
Original Articles

SENSITIVITY OF POLIOMYELITIS SURVEILLANCE IN INDIA

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*Objective: To estimate the sensitivity of poliomyelitis surveillance in India Design: A comparison of two sets of data obtained from lameness surveys and routine surveillance system
Methods: Lameness surveys were undertaken by the Ministry of Health and Family Welfare in 1981, 1989 and 1992 using 30-cluster sampling technique These data were compared with the number of polio cases reported through routine surveillance system Results: Based on the 1981 survey which was undertaken near the initiation of routine immunization with oral polio vaccine (OPV) in India, poliomyelitis incidence was estimated at 25 cases per 100,000 population Subsequent studies in 1989 and 1992 estimated a decrease in incidence rates to 15.7 and 6.3 cases per 100,000 population, respectively Comparing the number of reported cases with the survey estimates provided a measure of the sensitivity of (completeness of reporting) surveillance, the sensitivity increased from 8% in 1981, to 20% in 1989, to 32% in 1992 Conclusion: The results are encouraging when compared with the global estimates of 10% reporting in 1993. Nevertheless, there is a need for further improvement in the completeness of reporting of poliomyelitis cases to detect all the cases of acute flaccid paralysis to allow epidemiological investigations and effective follow-up action which is critical to interrupt wild virus transmission.*

Key words: Lameness surveys, Poliomyelitis, Surveillance.

IN 1988, the World Health Organization set a target for the global eradication of poliomyelitis by the year 2000(1) Success in this global effort requires the leadership of India which in 1996 reported about one-fourth of the world's cases of poliomyelitis(2). In December 1995, the Government of India launched its national poliomyelitis eradication programme in co-ordination with WHO and neighboring countries(3). Interruption of poliomyelitis transmission

requires strategies which include: (i) the maintenance of high rates of immunization coverage with 3 doses of OPV through the routine vaccination of children in their first year of life; (ii) national or sub-national immunization days providing OPV to all children below five years of age; (iii) sensitive disease surveillance detecting all suspected cases of poliomyelitis [acute flaccid paralysis (AFP) surveillance]; (iv) rapidly and expertly-managed outbreak response

when suspected cases are detected, and (v) mopping-up immunization in selected high risk areas where wild virus transmission may persist(1,4)

Development of a system to detect, report and investigate all cases of AFP is a formidable task. The magnitude of challenge can best be understood through a retrospective study of the traditional passive poliomyelitis reporting system in India. Estimates of the sensitivity (completeness of reporting) of poliomyelitis surveillance are obtained by comparing the number of cases of polio-compatible lameness determined by sample surveys with the number of cases reported.

Subjects and Methods

National level lameness surveys were carried out by the Ministry of Health and Family Welfare in 1981(5-7) and 1989(8). In 1992, the surveys were carried out in 2 randomly selected districts each in only 5 states situated in different geographical regions of the country and in different stages of programme implementation[^]). The methodology used in the lameness surveys was based on a simplified 30 cluster sampling method which has been used widely to determine immunization coverage in children. In each lameness survey, a sample of 6000 children of 5-9 years (10,000 children of 0-4 years in 1989 and 1992) of age was sought in 30 randomly selected clusters. Children with leg lameness or deformity were identified and listed. Cases were then examined by a physician for compatibility with poliomyelitis defined as the acute onset of AFP without sensory change. As described by LaForce, the estimates were adjusted to correct for death, recovery, and non-leg involvement(5-10).

Surveys in 1989 and 1992 provided an under-estimate of the problem, because many of the children were still potentially

susceptible to polio. Taking into consideration that almost all polio cases in India occur in children below 5 years of age and 85% of them occur in under 3 children(11), we calculated a correction factor of 1.38 for under-estimation of polio in 1989 and 1992 surveys (authors' unpublished data). The details of methodology and the results obtained in the surveys have been described elsewhere(5-9).

