



Antibiotic Susceptibility and Pneumococcal Carriage Patterns in Mother-Baby Pairs

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ABOUT THE STUDY

In our study, we determined the prevalence of pneumococcal carriage and factors associated with pneumococcal colonization in a mother-baby pair. Only 12(3.95%) of the 304 nasal swabs cultured were positive for pneumococci, with 7(4.61%) in children under the age of five and 5(3.29%) in mothers. We found that pneumococci carriage was low among the mothers and babies in this study. In contrast, a previous study found high carriage rates of more than 50% in children under the age of five. Participants were chosen based on their presentation with pneumonia symptoms as defined by WHO guidelines, whereas our study included all children who met our selection criteria, which did not include signs and symptoms of pneumonia.

Pneumococci colonized 90.0% of children in a similar study conducted. The difference in carriage observed in our study can be attributed to the facts that were conducted prior to the introduction of Pneumococcal Conjugate Vaccine (PCV-10). Different studies elsewhere have found varying rates of pneumococci carriage among children under the age of five, with the majority reporting a higher carriage rate than our study. A systematic review found that the carriage rate ranged from 21% to 94%, with more studies done on children than adults.

The high PCV-10 immunization may explain the low pneumococci carriage rate in our study, as opposed to the study, which found a high carriage rate of 56% with lower immunization coverage of 42% PCV-10 and 54% PCV-13. In our study, there was a statistically significant relationship between pneumococcal carriage and immunization status of the babies. Because pneumococcal carriage is a prerequisite for disease, our findings suggest that full PCV-10 immunization protects against pneumococcal carriage and thus pneumonia caused by *Streptococcus pneumoniae*. Since the introduction of the PCV vaccine, several studies have reported a decrease in the burden of invasive pneumococcal disease and serotype distribution. The first dose of PCV-10 (PCV 1) immunization coverage was 97.78% (133/136), with 2.22% (3/136) of children

over six weeks not receiving PCV 1. 10.53% of the 152 participants were children under the age of six weeks, making them ineligible for PCV-10 immunization. PCV 3 immunization coverage was 90.99% (101/111). Children under the age of fourteen weeks who had not received PCV 3 were not included in the denominator because they were ineligible.

We also found that the mothers had a low pneumococci carriage rate. A similar study found that pneumococcal carriage was more common in children under the age of five than in adults. Other studies have linked the low carriage rate of pneumococci among adults to the development of natural immunity. Because of the development of mucosal host defenses such as sIgA, the upper respiratory tract appears to be a disadvantageous niche for *Streptococcus pneumoniae*. Vaccination with PCV has also resulted in the development of herd immunity against *S. pneumoniae* in the adult population. Cases of pneumococcal colonization have been reported to rise in the elderly population due to immune senescence, with many countries failing to recognize the importance of immunizing this population. According to our findings, there was no statistically significant relationship between the child's sex/gender and the risk of pneumococcal carriage. This finding is similar to the findings systematic review, which found no association between pneumococcal carriage and gender, despite the fact that one study associated carriage with males and the other with females.

Chloramphenicol, Tetracycline, and Erythromycin all showed a high trend of antimicrobial resistance. Other studies have found that pneumococci are highly resistant to commonly used antibiotics. In a study of Erythromycin-resistant *S. pneumoniae* isolates, 81% were tetracycline resistant, 76% were multidrug resistant, and 12% were resistant to clindamycin, tetracycline, chloramphenicol, and kanamycin combined. In contrast to our findings, Tanzania has reported low resistance rates to tetracycline, erythromycin, chloramphenicol, and ceftriaxone. Again, contrary to our findings, an earlier study found no resistance to erythromycin and ceftriaxone, indicating an emergency of antimicrobial resistance against those drugs, which

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Received: 02-Aug-2022, Manuscript No. JVV-22-18120; **Editor assigned:** 04-Aug-2022, PreQC No. JVV-22-18120 (PQ); **Reviewed:** 18-Aug-2022, QC No. JVV-22-18120; **Revised:** 25-Aug-2022, Manuscript No. JVV-22-18120 (R); **Published:** 02-Sep-2022. DOI: 10.35248/2157-7560.22.S20.003

Citation: Cai Y (2022) Antibiotic Susceptibility and Pneumococcal Carriage Patterns in Mother-Baby Pairs. J Vaccines Vaccin. S20:003.

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may be attributed to irrational use of antibiotics as well as the fact that such drugs are given empirically due to a lack of laboratory capacity to conduct culture and sensitivity studies.

We found low pneumococcal carriage in a mother-baby pair. There was no link found between pneumococcal carriage in the

mother and infant prevalence. The association between pneumococcal carriage and immunization status suggests that PCV-10 is anti-pneumococcal carriage. *S. pneumoniae* had a high level of resistance to commonly used antibiotics.