Antibiotic Resistance in *Escherichia Coli* from Selected Mahaweli River Intake Points in Central Highlands of Sri Lanka

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The global increase in antibiotic resistance and the prevalence of waterborne diseases present significant public health challenges, especially in low and middle-income countries. *E. coli* is a faecal indicator bacterium commonly used in environmental antimicrobial resistance (AMR) monitoring. This preliminary study aimed to evaluate and compare the antibiotic resistance profiles of *E. coli* isolated from untreated water collected at 7 intake points that receive water from the Mahaweli River. Water samples of 100 ml were plated on MacConkey agar. Suspected colonies were sub-cultured and confirmed as *E. coli* based on typical colony morphology and biochemical tests including negative oxidase and positive indole results. From each intake point, two confirmed *E. coli* isolates were subjected to antimicrobial susceptibility testing using the disk diffusion method on Mueller-Hinton agar, following EUCAST guidelines. Antimicrobials tested included amoxicillin (10 µg), cefuroxime (30 µg), tetracycline (30 µg), streptomycin (10 µg), ciprofloxacin (5 µg), and co-trimoxazole (25 µg). All the tested isolates were resistant to amoxicillin and cefuroxime, while 43% were resistant to tetracycline, 36% to co-trimoxazole, 21% to streptomycin and 7% to ciprofloxacin. Multidrug resistance, which is defined as resistance to three or more antibiotic classes, was found in 57% of isolates, primarily from Heightenford, Elpitiya, Pahalkondadeniya, Oya Pahala and South Water Treatment plants. Out of the 14 isolates tested, 5 exhibited extensive drug resistance (XDR). These XDR. isolates were predominantly found in samples from Weligalla, Meewathura, Katugastota and Matale indicating potential resistance hotspots in these locations. These findings suggest that aquatic systems may act as reservoirs and transmission pathways for antimicrobial-resistant bacteria. While a direct assessment of contamination sources was not conducted, supporting evidence from previous studies indicates that untreated wastewater in Katugastota's Meda Ela canal, landfill runoff in Matale and inadequate sanitation infrastructure may contribute to the observed distribution of resistant isolates. These findings highlight the urgent need for improved waste management, regular water quality monitoring and strengthened antimicrobial stewardship to mitigate the spread of resistant bacteria. This study provides helpful insights into the environmental distribution of AMR, emphasising the importance of continuous monitoring of natural water sources to reduce public health risk.

Keywords: Antimicrobial-resistant bacteria, *E. coli*, multidrug resistance, Mahaweli river