



SMALLPOX SURVEILLANCE IN REMOTE AND INACCESSIBLE AREAS OF INDIA

by

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Each Indian State or Union Territory has geographical areas constituting special surveillance problems due to the relative inaccessibility of the area. Some have been missed during active search operations, however. Recently, special assessment surveys have been organized in Ladakh, Sikkim, Mizoram, Andaman and Nicobar Islands. Assessment surveys are an inexpensive source of information for the Indian Public Health Service and have confirmed that there are practical methods of detecting the "weak spots" in local smallpox eradication programmes which require remedial action.

1. SURVEY OBJECTIVES

- To assess the effectiveness of the local smallpox eradication activities;
- To assess epidemiological data showing the history of smallpox transmission in selected localities;
- To assess the vaccination status of selected samples of the population.

2. METHODOLOGY

Epidemiological and immunization data were usually collected by a team consisting of an experienced medical officer and a health supervisor. They carried out interviews and physical examinations of selected persons, in their allotted areas.

Questions included demographic data (identification of a person by age, sex, ethnic group and language) and detailed information on recent or previous vaccinations (history of primary vaccination as well as revaccination).

Specific questions about the history of smallpox were asked:

"Has there ever been a case of smallpox in your household?
In what year did this case occur?"

"Have you ever seen a case of smallpox in your neighbouring block?
Where? In which year?"

"If you have never seen a case of smallpox, have you ever heard of someone in your district getting smallpox in your neighbouring blocks? Where? In what year?"

Each respondent was asked if he knew of the recent search activities, if he had ever seen the smallpox recognition card, if he knew about the Rs 1 000/- reward for notification of an unknown smallpox outbreak and if he knew where to report suspected smallpox cases (i.e., those with fever and rash). All pertinent information was recorded on an epidemiological investigation sheet.

The interview was followed by a physical examination of the person's face and both arms and hands using the following criteria:

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A person was considered to have smallpox facial scars if at least five characteristic, round, depressed facial scars each with a base diameter of 2 mm or more were present;

A person was considered to have a vaccination scar if they gave a history of vaccination and had a characteristic vaccination scar on the right or left arm.

3. RESULTS

Ladakh

An assessment survey was organized in Ladakh in September 1975. Ladakh differs in many ways from other parts of India. It covers an area of nearly 97 782 square kilometres; the tehsil Leh, alone, accounting for 82 696 square kilometres. It is bounded on the east by Tibet, on the south by Himachal Pradesh, on the north by Pakistan and on the west by Kashmir. Its altitude ranges between 8 000 to 13 000 ft. above sea level. The altitudes of Leh and Kargil area are 11 500 ft. and 8 500 ft. respectively. The climate is characterized by extremes of heat and cold; the annual rainfall is approximately 3 inches.

There are 104 250 inhabitants (52 258 males and 51 992 females). At present in the entire Ladakh area there are only about 250 villages consisting of about 20 000 housing units. The density of population is low - about 1.25 persons/km². In the Dras area of Ladakh the people are known as Dard Brokpas. They speak the Shina dialect and belong to the Sunni Muslim sect. Tehsil Kargil is the homeland of the Balti people, a majority of whom belong to the Shia orthodox Muslim sect. The Leh tehsil and Zaskar areas are predominantly Buddhist. The capital Leh itself is a cosmopolitan town of Ladakhis, Tibetans, Yarkandis, Kashmiris. Polyandry, though abolished by law, continues to be practiced in some areas.

Altogether 1 010 persons (586 males and 424 females) were interviewed and examined in this survey. Of that number, 284 were under 15 years of age, the urban population numbered 384 and 626 persons lived in rural areas of Khalsi Valley, Dras area and Kargil Valley.

In Leh, only 3.6% of the population was found without any smallpox vaccination scars. In rural areas the percentage of unprotected persons was found substantially higher about 18%. Visible pockmarks were found on 2.7% of the overall population. There were no persons with facial scars found in either rural or urban population groups below 20 years of age. A male of 25 years of age from Kargil Valley, who had suffered an attack of smallpox in 1955, was the youngest case found in this survey. No person interviewed stated that he was suffering from smallpox after 1967-68.

Detailed interviewing of persons showed smallpox outbreaks of varying size had been detected in the Indus Valley and Valleys of Dras, affecting mainly the larger population centres of Dras, Kargil, Khalsi, Leh and their neighbouring villages during 1947-48, 1955-57, and 1966-67. During 1955-57 and 1965-67, 2.1% of those interviewed claimed to have seen a smallpox case in the locality of their residences. No person claimed to have seen a case of smallpox after 1968. Interestingly 4.9% claimed they had heard of smallpox transmission in the locality of their residence and surprisingly, three people stated they had heard of smallpox cases occurring near the Tibetan borders during 1973. This was in perfect agreement with the fact that the last discovered smallpox outbreak caused by imported cases from Bodh Gaya (Bihar) and affecting a total of 12 persons (5 deaths) were detected in the Durbuk area in Laga, Bukruk and Punpun villages near Pangong lake in Leh Tehsil in early November 1973.

