



ELSEVIER

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

Rates of catheter-associated urinary tract infection in tertiary care hospitals in 3 Arabian Gulf countries: A 6-year surveillance study

Wafa Al Nasser MD ^a, Aiman El-Saed MD, PhD ^{b,c,d}, Amina Al-Jardani MD ^{c,e},
 Abdulhakeem Althaqafi MD ^{f,g}, Huda Alansari MD ^h, Jameela Alsalman MD ^{c,h},
 Zaina Al Maskari MD, FRCPATH ^e, Ayman El Gammal MD ⁱ, Seif S. Al-Abri MD, DTM&H ^{c,e},
 Hanan H. Balkhy MD ^{b,c,f,*}

^a Infection Prevention and Control, Imam Abdulrahman bin Faisal Hospital, Dammam, Saudi Arabia

^b Infection Prevention and Control Department, King Abdulaziz Medical City, Riyadh, Saudi Arabia

^c Gulf Cooperation Council States and World Health Organization Collaborating Center for Infection Prevention & Control, Riyadh, Saudi Arabia

^d Community Medicine Department, Faculty of Medicine, Mansoura University, Mansoura, Egypt

^e Infection Prevention and Control, Royal Hospital, Muscat, Oman

^f King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia

^g Infection Prevention and Control, King Abdulaziz Medical City, Jeddah, Saudi Arabia

^h Infection Prevention and Control, Salmaniya Medical Complex, Manama, Bahrain

ⁱ Infection Prevention and Control, King Abdulaziz Hospital, Al hasa, Saudi Arabia

Key Words:

Urinary tract infection
 Catheter
 Health care
 Surveillance
 Infection control
 Saudi Arabia
 Oman
 Bahrain

Background: The true burden of catheter-associated urinary tract infections (CAUTIs) remains largely unknown because of a lack of national and regional surveillance reports in Gulf Cooperation Council (GCC) countries. The purpose of this study was to estimate location-specific CAUTI rates in the GCC region and to compare them with published reports from the U.S. National Healthcare Safety Network (NHSN) and the International Nosocomial Infection Control Consortium (INICC).

Methods: CAUTI rates and urinary catheter utilization between 2008 and 2013 were calculated using NHSN methodology pooled from 6 hospitals in 3 GCC countries: Saudi Arabia, Oman, and Bahrain. The standardized infection ratios of the CAUTIs were compared with published reports of the NHSN and INICC.

Results: A total of 286 CAUTI events were diagnosed during 6 years of surveillance, covering 89,254 catheter days and 113,807 patient days. The overall CAUTI rate was 3.2 per 1,000 catheter days (95% confidence interval, 2.8-3.6), with an overall urinary catheter utilization of 0.78. The CAUTI rates showed a wide variability between participating hospitals, with approximately 80% reduction during the study. The overall compliance with the urinary catheter bundle implementation during the second half of the study was 65%. The risk of CAUTI in GCC hospitals was 35% higher than the NHSN hospitals, but 37% lower than the INICC hospitals.

Conclusions: CAUTI rates pooled from a sample of GCC hospitals are quite different from rates in both developing and developed countries.

© 2016 Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier Inc. All rights reserved.

BACKGROUND

The World Health Organization estimates that each year, hundreds of millions of patients around the world are affected by hospital-associated infections (HAIs).¹ The burden of the problem

* Address correspondence to Hanan H. Balkhy, MD, King Saud Bin Abdulaziz University for Health Sciences, PO Box 22490, Riyadh 11426, Saudi Arabia.

E-mail address: balkhyh@hotmail.com (H.H. Balkhy).

Conflicts of interest: None to report.

is several folds higher in low- and middle-income countries than high-income countries.^{2,3} Pooled prevalence of HAI in different patient populations from 1995-2010 was reported by the World Health Organization to be approximately 10.1%-15.5% in developing countries compared with 7.6% in developed countries.¹ In a recent report by the International Nosocomial Infection Control Consortium (INICC), the rate of device-related infections was 5-16 times higher in INICC hospital intensive care units (ICUs) compared with National Health Safety Network (NHSN) hospitals over 6 years of surveillance.³

Although improving over the last years, urinary tract infections (UTIs) accounted for up to 35% of all HAIs, and most of the

events are linked to indwelling catheter use (catheter-associated urinary tract infections [CAUTIs]).^{1,4,5} It is a leading cause of bloodstream infection and is linked directly and indirectly to increasing morbidity and mortality.^{6,7} In addition to the huge cost attributed to HAIs in general and CAUTIs in particular,^{8,9} patients with CAUTI act as a huge reservoir for multidrug-resistant organisms in hospitals and long-term facilities and a source of transmission through the hands of health care workers and maybe the environment.¹⁰

Although neglected before, recently there has been an upsurge in the interest and research in HAIs all over the world. This led many health care preventive societies to release guidance and policies to help hospitals to define, measure, and prevent CAUTIs.¹¹⁻¹⁴ This increasing interest probably reflects the increasing demand for public reporting of HAI rates.^{15,16} However, the true global burden of HAIs, including CAUTIs, remains unknown because of the lack of active surveillance systems in most countries.¹⁷ Additionally, those who do have them struggle with the complexity of surveillance definitions, the lack of standardization and uniformity in diagnosing HAIs, and a lack of a clear benchmark among those countries.^{2,18}

The aim of this study was to estimate location-specific CAUTI rates pooled from hospitals in 3 Gulf Cooperation Council (GCC) countries from 2008-2013 and to compare such rates with published reports from NHSN and INICC hospitals, after adjusting for different hospital locations.

