Escherichia coli in recreational water in selected sites of the river Mahaweli between Peradeniya and Katugastota

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Introduction and Objectives: Faecal contamination of recreational water poses a public health risk due to the possible presence of pathogens in faeces. *Escherichia coli* is used as an indicator of faecal contamination of water. The current study was conducted to enumerate *E. coli* in recreational water and investigate antibiotic sensitivity of the isolated *E. coli*.

Methods: Water samples were collected from six bathing sites along the river Mahaweli between Peradeniya and Katugastota, in two time series each, during the rainy and dry periods from August 2020 to April 2021. Samples (100 ml) were subjected to membrane filtration (0.45 µm) and filters were incubated on m-FC agar at 44.5 °C for 24 hours for enumeration. Antibiotic sensitivity testing was performed for *E. coli* isolates using the disc diffusion method, for cefotaxime (30 µg), ticarcillin-clavulanate (75/10 µg), amoxicillin-clavulanate (20/10 µg), imipenem (10 µg), meropenem (10 µg), amikacin (30 µg) and ciprofloxacin (5 µg), according to CLSI guidelines.

Results: In 87.5% of bathing water samples, the *E. coli* counts exceeded the permissible levels of 235 CFU/100 ml (U.S. EPA guidelines). In both sampling series, counts observed for the dry period were significantly lower than those for the rainy period (series 1: p=0.00; series 2: p=0.02). The proportions of isolates that were resistant, intermediate and susceptible, respectively, to each antibiotic were as follows; ciprofloxacin 78.6%, 19.8%, 1.6%; amikacin 5.2%, 5.2%, 89.6%; cefotaxime 3.6%, 15.6%, 80.7%; ticarcillin-clavulanate 1.6%, 46.4%, 52.1%; amoxicillin-clavulanate 1.6%, 34.9%, 63.5%; imipenem 0%, 0.5%, 99.5% and meropenem 0%, 0.5%, 99.5%. The proportion of rainy period isolates that were resistant to at least one antibiotic was significantly higher compared to that from the dry period (p=0.00), while 1.0% of the isolates were multiple drug resistant.

Conclusions: The microbiological quality of bathing water in the selected area of river Mahaweli is subject to seasonal variations. The high numbers of *E. coli* indicate faecal contamination and potential risk of faecal pathogens in water. The use of this water for bathing and recreational purposes poses significant health risks due to possible transmission of waterborne diseases and antibiotic resistant *E. coli*.

Keywords: Faecal contamination, water, membrane filtration, antibiotic resistance

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