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A SHORT REPORT ON THE EPIDEMIOLOGICAL FINDINGS OF SMALLPOX OUTBREAKS IN THE STATE OF TAMIL NADU, JULY 1968 - JUNE 1969

by

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Introduction

The State of Tamil Nadu, like Madras City, has until recently been a principal endemic focus for smallpox. The number of reported cases has ranged from 6000 to 10 000 or more each year. Tamil Nadu State (1969 population of 38 871 000) is divided into 13 districts and until recently, no district has been free from smallpox during an entire year. The State has a good public health organization and a system of reporting of infectious diseases which is reasonably effective. Except for wards or sheds attached to district headquarters hospitals, there are no infectious disease hospitals. Smallpox cases are isolated at home and either reported voluntarily or detected by health inspectors. In villages not visited by the Health Inspector for several months, the notifications are made by the village Munsif. There are some deficiencies in notification but the extent is unknown. For example, an epidemic of 47 cases unknown to the public health department had been in progress for nearly six months before being investigated by our epidemiological unit (WHO/SE/68.6).

The national smallpox eradication programme was launched in Tamil Nadu State in March 1963; intensive campaigns were begun in half of each of the 13 districts during that year and in the remaining half the following year. The methods of approach were almost the same as those used in Madras City. During the attack phase, family registers were prepared and maintained, and house to house vaccinations were performed.

Table 1 shows the number of cases, deaths and the case fatality ratios by year since 1958. Beginning in 1964, there was a rapid and dramatic decline in the number of reported cases. Seasonally, two peaks in incidence are noted, one in the first quarter and one in the third quarter (Table 2). The seasonal variation, however, is not so marked as in many endemic areas.

In 1968, the WHO/ICMR epidemiological unit attached to the Madras Infectious Diseases Hospital investigated all outbreaks of smallpox in the city as well as in the State of Tamil Nadu. A summary of 13 outbreaks in Madras City (WHO/SE/68.7) and of one outbreak in Tamil Nadu State, all of which occurred during the first half of 1968 have been previously prepared. The present paper deals with the only two outbreaks of smallpox detected in Tamil Nadu State during the period July 1968 - June 1969.

Summary of the outbreaks:

The first outbreak was notified to the epidemiological unit on 30 January 1969 from the town of Erode, Coimbatore District, and the second, from a village, Visalur, Mangalampettai, South Arcot on 26 March 1969.

1. Erode Outbreak

On 30 January, the Assistant Director of Health Services for Tamil Nadu State telephoned to report a case, a 43 year old Hindu male residing in Erode. The epidemiological unit was despatched immediately.

Erode, (a municipality of about 100 000 population in the District of Coimbatore) is a fairly important railway junction of the Southern Railway about 200 miles from Madras city.

The notified case was a hotel server who had become ill on 12 January. He lived in a hut behind the hotel where he worked. The disposition of the various huts and residences near the infected hut is shown in Figure 1. The road between the hotel and railway station is 50-60 feet wide. The hotel is bounded on one side by 20 to 30 huts and on the other side by pucca residences. On one side of the station yard are 15 to 20 huts, and on the other side are railway staff quarters. Twenty to 30 beggars and cobblers live on the pavement near the entrance to the railway station.

All persons in the huts and masonry buildings as well as platform dwellers in an area of about 100 yards around the infected hut were thoroughly interrogated and examined in an attempt to detect hidden and recovered cases of smallpox. Four recovered cases and one acute case in the early stage of the disease were detected among the platform dwellers.

The outbreak started during the third week of November 1968 and lasted nearly 2-1/2 months, the last case occurring on 29 January 1969. Of the six cases, only the fifth case had been notified.

The first two cases were pavement dwellers, a 12 year old girl and her 16 year old brother, who had left Erode with their parents about 1 November to see their brother at Raipur, Madhya Pradesh State. En route they passed through several railway junctions in Andra Pradesh State and being ticketless travellers, they were detrained in many of them. At various junctions, they were reported to have stayed in and around the railway platforms, in each instance changing trains unnoticed by the railway staff. As a result they took nearly seven days rather than the normal 36-48 hours to reach Raipur. They stayed with a brother at Raipur for about a week. Returning by the same route, they experienced the same fate of detention at every junction and arrived at Erode about 20 November after seven days of travel. The 12 year old girl (case 1) developed fever on 22 November, presumably having contracted the infection during her stay at Raipur (Table 3). However, there was no definite history of direct contact with a case of smallpox during the journey or at Raipur.

The brother of case 1 evidently was infected by his sister. He became ill on 10 December. Cases 3 and 4, also pavement dwellers at the station entrance, became ill on 17 and 19 December respectively. They probably contracted the infection from case 1 who remained throughout her illness on the pavement at the station entrance.

Case 5, a hotel server, who was the first notified case, became infected either from case 2 or 3, both of whom went to the hotel for their meals. Case 5 stated that he had been serving food to them knowing full well that they had active smallpox. Case 6, another pavement dweller at the station entrance, became ill on 29 January. Presumably, he was infected by one of the other pavement dwellers, or by some unrecognized contact with case 5.

This outbreak of six cases, resulted from the importation of smallpox from Madhya Pradesh State by an unvaccinated 12 year old child. Subsequent cases included three cobblers, a shoeshiner and a beggar, all of whom were pavement dwellers, and a hotel server. Three of the six were unvaccinated while three had been vaccinated in infancy and never successfully revaccinated. None died.