METHODS

Setting

The data used in this study were obtained from 6 hospitals in the 3 GCC countries between 2008 and 2013. The hospitals included were the National Guard Hospitals in Riyadh, Jeddah, Alhasa, and Dammam, Saudi Arabia; Salmaniya Medical Complex, Manama, Kingdom of Bahrain; and Royal Hospital, Muscat, Sultanate of Oman. The hospital locations included were medical-surgical, neurosurgical, and surgical critical care units (ICUs) and medical and medical-surgical inpatient wards. National Guard Hospitals are tertiary care hospitals that provide services to a total of 753,000 individuals in Riyadh, 258,000 individuals in Jeddah, 158,000 individuals in Alhasa, and 100,000 individuals in Dammam. The total bed capacity is >2,000 beds (1,200 in Riyadh, 570 in Jeddah, 245 in Alhasa, and 100 in Dammam), with approximately 10%-15% of the total number of beds allocated for critical care services distributed in 12 different adult, pediatric, and neonatal specialties. Salmaniya Medical Complex is a tertiary care hospital that provides services for all Bahrainis. The total bed capacity is 870 beds, with approximately 4% of the total number of beds allocated for critical care services distributed in 3 different adult, pediatric, and neonatal specialties. Royal Hospital is a tertiary care hospital that provides services for 640,000 individuals in Muscat. The total bed capacity is 716 beds, with approximately 6.5% of the total number of beds allocated for critical care services distributed in 4 different adult, pediatric, and neonatal specialties.

Design

Pooled analysis of aggregated surveillance data from 6 GCC hospitals was done using data collection methods similar to the U.S. NHSN. The surveillance was active, patient-based, prospective surveillance done on targeted hospital locations for planned durations that were not necessarily continuous. Additionally, the compliance data of the urinary catheter bundle (of the Institute of Healthcare Improvement) that was surveyed starting in 2011 in 3 out of the 6 hospitals were pooled and analyzed. Trained infection control practitioners in every hospital were responsible for collecting individual

event and bundle data using predesigned unified GCC forms, which were then entered in unified data entry programs. The GCC Center for Infection Control has been working on setting standard surveillance methodology in the GCC countries by organizing multiple educational and training activities, developing a surveillance manual, on-site surveillance and data auditing, and central data management and analysis.

Surveillance definitions

The definition of CAUTI implemented was changed in the surveillance system starting in 2011, after a corresponding change in the NHSN definitions in 2009. Before 2011, CAUTI was classified into 2 groups: symptomatic urinary tract infections (SUTIs) and asymptomatic bacteriuria (ASB), in a patient who had an indwelling urinary catheter at the time of or within 7 days before the onset of the event. There were no minimum period of time that the catheter must be in place in order for the UTI to be considered catheter-associated. Starting in 2011, CAUTI was classified into 2 groups: SUTIs or asymptomatic bacteremic UTI, in a patient who had an indwelling urinary catheter in place for >2 calendar days, and the catheter was in place on the date of event or the day before.

Data analysis

CAUTI rates were calculated by dividing the number of events by urinary catheter days and were expressed per 1,000 urinary catheter days. The 95% confidence intervals (CIs) of the rates were calculated using the following formula: $[\text{rate} \pm 1.96 \times \text{SEM}(\text{rate})]$. The SEM was calculated under the Poisson model assumption as follows: $[\text{square root}(\text{CAUTI}/(\text{catheter days}))]$. Urinary catheter utilization was calculated by dividing the number of urinary catheter days by the number of patient days. The 95% CIs of the ratios were calculated using the following formula: $[\text{rate} \pm 1.96 \times \text{square root}(\text{rate} \times (1 - \text{rate})/\text{patient days})]$. CAUTI rates and urinary catheter utilizations were stratified by year, hospital, and ICU type. Standardized infection ratios (SIRs) were calculated by dividing the number of observed CAUTIs by the number of expected CAUTIs. The number of expected CAUTIs was calculated using CAUTI rates from the published reports of the NHSN¹⁹ and the INICC.³ SIRs of CAUTIs in GCC hospitals were compared with NHSN and INICC hospitals after adjusting for different hospital locations. New and old diagnostic criteria of CAUTIs in GCC hospitals were compared with NHSN hospitals.^{19,20} The overall compliance of the urinary catheter bundle was calculated by dividing the number of patients who were compliant with all 4 elements of the urinary catheter bundle by all patients with indwelling urinary catheter who have been reviewed.

RESULTS

Overall and year-specific CAUTI rates and urinary catheter utilization are shown in [Table 1](#). A total of 286 CAUTI events were diagnosed during 6 years of surveillance, covering 89,254 catheter days and 113,807 patient days. The overall CAUTI rate was 3.2 per 1,000 catheter days (95% CI, 2.8-3.6). The CAUTI rates that were highest in 2009 (6.5 per 1,000 catheter days) progressively decreased over the years, with considerable reduction over the last 2 years covered (1.6 in 2012 and 0.6 in 2013). In 2013, the CAUTI rate represented an approximately 81% reduction from the start of the study (in 2008). The 95% CI of these 2 years indicated a significant difference. The overall catheter utilization was 0.78, which remained relatively constant over the years, with the exception of the last year when >30% reduction was observed (from 0.79 to 0.54).

The CAUTI rates were estimated in both critical care units and wards ([Table 2](#)). Both CAUTI rates and catheter utilization were higher

Download English Version:

<https://daneshyari.com/en/article/5566299>

Download Persian Version:

<https://daneshyari.com/article/5566299>

[Daneshyari.com](https://daneshyari.com)