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Research Article Open Access

Bacille Calmette-Guerin (BCG) Revaccination: Is it Beneficial for Tuberculosis Control?

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Abstract

Background: The duration of the protective efficacy of BCG vaccine plays an important role in the establishment of vaccination policies particularly for tuberculosis endemic countries. The effectiveness of revaccination with two or more doses is still a controversial issue. In this systematic review, we qualitatively appraised available epidemiological evidence.

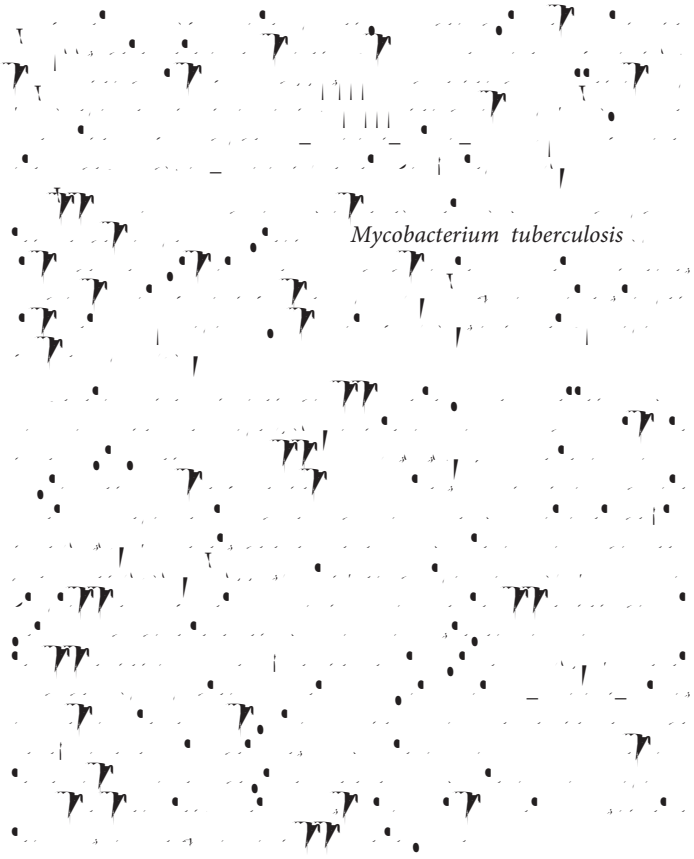
Method: A search strategy using both PubMed and Embase databases and manual search was done up to January 2013. The main search terms used include BCG, revaccination, tuberculosis, mortality and adverse reaction. The studies were grouped by designs; randomized-control trials, cohort and case-control studies. Outcomes were categories into primary outcomes (tuberculosis and mortality from tuberculosis) and secondary outcomes (vaccine efficacy, immunity and adverse reaction from BCG revaccination).

Results: Nine articles were selected and data on the primary and secondary outcomes were extracted. The review noted no significant difference in the incidence rate ratio (range 0.57-1.74), relative risk [0.39 (0.31-0.49)] and hazard ratio [1.20 (0.77-1.89)] from tuberculosis in the BCG revaccinated group compared to BCG non-revaccinated group. Comparison between the two groups also noted no significant difference in the relative risk of adverse reaction [2.3 (0.67-7.80)] and vaccine efficacy [8 (-77-52)], but a significant increase in immune response in revaccinated group.

Conclusion: In summary, our review demonstrated the available evidences do not support BCG revaccination as a strategy to reduce tuberculosis.

