

Brief Report

BCG Vaccination and Development of a Scar

N SIVARAJAH¹, S SIVAYOGAN², J JEGATHEESAN³ and V GNANANATHAN⁴

Ceylon Medical Journal, 1990, **35**, 75-77

Summary

Nine hundred and seventy six children who had been given BCG vaccine previously were examined for the presence of a scar. It was found that 13.9% of them did not have a scar. The absence of a scar was more among those who were given BCG immediately after delivery.

Introduction

BCG vaccine was included in the Expanded Programme of Immunization (EPI) and island-wide coverage was commenced in 1978. EPI coverage assessment surveys¹ have indicated that there was almost 100% coverage for BCG. But at the same time there were a considerable number of BCG vaccinations being given in grade 1 during school BCG vaccination programmes.

It was also noted by the authors that several children who had been given BCG had not developed a scar. This study was carried out to estimate the proportion of children who did not develop scars following BCG immunization and to identify the reasons for the absence of a scar.

¹ Head ² Senior Lecturer ³ Lecturer, Department of Community Medicine Faculty of Medicine, University of Jaffna and ⁴ House Officer, General Hospital, Jaffna.

Material and methods

The study was carried out in the Kokuvil-Kondavil Community Health Project (KKCHP) area which is the field training area of the Faculty of Medicine, University of Jaffna.

The area had an estimated mid-year population of 29 250 during 1985 and 29 700 during 1986. The study population consisted of all children born during the 2 year period from 01.01.85 and registered by the Family Health Workers (FHW).

These children were examined by one of the authors for the presence of a BCG scar.

Results

The FHW registers indicated that 1 337 children were born during the period of study (01.01.85 to 31.12.86). The estimated births for 1985 and 1986 were 1 356, calculated on the basis of a birth rate of 23.2 for 1985 and 22.8 for 1986 for Jaffna District.^{2 3}

Of these 1 337 children, 976 (73.6%) attended the KKCHP area clinics and were examined for scars. According to records available, all these children had been given BCG. Out of the non-responders, 147 (11%) had left the area, 24 (1.8%) had died and 190 (14.12%) were attending clinics outside the KKCHP area.

Table 1

Place of delivery and time of BCG vaccination

Place of delivery	Number vaccinated before leaving hospital	Number vaccinated subsequently	Total	%
General Hospital Jaffna	641	15	656	67.2
Maternity Home	26	72	98	10.1
Peripheral Unit	32	1	33	3.4
Private Nursing Home	10	122	132	13.5
Home	—	39	39	4.0
Not recorded	10	8	18	1.8
Total	719(74%)	257(26%)	976	100.0

Table 1 gives the place of delivery and the time of BCG vaccination. 719 (74%) children were vaccinated before leaving hospital and the balance were vaccinated at the child welfare clinics. Among those who were vaccinated subsequently, only 51.4% were given the vaccine within the stipulated 4 weeks after delivery.

Of the 257 who were not vaccinated soon after delivery, 93.8% were not vaccinated due to non-availability of vaccines at the place of delivery. The balance were not vaccinated due to an illness or prematurity.

Of the 976 children examined 136 (13.9%) did not have a BCG scar. The presence of scar by time

of vaccination is given in Table 2. Among those who were vaccinated immediately after delivery, 17.1% did not develop a scar and among those vaccinated later at the clinics, 5.1% did not develop a scar. The difference is statistically significant ($P < 0.01$).

Of the 136 children who did not have a scar, 124 were revaccinated and every one of them developed a scar. One child developed two scars. The balance 12 who were interviewed at the beginning of the survey were not re-vaccinated.

Discussion

According to the EPI, BCG vaccine has to be administered between 12

Table 2

Time of BCG vaccination and presence of scar

Time of BCG Vaccination	Number of children given BCG	Number of children without scar	Percentage without scar
Before leaving hospital	719	123	17.1%
After leaving hospital	257	13	5.1%
Total	976	136	13.9%

hours after delivery and before discharge from hospital or within 4 weeks of delivery³. Vaccination after leaving hospital is usually carried out in child welfare clinics.

On intradermal administration of BCG vaccine a swelling appears at the site of injection. Two or three weeks later a small red slightly tender swelling develops and remains for another week. This develops into a small abscess which ulcerates and crusts. The crusts disappear leaving a small red swollen scar which becomes smaller, paler and sunken and remains for years⁴.

When BCG vaccine is given the appropriate entry is made in the immunization record, and this is taken as proof of successful immunization. No attempt is usually made in the child welfare clinics or by the FHW, to verify whether a scar has been formed. Hence these children are missed until they enter school where all children without a BCG scar are given BCG vaccine.

The finding that 17.1% of the neonates given BCG in hospitals do not develop a scar is significant.

The reason for non-development of the scar may be

- 1 Faulty technique, including leaving the prepared vaccine for long periods, leaving the prepared vaccine near a flame or in direct sunlight, not expelling the vaccine in the heated needle, and injecting subcutaneously instead of intradermally.
- 2 Use of vaccine which is not potent.
- 3 BCG may not have been given even though an entry is made. This could happen, since the cards are usually completed before the vaccination is given. Some mothers could slip away with their babies during this procedure.
- 4 The immune response system may not have been developed sufficiently immediately after delivery. This may explain the higher scar rate when vaccinated in the clinic.

It is recommended that extra care should be taken when BCG is given in hospitals. FHWs should look for the scars when children come for DTP vaccine and mark it on the immunization record. The presence of a scar should be taken as proof of vaccination and not the entry that BCG has been given.

Further studies are necessary to find out whether this is island-wide and also to determine, whether there are sufficient antibodies in spite of the scar being absent.

Acknowledgements

The authors thank the field staff in the KKCHP area for the assistance in conducting this study.

REFERENCES

1. Annual Health Bulletin 1987. Sri Lanka Ministry of Health 1988.
2. Annual Health Bulletin 1985. Sri Lanka Ministry of Health 1986.
3. Annual Health Bulletin 1986. Sri Lanka Ministry of Health 1987.
4. Maurice King. Medical Care in Developing Countries. London. Oxford University Press, 1966, p. 17.