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Continuing or discontinuing BCG revaccination in adolescents

ABSTRACT

BCG revaccination was introduced in Brazil in the mid-90's but no study has evaluated vaccine coverage through direct assessment of the scar. BCG scars were assessed in 2,785 public school adolescents, aged 13 to 14 years, in Southeastern Brazil, between September 2001 and May 2002. The prevalence rate of revaccination was 64.3% (95% CI: 62.5-66.0). Despite the efforts to implement and sustain revaccination, continuing this practice should be reevaluated by public health authorities due to the lack of evidence on its effectiveness.

KEYWORDS: BCG vaccine. Vaccination. Vaccinal coverage. Effectiveness. Adolescent.

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INTRODUCTION

The administration of the second dose of BCG vaccine in Brazilian school students has started in the mid 1990s assuming that, among other rationale, neonatal BCG vaccination would become less effective over the years. Besides, revaccination was assumed to yield a booster effect and thus would prevent increasing tuberculosis rates in teenage years. Given high school dropout rates seen in Brazil, revaccination would preferably take place at school admission. The Brazilian Ministry of Health has left up to State Health Departments to set the best time for revaccinating this population. But estimating vaccine coverage based on the number of vaccine doses administered and population information is quite a complex undertaking by health services, as the target population has a wide range of age groups, i.e., it includes first to eighth grade school children aged between 6–7 years and 15–17 years.

Moreover, no Brazilian studies have assessed BCG vaccine coverage through direct assessment of the scar, which has proved to be a highly sensitive and specific marker of first BCG vaccination in the first 14 years of life.⁴

The present study was conducted aiming at assessing the prevalence of vaccine scar associated to the first BCG vaccination and revaccination among public school students.

METHODS

A cross-sectional study was carried out in the city of Belo Horizonte, Southeastern Brazil. BCG revaccination basically comprised children and adolescents aged 10 or more. First, a census of local public elementary and middle schools was conducted. Of 182 schools identified, for operating matters those with less than 200 students were excluded. Then, of 43 remaining schools, 14 (32.5%) were randomly selected using Epi Info 6.04 software package.

Between September 2001 and May 2002, data were collected only from those students aged 13 and 14. To minimize loss due to absenteeism, each school was visited two or three times.

BCG scar was defined as a flat or slightly hollowed out oval atrophic scar, 3–10 mm diameter, at the level of the lower insertion of the right deltoid muscle. No questions were asked to the students regarding their previous BCG vaccination and they were also blinded to the purpose of the study. Identification and counting of vaccine scars were conducted by specially trained people.

Table - Demographic characteristics and vaccination status of the study population (N=2,785). Belo Horizonte, Brazil, 2001-2002.

Variables	N	%
Age (years)		
13	1,264	45.4
14	1,521	54.6
Gender		
Male	1,307	46.9
Female	1,478	53.1
Vaccination status (BCG scar)		
One	947	34.0
Two	1,790	64.3
Unclear	22	0.8
None	26	0.9

Given the difficulty of clinically differentiating first BCG vaccination from revaccination scars, students were classified as first vaccinated when there was one scar only and as revaccinated when there were two scars.

RESULTS

The Table shows the characteristics of the study population.

There is a slight preponderance of female students (53.1%) and those aged 14 years (54.6%). The prevalence of first BCG vaccination was 98.3% (95% CI: 97.8–98.7), estimated by summing up those students who had one scar only (34.0%) with those who had two scars (64.3%, 95% CI: 62.5–66.0). About two-thirds of first vaccinated students were revaccinated.

DISCUSSION

The finding of two scars does not necessarily mean that the subject was first BCG vaccinated in the first years of life and then revaccinated after turning 10 years old. However, the study results show similar coverage of first BCG vaccination to that reported in official estimates for the city of Belo Horizonte. One can thus reasonably assume as valid the BCG revaccination rate found in this study. Based on the study sampling process, it is most likely that the proportion of revaccinated students reflects revaccination rate in the study population.

A BCG revaccination coverage reaching about two-thirds of the target population can only be achieved by allocating and mobilizing economic, human and other resources. Yet, such logistic effort has been made with no definite evidence on the efficacy of BCG revaccination^{1,3} and despite the World Health Organization's recommendations against this practice.²

A recent randomized study conducted in Brazil,⁵ published in 2005, found that the efficacy of BCG revac-

ination in preventing tuberculosis among school children was only 9% (95% CI: -16% to 29%), which was not significant. Based on this evidence, it seems advisable to take actions aimed at discontinuing BCG revaccination in Brazil.

This result shows that adolescents who were revaccinated during school years are not protected against tuberculosis. Besides, BCG vaccination coverage in Belo Horizonte and other Brazilian cities favors further observational case-control studies. It is suggested to study different age groups from that of the study mentioned above,⁵ with different time point for either revaccination or outcome assessment (pulmonary or extra-pulmonary tuberculosis or not). The present study indicates that, in Belo Horizonte, stu-

dents were on average older at the time of BCG revaccination than those included in the randomized study.⁵ But if outcomes are assessed at a later age, let's say, at the age of 25-30, these new observations could provide additional clinical and epidemiological information, which are undoubtedly important for understanding the impact of BCG revaccination as well as the particular epidemiology of tuberculosis disease.

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