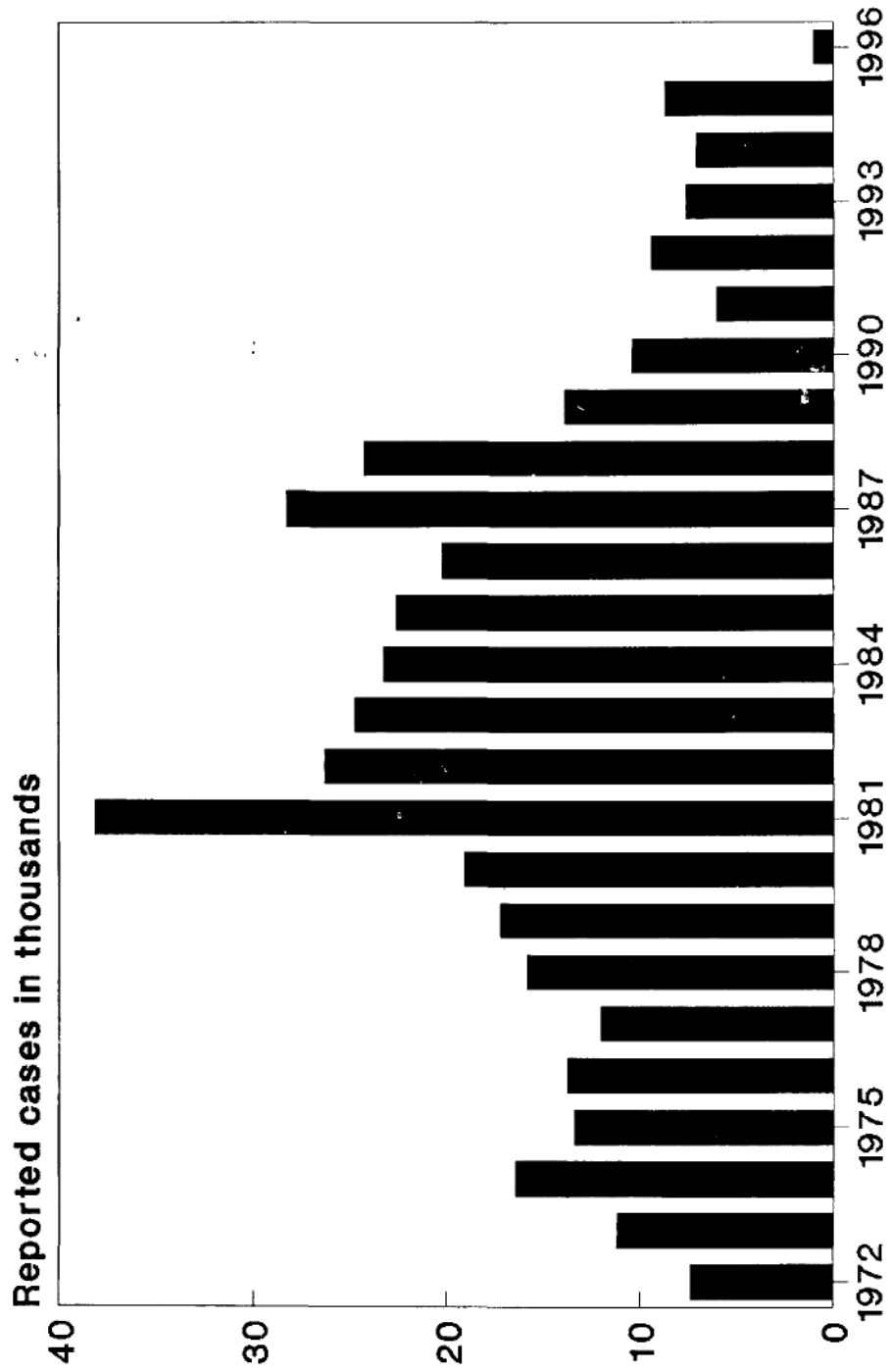
Based on the incidence revealed by lameness surveys, we estimated polio cases which occurred during the period covered by these surveys. The data on the polio cases reported for the period 1972-1996 have been taken from various documents of the Ministry of Health and Family Welfare(6,12,13) and World Health Organization(2).

Results

Based on the 1981 survey which took place near the initiation of routine immunization with oral polio vaccine (OPV) in India, poliomyelitis incidence was estimated at 25 cases per 100,000 population. Subsequent studies in 1989 and 1992 estimated a decrease in incidence rates to 15.7 and 6.3 cases per 100,000 population, respectively. This decline is mirrored in the annual reports of poliomyelitis cases from 1972 to 1996 (*Fig 1*). Comparing the number of reported cases with the survey estimates provides a measure of the sensitivity of (completeness) poliomyelitis cases reporting. The sensitivity increased from 8% in 1981, to 20% in 1989, to 32% in 1992 (*Table 1*).

Discussion

In 1979, OPV was added to the vaccine schedule of the Indian Expanded Programme on Immunization. Reported coverage with 3 doses of OPV increased from 36% in 1985-86, to 75% in 1988-89, to more than 90% in 1990s(13). Consequently, as shown in *Fig 1*, the number of reported cases of poliomyelitis declined.



Source: Documents of Health Ministry

Fig. 1. Reported cases of polio in India during 1972-96.

TABLE I—Sensitivity of Poliomyelitis Surveillance in India

Year of survey (age group surveyed)	Incidence/100,000 population	Average annual cases estimated (Period)	Average annual cases reported (Period)	% Reporting completeness
1981* (5 - 9 years)	24 (Rural) 25.8 (Urban)	149,132 (1972-76)	12,414 [ⓐ] (1972-76)	8.3
1989* (0 - 4 years)	15.7	119,392 (1984-88)	23,705 [Ⓢ] (1984-88)	19.9
1992** (0-4 years)	6.3	51,084 (1987-91)	16,565 [Ⓢ] (1987-91)	32.4

* National surveys

** Surveys carried out in 5 states, but incidence extrapolated to the entire country

ⓐ Source - Reference 6

Ⓢ Source - Reference 12

Experience has shown that routine OPV immunization will not interrupt human to human transmission. Experience in Pan American Health Organization on the western hemisphere has proven conclusively that the addition of National Immunization Days (NIDs) and AFP surveillance can interrupt wild virus transmission(14). While NIDs will reduce the incidence of poliomyelitis, a few foci of transmission will be maintained. The purpose of surveillance (detection, reporting, investigation, action) is to identify and eliminate the few remaining chains of transmission. Thus, surveillance is the critical component of the polio eradication strategy.

The present study showed that the sensitivity of routine surveillance system for poliomyelitis improved from 8% in 1981 to about 32% in 1992. Keeping in view these trends on efficiency of polio surveillance in India and the priority being given to its further improvement, the current completeness of reporting might have increased further. These results are encouraging when compared with the WHO estimates of a global reporting efficiency of approximately 10% in 1989(15), 1991(16) and also in

1993(17). Nevertheless, the target of eradication requires further improvement in the completeness of reporting and shifting the emphasis of surveillance system to obtaining information on all AFP cases as early as possible to allow epidemiological investigations and effective follow-up action(18). The study highlights the need for further efforts in this direction.

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