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Abstract Title: **Use of a novel electronic health records reporting tool to assess the most common bacterial strains in urine cultures in Jordan and their resistance to common antibiotics: A population based study**

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Body:

Introduction & Objectives

In Jordan where most antibiotics are sold over the counter, centralized data on bacterial incidence and antibiotic resistance is lacking. Nationwide Electronic Health Record, EHR; is being implemented in an ambitious roll out plan to include all public sector hospitals. This study uses a novel reporting tool to investigate the most commonly identified bacterial strains in urine cultures and identify the resistance of E. coli to antibiotics in two big cities of Jordan.

Material & Methods

After obtaining ethics board approval from the Ministry of Health of Jordan, data were collected retrospectively using the national electronic health record, EHR system, "Hakeem". This EHR is based on the US Veterans Health Information Systems and Technology Architecture, VistA. Urine culture data were centrally and electronically gathered from four Jordanian public hospitals (795) beds in total; between January 1st, 2011 and April 30th, 2015. All urine cultures were collected, processed and reported in a standard manner and then were entered into the EHR. Using VistA laboratory package built-in reports, urine culture data were extracted, tabulated and graphed into a monthly reporting tool.

Results

Over 1.2 million unique patients were registered on the national EHR system "Hakeem" by the end of data collection. A total of (29410) urine cultures were performed at the participating study sites for the duration of the study. Of all samples, 4940 (16.8%) grew bacterial isolates $>10^5$ colony forming units/mL and were considered positive. The positive cultures were evaluated to identify the most common bacterial isolates. These were; Escherichia coli (E. coli) comprising 64.1% (3164), Klebsiella species, 16.8% (832) and Enterecoccus in 3.7% (182). Of the cultures positive for E. Coli, 74% were females and 26% males. The highest incidence of E.coli was amongst females below the age of 16 years 57 %, followed by females above the age of 60 years 18 %. Among males, the highest incidence was below the age of 16 years 48%, followed by males above the age of 60 years 25 %.

E. coli exhibited the highest resistance to ampicillin 90.3% followed by cephalothin 83.7%, nalidixic acid 70.6%, trimethoprim/sulfamethoxazole 69.8%, cephalexin 53.7%, norfloxacin 53.5%, cefuroxime 52.7%, levofloxacin 46.5%.

E. coli exhibited the least resistance to meropenem 0%, imipenem 2%, ertapenem 2.4%, amikacin 8.5%, nitrofurantoin 10.6%, cefoxitin 15.5%, ciprofloxacin 22.2% and gentamicin 25.7%. Of the E. coli 61% were outpatient and 39% inpatients.

Conclusions

The use of centralized electronic reporting tool for reporting microbial incidence and resistance in urine cultures can offer large data that would allow establishing a more suitable local guideline for empirical antibiotic treatment of bacterial urine infections. In our study, E. coli was the most commonly isolated organism and the usual empirical treatment with trimethoprim/sulfamethoxazole or ampicillin was inadequate in more than 70% of cases. On the other hand, Nitrofurantoin had only 10.6% resistance and offers a more cost-effective option than most cephalosporins. Management guidelines for urine tract infections in our region should take this new data into account to treat infections more efficiently and prevent further antimicrobial resistance.