Epidemiology of Tuberculosis and BCG vaccine uptake among Pasifika in Aotearoa New Zealand

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Summary

Tuberculosis (TB) has many known risk factors that contribute to its persistence worldwide, particularly in developing countries. Aotearoa New Zealand (NZ), as a high-income country, is fortunate to fall in the low-risk category. However, the incidence of TB is more common in particular ethnic groups such as Pasifika. The Pasifika population exhibit a unique set of vulnerabilities that increase their susceptibility to TB disease. Therefore, this study aimed to identify strategies for improving TB prevention efforts by identifying the level of protection against TB for Pasifika. Given their higher TB burden and vulnerabilities, assessing the effectiveness of the BCG vaccination programme to capture at-risk populations is particularly important for these vulnerable ethnic groups. This will contribute to Aotearoa NZ's capability to support prevention and preparedness for current and future infectious disease challenges such as TB outbreaks.

A Pasifika framework, Te Kora, was employed to guide a convergent parallel mixed methods design. To understand the epidemiology of TB and BCG vaccine uptake among Pasifika in Aotearoa NZ, a quantitative observational study and a qualitative interpretive descriptive study were undertaken. TB and BCG data from 2006 to 2023 were descriptively analysed. Maroro (conversations) was used as the method to generate qualitative data to understand the perceptions of healthcare professionals on the BCG vaccination programme and TB prevention efforts. The qualitative data was then analysed following a conventional content analytic approach.

The quantitative results showed that Pasifika and Asian populations in Aotearoa NZ had the highest TB incidence rates from 2006 to 2023, with average incidence rates of 11.4 per 100,000 (confidence interval (CI): 8.2 – 15.3) and 27.5 per 100,000 (CI: 23.5 – 32), respectively. Further analysis of the Pasifika population showed a higher percentage (average of 55%) of TB incidence among the less dominant Pasifika ethnicities such as Kiribati, Tokelau, Tuvalu and Niue. BCG vaccination rates were steadily high among the Asian population, with an average rate of 1000.7 per 100,000 (CI: 975.8 – 1026.2). BCG rates were also reasonably high among Pasifika, however, there was an observed rapid significant decrease to exceedingly low vaccination rates from 2011 to 2023. The average BCG vaccination rate for Pasifika was 519.4 (CI: 500.3 – 539.3) per 100,000, however, based on the significant decrease which reached vaccination rates as low as 26.6 per 100,000 (CI: 21.7 – 32.2), the Pasifika population were significantly under-vaccinated. Further analysis of the Pasifika vaccination rates indicated that Pasifika ethnicities were proportionately vaccinated relative to their population sizes except for the Cook Island Māori and Niuean ethnicities. The quantitative findings highlight the need for an increase in BCG vaccine uptake for the Pasifika population, especially among the less dominant Pasifika ethnicities, which have the highest proportion of TB notifications.

Three main categories were constructed from the qualitative data that outlined barriers of the current BCG vaccination programme and TB prevention efforts. These include systemic gaps in identifying at-risk groups, which identified knowledge gaps among healthcare workers and fragmented referral processes. The second category, perceptions of TB disease and BCG vaccine among migrants and Pasifika communities, identified stigma and

migrants' perception of TB risk as key concerns. The third category, related to system-level factors that affect BCG uptake and TB reduction include the BCG policy and programme changes, the Pasifika umbrella and effective communication.

The findings from both quantitative and qualitative phases suggest that while the BCG vaccination programme aligns with the WHO recommendation for low incidence countries, the programme requires refinement to enhance its effectiveness. To ensure equitable outcomes for TB disparities including improvements to the current BCG vaccination programme in Aotearoa NZ, the present study recommends: *refinement of referral pathways for BCG vaccination and TB patients, enhancing healthcare workers' training, increase community health education on TB risk, enhancing data disaggregation and community empowerment.*

Dissemination and presenting of findings to Pasifika communities and leaders/stakeholders are planned upon completion of the research. This is to ensure that Pasifika can utilise the findings to make improvements to the BCG vaccination programme to benefit Pasifika. Sharing the findings to Pasifika communities also ensures collaborative values and endorses Pasifika leadership efforts.