

Device-associated Nosocomial Infection in General Hospitals, Kingdom of Saudi Arabia, 2013 – 2016

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BACKGROUND

- Healthcare-associated infections (HAIs) are serious patient safety issue in hospitals worldwide, affecting 5%-10% of hospitalized patients
- Deadly for patients in intensive care units (ICUs)
- Device-associated HAI (DA-HAI) surveillance exists in most hospitals
- DA-HAIs account for up to 23% of HAIs in ICUs and about 40% of all hospital infections
- This study aims to identify DA-HAI rates among group of selected hospitals in KSA from 2013 – 2016
- Study focuses on central line-associated blood stream infections (CLABSI), ventilator-associated pneumonia (VAP), and catheter-associated urinary tract infections (CAUTI)
- Results will be used for comparison, benchmarking, and detecting areas to focus on for improvement

METHODS

- Analyzed secondary data from 12 medical/surgical intensive care units (M/SICUs) and two cardiac care units (CCUs) from 12 Ministry of Health (MoH) hospitals from different regions in the Kingdom of Saudi Arabia (KSA)
- Data reported by infection control practitioners to MoH via electronic International Nosocomial Infection Control Consortium (INICC) system

RESULTS

- 6,178 ICU patients with 13,492 DA-HAIs during 2013 – 2016
- Average length of stay (LOS) was 10.7 days (range 0 to 379 days)
- VAP most common DA-HAI (57.4%), followed by CAUTI (28.4%), and CLABSI (14.2%)
- No CLABSI cases in CCUs; CAUTI reported from 1 – 2.6 per 1000 device-days; VAP did not occur in Hospital B but occurred 8.1 times per 1000 device-days in the CCU in Hospital A
- In M/SICUs, CLABSI varied between hospitals from 2.2 to 10.5 per 1000 device-days; CAUTI occurred from 2.3 to 4.4 per 1000 device-days, while VAP had highest rates, from 8.9 – 39.6 per 1000 device-days
- Most hospitals had high device-utilization rates: 75th – 90th percentile of NHSN standard and 50th – 75th percentile of INICC standard

CATHETER ASSOCIATED INFECTIONS

Table 1. Central Line-Associated Blood Stream Infection rates (CLABSI), Catheter Associated Urinary Tract Infection rate (CAUTI), and Ventilator Associated Pneumonia (VAP) rates in 12 adult intensive care units of General MOH hospitals, KSA, 2013-2016.

Hospitals	ICU	CLABSI /1000 UC. Days (95% CI)	CAUTI /000 UC. Days (95% CI)	VAP/000 UC. Days (95% CI)
Hospital A	Cardiac	0	1 (0.21-3.34)	8.13 (0.74-37.90)
Hospital B		0	2.6 (0.23-11.77)	0
Group 1(4 hospitals) for 9 Months)	Medical/Surgical < 15 BED	From 0 to 6.19(2.07-14.73)	From 2.3(0.65-10.51) to 7.19(3.69-12.77)	From 18.1 (6.04-43.01) to 26.6 (18.91-36.35)
Group 2(2 Hospitals) for rates 17 Months	Medical/Surgical > 15 BED	From 0 to 4.28(1.62-9.38)	From 2.3(0.65-10.51) to 7.19(3.69-12.77)	From 9.33 (4.61-17.03) to 20.7 (13.62-30.31)
Group 3(2 Hospitals) for 29 Months	Medical/Surgical > 15 BED	From 6.68 (4.68-9.27) to 7.9 (4.98-11.96)	From 1.9 (1.26-2.77) to 3.5 (2.69-4.53)	From 0.9(0.34-1.97) to 16.4 (13.37-19.95)
Group 4(3 Hospitals for 6 Months)	Medical/Surgical > 15 BED	From 0 to 2.9(0.57-9.18)	From 0 to 5.2(3.37-7.78)	From 10.1(4.19-20.79) to 51.6 (40.38-64.96)
Group 5 (One Hospital) for 14 months	Medical/Surgical > 15 BED	10.2 (0.459-54.25)	11.75 (4.46-25.75)	186.5 (121.44-275.04)



Table 2. Device utilization ratios in Intensive Care Units in 12 adult intensive care units of General MOH hospitals, KSA, 2013-2016.

HOSPITALs	ICU	Central line utilization ratio (95% CI)	Urinary catheter utilization ratio (95% CI)	Mechanical ventilator- utilization ratio (95% CI)
Hospital A	Coronary	0.46 (0.38-0.56)	0.69 (0.65-0.74)	0.53 (0.44-0.63)
Hospital B		0.74 (0.5-1.05)	0.78 (0.67-0.89)	0.55 (0.43-0.68)
Group 1 (4 Hospitals)	Medical/Surgical < 15 BED	0.58 (0.55-0.6)	0.75 (0.73-0.77)	0.54 (0.52-0.56)
Group2 (2Hospitals)	Medical/Surgical > 15 BED	0.33 (0.31-0.34)	0.42 (0.40-0.43)	0.31 (0.29-0.32)
Group 3 (2 Hospitals)	Medical/Surgical > 15 BED	0.66 (0.65-0.68)	0.79 (0.78-0.81)	0.65 (0.64-0.66)
Group 4 (3 Hospitals)	Medical/Surgical > 15 BED	0.64 (0.61-0.68)	0.85 (0.83-0.88)	0.94 (0.90-0.98)
Group 5 (1Hospital)	Medical/Surgical > 15 BED	0.05 (0.68-0.06)	0.06 (0.05-0.06)	0.05 (0.04-0.06)

CONCLUSION

- Device-associated CAUTI and VAP infection rates and device-utilization ratios were higher than NHSN benchmarks in the study's CCUs and M/SICUs
- CLABSI rates were lower

RECOMMENDATIONS

- Ongoing monitoring of infection control practices
- Comprehensive education
- More sensitive and specific healthcare safety network

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