In Leh, only 23% knew of a recent search or had seen searchers; 38% had been shown smallpox recognition cards; 32% knew about the reward for reporting any unknown smallpox outbreak and 43% knew where to report cases with fever and skin eruptions. In rural areas these percentages were smaller.

Sikkim

A special assessment survey undertaken in conjunction with an active search operation was started in Sikkim in November 1975. Sikkim was considered to be one of the most inaccessible

and least known areas. Its total population is estimated at 255 497 with a mixture of five population groups: Lepchas (13%), Bhutiyas (14%), Nepalese (71%), Tibetans (1%), Indians (1%). The main languages spoken are Sikkimese, Bhutia, Nepali, Tibetan, Hindi and English. Sikkim has an area of 7 298 sq. kms with tremendous variation in altitude, climate, vegetation. The density of population is low, 35 persons/km². Frequently habitations consist of isolated houses or clusters of 10 to 15 houses forming a hamlet perched high on a cliff or mountain-top.

For administrative purposes there are four districts (South, East, North, West) having 217 Panchayat Blocks with 684 villages.

A total of 1 495 persons (771 males and 724 females) were interviewed and examined in the assessment survey.

Of all people interviewed 79% had received primary vaccination. In children aged 0 - 4, only 24% had been vaccinated. This can be explained by the relative inaccessibility of many villages and the practice of vaccinating only at schools.

Of all persons interviewed, 2.8% had smallpox facial scars, of which only three persons were below the age of 10. Two of these suffered from smallpox in Deorauli village in East district in April 1973 and the third one in village Renok of the same district in 1972. Of all facial scars detected, 10 people (22%) represented infections which had occurred within the last 10 years. Five of these cases had occurred in 1973.

More than 2% of people interviewed had seen a case of smallpox in 1973. Information obtained led to detailed investigations of smallpox outbreaks which occurred in 1973. The first outbreak detected started in village Namthang in South district in March 1973. The source of infection was traced to Choonna Bhatti Tea Garden in Jalpaiguri in West Bengal. There were nine cases resulting in four deaths in this outbreak. This led to a second outbreak, found 3 miles away from the first one, in village Kurum (Turung) and affected two persons. The third outbreak occurred in Deorauli village, in East district, in April 1973, with source of infection, Darjeeling, in West Bengal.

An active search operation lasting 17 days and utilizing 98 search workers was carried out at the same time as the assessment survey. A total of 142 cases of fever with rash from 56 different villages were detected and found not to be smallpox.

Mizoram

In Mizoram the assessment survey was conducted in December 1975 and January 1976. Mizoram is a small State bordered by Cachar (Assam), Manipur, Tripura, Burma and Chittagong (Bangladesh). The population of 332 390 persons lives in 455 villages scattered over a mountainous and dense forest area of 21 067 km² (15 persons/km²). The villages were relocated and grouped together in 1965 to facilitate providing assistance to the people. However, the people are again re-habiting their original villages. The villages are compact and situated at the top of hills ranging in height from 2 000 ft to 5 000 ft. The villagers are very cooperative, especially with the Medical and Health staff.

The literacy rate, about 54% in this State, is the fourth highest in India. Communication between villages is very difficult as travel from one to another usually takes one day. In addition, walking, especially in the summer and rainy seasons, is extremely difficult.

There is no specific name for smallpox in the local language (Lucai). The name used for the disease is "Zowngghri", which, in fact, describes not a disease but the process of monkeys picking lice from each other. The reason this word is used is because smallpox patients in the scabbing stage pick off the scabs. Rumours were heard saying that Mizos cannot get smallpox because they eat beef and pork and only those who do not take beef and pork suffer from the disease.

Altogether 1 420 persons (644 males and 776 females) were interviewed and examined for vaccination scars, facial pockmarks, and for knowledge about active searches.

Of 1 420 persons examined, 455 (32%) had no vaccination scar. Below the age of 19, 53% of the males and 67% of the females were found unprotected.

Ten persons had facial scars from smallpox. Seven were infected locally in 1918 in the villages of Khaulian, Phuibuang and Nagopa which border Manipur State; all were more than 63 years old. Two were infected in Tripura in villages Gadang and Kanchanchura Basti and were above the age of 40 and had migrated to Mizoram 30 years ago. The tenth case, a male, 26 years of age, was living in village Rawpuichhip and had had smallpox in 1968 in village No. 4, Bhojpur, Nepal.

The last known indigenous outbreak occurred in 1942 in village Siarang. The village was searched but not even a single person with pockmarks was found. The outbreak was described by an old lady aged 85 years who said that those who had suffered from smallpox had since died. The tradition at that time was that the patient having a rash was immediately shifted to a 'Zhoom' (a cultivation field). Food and water was kept near to the patient and nobody went to take care of him.

