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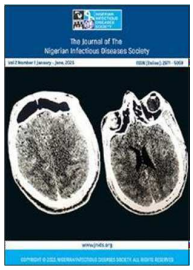

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# Molecular Characterization and Antimicrobial Susceptibility Pattern of Pseudomonas Species Isolated from Infected Wounds of Patients in Insurgency-Stricken Maiduguri, Borno State

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**ABSTRACT**

**Background:** Multidrug-resistant *Pseudomonas aeruginosa* has been known to cause infections among hospitalized patients, leading to significant morbidity and mortality. Carbapenems, considered to be antibiotics of last resort, are usually deployed for treating these infections, which could potentially lead to the development of resistance.

Methods: In this prospective cross-sectional study from Maiduguri metropolis in South-East Nigeria, a city devastated by a decade-long insurgency, we report on wound infections due to *Pseudomonas spp* among patients admitted between February and October 2020 from four major hospitals. Samples were first inoculated on selective agar (Cetrimide and MacConkey); then later sub-cultured on blood agar and on Muller-Hinton agar (MHA). Analytical profile index (API) kit was used for identification to species level. Interpretation of antimicrobial susceptibility was according to clinical and laboratory standard institute (CLSI) criteria. Molecular characterization, multiplex PCR and agarose gel electrophoresis were employed for molecular detection according to standard procedures.

**Results:** 420 wound specimens were collected from surgical units at the four study sites. *Pseudomonas spp* constituted 72 (17.1%) of all isolates, with *P. aeruginosa* being responsible for 68 (94.4%); the remaining were *P. putida* 2(2.8%) and *P. fluorescens* 2(2.8%). The highest prevalence of 36.8% was in the 21-40-year age group, with 66% being males ($p<0.05$). Resistance was documented at 100%, 83.6%, 35.3% 29.4%, 27.9% and 4.4% for Ceftazidime Aztreonam, Meropenem, Gentamicin, Ciprofloxacin and Piperacillin- tazobactam, respectively. Genotypic characterization of the *P. aeruginosa* isolates was positive for $bla_{VIM}$, $bla_{IMP}$.

**Conclusions:** Our study revealed high prevalence of carbapenemase-production among *Pseudomonas spp* from our patients with infected surgical wounds. This finding will serve as a guide for empiric therapy of infected surgical wounds among our patients. Our study also revealed the presence of VIM and IMP in our isolates, genes conferring resistance to carbapenems. Strict adherence to antimicrobial stewardship guidelines, infection prevention and control, and the need for improved surveillance on antimicrobial resistance in humans, animals and the environment; employing the ONE health approach will mitigate against the emergence and spread of infections due to multidrug resistant organisms.

**Key words:** Molecular characterization, Antimicrobial susceptibility, Pseudomonas Species, Surgical wounds, Insurgency