

Prevalence and Antimicrobial Susceptibility of *Streptococcus pneumoniae* Isolated from Hospital in Thailand between 2016 and 2020

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Objective: To determine prevalence and antimicrobial susceptibility of *Streptococcus pneumoniae* at Taksin Hospital.

Materials and Methods: A retrospective descriptive study was conducted between January 2016 and December 2020. The bacterial susceptibility of isolates to clindamycin, erythromycin, trimethoprim-sulfamethoxazole, levofloxacin, and vancomycin were evaluated by the disk diffusion method. Bacterial susceptibility to penicillin and cefotaxime were evaluated for minimal inhibitory concentration (MIC) by a strip test (E-test).

Results: One hundred and nineteen patients were included, 65.55% male, and the age ranged from three months to 98 years. The median age of patients was 60 years with an interquartile range of 43 to 78 years. Unduplicated pneumococci from different patients were isolated from sputum (70.59%), blood (18.49%), and pus from ears and sinuses (5.04%). *S. pneumoniae* was demonstrated to be 100% susceptible to vancomycin and levofloxacin but less susceptible to clindamycin, erythromycin, and trimethoprim-sulfamethoxazole by disk diffusion method. Pneumococci exhibited total multiple drug resistance (MDR) at 31.94%. The predominant MDR pattern was clindamycin + erythromycin + trimethoprim-sulfamethoxazole (31.10%). The MIC range, MIC₅₀, and MIC₉₀ of penicillin was 0.008 to 3.0, 0.25, and 2.0, and for cefotaxime, it was 0.008 to 1.0, 0.25, and 1.0 µg/mL, respectively. From an extra study to determine serotypes, *S. pneumoniae* isolated from blood or CSF (n=25) were randomly picked between 2007 and 2021 from Thai IBIS and Taksin Hospital. The three most common serotypes were 19F (20%), 6B (16%), and 6A (12%).

Conclusion: These results suggest the importance of monitoring the prevalence of pneumococci. The antibiogram of susceptibility helps provide guidelines for clinician to consider empirical treatment. An antibiogram is an overall profile of antimicrobial susceptibility testing results of pneumococci to a battery of antimicrobial drugs. Antibiograms are often used by clinicians to assess local susceptibility rates, as an aid in selecting empiric antibiotic therapy, and in monitoring resistance trends over time within an institution. Antibiograms can also be used to compare susceptibility rates across institutions and track resistance trends.

Keywords: *Streptococcus pneumoniae*; Pneumococci; Drug resistance

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Streptococcus pneumoniae is an important pathogen in humans and poses a serious threat to public health as it causes various illnesses and deaths each year globally^(1,2). It can cause a wide range of disease

in children and adults, especially community-acquired pneumonia, invasive pneumococcal disease (IPD), meningitis, sinusitis, otitis media, bronchitis, and conjunctivitis^(1,3). Community-acquired pneumonia is the most common type of pneumococcal disease with 900,000 cases and 400,000 hospitalizations per year in the United States⁽⁴⁾. IPD refers to pneumococci that have already invaded normally sterile sites such as blood, cerebrospinal fluid, pericardial fluid, joint fluid, or pleural fluid. The U.S. Centers for Disease Control and Prevention has estimated the incidence of IPD to be 10.6/100,000 per year and noted it occurs more frequently in adults than children with bacteremia present in 20% of all cases⁽⁴⁾. For Latin America and the Caribbean, pneumococcal diseases cause 12,000 to 18,000 deaths with 4,000 from meningitis and 1,229

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