

BCG vaccination scars of internally displaced children in the north of Sri Lanka

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(Key words: BCG vaccination, BCG scar, revaccination, scar failure, internally displaced children)

Abstract

Objective: To study the BCG vaccination scars among the under 5 year old internally displaced children in Vavuniya district.

Study design: Cross sectional descriptive study

Setting: Temporary settlement camps in Vavuniya district

Method: All children between 6 to 60 months attending paediatric clinics held in the temporary settlement camps from 1st April to 15th May 2009 were included in the study. The interviewer administered questionnaire and examination of the child for the BCG scar were used to collect data.

Results: One thousand and six children attending the clinics during the study period were analyzed. Nine hundred and seventy five children received BCG vaccination whilst vaccination data for 31 patients was not available. One hundred and fifty three children did not have a visible scar.

Conclusion: Fifteen percent of under 5 year old internally displaced children in Vavuniya district did not have BCG scars.

Introduction

BCG vaccination is the only method of inducing specific immunity against tuberculosis (TB) and provides 50-80% protection against disseminated TB in children below 5 years of age^{1,2}. Presence of BCG scar is the best clinical evidence of vaccine induced immunity. However, non development of a scar is a known occurrence^{3,4}. Disappearance of the BCG scar with time is also documented in some studies⁵. There are controversies regarding revaccination^{6,7}.

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In the paediatric unit of General Hospital Vavuniya, we had 5 internally displaced children over the past one month with either confirmed or probable disseminated TB. None of them had BCG scars. Therefore we decided to perform this study.

Objectives

General objective

To study the BCG vaccination status of the under 5 year old internally displaced children who are temporarily settled in camps in Vavuniya district, Sri Lanka.

Specific objectives

- Proportion of children without BCG scars
- Proportion of children revaccinated
- Reasons for non revaccination
- Association of maternal educational level and vaccination/ revaccination

Method

A cross sectional descriptive study was carried out in all children between 6 to 60 months who attended the paediatric clinics held in temporary settlement camps in Vavuniya district from 1st April to 15th May, 2009. An interviewer administered questionnaire was used to document immunization status according to Child Health Developmental Record (CHDR) entries. In the event of lost CHDRs, parents' recollection of giving BCG immunization was taken as evidence of BCG vaccination. The left deltoid region was examined for the presence of the BCG scar.

Results

One thousand and six children attended the clinics during the study period. Eight hundred and fifty three had BCG scars while 153 (15.2%) did not have a visible scar. Tables 1 & 2 show the distributions of study population according to age and gender.

Table 1
Distribution of children with BCG scars according to age and gender

Age groups (months)	Male	Female	Total	
			No	%
6 – 12	121	78	199	23.4
13 – 18	87	66	153	17.8
19 – 24	42	40	82	9.6
25 – 30	34	42	76	8.9
31 – 36	33	36	69	8.1
37 – 42	25	36	61	7.2
43 – 48	42	31	73	8.6
49 – 54	33	24	57	6.7
55 – 60	45	38	83	9.7
Total	461	391	853	100

Table 2
Distribution of children without BCG scars according to age and gender

Age groups (months)	Male	Female	Total	
			No	%
6 – 12	11	8	19	12.4
13 – 18	8	14	22	14.4
19 – 24	15	4	19	12.4
25 – 30	8	10	18	11.8
31 – 36	10	7	17	11.1
37 – 42	12	8	20	13.1
43 – 48	8	11	19	12.4
49 – 54	5	5	10	6.5
55 – 60	7	2	9	5.9
Total	84	69	153	100

The study population comprised 545 (54.2%) boys and 461 (45.8%) girls. Nine hundred and fifty eight (95.2%) children received BCG vaccination after birth.

CHDRs were available only in 879 (87.4%) children. All available CHDRs were of the type introduced by the Ministry of Health in 2003. Thus, documentary evidence of giving BCG vaccination was not available in 127 (12.6%), the CHDRs having been either lost during war time or soaked in lagoon water during the humanitarian rescue operation.

In 900 (89.5%) children, the main caregiver was one or both parents. One hundred and six children were not accompanied by either parent because of parental injuries, illness or death. Sixty of these 106 children were looked after by a grandparent and 46 by a caregiver known to the family. There were 4 children who had lost both parents in the war.

Of the 153 (15.2%) children without BCG scars, 105 had received the vaccination. Thirty one children without a BCG scar were not accompanied by either parent and no information regarding BCG vaccination status was available.

Table 3 compares the maternal educational level in children with and without BCG scars. There was no significant difference ($P > 0.05$). Only 90 (9%) mothers in the study population were educated below grade 5.