2. Visalur outbreak

After receipt of a telegram on the night of 25 March from a health inspector notifying that a case of smallpox had been reported from the village of Visalur, South Arcot, the WHO/ICMR Epidemiological Unit was despatched on the morning of 27 March to investigate.

The village is in Mangalampettai block and is serviced by the Primary Health Centre there. A cart track is the only access to the village, which consists of about 200 huts and an agricultural population of about 1000 to 2000 who belong mainly to the Konar, Harijan community. The patient's house, a one room detached hut constructed of mud with roofing made of hay, was occupied by six family members.

The patient, a 10 year old girl, had developed fever at Arkonam in the train on 13 March during travel of the family from Bombay. By the time they arrived at Villupuram where they spent the night, her temperature had risen very high. They reached their village the next morning. On 16th March, a rash was noted; the case was reported to the Health Inspector on 25 March.

All the huts and houses surrounding the infected hut were thoroughly searched and all persons examined, but no other cases of smallpox were found. There had been three recent deaths in the village, one in February and two in March but investigation revealed that none was due to smallpox. During the search, the unit discovered one child who was reported to have recovered from an eruptive fever. Some scars and a few scabs were found on examination. The scabs were cultured but were negative for variola virus. Clinically, the illness appeared to be an ill-defined dermatological condition rather than smallpox.

The patient, her mother, sister and brother, had been living at Jamnagar, Gujarat, for the last 10 years, where her father was employed. After the father's death two years before, the mother obtained employment as a casual labourer in the Gujarat Railway, but was discharged from service five weeks before. Because of unemployment, the family returned to their native village where they owned a house.

According to the mother of the patient, Jamnagar was heavily infected with smallpox and a relative of the patient had died of smallpox very recently. The family had visited the patient and had also attended the funeral a few days before they returned.

The source of infection, therefore, was Jamnagar, Gujarat.

This case had five contacts, four of whom had been vaccinated. Her brother, aged seven, was unvaccinated but did not develop the disease.

Observations

In both outbreaks, the infection was imported. In the first introduction, five secondary cases occurred, whereas in the second, there was no further transmission.

Notably, in the second outbreak, the relatives of the case notified the village chief as soon as they suspected the disease to be smallpox. The village chief notified the Health Inspector and containment measures were taken immediately. In the first outbreak the relatives of the imported case notified no one and the case was not detected by the resident Health Inspector. The outbreak continued for nearly two months and was not detected until the fifth case was voluntarily notified. It is surprising that these cases had been overlooked, especially when all occurred among platform dwellers residing at the entrance of an important railway station. Had the first case been immediately notified or detected and immediate containment measures taken, transmission of infection would have been arrested.

In describing the transmission of infection in Madras City (WHO/SE/68.7), an outbreak was described in which a patient with smallpox had travelled in a train and was responsible for transmission of infection to his co-passengers. In these two outbreaks the railway played a major role in transmission of disease. At Jamnagar, there was an epidemic of smallpox among railway workers. According to the report given by a relative of the Visalur case and, similarly, in the Erode epidemic, all but one case of smallpox resided on the platform at the entrance of the railway station. Since the railways are the most common mode of travel and employ large numbers of both regular employees and temporary staff, the railway authorities have a great responsibility in detection of smallpox cases and enforcement of containment measures. In a national programme, the railway staff should be actively involved if the goal of eradication is to be achieved.

TABLE 1. NUMBER OF CASES, DEATHS AND CASE FATALITY RATIO - TAMIL NADU STATE - 1958-1969

Year	Cases	Deaths	Case fatality ratio (%)
1958	9 209	2 699	28
1959	4 500	1 250	28
1960	3 167	879	27
1961	4 696	1 357	27
1962	6 895	2 036	29
1963	6 831	1 935	28
1964	3 354	893	27
1965	2 654	639	24
1966	708	140	20
1967	226	62	27
1968	94	15	16
1969	3	-	

TABLE 2. MONTHLY INCIDENCE OF SMALLPOX - TAMIL NADU STATE - 1962-1969

Years	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1962	452	641	695	509	473	411	782	787	701	488	438	518
1963	645	877	967	711	432	603	688	631	432	378	285	182
1964	209	369	347	341	238	321	416	351	202	181	206	173
1965	115	135	284	365	233	334	434	248	152	141	88	125
1966	73	37	61	81	38	101	79	57	68	26	64	23
1967	20	8	61	29	7	7	32	4	30	5	5	18
1968	4	15	17	10	25	18	1	-	-	-	(1)	(3)
1969	1 (1)	-	1	-	-	-	-	-	-	-	-	-

( ) Denotes additional cases discovered during current investigation.

TABLE 3. SMALLPOX CASES IN THE ERODE AND VISALUR OUTBREAKS

Case No.	Age	Sex	Date of onset	Vaccination scar	Occupation	Comment
Erode Outbreak						
1	12	F	22 Nov.	No	Beggar	
2	16	M	10 Dec.	No	Shoeshiner	Brother of case 1
3	8	F	17 Dec.	Yes	Cobbler	Mild case
4	32	M	19 Dec.	Yes	Cobbler	Mild case
5	43	M	12 Jan.	No	Hotel server	
6	30	M	29 Jan.	Yes	Cobbler	
Visalur Outbreak						
1	10	F	13 Mar.	No	Nil	

Fig. 1

Sketch of Erode infected locality (not to scale)