

Peer Review

Review of: "Carriage of Oropharyngeal Bacteria Among Children in a Rural Population Living in a Tropical Region in São Paulo, Brazil"

Jonas Michel Wolf¹

1. Hospital Moinhos de Vento, Porto Alegre, Brazil

This study presents valuable research on the oropharyngeal carriage of key respiratory pathogens (*S. pneumoniae*, *H. influenzae*, and *M. catarrhalis*) in children residing in a tropical rural settlement in São Paulo, Brazil. Given the significant global burden of respiratory infections, particularly in vulnerable populations within low- and middle-income tropical countries, investigating the prevalence of these pathogens in such a setting is highly relevant to public health and informs targeted intervention strategies. The study's aim to detect carriage and determine its association with airway infections in this specific population is a crucial step towards understanding local epidemiological dynamics. A significant strength of this study lies in its focus on a specific, vulnerable population within a rural settlement. Such populations often face unique socioeconomic and environmental challenges that can influence health outcomes, including susceptibility to infectious diseases. By concentrating on the Dona Carmen settlement, the researchers provide insights into the health landscape of a community that is likely representative of many other rural settlements in Brazil. This localized approach is essential for developing context-specific public health interventions and policies. The use of both conventional culture methods and multiplex PCR for pathogen identification is another strong point. While conventional culture can be challenging for fastidious organisms and may yield inconclusive results, the inclusion of multiplex PCR significantly enhances the sensitivity and specificity of detection. The finding that PCR identified a much higher percentage of positive samples for *S. pneumoniae* and *M. catarrhalis* compared to culture underscores the importance of molecular techniques in accurately assessing pathogen carriage, particularly in settings where logistical limitations may impact sample viability for culture. The study effectively presents data on the carriage rates of *S. pneumoniae* and *M. catarrhalis* across different age

groups, highlighting higher colonization rates in younger children. This aligns with established knowledge about the age-dependent nature of nasopharyngeal colonization by these pathogens. The identification of potential risk factors through univariate analysis, such as gender, skin color, and increased use of antimicrobials, provides valuable insights into the demographic and behavioral factors that may influence carriage in this specific population. The discussion connecting these findings to broader socioeconomic inequalities and the culture of self-medication in Brazil adds a humanized dimension to the technical results. Furthermore, the study's discussion of the impact of the *H. influenzae* type b (Hib) vaccine on the absence of *H. influenzae* detection is an important point. This finding reinforces the effectiveness of vaccination programs in reducing the prevalence of specific pathogens and highlights the public health benefits of such interventions. The acknowledgement of the low Human Development Index (HDI) in the study region and its connection to the low income of the settlement residents provides crucial context for understanding the underlying vulnerabilities of the population. However, the study also presents several significant opportunities for improvement that, if addressed, could substantially enhance its scientific rigor, generalizability, and impact. A primary limitation is the small sample size, which the authors acknowledge. While the study provides valuable insights into the specific settlement, the low number of participants (44 out of a potential 103 children) and the resulting low level of confidence (12%) significantly restrict the statistical power and the generalizability of the findings to other rural settlements or the broader Brazilian child population. Future studies should aim for larger, more representative sample sizes to increase the robustness of the conclusions. The difficulties encountered in participant adherence due to logistical challenges, low levels of education, and poor infrastructure in the rural setting highlight the practical complexities of conducting research in such areas. The complaint from settled families about not receiving feedback from previous surveys also points to a need for improved community engagement and communication strategies in future research endeavors. Building trust and demonstrating the tangible benefits of research to the community are essential for ensuring better participation and data collection. A notable absence in the methodological approach is the lack of serotype information for *S. pneumoniae*. Serotyping is crucial for understanding vaccine coverage and effectiveness, as different serotypes are included in different conjugate vaccines (e.g., PCV10). Identifying the serotypes circulating in this population would provide valuable insights into whether the detected carriage is due to vaccine or non-vaccine serotypes, which has direct implications for evaluating the impact of the current vaccination program and informing future vaccine strategies. Furthermore, the study did not include antibiotic susceptibility testing for the isolated bacterial species. Given the increasing global concern about antimicrobial

resistance, obtaining this data from healthy carriers would provide important insights into potential reservoirs of resistance within the community. This information is critical for guiding empirical antibiotic treatment recommendations and informing strategies to mitigate the spread of resistant strains, particularly in vulnerable populations with potentially limited access to healthcare. While the study used multiplex PCR, the DNA was extracted directly from swabs rather than from cultures. Extracting DNA from cultures, when possible, can be a better choice to minimize false negative rates by concentrating the target bacteria and reducing the presence of inhibitors that may be present in direct swab samples. This methodological consideration could potentially improve the sensitivity of the PCR detection. In conclusion, this study makes a valuable contribution by shedding light on the prevalence of key respiratory pathogens in a vulnerable child population within a Brazilian rural settlement. Its strengths lie in its focus on a specific community, the use of molecular detection methods, and the identification of potential risk factors. However, to enhance the impact and generalizability of these findings, future research should prioritize larger sample sizes, improved community engagement, the inclusion of serotype information for *S. pneumoniae*, antibiotic susceptibility testing, and consideration of methodological refinements in DNA extraction for PCR. Addressing these opportunities for improvement will provide a more comprehensive understanding of the epidemiological landscape and inform more effective public health interventions in similar rural settings in Brazil and other tropical regions.

Declarations

Potential competing interests: No potential competing interests to declare.