Table 3
Comparison of the maternal educational level in children with and without BCG scars

Maternal educational level	BCG scar present	BCG scar absent
Illiterate	17 (2.1%)	2 (1.3%)
< Grade 5	56 (6.6%)	15 (9.8%)
Grade 6 – 10	290 (34.2%)	58 (37.9%)
GCE O/L	335 (39.5%)	56 (36.6%)
GCE A/L	151 (17.8%)	22 (14.4%)
Total	849	153

(Degree of freedom- 4, $X^2 - 3.881$, $P - 0.422$)

Of the 153 children without a BCG scar 16 (10.4%) were re-vaccinated. Following re-vaccination 6 children developed a scar whilst 10 did not develop a visible scar.

Table 4 shows the analysis of reasons for non-revaccination.

Table 4
Analysis of the reasons for non revaccination in the BCG scar absent group (N= 137)

Reason	No	%
Unaware of absent scar	69	50.4
Aware of absent scar, didn't seek advice	61	44.5
Attended revaccination but revaccination postponed	6	4.4
BCG scar marked positive in CHDR	1	0.7
Total	137	100

There were no children among the study population who were investigated or treated for TB in the past.

Although 16 children without BCG scars in our study were revaccinated, only 10 developed BCG scars. Therefore non development of a scar following initial vaccination is a possibility.

Discussion

In Sri Lanka, the Expanded Programme of immunization (EPI) coverage assessment surveys indicate almost 100% coverage for BCG⁸. In our study 958 (95.2%) children were BCG vaccinated after birth. This finding shows that despite the war there was good EPI coverage among the internally displaced children in the north of Sri Lanka.

There are controversies regarding revaccination of BCG. In Sri Lanka, the National Programme for Tuberculosis Control and Chest Diseases recommends repeat vaccination in case of an absent BCG scar after 6 months of age up to 5 years of age¹⁰. However revaccination is not recommended by WHO as there is no evidence for the efficacy of revaccination of BCG¹¹.

In our study in under 5 year old internally displaced children in Vavuniya district in the north of Sri Lanka, 153 (15.2%) children did not have BCG scars. A study done at the Lady Ridgeway Hospital (LRH), Colombo in December 2006 showed absent BCG scars in 11%⁹.

Conclusion

Fifteen percent of under 5 year old children internally displaced children in Vavuniya District in Northern Sri Lanka did not have BCG scars.

The reasons for non development of a scar include injecting subcutaneously instead of intradermally and use of low potency vaccines.

Recommendation

Prospective studies are needed to observe scar disappearance and non development.

Scar disappearance is another known phenomenon. Several studies done in India have demonstrated scar disappearance in up to 30% within 2-4 years⁵.

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References

1. Rodrigues LC, Diwan VK, Wheeler JG. Protective effect of BCG against tuberculous meningitis and miliary tuberculosis: a meta analysis. *International Journal of Epidemiology* 1993; **22**(6):1154-8
2. Colditz GA, Brewer TF, Berkey CS, Wilson ME, Burdick E, Fineberg HV, et al. Efficacy of BCG vaccine in the prevention of tuberculosis. Meta analysis of the published literature. *JAMA*.1994; **271**(9):698-702
3. Sivarajah N, Sivayogan S, Jegatheesan J, Gnananathan V. BCG vaccination and development of a scar. *CMJ*. 1990; **35**(2): 75-8
4. Rani SH, Vijayalakshmi V, Sunil K, Lakshmi KA, Suman LG, Murthy KJ. Cell mediated immunity in children with scar failure following BCG vaccination. *Indian Paediatrics*. 1998; **35**(2):123-7
5. Channabasavaiah M, Mohan V, Suryanarayana HV, Krishnamurthy MS, Shshidhara AN. Waning of BCG scar and its implications. *Indian Journal of Tuberculosis* 1993; **40**: 137-44
6. Bothamley GH, Ed Cooper, Shingadia D, Mellanby A, Tuberculin testing before BCG vaccination. *BMJ* 2003; **327**:243-4
7. Rodrigues LC, Pereira SM, Cunha SS, Genser B et al. Effect of BCG re vaccination on the incidence of tuberculosis in school aged children Brazil: The BCG- REVAC cluster randomized trial. *The Lancet* 2005; **366**:1290-5.
8. Ministry of Health, Sri Lanka. Annual Health Bulletin; 2003: table 52.
9. N Srisaravanapavanathan, NN Dissanayaka, J Sarachchandra. BCG vaccination scars of children under 5 years in a tertiary care hospital. *Sri Lanka Journal of Child Health* 2008; **37**:81-4.
10. National Programme for Tuberculosis Control and Chest Diseases, Ministry of Health, Sri Lanka. General Manual for Tuberculosis Control. 2nd ed. 2005.
11. Tam CM, Leung CC, Cessation of the BCG re vaccination programme for primary school children in Hong Kong. *Public Health and Epidemiology Bulletin* 2000; **9**(3):25-7