

EPIDEMIOLOGY OF POLIOMYELITIS IN A SLUM OF BOMBAY

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ABSTRACT

A disease prevalence and immunization coverage survey in a typical slum in Bombay in the year 1988 revealed 93 children with residual poliomyelitis amongst 14,439 children below 9 years of age, indicating high (33.0/100,000 population) annual incidence of poliomyelitis. Only 62 (66.6%) of these 93 lame children sought admission in hospital during the acute phase of illness. The high incidence was attributed to a low immunization (OPV) coverage level in the most vulnerable age group. The immunization coverage for 3 doses of oral polio vaccine below 2 years of age was 43.5%. A large number of children were not commencing their immunization schedule at the right age. The survey indicated a poor "community participation" in the immunization programmes due to a poor "health awareness".

Key words: *Poliomyelitis, Incidence, Immunization.*

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Bombay with the present population of 9 million is highly endemic for poliomyelitis. The incidence of paralytic poliomyelitis in Bombay from the years 1982 to 1987 was above 10/100,000 population(1).

Poor environmental sanitary conditions that prevail in slums, facilitates easy feco-oral transmission of infection. The slum population of Bombay is estimated to be 45 to 50% of the total population. Enterovirus Research Centre's surveillance on poliomyelitis reveals that about 90% of the attacks of acute paralytic poliomyelitis occur in the children residing in the slums, and that 50 to 55% of the "Non-slum" population contributes to only 10 to 15% of the total cases(1).

To document whether this disproportionately high incidence in the slum population can be attributed to a low immunization (OPV) coverage in the susceptible population, a survey was undertaken from December, 1987 to January, 1988 in a large representative slum in Bombay, viz., Juhu Lane located in the Municipal Ward 'K'.

Material and Methods

The survey was undertaken in December, 1987 and was completed in January, 1988. The work was carried out by "Door to Door" visits. Besides the information of a family, the details such as Name, Age, Sex, Immunization (OPV) status of all the children below 9 years of age were recorded on a standard proforma. In the case of fully or inadequately immunized (against polio) children, the details of the number of doses of oral polio vaccine administered and age of commencement of immunization were also recorded. All the children below 9 years of age were inspected for lameness and the diagnosis of paralytic poliomyelitis was confirmed (or

ruled out) by a Medical personnel of the team with the help of clinical examination, history and inspection of available documents. The detailed information of the attack of poliomyelitis was obtained. The locked houses were revisited.

Results

Demographic and Other Information

There were 10,014 houses in the slum with a total population of 54,046 (average 5.4 persons/house) with 14,439 children below 9 years of age.

The population belonged to low socio-economic stratum of the society and lived in extremely poor environmental sanitary conditions. Personal hygiene was found wanting.

Incidence of Paralytic Poliomyelitis

One hundred and forty lame children were detected below 9 years of age. Of these, 93 (66.4%) were confirmed as cases of residual poliomyelitis. The age-wise break-up of these 93 children was; 1 to 12

months (2 children), 13 to 24 months (11 children), 25 to 36 months (8 children), 37 to 48 months (18 children), 49 to 60 months (11 children), and 61 to 108 months (43 children).

Using the standard formula(2), the annual incidence of poliomyelitis in this slum population was 33/100,000 population.

Poliomyelitis vis-a-vis Age at Onset of Disease

Of 93 children with residual poliomyelitis, onset of disease prior to 3 months of age was observed in 1 child (1.1%) and in 12 children (12.9%) between 4 to 6 months of age, and in 81 children (87.1%) below 2 years of age (*Table I*).

Poliomyelitis vis-a-vis Immunization Status

Of 93 children with residual poliomyelitis, 52 children (55.9%) were not immunized, while 20.4% of the children were fully immunized with 3 doses of oral polio vaccine prior to the attack (*Table I*).

