IMPACT OF PCV10 ON NASOPHARYNGEAL CARRIAGE OF *STREPTOCOCCUS PNEUMONIAE* IN COMMUNITY CHILDREN OF NEPAL

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INTRODUCTION

Nasopharyngeal carriage prevalence of pneumococcus is one of the major factors that determine the burden of pneumococcal diseases in the community [1]. This is especially true for pneumococcal serotypes contained in PCV (vaccine serotypes, VT) as the majority of invasive pneumococcal diseases (IPD) are caused by these serotypes [2]. Nepal introduced PCV10 vaccine in January 2015, the rollout reaching Kathmandu (urban) in August 2015 and Okhaldhunga (rural) in October 2015. The aim of this study was to determine the impact of PCV10 on VT carriage prevalence in urban and rural community-dwelling children of Nepal as an indirect measure of the vaccine's effectiveness against pneumococcal diseases.

METHODS

- In this cross-sectional study, nasopharyngeal (NP) swabs were collected from community-dwelling children aged 6 to 23 months in Kathmandu and Okhaldhunga before and after PCV10 introduction.

- In Kathmandu, NP swabs were collected over 9 months a year from children who presented to Patan hospital for immunization, routine check-ups or minor injuries. The NP swabs were transported in STGG media, and cultured and serotyped at Patan hospital by Quellung.

- In Okhaldhunga, NP swabs were collected from children in the community for a 2-week period in February 2015 and in February 2017. The NP swabs were frozen in STGG media, and transported in liquid nitrogen to Patan hospital for culture and serotyping.

RESULTS

Kathmandu:

- From April 2014 to June 2017, NP swabs were collected from 3253 children.

- All-serotype pneumococcal carriage prevalence was 65% (1143/1749) in 2014/2015 (pre-vaccine) and 63% (954/1505) in 2016/2017 (post-vaccine) (p=0.243). Note: all p-values were calculated using Pearson's chi-squared test.

- VT carriage decreased from 19% (334/1749) of total participants in 2014/2015 to 12% (134/1152) in 2016, and 9% (31/353) in 2017 (p<0.001). VT carriage in children with 3 doses of PCV10 in 2017 was 6% (19/330), representing a reduction of 70% from pre-vaccine prevalence (p<0.001).

