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BACTERIAL CONTAMINATION OF FLOWER BOUQUETS IN MATERNITY AND SURGICAL WARDS IN PALESTINIAN HOSPITALS: A CROSS-SECTIONAL STUDY

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Abstract

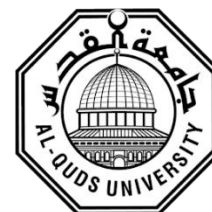
Background: Healthcare-associated infections (HAIs) remain a significant cause of morbidity and mortality worldwide, frequently associated with environmental reservoirs of multidrug-resistant organisms (MDROs). While infection prevention efforts primarily focus on medical equipment and high-touch surfaces, non-medical items such as flower bouquets are commonly present in patient care environments yet remain largely overlooked as potential sources of contamination.

Objective: To characterize bacterial contamination of flower bouquets in hospital wards and evaluate their potential role as reservoirs of clinically relevant and antibiotic-resistant pathogens.

Methods: A cross-sectional study was conducted on 48 flower bouquet samples collected aseptically from maternity and surgical wards at Al-Ahli Hospital and the Palestine Red Crescent Hospital. Samples, including leaves and roots, were cultured on MacConkey and blood agar and incubated at 37°C for 24 hours. Bacterial identification and antimicrobial susceptibility testing were performed using the VITEK system and confirmed by standard biochemical methods and Kirby–Bauer disk diffusion, following established microbiological protocols.

Results: Bacterial contamination was detected in 85% of samples, indicating a high burden of microbial presence on flower bouquets within hospital environments. The most frequently isolated organisms were *Enterobacter cloacae* complex (21.78%) and *Klebsiella* spp. (19.57%). Additional clinically important isolates included MRSA, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii* complex, all of which are well-recognized nosocomial pathogens.

Antimicrobial susceptibility testing demonstrated that 76.27% of isolates were sensitive, whereas 17.74% were resistant and 5.99% exhibited intermediate susceptibility. Importantly, resistance patterns observed among isolates are suggestive of multidrug-resistant phenotypes, including potential extended-spectrum β -



lactamase (ESBL)-producing and carbapenem-resistant strains. A predominance of Gram-negative organisms was observed, consistent with typical profiles of hospital-acquired pathogens.

Conclusion: Flower bouquets in hospital wards represent a previously underrecognized environmental reservoir of pathogenic and potentially multidrug-resistant bacteria. These findings are consistent with prior studies identifying non-medical environmental sources as contributors to hospital-acquired infections. The high contamination rate, presence of clinically significant pathogens, and evidence of antimicrobial resistance underscore the need to re-evaluate infection prevention policies, particularly regarding the presence of organic materials such as flowers in high-risk clinical settings. Addressing these overlooked reservoirs may contribute to improved infection control strategies and enhanced patient safety.

Keywords: Healthcare-associated infections (HAIs), flower bouquets, environmental reservoirs, antimicrobial resistance, multidrug-resistant organisms (MDROs), nosocomial pathogens, infection control."