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Emergence and spread of carbapenemase producing Gram negative bacteria in Ethiopia: a call for action

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Editorial

Carbapenems are considered last-resort antibiotics used for the treatment of multidrug-resistant (MDR) Gram negative bacterial (GNB) infection, particularly in hospital settings. However, the emergence of carbapenem resistant bacteria is threatening the effectiveness of these vital antibiotics (1). Globally, the most common resistance mechanism to carbapenems is the production of carbapenemase enzymes (2).

The worldwide distribution of carbapenemases is dynamic, with emerging resistance hotspots. The spread of carbapenem resistant bacteria is facilitated by factors such as travel, medical tourism, and antibiotic overuse. Globally, the most common carbapenemases include *K. pneumoniae* carbapenemases (KPC), New Delhi metallo-b-lactamases (NDM), Verona integronencoded metallo-b-lactamases (VIM), imipenemase (IMP) and oxacillinases (OXA), such as OXA-23, OXA-58, and OXA-48 (2). The distribution of these enzymes varies globally. NDM is prevalent in South Asia, the Middle East, and is increasingly found in Africa and Europe, while KPC dominates in North and South America, Southern Europe, and China. VIM and IMP are common in Europe, South America, and Asia. OXA-48 is widespread in Turkey, North Africa, and Europe, whereas OXA-23 and OXA-58 are frequently detected across Asia, South America, and Africa (3).

In Ethiopia, the occurrence of carbapenemase-producing GNB was first reported in 2017, with *A. baumannii* producing NDM (4). Since then, additional studies have revealed the presence of a variety of carbapenemases, including NDM, OXA-48, OXA-23, OXA-58, OXA-51-like, and KPC-42. These carbapenemases have been detected in a range of pathogens such as *K. pneumoniae*, *A. baumannii*, *P. aeruginosa*, *E. coli*, and other *Enterobacteriaceae* isolated from both patients and environmental samples (5-10). Among these, NDM is the most prevalent carbapenemase detected in Ethiopian isolates. Moreover, co-harboring of multiple carbapenemases, mostly in combination with NDM, has been fre-

quently reported, particularly in *K. pneumoniae* and *A. baumannii*. This co-resistance significantly complicates treatment options, making it more challenging to manage infections (6, 7, 9, 10). The few available studies in Ethiopia reported an alarming rise in carbapenem-resistant pathogens in the country and recommended the urgent need for enhanced surveillance, infection control measures, and antimicrobial stewardship to mitigate the threat of MDR infections. Therefore, further research to better understand the epidemiology of carbapenem-resistant bacteria in Ethiopia, and capacity-building initiatives for healthcare providers are crucial for early detection and effective management of MDR infections.

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