Molecular characterisation trends of carbapenemase-producing carbapenem-resistant enterobacteriaceae (CP-CRE) in Malaysia from 2021 to 2023

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ABSTRACT

Introduction: Carbapenemase-Producing Carbapenem-Resistant Enterobacteriaceae (CP-CRE) pose a serious public health threat due to their resistance to multiple antibiotics. These infections, which can lead to severe morbidity and mortality, are primarily transmitted through direct or indirect contact. This mode of transmission significantly impacts patient management in hospital settings. Common Enterobacterales such as *Escherichia coli, Klebsiella spp., Enterobacter spp., Citrobacter spp., Morganella spp., Serratia spp., Proteus spp.* and *Providencia spp.* are frequently identified, with KPC, VIM, IMP, NDM, and OXA-48 being the most prevalent carbapenemase genes contributing to phenotypic resistance in these bacteria. In recent years, the global prevalence of CP-CRE transmission has risen. However, data on CP-CRE cases in Malaysia remain scarce. Therefore, this study aims to underscore the prevalence of CP-CRE cases based on samples submitted to the Bacteriology Unit at the Institute for Medical Research over a three-year period from 2021 to 2023. **Materials and Method:** A total of 7677 received samples were subjected to PCR for species and genes detection. Each PCR run utilized 5 primer sets to detect blaNDM, blaKPC, blaVIM, blaIMP, and blaOXA-48 genes. The annual PCR results underwent comparative analysis. **Results:** The analysis indicates an increasing trend in the prevalence of CP-CRE in Malaysia over these three-year periods. The data revealed that *Klebsiella pneumoniae* is the most common species associated with carbapenemase production and the NDM being the most frequently detected carbapenemase gene. **Conclusion:** This study highlights the need for continuous surveillance and further research to understand the dynamics of CP-CRE transmission and resistance mechanisms, which will contribute to future infection treatment and prevention strategies.