

# **Antimicrobial Susceptibility Patterns of Pseudomonas Aeruginosa on Clinical Isolates obtained from Hospitalized Patients**

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## **Background and Objectives**

Infection with *Pseudomonas aeruginosa* (*P. aeruginosa*) is of great concern for patients who are critically ill and immunocompromised. Unfortunately, resistance to available anti-pseudomonal agents is on the rise, jeopardizing selection of appropriate treatment and subsequently increasing morbidity and mortality in patients infected with this pathogen. The present study was carried out in Khartoum Teaching Hospital, Fedail Hospital and Military Hospital to investigate the problem of resistance among *P. aeruginosa* isolates as well as to determine the relationship patterns of resistance and antibiotics consumption.

## **Method**

Bacterial isolates were collected from laboratories at Khartoum Teaching Hospital, Fedail Hospital and Military Hospital. Identification of *P. aeruginosa* was done by colonial morphology, Gram stain and biochemical tests. Antimicrobial sensitivity test was carried out to: amikacin, gentamycin, 180

ceftazidime, ciprofloxacin, imipenem, piperacillin and polymyxin-B using modified Kirby- Bauer disc diffusion technique. Annual consumption data were collected from pharmacies and drug stores of the three hospitals.

## **Results**

152 *P. aeruginosa* clinical isolates were identified. Assessment of the current level of resistance to traditionally used anti-pseudomonal antibiotics revealed the following rates: piperacillin, 82.9%; ciprofloxacin, 34.9%; gentamycin 30.3%; ceftazidime, 20.4%; amikacin, 7.9%; imipenem, 5.9%; polymyxin-B 0.7%. The incidence of resistant was dependent on the origin of the strains, probably reflecting the patterns of antibiotics usage for prophylaxis and therapy in different hospitals. This was evident for ciprofloxacin resistance in Military Hospital and the high resistance rate (56.2%) reflected high consumption of ciprofloxacin in this hospital (approximately 12,000 infusion bottles and 24,000,000 tablets). The reverse of that appears in amikacin resistance in Fedail Hospital (no resistant isolates) and this reflect the low consumption of amikacin injections in Fedail Hospital (less than 240 ampoules in the year 2009-2010). The study revealed that polymyxin-B has the highest activity against clinical isolates of *P. aeruginosa* at 99.3%. The sensitivity of isolates to other antimicrobial agents was 88.2% for amikacin 82.2% for imipenem (. The highest resistance rate was found to be to piperacillin (82.2%).

## **Conclusion**

This study concluded that the antibiotic resistance for *P. aeruginosa* is common in the three hospitals and differs significantly ( $P= 0.000$ ) from one hospital to another according to the patterns of antibiotic usage. Further studies in other hospitals are highly recommended to get more data on anti-pseudomonal resistance among hospitalized patients.

Applying rational antibiotics use policies is the mainstay to control spreading of *P. aeruginosa* resistant strains. This includes optimizing prophylactic antimicrobial use prior to surgical procedures. In addition to incorporation of detection, prevention and control of antimicrobial resistance into strategic goals of our health system.