PROJECT TITLE

Duration and appropriateness of indwelling urinary catheters in hospital inpatients: Capturing patients' experience and healthcare providers' awareness. A cross-sectional study

Short title: IDC Awareness Study

Principal Investigators

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INTRODUCTION

Hospital-acquired infection is a major concern entailing personal distress and discomfort for patients and substantial financial burden for the Australian healthcare system. A lack of awareness among healthcare providers of the need to remove indwelling urinary catheters (IDC) in a timely manner is a major cause of catheter-associated urinary tract infection (CAUTI). Previous research has demonstrated substantial variation in healthcare providers' awareness of the duration and continued appropriateness of patients' IDCs. Furthermore, patients are often uncertain of the reason for the IDC and may be reluctant to ask if it can be removed.

We aim to assess the patient experience of having an IDC and identify any knowledge or practice gaps in healthcare provider awareness of IDCs at QEII Jubilee Hospital. Results of this study will aid future planning and implementation of strategies to overcome current limitations and bridge these gaps, leading to improved patient outcomes and reduced hospital costs.

BACKGROUND AND SIGNIFICANCE

Each year in Australia, over 60,000 hospital patients experience a hospital-acquired infection[1]; catheter-associated urinary tract infection (CAUTI) accounts for 26.6% of hospital-acquired infections[1,2]. CAUTI can lead to a myriad of complications, most commonly cystitis, pyelonephritis and bloodstream infections. These events are linked to an increase in mortality and length of stay, and impose a significant burden on healthcare costs. Studies have shown that patients with hospital-acquired urinary tract infections required an average of 20.6 extra days in hospital, attributing to estimated excess costs of AUD $40,000 per episode[3].

Point prevalence surveys have reported 20%–26% of hospital patients in Australia have an indwelling urinary catheter (IDC)[4,5]. A point prevalence survey in six Australian hospitals identified an overall prevalence of healthcare-associated urinary tract infection as 1.4%, and CAUTI prevalence of 0.9%[4]. A larger, more recent study in 19 Australian hospitals reported a prevalence rate of healthcare-associated infections as 9.9%, including 2.4% urinary tract infection; 50% of the patients with a urinary tract infection had an indwelling urinary catheter[5]. At QEII Jubilee Hospital in 2019, the Infection Prevention and Management Service identified 30% of bloodstream infections attributable to a urinary source, with 63.6% of the cases relating to an IDC.

A large portion of patients with a short-term IDC (< 30 days) will develop bacteriuria, with a daily incidence of 3%–8%; of these patients, an estimated 16%–32% develop symptoms related to their bacteriuria[3], causing unwanted discomfort to patients. Duration of catheterisation has been identified as the single most important and consistent risk factor for developing bacteriuria[3]. However, a recent study identified that 21% of patients were unaware of the reason for the catheter and only 25% reported that they would ask their doctor if the catheter could be removed[6].

Preventing CAUTI is a high priority patient safety issue, highlighted under Standard 3 of the National Safety and Quality Health Service Standards[7]. Failure to remove IDCs when no longer required or appropriate is a serious problem in acute hospitals[3]. As the main contributors to CAUTI are unnecessary catheterisation and prolonged use of catheters[8, 9], the most effective way to prevent CAUTI is to insert catheters only when necessary and medically indicated, and to remove catheters promptly once no longer required[10, 11].

Due to the prevalence and considerable costs attached to this problem, reducing unwarranted IDC use is imperative. This can be quelled by frequently assessing the appropriateness of IDC use, along with its timely removal. In order for this to occur, healthcare providers must be aware of the presence of the IDC. A US study that assessed IDC awareness among medical staff showed that unawareness rates were highest for attending physicians (38%), with the rates in other training groups being somewhat equivalent (students 21% vs. interns 22% vs. residents 27%)[12]. The likelihood that the provider was aware that patient was using a catheter was related to appropriateness of catheterisation, with 41% of providers being unaware for inappropriately placed IDCs vs. 21% for appropriately placed IDCs[12].

We aim to assess the patient experience of having a urinary catheter and identify any knowledge or practice gaps in healthcare provider awareness of IDC appropriateness at QEII Jubilee Hospital. Results of this study will aid future planning and implementation of strategies to overcome current limitations and bridge these gaps, leading to improved patient outcomes and reduced hospital costs.

METHODS

Study aim and objectives

This research project aims to (1) assess the patient experience of having a urinary catheter and (2) identify any knowledge or practice gaps in healthcare provider awareness of IDC appropriateness at QEII Jubilee Hospital.

Furthermore, this project seeks to evaluate the overall incidence of IDC-related complications from adverse events and/or infection at QEII Jubilee Hospital, captured in RiskMan and/or Auslab data.

The study findings will enable future planning and implementation of strategies to overcome current limitations and bridge these gaps, leading to improved patient outcomes.