Urban vaccine serotype (VT) carriage prevalence

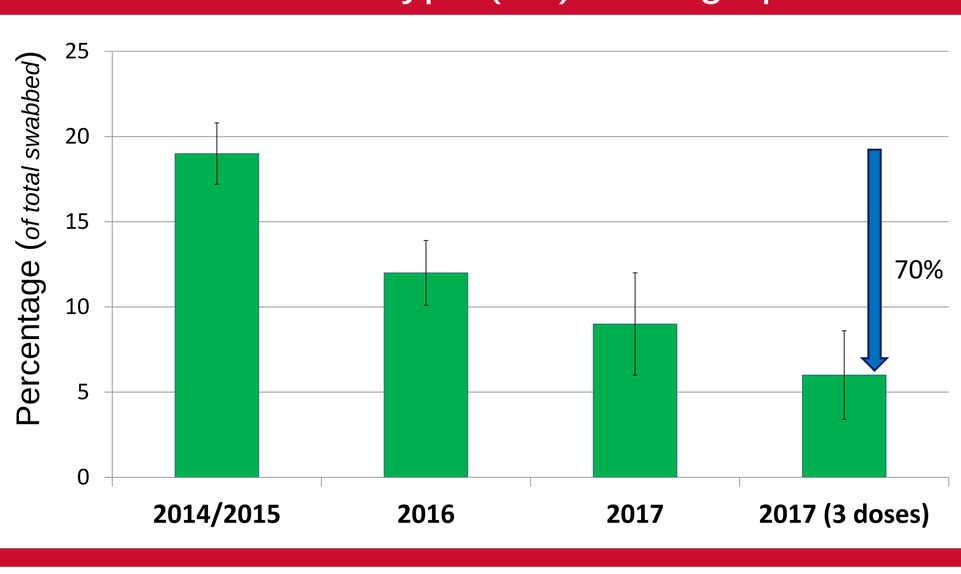

Figure 1: VT carriage in Kathmandu before (2014/2015) and after PCV10 introduction. VT carriage dropped from 19% of total participants in 2014/2015 to 12% in 2016 (1st post vaccine year), and 9% in 2017 (p<0.001). VT carriage in children with 3 doses of PCV10 in 2017 was 6%, representing a decrease of 70% from pre-vaccine prevalence.

Rural vaccine serotype (VT) carriage prevalence

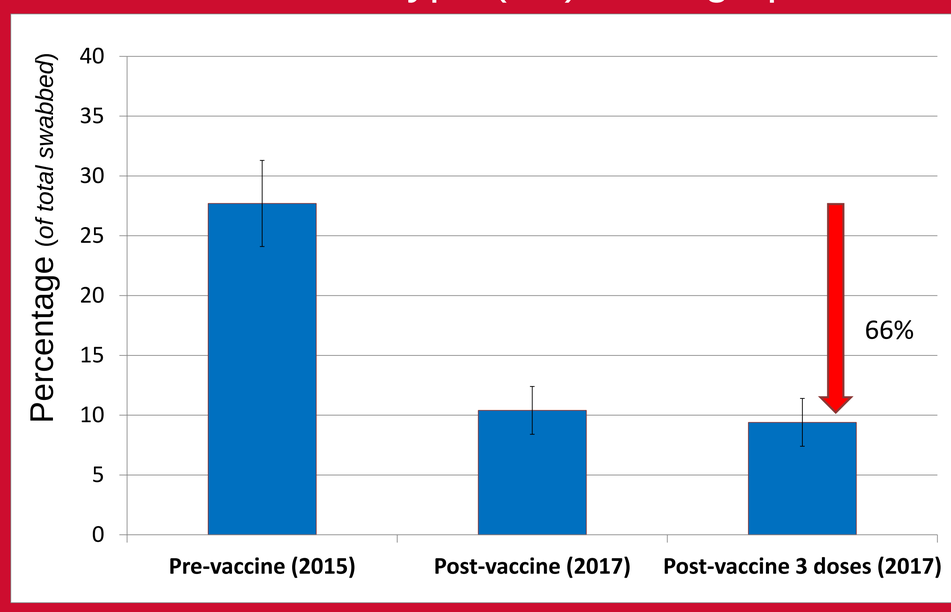

Figure 2: VT carriage in Okhaldhunga before (2015) and after PCV10 introduction. VT carriage dropped from 28% of total participants in 2015 to 10% in 2017 (p<.001). VT carriage in children with 3 doses of PCV10 in 2017 was 9%, a 66% reduction from 2015 (p<0.001). In 2017, 64% children had received 3 doses.

Okhaldhunga:

- 600 and 914 children were enrolled in 2015 and 2017 respectively.

- All-serotype pneumococcal carriage prevalence was 83% (495/600) in 2015 (pre-vaccine) and 84% (769/914) in 2017 (post-vaccine) (p=0.402).

- VT carriage dropped from 28% (166/600) of total participants in 2015 to 10% (95/914) in 2017. VT carriage in children with 3 doses of PCV10 in 2017 was 9% (55/585), a decrease of 66% from pre-vaccine prevalence (p<0.001).

CONCLUSION

While all-serotype carriage prevalence of S. pneumoniae remained unaffected, the carriage prevalence of PCV10 vaccine serotypes declined significantly after vaccine introduction in both urban and rural communities of Nepal. These preliminary data using carriage as a surrogate of vaccine impact against disease indicate that PCV10 is likely to have an important impact on the health of young children in Nepal.

REFERENCES

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