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NEO-NATAL VACCINATION

by

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The earliest age at which primary vaccination can be done has always engaged the attention of health administrators. In Tamil Nadu primary vaccination was statutorily prescribed when the child attained the age of 6 months. This age limit of 6 months was fixed probably on the assumption that maternal antibodies are placentally transmitted to the child and that the immune mechanism of the new-born is not well developed to elicit an antibody response.

While routinely primary vaccination was therefore done when children attained 6 months of age, there were reasons to doubt our dependency on the passive immunity acquired at birth to protect the child up to 6 months from variola. An analysis of the smallpox cases admitted to the Infectious Diseases Hospital, Madras City, has shown that 13% of the smallpox cases among the unvaccinated was in the age group 0 - 6 months. Also, there were instances when new-borns who were contacts of a smallpox case were primarily vaccinated immediately after birth. A good proportion of these new-borns so vaccinated had a successful take.

Based on these two observations, a pilot project of vaccinating the new-born was organised by Dr A. Ramachandra Rao of Madras. The pilot study was started in October, 1959. Babies born in selected maternity homes were vaccinated on the third day of birth with glycerinated calf lymph manufactured by the King Institute of Public Health, Guindy, Madras. The vaccination was performed with the rotary lancet on the lateral aspect of arm.

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In this 18 month long pilot study, out of 2535 babies vaccinated, 2233 were subsequently examined and 1779 (79.6%) had successful takes. Of the vaccinated neo nates, 36 babies subsequently experienced household contact with a smallpox case. Of these 36, 4 had been unsuccessfully vaccinated and 3 developed smallpox and died. Of the remaining 32 successfully vaccinated babies, only 3 developed modified smallpox and all recovered (table I). The relative risk of developing smallpox with and without successful vaccination among these neo nates works out to 1:29.

No "post-vaccination complications" were either reported or detected in this pilot study.

Encouraged by the results of the pilot project which showed that neo natal vaccination gives a successful take and offers protection to an infant when exposed to smallpox, this scheme was extended gradually. Now neo natal vaccination is done in the three principal cities of Tamil Nadu State, viz. Madras, Madurai and Coimbatore. Between 40 000 and 60 000 vaccinations are performed annually (table II).

In the City of Madras, neo natal vaccination is performed in the 55 maternity homes run by the Corporation of Madras and in 3 Government maternity hospitals. The vaccinations in the Corporation maternity homes are done by the Health Visitor or by the Auxillary Nurse Midwife who were trained in neo natal vaccination for a period of 7 days. In the Government maternity homes neo natal vaccination is done by one of the Sanitary Inspectors of the Corporation of Madras. He visits these hospitals daily at an appointed hour and does the vaccination. The Health Visitor and Sanitary Inspector submit the particulars of the vaccinations to the Chief Health Officer of the Corporation who arranges for necessary posting of the particulars in the respective Family Registers, and for further follow-up.

In the City of Madurai, neo natal vaccination has been performed since February, 1972. The Vaccinator of the respective division visits daily the maternity homes of the Corporation and the Christian Mission Hospital at a fixed time and does the neo natal vaccination in the presence of the Woman Medical Officer. A neo natal vaccination register is opened in each maternity home and the details of the vaccinee are recorded in this register. The vaccinator completes intimation slips showing the names of the father, the mother and the vaccinee and the residential address and sends them to the office of the Corporation Health Officer (table III). At the office of the Health Officer all neo natal vaccinations are recorded in the "Central register of neo natal vaccination" and a serial number is given. The intimation slips are then despatched to the concerned Sanitary Inspector where the parents of the vaccinated children reside for follow-up and verification. The results of verification are entered in the neo natal vaccination register of the division and family registers and the vaccination intimation slips are returned to the office of the Health Officer for necessary entry in the Central register. After noting the results in the Central register, the intimation slips are despatched to the concerned maternity homes for entering the results of vaccination in the registers of the maternity home.

Until 1967, glycerinated liquid vaccine was used; since 1967, freeze-dried vaccine has been employed. From 1971, vaccination has been done with the bifurcated needle using the multiple puncture method. The site of vaccination is the lateral side of the left arm; the number of punctures given is 5.

The success rate of neo natal vaccination utilising freeze-dried vaccine and the multiple puncture technique ranges between 90 and 96%. The constitutional symptoms are minimal among neo nates. Scar formation is normal but there is difficulty in distinguishing the smallpox vaccination scar from the B.C.G. vaccination scar.

Post-vaccination complications are rare. Two cases of generalised vaccinia have been observed so far and one case of post-vaccination encephalopathy has been suspected.

Madras City has been endemic for smallpox for decades - the average annual number of cases being about 1 000. The city has been free from smallpox only since 1969 (table IV). Even in such an endemic area, the case success rate for neo natal vaccination is 90 to 96% (80% with glycerinated lymph) showing that even in an area "endemic for smallpox" the new-born inherits very little maternal immunity, and so must be protected by successful vaccination.

Nearly 200 000 neo natal vaccinations have been done from 1966 through 1972. However, due to the virtual absence of indigenous cases of smallpox in Tamil Nadu during the past 5 years, those vaccinated have not been challenged by active variola infection. Thus, no conclusions can be drawn as to how long the immunity lasts after neo natal vaccination, though there is no doubt that neo natal vaccination gives "highly significant" protection against house hold contact with a smallpox case for at least two years (table I). However, it is generally agreed that the immunity conferred by neo natal vaccination should be boosted by a re-vaccination done when the child is about 2 or 3 years of age. The child should again be vaccinated when he enters school and again, at least, when he leaves the high school.

