

**BJMHR**

British Journal of Medical and Health Research

Journal home page: [www.bjmhr.com](http://www.bjmhr.com)

## Penicillin resistance in *Streptococcus pneumoniae*: Threat, Treatment, and Future trends in Management

Mila Nu Nu Htay<sup>1\*</sup>, Angus E Aranan<sup>2</sup>, Wai Wai Myint<sup>3</sup>, Win Htay<sup>4</sup>

1. Department of Community Medicine, Melaka-Manipal Medical College, Melaka, Malaysia

2. Newcastle University Medicine Malaysia, Johor, Malaysia

3. Department of reconstructive and rehabilitation, University Malaysia Sarawak, Sarawak, Malaysia

4. General Practitioner, Mandalay, Myanmar

### ABSTRACT

Emergence of antibiotic resistance is a global concern in this era to combat infectious diseases. *Streptococcus pneumoniae* is one of the most common causes of community-acquired respiratory tract infections and the drug of choice for treatment was penicillin. However, the first clinically significant penicillin-non-susceptible pneumococcus (PNSP) was documented in 1967. Since then, penicillin resistance strain had been identified in different continents of the world. Among 94 serotypes of *S. pneumoniae*, “paediatric serotypes” (6A, 6B, 9V, 14, 15A, 19A, 19F and 23F) were found to have the highest resistance to penicillin and erythromycin globally. The mechanism of penicillin resistance in *S. pneumoniae* is conveyed by the alternation of the structure of penicillin binding proteins (PBPs), which leads to reducing the affinity for penicillin. There is a relationship between antibiotic consumption and dissemination of antibiotic resistant pneumococcal clones in Southern and Eastern Europe, America, and Asia. Therefore, rational use of antibiotics is important in order to decrease the development and spread of resistant strains. After the introduction of Pneumococcal conjugate vaccine (PCV) 7 vaccines, non-vaccine serotypes like 6C, 11A, 15A, and 15B/C have increased in prevalence. Since the changes in serotype prevalence due to selective pressure have been observed, it is necessary to monitor the prevalent serotypes. Optimal coverage may be achieved by using vaccines with a wide range of serotype coverage in the future. In managing pneumococcal infections, sensitivity tests are important to choose the appropriate antibiotics. In severe pneumonia or hospital-acquired pneumonia patients at the area of high prevalence of PNSP, the initial antibiotics must include intravenous carbapenems, ceftriaxone, cefotaxime or newer quinolones, meanwhile, penicillin-resistant pneumococcal meningitis ( $\geq 2 \mu\text{g/ml}$ ) is vancomycin and ceftriaxone or cefotaxime. Judicious use of antibiotics, modification of the treatment duration and encouragement for adherence by patients are recommended to prevent antibiotic resistance. Development of new classes of drugs and novel therapeutic regimen is essential to overcome the hazard of penicillin resistance pneumococcal infection in future.

**Keywords:** Penicillin resistance,  $\beta$ -Lactams, *Streptococcus pneumoniae*, Community-acquired respiratory tract infections.

\*Corresponding Author Email: [drmlnnh@gmail.com](mailto:drmlnnh@gmail.com)

Received 2 January 2017, Accepted 27 February 2017

Please cite this article as: Mila NH *et al.*, Penicillin resistance in *Streptococcus pneumoniae*: Threat, Treatment, and Future trends in Management. British Journal of Medical and Health Research 2017.