TABLE I—*Polio Affected Children: Age at Onset of Disease*

Age of attack (mo)	Total children (%)	FI*	PI*	NI*
1-3	1 (1.1)	0	0	1
4-6	12 (12.9)	0	4	8
7-12	33 (35.5)	6	9	18
13-24	35 (37.6)	10	5	20
25-36	10 (10.7)	2	4	4
37-48	2 (2.2)	1	0	1
Total	93 (100.0)	19 (20.4)	22 (23.7)	52 (55.9)

* FI — Fully immunized with 3 doses of OPV;

* PI — Partially immunized with ½ dose of OPV;

*NI — Non-immunized.

Hospitalization During the Acute Phase Illness

Of 93 children with residual poliomyelitis, only 62 (66.6%) were hospitalized during the acute phase of illness.

Immunization (OPV) Coverage

It is seen from Table II that the immunization coverage with three doses of oral polio vaccine in the age group below 1 year was 28.9% (573 children out of 1982), 53.4% (1678 children out of 3142) between the age group 7 to 24 months, and 43.5% (1736 children out of 3982) below 2 years of age.

Commencement of Immunization (OPV)

It is observed that of 6993 fully immunized children, only 61.4% had commenced their immunization at or before the age of 3 months, 24.8% between 4 months to 12 months, and 6.0% after the age of 12 months (age of commencement was unknown in 7.8%).

Of 1521 children immunized with 1 or 2 doses of oral polio vaccine, only 21.1% had commenced their immunization at or below the age of 3 months, 46.0% between 4 to 12 months of age and 21.0% after the age of 12 months (age of commencement was unknown in 11.9%).

TABLE II—Immunization (OPV) Status of Children

Age group (mo)	Total of No. children	FI* (%)	PI* (%)	NI* (%)	UK* (%)
1-3	413	0 (0.0)	19 (4.6)	392 (94.9)	2 (0.5)
4-6	427	58 (13.6)	128 (29.9)	236 (55.3)	5 (1.2)
7-12	1142	515 (45.0)	178 (15.6)	432 (37.9)	17 (1.5)
13-24	2000	1163 (58.2)	210 (10.5)	518 (29.0)	46 (2.3)
25-36	1953	1018 (52.1)	213 (10.9)	653 (33.5)	68 (3.5)
37-48	1649	900 (54.6)	182 (11.0)	508 (30.8)	59 (3.6)
49-60	1707	885 (51.8)	165 (9.7)	578 (33.9)	79 (4.6)
61-108	5148	2454 (47.7)	426 (8.3)	1893 (36.8)	375 (7.2)

* FI — Fully immunized with 3 dose of OPV;

* PI — Partially immunized with ½ dose of OPV;

* NI — Non-immunized;

* UK — Immunization status unknown.

Discussion

Projecting the overall picture of poliomyelitis in a metropolis like Bombay, masks the magnitude of problems in different strata of population as evident by high

(33/100,000) incidence in a representative slum surveyed. The overall incidence of poliomyelitis in Bombay in the year 1987 was 14.2/100,000 population(1). In Delhi also 64% of the cases of poliomyelitis are from crowded and less developed localities(3).

The magnitude of poliomyelitis in the slums of urban areas can be as high or even greater than the magnitude in rural areas(4-7).

Since 87.0% of the attacks are reported below the age of 2 years, immunization coverage below 2 years of age is a more relevant and informative pointer. In our study the immunizing coverage for 3 doses of OPV for age group below 2 years was 43.5%. The fact that 55.9% of the cases of poliomyelitis in our study had not been immunized prior to the attack indicates poor "community participation" in the immunization programmes. Data on age at which immunization is commenced also reveal that health education needs to be improved.

In our study, of the 93 children with residual poliomyelitis, only 66.6% cases sought admission in hospital in the acute phase of illness. This suggests that computing health indices on poliomyelitis from only hospital based data will be inaccurate.

No significant impact of immunization can be expected in the slums of Bombay where lowest levels of environmental sanitation prevail and immunization coverage levels are low in the "high risk" age groups.

It is essential to identify such areas in metropolis and aim at achieving '85 to 90%' immunization coverage levels, and such levels should be sustained.

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