



Summary brief

September 14, 2021

High levels of multidrug-resistance in urinary tract infections and inefficient use of laboratory resources at a tertiary hospital in Nepal: Action is needed

¹Reference: Baral R, Shrestha LB, Ortuño-Gutiérrez N, Pyakurel P, Rai B, Rimal SP, Singh S, Sharma SK, Khanal B, Selvaraj K, Kumar AMV. Low yield but high levels of multidrug resistance in urinary tract infections in a tertiary hospital, Nepal. Public health Action, 2021 [In press]

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Key Messages

- Thousands of patients are taken urine culture at B.P. Koirala Institute of Health Sciences (BPKIHS), but the yield is low, possibly indicating inappropriate selection of patients for culture. Targeting urine culture in symptomatic patients would lead to economies of resources at the wards and the laboratory.
- There is a high level of multidrug-resistance (MDR) in positive samples of *Klebsiella pneumoniae* and *Escherichia coli*. In light of these findings, the hospital needs to revise treatment protocols and ensure access to latest-generation antibiotics.
- Testing for resistance was hampered by interrupted supply of antibiotic discs at the laboratory. This warrants streamlining of procurement and supply of antibiotic discs, especially in months (July-August) where a peak in urinary infections is expected.

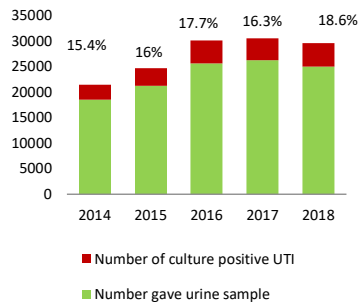
What is the problem and why is it important?

- Globally, about 150 million people suffer from urinary tract infections (UTI), resulting in health care expenditure of six billion USD per annum. There is a worrying trend of increasing rates of multidrug-resistance in *E. coli* and *K. pneumoniae*, which leads to difficulties in selecting appropriate empirical therapy and achieving treatment success in UTI.
- Understanding the patterns of multidrug-resistance in organisms causing urinary tract infections in Nepal is imperative to inform clinical practice and stewardship in relation to appropriate use of antibiotics in patients with UTI.
- We conducted this study in BPKIHS, a large tertiary care hospital in the Eastern region of Nepal to identify common organisms causing UTI and their resistance patterns. We also assessed if there were seasonal variations.

How did we measure it?

- We extracted secondary data from the electronic laboratory database of urine samples examined at the microbiology laboratory of BPKIHS from 2014 to 2018.
- We examined the positivity rate, resistance patterns and seasonality of the samples received.
- We applied descriptive statistics and a Seasonal Auto-Regressive Integrated Moving Average (SARIMA) model to explore the data.

Annual trend of urine numbers tested, number culture and culture positivity from 2014-2018

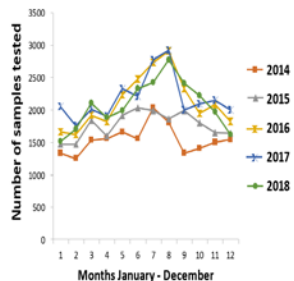


What did we find?

- Among 116,417 urine samples tested throughout the five-year period, 19,671 (16.9%) were culture-positive.
- *E. coli* (54.3%) was the most common organism detected, followed by *K. pneumoniae* (8.8%).
- We observed seasonality in the number of samples tested and culture-positive, with a peak during July-August.
- Among *E. coli* and *K. pneumoniae* isolates, MDR was seen in 42.5% and 36.0% respectively. MDR was higher in males and people aged >55 years, but there was a decreasing trend over the years.
- Testing for resistance was hampered by interrupted supply of antibiotic discs at the laboratory, and there were challenges in accessing data due to multiple databases (and software) used.

Implications

- Low yield of culture possibly indicates inappropriate selection of patients for urine culture. This calls for refining diagnostic protocols, in order to decrease the laboratory workload and optimize the use of available human and material resources.
- Seasonality with a peak was seen in July-August – the laboratory should use this information and be better prepared.
- High levels of multidrug-resistance indicate that the hospital should revise treatment protocols and provide access to latest-generation antibiotics.
- Antibiotic susceptibility test was hampered by interrupted supply of antibiotic discs. The laboratory should streamline the procurement and supply chain management of antibiotic discs, especially in months where a peak in urinary infections is expected.
- There is a need of a technical expert under the Hospital management to review the existing electronic databases and the multiple software used at the laboratory and develop a system that allows easy extraction of data and analysis for use in the clinical practice.



Frequency of urine samples tested month-wise during 2014-2018.