



John Njuma Libwea

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Assessing the burden of Otitis media (OM) in children 2 to 3 years of age and estimate the effect of pneumococcal conjugate vaccine (PCV-13) inclusion on OM in the Expanded Programme on Immunizations (EPI) in Cameroon

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Background

Otitis media (OM) is among the most common illness requiring medical consultation in children under 3 years old (Rovers, 2011; Vergison et al., 2010; Verhoeff et al., 2006). On 1 July 2011, the Cameroon Expanded Programme on Immunization (EPI) included the 13-valent pneumococcal conjugate vaccine into its schedule free of charge; with the objective to significantly reduce the burden of diseases due to invasive pneumococcal infections (IPD) and OM. Otitis media a spectrum of different disease syndromes, ranging from acute otitis media (AOM), chronic otitis media with effusion (OME) to chronic complications (Rovers, 2011). Systematic epidemiological studies focusing at the burden of otitis media in Cameroon are rare or not yet published. However, estimates of the disease incidence in children in the country could be high if comparative data from other developing countries notably Kenya (Simoes et al., 2015) and Nigeria (Adeyi et al., 2010; Amusa et al., 2005) are borne in mind.

Rationale for the Study

Chronic complications and hearing loss are some of the dangerous effects of otitis media and literature on the burden of the disease in the country is rare. Therefore, a cross-sectional study on randomly selected population was necessary to generate an overall idea of the disease burden and establish a baseline needed for assessing the effectiveness of the PCV-13.

Primary Objectives

- I. To estimate the prevalence of otitis media in children 2 to 3 years of age
- II. To estimate the effects of the 13-valent pneumococcal conjugate vaccine (PCV13) on otitis media in children 2 to 3 years old

Methods

A community-based cross-sectional prevalence study of otitis media (OM) was performed on quasi-randomly selected unvaccinated children aged from 24 to 36 months in Yaoundé, Cameroon. Two rounds of data collection phases were performed- first between March to June 2013 and two years later in 2015. OM burden was estimated by clinical examination for chronic suppurative otitis media (CSOM), tympanometry and pneumatic otoscopy for otitis media with effusion (OME) and by parental questionnaires for acute otitis media (AOM). Here we report only the results from clinical inspection and tympanometry for the first phase. A flat ‘type B’ tympanogram was interpreted to define OME. Hence, it was important first to

continued on next page



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Dr. Libwea is presently a visiting researcher at the Finnish National Institute for Health and Welfare (THL) where he is the Principal Investigator on the project 'Cameroon PCV Impact study'. This population-based study focuses on the direct and indirect effectiveness of the PCV13 on both invasive pneumococcal diseases (IPD) and nasopharyngeal carriage on vaccine-eligible children within the Expanded Immunization Programme (EPI) in Cameroon. This project is done in partnership with the EPI Cameroon, THL, the University of Tampere and other partners

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ISID Research Grant Report *continued*

understand the specific disease burden in Cameroon, in order to develop a methodology to measure the effectiveness of the PCV-13 in reducing the prevalence of otitis media.

Summary of Findings

A total of 529 children were enrolled; 433 (82%) were included in the analyses and the rest were excluded due to indeterminate tympanogram data. 67/433 children (15.5%) were diagnosed with at least one form of otitis media or its complications. This consisted of 3 (0.7%) children identified with unilateral CSOM; 19 (4%) children with bilateral OME; 44 (10%) with unilateral OME and 1 (0.2%) subject with unilateral dry tympanic membrane perforation. Logistic regression analyses showed statistically significant association between OM and previous history of OM within 6 months (POR 2.0, 95% CI 1.1 to 3.5; $p=0.02$); and between OM and current symptoms of upper respiratory tract infections (Prevalence Odds Ratio: POR = 2.9, 95% CI 1.4 to 5.6; $p = 0.003$).

Study Limitations

Persistent power cuts, lack of sufficient materials by clinicians to clean cerumen accumulated in the inner ears were the main limitations encountered in the field. This resulted in challenges to adequately determine inner ear statuses by otoscopy and increased the possibility of false positives by tympanometry.

Research Highlights and Conclusions

The preliminary findings were first reported as an abstract for presentation during the 17th International Congress on Infectious Disease, 2-5th March 2016 in Hyderabad, India. This has also been submitted as an original research paper to a peer-reviewed international Journal for publications. In brief, the findings indicate that one in every twenty children in the study population was affected by major OM morbidity: CSOM or bilateral OME between the ages of 2 and 3 years in the study population. These data could be useful as a baseline for estimating the impact of pneumococcal conjugate vaccines (PCV13) introduced in July 2011. The 2015 data will report on vaccine effectiveness.

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