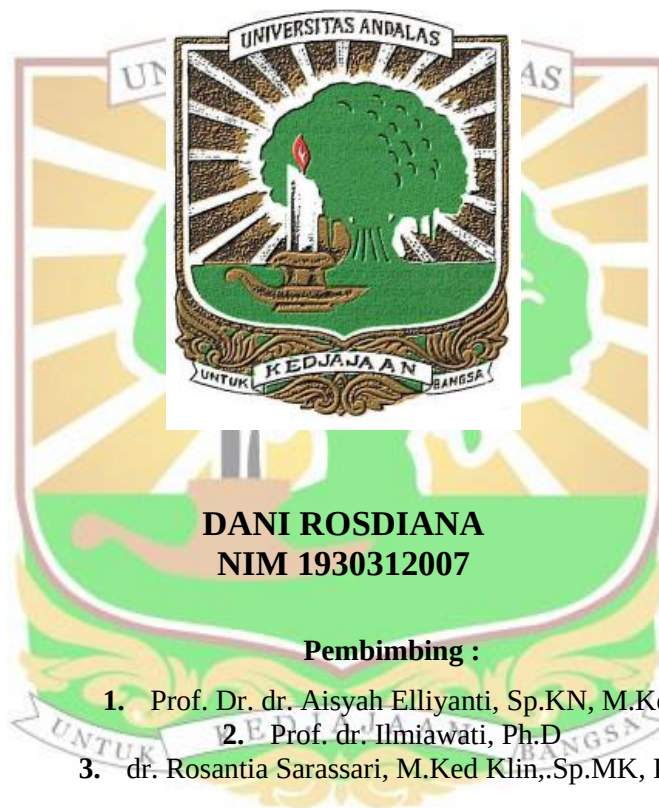


DISERTASI

ANALISIS PERBEDAAN SEROTIPE dan HASIL UJI KEPEKAAN ANTIBIOTIK ISOLAT *Streptococcus pneumoniae* PADA POPULASI DEWASA ANTARA PERKOTAAN DAN PEDESAAN



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ABSTRAK

ANALISIS PERBEDAAN SEROTIPE dan HASIL UJI KEPEKAAN ANTIBIOTIK ISOLAT *Streptococcus pneumoniae* PADA POPULASI DEWASA ANTARA PERKOTAAN DAN PEDESAAN

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Tujuan: menganalisis perbedaan serotipe dan pola kepekaan antibiotik isolat *S. pneumoniae* pada populasi dewasa sehat (karier) di pedesaan dan perkotaan, guna menyediakan data yang bermanfaat dalam pencegahan infeksi pneumokokus dan pemilihan antibiotik rasional.

Metode: Sebanyak 601 partisipan sesuai kriteria inklusi dan eksklusi di Bengkalis dan Pekanbaru, Riau dilibatkan. Isolasi bakteri dari usap nasofaring dengan kultur pada media TSA2 – darah domba 8% *enriched rabbit serum*. Koloni optochin sensitif diidentifikasi dengan VITEK-2 sekaligus uji kepekaan antibiotik. Isolat terkonfirmasi dilakukan *serotyping* dengan PCR 8 reaksi multiplex. Pemeriksaan *sequencing* dengan illumina menyediakan data: *sequence cluster*, serotipe dan gen resistansi antibiotik. uji statistik menggunakan Chi square dan *Fisher's Exact Test*.

Hasil: Teridentifikasi 30 karier *S. pneumoniae* (4,99%) dengan klasifikasi 6,7% vs 3,3% (pedesaan vs perkotaan). Ditemukan 15 serotipe: 6 serotipe VT dan 9 Serotipe NVT, proporsi serotipe VT sama dengan NVT. Proporsi serotipe dominan meliputi: 3 (16,7%), 18B (13,3), 18C (10%), 6A (10%). Sebanyak 56,7% karier resistan antibiotik, MDR 16,7%. Tidak ada yang resistan dengan penisilin. Uji statistik menunjukkan tidak ada perbedaan prevalensi karier, pola kepekaan antibiotik dan distribusi serotipe pada kedua area, namun terdapat hubungan antara serotipe dan resistansi antibiotik ($p=0,029$). Data genomik menunjukkan gen pembawa resistansi yang berkaitan dengan kluster 67 dan 10.

Kesimpulan: Karier *S. pneumoniae* pada populasi dewasa memerlukan perhatian Teridentifikasinya Serotipe VT pada komunitas mendukung relevannya vaksinasi pneumokokus. Serotipe-multiresistan antibiotik menjadi tantangan bagi klinisi dalam tata laksana. Studi lebih lanjut secara berkala dan berkesinambungan pada komunitas masih diperlukan.

Kata Kunci: karier *S. pneumoniae*, kepekaan antibiotik, multiplex PCR, serotipe, WGS

ABSTRACT

ANALYSIS OF DIFFERENCES IN SEROTYPES AND ANTIBIOTIC SUSCEPTIBILITY PATTERN OF *Streptococcus pneumoniae* CARRIAGE IN ADULT POPULATIONS BETWEEN URBAN AND RURAL AREAS

Dani Rosdiana

Objective: To analyze differences in serotype distribution and antibiotic susceptibility patterns of *Streptococcus pneumoniae* isolats among healthy adult carriers in rural and urban settings, with the aim of generating data to support pneumococcal disease prevention strategies and rational antibiotic selection.

Methods: A total of 601 participants meeting the inclusion and exclusion criteria were enrolled from Bengkalis and Pekanbaru, Riau Province. Bacterial isolation was performed from nasopharyngeal swabs cultured on TSA II agar supplemented with 8% sheep blood and enriched rabbit serum. Optochin-susceptible colonies were identified using the VITEK 2 System, which also provided antibiotic susceptibility profiles. Confirmed isolats underwent serotyping by PCR using eight multiplex reactions. Whole-genome sequencing with the Illumina platform generated data on sequence clusters, serotypes, and antibiotic resistance genes. Statistical analysis was conducted using the Chi-square test and Fisher's exact test.

Results: Thirty *S. pneumoniae* carriers were identified (4.99%), with carriage rates of 6.7% in rural areas and 3.3% in urban areas. Fifteen serotypes were detected, comprising six VT and nine NVT serotypes, with equal proportions of VT and NVT. The most common serotypes were 3 (16.7%), 18B (13.3%), 18C (10%), and 6A (10%). Antibiotic resistance was observed in 56.7% of carriers, including 16.7% with multidrug resistance; no isolats were resistant to penicillin. Statistical analysis showed no significant differences in carriage prevalence, antibiotic susceptibility patterns, or serotype distribution between rural and urban areas. However, a significant association was found between serotype and antibiotic resistance ($p = 0.029$). Genomic analysis identified resistance-associated genes linked to sequence clusters 67 and 10.

Conclusion: Pneumococcal carriage among healthy adults warrants attention. The presence of vaccine-type serotypes in the community underscores the continued relevance of pneumococcal vaccination. Multidrug-resistant serotypes pose a challenge for clinical management. Ongoing, periodic community-based surveillance studies are still needed.

Keywords: *S. pneumoniae* carriage, serotypes, antibiotic susceptibility, multiplex PCR, WGS

