The Open Microbiology Journal

Content list available at: https://openmicrobiologyjournal.com

Supplementary Material

RESEARCH ARTICLE

# Nasopharyngeal Carriage of *Streptococcus pneumoniae* and Associated Factors among Children in Southwest Ethiopia

Dejene Derseh Abateneh[1,2,*], Abera Kumalo Shano[2,3] and Teshale Worku Dedo[2]

[1]*Kotebe Metropolitan University, Menelik II College of Medicine and Health Sciences, Addis Ababa, Ethiopia*
[2]*Department of Medical Lab oratory Sciences, College of Health Sciences, Mizan-Tepi University, Mizan Teferi, Ethiopia*
[3]*Department of Medical Laboratory Sciences, College of Medicine and Health Sciences, Wolaita Sodo University, Sodo, Ethiopia*

**Abstract:**

***Background:***

In Ethiopia, *Streptococcus pneumoniae* is the predominant causative agent of pneumonia. About, 95% of bacterial pneumonia cases in under five years of children are caused by *pneumococci*.

***Objective:***

To assess the nasopharyngeal carriage of *Streptococcus pneumoniae*, its antibiotic susceptibility pattern, and associated factors among children in Southwest Ethiopia.

***Methods:***

A cross-sectional study was conducted from October 01, 2018, to December 30, 2018. A total of 293 children aged ≤15 years were included in the study using a systematic random sampling technique. A nasopharyngeal swab was collected using a sterile cotton swab and cultured on blood agar supplemented with 5µg/ml gentamicin. The antimicrobial susceptibility testing was performed using the Kirby-Bauer disc diffusion technique.

***Results:***

The ages of participants ranged from 5 months to 14 years. The carriage rate of *Streptococcus pneumoniae* was 74/293 (25.3%). Being within the age group <3 years, the habit of sleeping with parent(s)/guardians and numbers of rooms per household were significantly associated with pneumococcal carriage. *Streptococcus pneumoniae* showed the highest resistance to Tetracycline, 36 (48.65%), and Trimethoprim/sulfamethoxazole, 29 (39.2%), and was found to be susceptible to Chloramphenicol, 54 (77%), and Erythromycin, 38 (51.4%).

***Conclusion:***

The nasopharyngeal carriage rate of *Streptococcus pneumoniae* is considerably high. High antimicrobial resistance of *Streptococcus pneumoniae* against Tetracycline and Trimethoprim/sulfamethoxazole was observed. Living in a house with a single room, children's habit of sleeping with parents/guardians and age are associated factors of high pneumococcal carriage. Strategies need to be designed to address the modifiable associated factors and the bacterium antibiotic resistance pattern should be monitored regularly.

**Keywords:** Streptococcus pneumoniae, Nasopharyngeal carriage, Antibiotics susceptibility, Children, Ethiopia.

| Article History | Received: April 10, 2020 | Revised: June 15, 2020 | Accepted: June 18, 2020 |
|---|---|---|---|

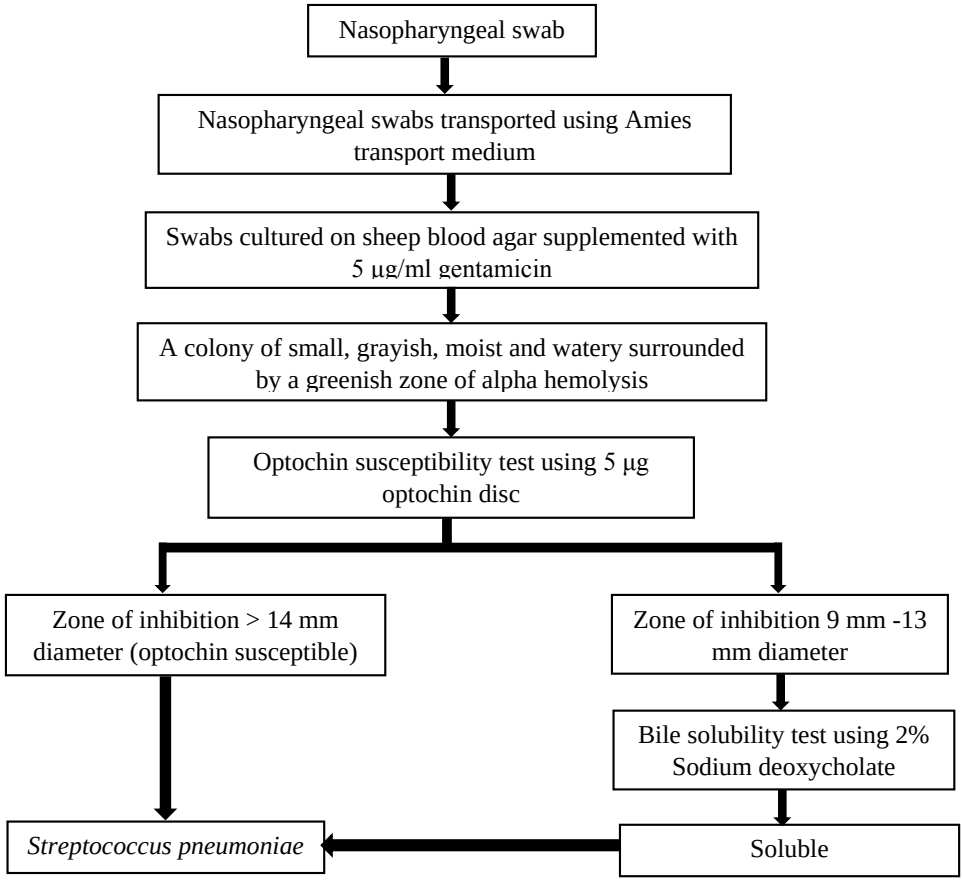
**Supplementary Table 1. Antimicrobial susceptibility test result interpretation of *Streptococcus pneumoniae* (Clinical Laboratory Standard Institute guidelines, 2014).**

| Antimicrobial agent | Disk content | Interpretive categories and zone diameter breakpoints (nearest whole mm) | | | Comments |
|---|---|---|---|---|---|
| | | Susceptible | Intermediate | Resistant | |

*(Supplementary Table 1) cont.....*

| | | | | | |
|---|---|---|---|---|---|
| Penicillin | 1 µg Oxacillin | ≥20 | - | - | Isolates of pneumococci with oxacillin zone sizes of ≥20 mm are susceptible to penicillin. Penicillin MICs should be determined for those isolates with oxacillin zone diameters of ≤19 mm, because zones of ≤19 mm occur with penicillin-resistant, -intermediate, or certain -susceptible strains. For isolates with oxacillin zones ≤ 19 mm, do not report penicillin as resistant without performing a penicillin MIC test. |
| TMP/SMX | 1.25/ 23.75 µg | ≥19 | 16-18 | ≤15 | |
| Chloramphenicol | 30 µg | ≥21 | - | ≤20 | |
| Erythromycin | 15 µg | ≥21 | 16-20 | ≤15 | |
| Tetracycline | 30 µg | ≥28 | 25-27 | ≤24 | |

TMP/SMX = Trimethoprim/sulfamethoxazole MIC = Minimum inhibitory concertation




**Supplementary Fig. (1).** Isolation and identification of Streptococcus pneumoniae from nasopharyngeal swab specimen.