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Antimicrobial Resistance Patterns among Patients Admitted with Sepsis at a Tertiary Hospital in Uganda

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Abstract

Background: Antimicrobial Resistance (AMR) poses a significant global health challenge, associated with an estimated 4.95 million deaths and 1.27 million deaths directly attributable to it annually. There is a lack of routine surveillance of AMR in sepsis patients in many healthcare settings, especially in Low- and Middle-Income Countries (LMICs).

Objective: This study aimed to determine patient characteristics, and AMR profiles of bacterial isolates in sepsis at St. Francis Hospital Nsambya (SFH) in Uganda.

Methods: Between 1st August 2022 and 31st July 2023, we consecutively enrolled 157 adult participants with suspected or confirmed infection who fulfilled the q-SOFA criteria for sepsis. Collected demographic and clinical information and biological specimens (blood, urine, pus, throat secretions, CSF) for culture and susceptibility testing. The overall SOFA score was also calculated after getting all laboratory results. Descriptive statistics (median, interquartile range, frequencies, and percentages) and tabular antibiograms and heat maps were used to describe the study findings.

Results: About 59.2% were female, with a median age of 64 (IQR=50-74). The median SOFA score was 4 (IQR = 2-6). 49.7% had diabetes, 79% had community-onset sepsis, and the most prevalent infection sites were the genito-urinary tract (33%), respiratory tract (30%), and skin and soft tissue (15%). Pre-hospital antibiotic exposure was present in 61.7% of the participants. Microbial growth was observed in 61.1%, majorly bacterial 89 (92.6%) and fungal 7 (7.4%). The growth rates were highest in throat swabs 14 (92.9%), urine 74 (68.9%), and pus 28 (71.4%). The most common isolated bacterial species (N=90) were *E. coli* (28.9%), *K. pneumoniae* (14.4%), and *P. aeruginosa* (10%). High resistance (>75-80%) to penicillins, cephalosporins, quinolones, tetracyclines, cotrimoxazole) was noted. "There was zero resistance to colistin, polymixin B, tigecycline, teicoplanin, and bacitracin. Average resistance to carbapenems stood at 24%, and 27% for both meropenem and imipenem. Vancomycin-resistant enterococcus was 50%.

Conclusions: In this study population, bacterial sepsis was the most predominant affecting majorly the middle aged and elderly with comorbidities. *E. coli, K. pneumonia, P. aeruginosa, S. aureus,* and *E. faecalis* were major causative bacterial species. There was high resistance to commonly used first line antibiotics and rising resistance to carbapenems and vancomycin. Routine AMR surveillance and ensuring antibiotics are used judiciously, guided by culture and susceptibility tests must be prioritized. Future research should investigate antimicrobial stewardship programs to reduce AMR. Funding for development of vaccine against *E. coli* should be looked into.

Key words: Antimicrobial Resistance (AMR), Bacterial isolates in sepsis