Wherever maternity services are well organised, the Maternity Assistant and Health Visitor can be trained to perform neo natal vaccination. This is easily possible in all big urban areas having organised Municipal Health Services where nearly 70 to 80% of births are institutional deliveries. Difficulty may be experienced in organising such a programme in the rural areas as only about 30% of the births are attended by Maternity Assistants.

From the administrative point of view, when the child and mother are in the maternity home or hospital they are readily available for vaccination and so the vaccination staff will find it easier to vaccinate the neo nates. Acceptance also has been found to be good and thus the total coverage of neo nates is usually good.

It is felt by certain workers that the vaccination of infants carries a higher risk and that vaccination should be postponed to an older age if possible. The following table adapted from Dick shows the number of complications due to primary vaccinations per million primary vaccinations done among those below 1 year and among those 15+ :-

Complications per 1 000 000 Vaccinations

Complication	Under 1 year	Among 15+
Generalised vaccinia	41	-
Neurological	15	15
Eczema vaccinatum	3	10
Ch. progressive vaccinia	3	0
Total	62	25

In Dick's report, the incidence of neurological complications was the same in both groups; generalised vaccinia and progressive vaccinia were seen only in the infant groups. In Tamil Nadu two cases of generalised vaccinia were observed among the 200 000 neo natal vaccinations done in Tamil Nadu - a rate of about 10 per million. In an area endemic for smallpox, the risk of exposing the infant to small-pox infection far outweighs the risk taken by vaccinating the infant.

References:

- 1 Ramachandra Rao, A. et al: "Medicine and Surgery"
Vol. III. No.6 1963.
- 2 Rao, A.R. WHO/SE/68.7.
- 3 WHO Public Health papers: No.8, 1961.
- 4 Dick, G: B.M.J. Vol.3, 163-66; 1971.

TABLE - I

Incidence of smallpox among children vaccinated as neo nates during
the PILOT PROJECT (1959-1961)

Vaccinal Status	Number of infants exposed to smallpox in their home and ----- developed did not deve- smallpox lop smallpox.		Total
	Successfully vaccinated	3		29	32
Unsuccessfully vaccinated	3	1	4
Total	6	30	36

Source: Adapted from Dr A. Ramachandra Rao (1963)

TABLE - II

Annual number of neo natal vaccinations - State of Tamil Nadu

PILOT Project													
1959-61	..	..	..	..	..	..	..	..	..	..	2 555
1961	..	..	..	..	..	..	..	..	..	..	694
1962	..	..	..	..	..	..	..	..	..	..	1 767
1963	(NSEP - Attack Phase)			..	..	..	..	..	..	..	1 402
1964	..	..	..	..	..	..	..	..	..	..	1 292
1965	..	..	..	..	..	..	..	..	..	..	602
1966	(NSEP consolidation)			..	..	..	..	..	..	..	3 148
1967	..	..	..	..	..	..	..	..	..	..	22 973
1968	..	..	..	..	..	..	..	..	..	..	35 847
1969	..	..	..	..	..	..	..	..	..	..	37 574
1970	..	..	..	..	..	..	..	..	..	..	62 259
1971	..	..	..	..	..	..	..	..	..	..	41 249
1972	(Up to August, 72)			..	..	..	..	..	..	..	34 173
Total										245 535

TABLE - III

Flow chart showing the transmission of particulars of neo natal vaccination in MADURAI CORPORATION, Tamil Nadu.

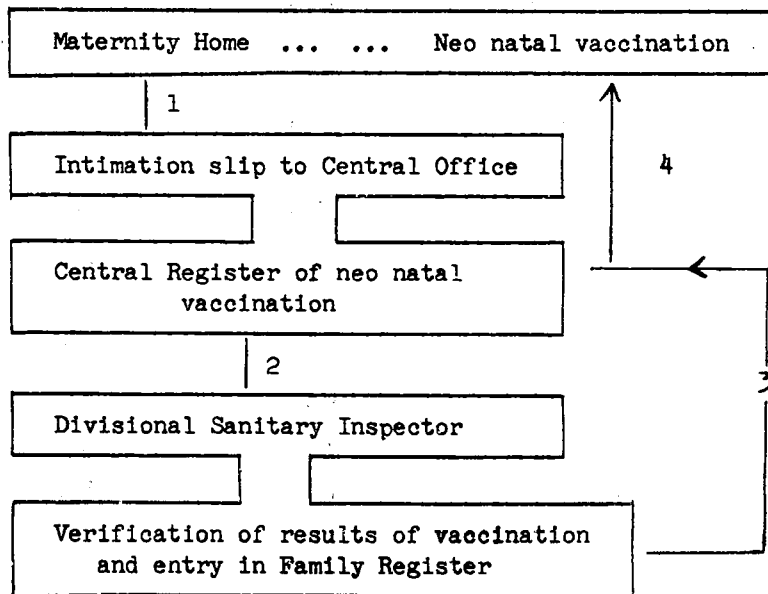


TABLE - IV

Incidence of smallpox in Tamil Nadu - 1963-1972

Year	State of Tamil Nadu	Madras City	Madurai City
1963	9 241	544	116
1964	5 545	2 201	3
1965	3 377	730	2
1966	945	75	Nil
1967	263	38	Nil
1968	150	26	Nil
1969	6	4	Nil
1970	Nil	Nil	Nil
1971	7	Nil	Nil
1972 (Up to Sep. 72)	1	Nil	Nil