



Emerging Resistance of Antibiotics Against *Escherichia coli*, *Pseudomonas aeruginosa*, and Methicillin Sensitive and Resistance *Staphylococcus aureus*

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SUMMARY. The aim of this study is to identify the recent evolutionary resistance patterns in the different bacterial strains obtained from biological fluids. We found that *Escherichia coli* resistance patterns is rising against amoxicillin/clavulanic acid, Piperacillin/tazobactam, imipenem, meropenem, aztreonam, cefuroxime, cefotaxime, ceftriaxone, cefoperazone/sulbactam, ceftizidime, and cefepime to 64, 16, 3.5, 24, 38, 100, 59, 62, 53, 16, and 61%, respectively. *Pseudomonas aeruginosa* was found to be resistant against β -lactam antibiotics piperacillin/tazobactam, imipenem, meropenem, aztreonam, ceftizidime, and cefipime to 13, 8, 33, 20, 10, and 14%, respectively. Moreover, levofloxacin ciprofloxacin, amikacin, and gentamicin were found to be 79, 15, 7, and 9% resistant against *P. aeruginosa*, respectively. MSSA resistance pattern against amoxicillin/clavulanic acid, piperacillin/tazobactam, imipenem, meropenem, cefuroxime, ceftriaxone, and cefepime, was 92, 75, 0, 2, 67, 15, and 33%, respectively. MSSA was found to be resistant against levofloxacin (100%), ciprofloxacin (50%), fusidic acid (29%), vancomycin (9%), and clindamycin (45%). MRSA did not report any resistance to fusidic acid and clindamycin in this time period. Study shows the population of *E. coli*, *P. aeruginosa*, MSSA and MRSA bacteria has significantly evolved resistance patterns, at least in Pakistani population.

RESUMEN. El objetivo de este estudio es identificar los patrones de resistencia evolutiva recientes en las diferentes cepas bacterianas obtenidas de fluidos biológicos. Descubrimos que los patrones de resistencia de *Escherichia coli* aumentan contra amoxicilina/ácido clavulánico, piperacilina/tazobactam, imipenem, meropenem, aztreonam, cefuroxima, cefotaxima, ceftriaxona, cefoperazona/sulbactam, ceftizidime y cefepima a 64, 16, 3.5, 38, 100, 59, 62, 53, 16 y 61%, respectivamente. Se descubrió que *Pseudomonas aeruginosa* es resistente a los antibióticos β -lactam piperacilina/tazobactam, imipenem, meropenem, aztreonam, ceftizidima y cefipima al 13, 8, 33, 20, 10 y 14%, respectivamente. Además, se encontró que la levofloxacina, la ciprofloxacina, la amikacina y la gentamicina eran 79, 15, 7 y 9% resistentes contra *P. aeruginosa*, respectivamente. El patrón de resistencia a la MSSA contra amoxicilina/ácido clavulánico, piperacilina/tazobactam, imipenem, meropenem, cefuroxima, ceftriaxona y cefepma fue de 92, 75, 0, 2, 67, 15 y 33%, respectivamente. Se descubrió que MSSA es resistente contra levofloxacina (100%), ciprofloxacina (50%), ácido fusídico (29%), vancomicina (9%) y clindamicina (45%). MRSA no mostró ninguna resistencia al ácido fusídico y clindamicina en este período de tiempo. El estudio muestra que la población de bacterias *E. coli*, *P. aeruginosa*, MSSA y MRSA ha desarrollado patrones de resistencia significativos, al menos en la población pakistaní.

KEY WORDS: antibiotic resistance, *E. coli*, Methicillin sensitive *Staphylococcus aureus*, Methicillin resistance *Staphylococcus aureus*, *P. aeruginosa*.

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