The last known introduction of smallpox into Mizoram was in 1973. A 19-year-old man who left Bihar during the incubation period, developed a rash in Sailing in Mizoram on 27 April 1973. This outbreak was limited to a single case.

In the January 1976 search, 146 searchers visited 488 of the 528 villages in Mizoram. One chickenpox outbreak of five cases in Bihari soldiers of BSF Camp Malpara was detected. The assessment of the search revealed that 70% of those interviewed had seen the search worker, 68% saw the recognition card, 64% knew of the reward, and 64% knew where to report a case of rash with fever.

Andaman and Nicobar Islands

An assessment survey was organized in some parts of Andaman and Nicobar Islands in March 1976. The Andamans are a string of 265 islands of various sizes averaging 25 by 322 km. The main part of the Andamans is composed of five large, inhabited islands consisting of a mass of hills covered with dense tropical forest. The Nicobars is another string of 62 islands, only 12 of which are inhabited.

There are altogether 115 113 inhabitants (70 027 males and 45 106 females) of which 93 468 persons live in the Andamans and 21 665 in the Nicobar group. Population density is about 14 persons/km². Exceptions are two islands, Car Nicobar (105 persons/km²) and South Andaman (20 persons/km²). These two islands were selected for survey. The population is composed of 96 931 settlers and 18 102 aboriginal tribes. These tribes are divided into Onge, Great Andamanese, Jawara, Sentinelese, Shompen, Nicobaries. About 20% of the settlers speak Bengali, 10% Malayalam, 10% Tamil, 6% Telugu, and 5% Hindi. The remainder speak English, Burme, Punjabi and Urdu.

Administratively, the Andaman and Nicobar Islands are divided into two districts, four subdivisions and seven tehsils. There is one town, Port Blair, and 399 villages consisting of 23 767 households.

Altogether 846 persons (439 males and 407 females) were interviewed, 538 of them in South Andaman and 308 in Car Nicobar. In South Andaman 10% of males and 15% of females were found without smallpox vaccination scars. In Car Nicobar the percentage of unprotected was found to be 5.2% in males and 5.3% in females.

During the survey no one with smallpox facial scars was found among those interviewed in South Andaman. After the survey an active search checked more than 17 000 persons, of which 21 persons (0.1%) had smallpox facial scars. All of them were settlers who suffered from smallpox on the mainland. Two with the most recent scars suffered from smallpox in West Bengal in 1970 and 1971.

In Car Nicobar, four persons were found with visible pockmarks. Two of them suffered from smallpox in villages Lapati and Teetop in the same Island in 1925. No villager has seen or heard of any smallpox since that time. Detailed epidemiological investigation discovered the following:

- (a) In 1921, the ship "Piryanki", carrying passengers and goods from Minicoy Islands, anchored near village Jayanti. Smallpox among passengers spread to tribal porters and affected villages Kimus, Lapati, Arong and Malacca of Car Nicobar for the first time in human memory.
- (b) In 1925, the ship "Minto" sailing from Nancowry Island was blown off course to Moulmain in Burma. After one month in Moulmain, the 30 odd passengers continued to Rangoon by train and after some days they boarded the ship "Maharaja" for Port Blair. Smallpox occurred among the passengers.
- (c) In 1930, smallpox broke out during a passage from Rangoon which probably originated in Bombay. All passengers were isolated in the deserted village Mus.
- (d) The last smallpox outbreak was detected among East Pakistan migrants in March 1951. Cases occurred on board the ship "Maharaja" on the open sea. The ship and passengers were isolated at Ross Island. There were nine cases resulting in two deaths. Nobody from the local population was affected.

Thus, smallpox seems to be unknown among the aboriginal tribes. It has no name in the native language. Furthermore, there has been a lack of continuity of smallpox transmission even among the settlers. Only occasionally has smallpox been introduced into the Islands ships' crews or newcomers. Outbreaks with limited numbers of secondary cases were extinguished very quickly. There is no documented evidence of smallpox transmission on the territory of Andaman and Nicobar Islands for the last quarter of a century.

CONCLUSION

The surveys show that the strategy of the local NSEP programmes in the areas visited have stressed on vaccination and that surveillance has suffered. The vaccination efforts of previous years were, in general, quite sufficient to achieve good coverage of the population.

Vulnerable sectors of the population were located by the surveys where the surveillance system needs further strengthening and level of information to the general public (except Sikkim) should be increased.

More emphasis is now required on all types of basic methods of surveillance: regular search weeks, market searches, special searches, secondary surveillance systems, continuous surveillance by state surveillance teams as well as by district mobile squads. A strengthening of regular reporting and keeping the documentation on training programmes coupled with continuous involvement of the local health staff of all categories in surveillance activities is needed. A high quality surveillance system cannot exist unless State, District and PHC Medical Officers continue to motivate and to stimulate their staff.

Survey results have provided local health officers with crucial information permitting them to modify the present local strategies based on vaccination and to reinforce the surveillance activities at all levels.