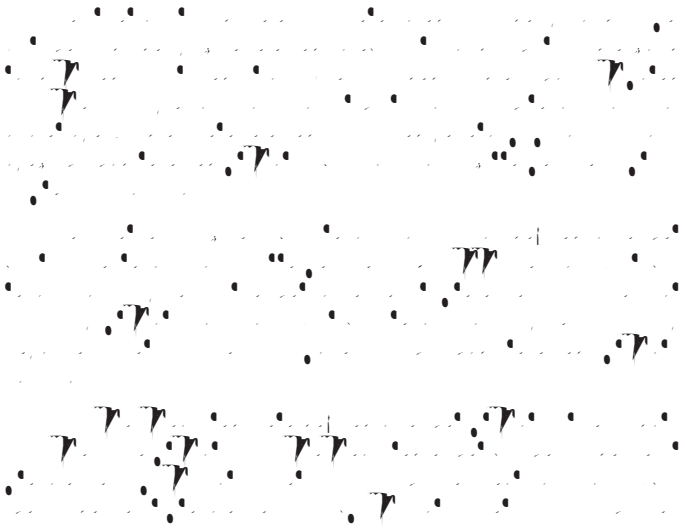
Keywords:

Background



Methods

Study selection



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Received Janary 23, 2013; **Published** March 31, 2013

Citation: Ahmad NA, Abd Hamid HA, Sahril N, Mohd Yusoff MF, Naidu BM, et al. (2013) Bacille Calmette-Guerin (BCG) Revaccination: Is it Benefcial for Tuberculosis Control? 2: 656 doi:10.4172/scientifcreports.656

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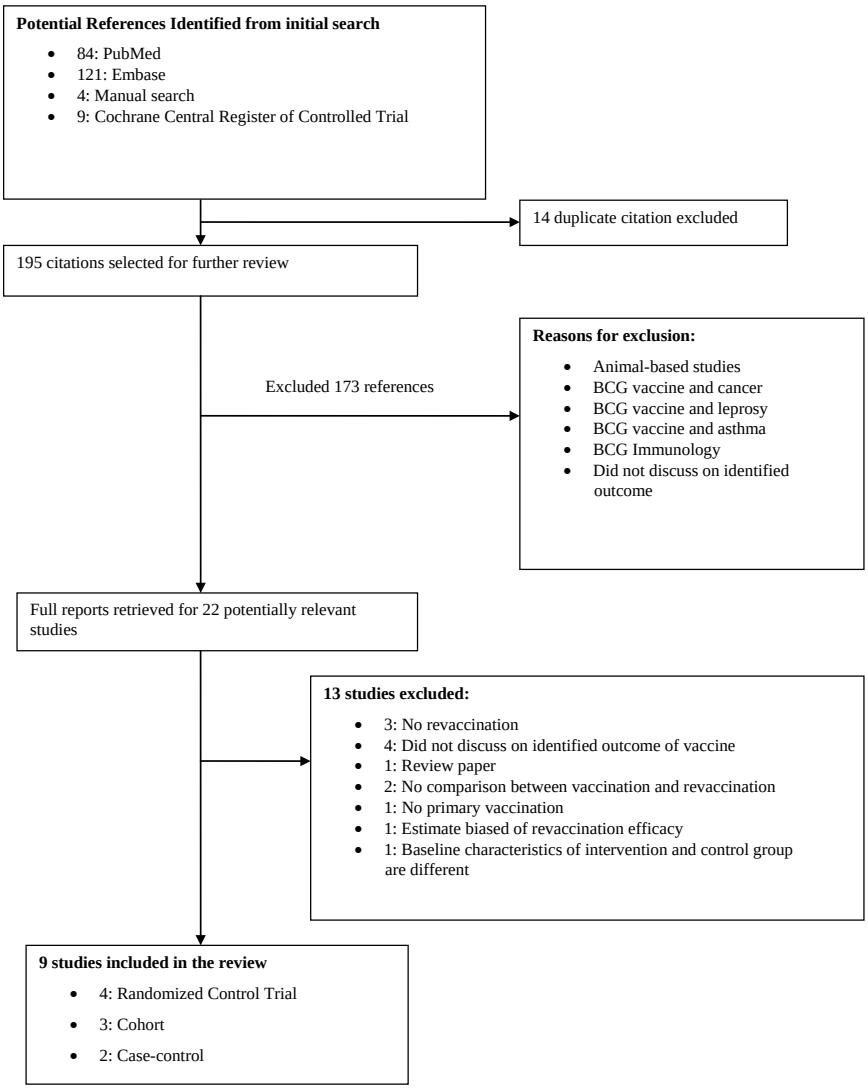
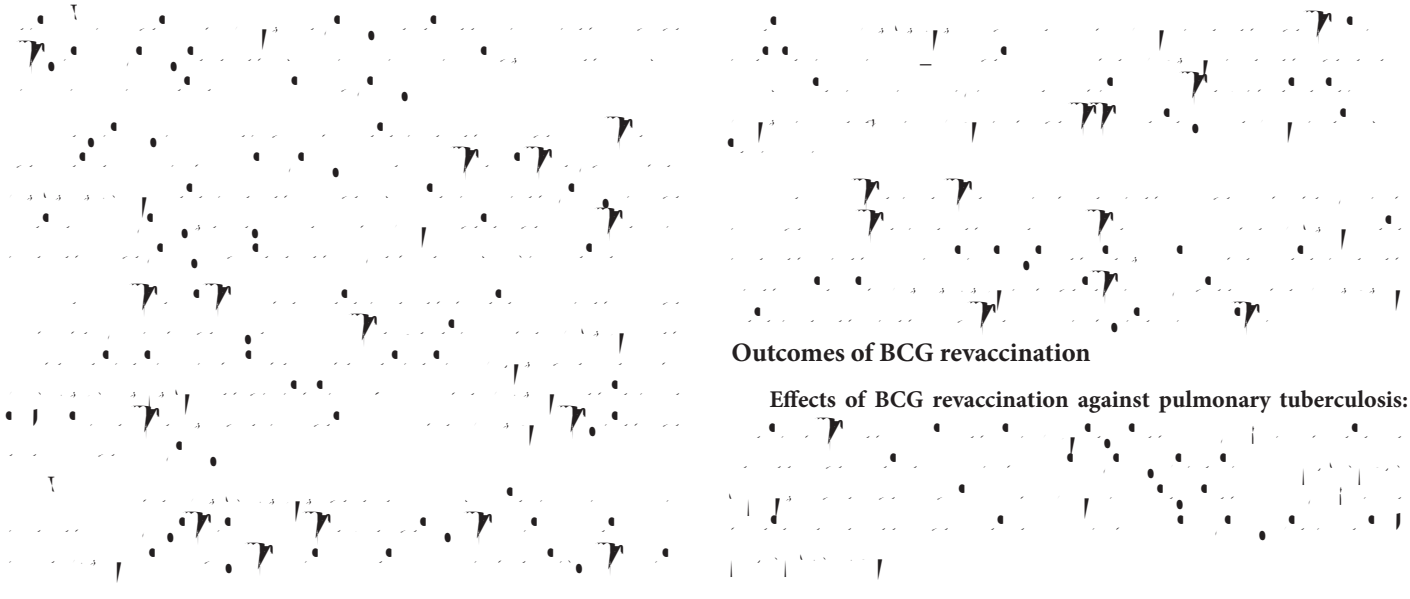

Potential References Identified from initial search
84: PubMed
121: Embase
4: Manual search
9: Cochrane Central Register of Controlled Trial
14 duplicate citation excluded
195 citations selected for further review
Excluded 173 references
Reasons for exclusion:
Animal-based studies
BCG vaccine and cancer
BCG vaccine and leprosy
BCG vaccine and asthma
BCG Immunology
Did not discuss on identified outcome
Full reports retrieved for 22 potentially relevant studies
13 studies excluded:
3: No revaccination
4: Did not discuss on identified outcome of vaccine
1: Review paper
2: No comparison between vaccination and revaccination
1: No primary vaccination
1: Estimate biased of revaccination efficacy
1: Baseline characteristics of intervention and control group are different
9 studies included in the review
4: Randomized Control Trial
3: Cohort
2: Case-control

Figure 1:


Outcomes of BCG revaccination
Effects of BCG revaccination against pulmonary tuberculosis:

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Effects of BCG revaccination against both pulmonary tuberculosis and extrapulmonary tuberculosis:

Effect of BCG revaccination against mortality:

Effect of BCG revaccination against secondary outcomes: