<tr>
<th>Tahsil</th>
<th>Persons examined</th>
<th>NCDR/10,000</th>
<th>Prevalence/10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Etinaadpur</td>
<td>4909</td>
<td>30.6</td>
<td>36.7</td>
</tr>
<tr>
<td>2. Kirtali</td>
<td>3057</td>
<td>22.9</td>
<td>26.2</td>
</tr>
<tr>
<td>3. Kheragarh</td>
<td>5171</td>
<td>9.7</td>
<td>9.7</td>
</tr>
<tr>
<td>4. Fatehabad</td>
<td>4064</td>
<td>27.1</td>
<td>27.1</td>
</tr>
<tr>
<td>5. Bah</td>
<td>982</td>
<td>30.5</td>
<td>40.7</td>
</tr>
<tr>
<td>6. Agra</td>
<td>41,996</td>
<td>30.7</td>
<td>37.6</td>
</tr>
<tr>
<td>Agra Urban</td>
<td>60,179</td>
<td>28.2</td>
<td>33.9</td>
</tr>
</tbody>
</table>

Results

Prevalence of Leprosy

The overall prevalence rate in urban Agra district was found to be 33.9/10,000 (range: 9.7–40.7) and new case detection rate was 28.2/10,000 (range: 9.7–30.7) (Table 1).

The prevalence of leprosy among children (<15 years) was found to be 4.4/10,000. Adult males (≥15) had a significantly higher prevalence per 10,000 (92 vs 41.6) of leprosy than the females of the same age group. Prevalence rates increased with age (P<0.0001). Manual workers were found to have significantly (94.9 vs 21.3, \( \chi^2 = 137.5, P<0.0001 \)) higher prevalence of leprosy than others. The prevalence rate was significantly lower among persons living in clean housing and having clean surroundings (64.3 vs 31.9, \( \chi^2 = 10.9, P<0.001 \)) than among persons living in slovenly houses with dirty surroundings. Prevalence was also significantly higher among persons who did not have toilet facility in their houses (39.1 vs 25.5, \( \chi^2 = 5.9, P = 0.015 \)) than among those living in households with toilet facilities.

Clinical Disease

Of the 204 cases detected, 84.2% were new. Of all, 37.3% were of MB type (BB/BL/LL/BT patients with either >5 patches or with ≥3 thickened nerves). Of the MB disease, BT (MB) was seen in 12.7%, BB type (8.3%), BL type (6.4%) and LL type (4.4%) and 5.4% were of neuritic type (Table 2). Of the PB disease, 22.6% were single skin lesion (SSL) cases without nerve and 19.6% with ≥1 nerves thickened, more often local cutaneous nerves. Disability of grade II or higher was found in 12.7% of all patients and 9.4% of new patients.

Discussion

The important observations from this survey are that the leprosy prevalence of 33.9/10,000 in urban Agra is still very high when compared to the leprosy elimination target of <1/10,000. Surveys undertaken almost a decade ago in other urban areas had shown a prevalence range of 17.8–119.5.\(^2\)-\(^3\) Geographically, the disease seems to be widespread in the entire district and is commoner in older persons. However, detection of disease in children, especially MB type, indicates continuing transmission in the community.

Risk factor analysis suggested that persons living in a clean environment had 45% lesser
Table 2. Prevalence of leprosy by age/sex and classification of disease, Agra Urban, 2000–01

<table>
<thead>
<tr>
<th>Age/sex</th>
<th>Population examination</th>
<th>Disease classification</th>
<th>Total cases of all types</th>
<th>Prevalence/10,000 population examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children age &lt; 15</td>
<td>27,578</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male ≥ 15</td>
<td>11,193</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female ≥ 15</td>
<td>21,408</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total % of cases</td>
<td>60,179</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ab Patients with ≤ 2 thickened nerves taken as PB, and patients with ≥ 3 thickened nerves taken as MB.

risk (adjusted for house type, age/sex) of having leprosy (OR = 0.56, 95% CI: 0.36–0.86). Similarly, persons engaged in sedentary or white-collar jobs had a much lower risk (adjusted) of leprosy (OR = 0.63, 95% CI: 0.43–0.95) in comparison to manual (blue collar) workers. This could be due to higher chances of exposure in labour-oriented jobs and therefore the increased risk of infection. Again, persons living in households with toilet facilities had 28% lower risk (adjusted) of having leprosy (OR = 0.72, 95% CI: 0.53–0.97) than persons who did not.

These observations reveal an association between poor sanitary conditions and the risk of leprosy as reported from Malawi⁶ and Punjab.⁷ Examination of contacts of 76 MB patients detected three cases of leprosy, giving a prevalence rate of 104/2/10,000 (3/288) among MB contacts, whereas among contacts of PB patients the prevalence rate was 43/2/10,000 (2/463). It is suggested⁸ that although residential contact with MB cases is the strongest known risk factor for transmission of leprosy, the vast majority of such contacts never manifest disease, which indicates a role for genetic and/or environmental factors.⁹ It can thus be postulated that a dirty living environment may create conditions associated with increased risk of leprosy.

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