Project design: Point prevalence surveys

Setting: Medical and surgical inpatient wards at QEII Jubilee Hospital

Sample size estimate

We aim to obtain a sample size of about 200 patient participants. The hospital has 190 inpatient beds, with approximately 25% having an IDC at any given time. Screening of the iEMR for patients with an IDC will be conducted Monday–Friday for one month. Patients can only be recruited once, regardless of the number of catheterisations.

Primary outcome measures

1. Prevalence of healthcare provider awareness vs unawareness of IDC
2. Prevalence of healthcare provider knowledge of indications of IDC: IDC appropriateness vs inappropriateness
3. Prevalence of patient awareness vs unawareness of indications for IDC
4. Prevalence of patients who are satisfied with their catheter

Secondary outcome measures

5. Prevalence of patients who express concerns with their IDC
6. Prevalence of patients who are reluctant to ask if the IDC can be removed
7. Prevalence of patients who experience adverse events with their IDC
8. Prevalence of catheter-associated urinary tract infection (CAUTI) during the study period.

Inclusion criteria

- Medical or surgical inpatients ≥ 18 years with IDC in situ for > 48 hours
- Healthcare providers (senior medical officers, registrar/principal house officers, senior house officers, junior house officers, interns, medical students, nursing staff) who hold direct responsibility for their patients on inpatient care teams

Exclusion criteria

- Patients admitted for elective short stay
- Palliative care and intensive care patients
- Patients with cognitive impairment or communication difficulties
- Patients with IDC inserted prior to hospital admission
- Long-term indwelling catheters for irreversible chronic disease (neurological conditions/bladder outlet obstruction/urethral strictures/cerebral palsy, etc.)

Data collection

Inpatients with an IDC will first be identified via a daily report generated from the integrated electronic medical record (iEMR), and these patients will be approached individually to confirm the continued presence of an IDC. The investigator will introduce themselves as part of the study team (not the treating team), provide a participant information sheet, briefly explain the study aims and objectives, and seek the patient's consent to participate in a questionnaire about their experience with the IDC. The patient will be given time (up to 30 minutes) to read the information sheet and ask any questions. If the patient agrees to participate, written consent will be obtained. If the patient declines to participate, no information will be collected.

Questionnaire data will be collected on paper. The investigator will ask the patient 10 questions about the patient's experience of having the IDC (Patient data collection form, v1.0, 20 August 2020). Patient age and gender will be collected. The last four numbers of the unit record number will be collected to enable matching of patient and healthcare provider feedback, but these will be removed from the data and destroyed once the matched data has been collected. No other identifying patient details will be collected. The questionnaire should take 5–10 minutes to complete.

Next, the investigator will identify the healthcare providers (medical and/or nursing staff) with responsibility for the patient with the IDC. The investigator will separately interview each member of the patient's medical team and nursing staff, as available. The investigator will explain the study aims and objectives to the provider, provide a participant information

sheet, and seek their consent to participate in a questionnaire about the patient's IDC. The healthcare provider will be given up to 5 minutes to read the information sheet and ask any questions. If the provider agrees to participate, written consent will be obtained. If the provider declines to participate, no information will be collected. Provider communication will occur on the same day as near as possible to the patient visit to ensure temporal congruence of findings. No patient care will be interrupted to facilitate this study.

Questionnaire data will be collected on paper. The investigator will ask the healthcare provider 8 questions about the patient's experience of having the IDC (Staff data collection form, v1.0, 20 August 2020). Provider category (medical/nursing) and role designation will be recorded, but no identifying personal details will be collected. Providers will not be allowed to view medical records or examine the patient during the questionnaire. If the provider is unsure of any responses, they will be offered the opportunity to further elaborate on any reasons for lack of IDC awareness. The questionnaire should take 5 minutes to complete.

Healthcare providers' responses will be matched to the patient's responses and iEMR documentation (date of IDC insertion; indication for IDC).

Anonymous CAUTI data will be sourced from the hospital Infection Prevention and Management Service monthly report.

Definitions

A short-term indwelling urinary catheter is defined as having an IDC for < 30 days.

Appropriateness is defined as appropriate indications for urinary catheters including: Haematuria, Obstruction, Urological surgery/intervention, Decubitus ulcer, Input and Output monitoring (critically ill patients), Nursing end-of-life care, and Immobility[13].

Catheter-associated UTI (CAUTI)[14]:

Patient must meet 1, 2, and 3 below:

1. Patient had an indwelling urinary catheter that had been in place for more than 2 consecutive days in an inpatient location on the date of event AND was either:
    - Present for any portion of the calendar day on the date of event, OR
    - Removed the day before the date of event
2. Patient has at least *one* of the following signs or symptoms:
    - fever (>38.0°C): Reminder: To use fever in a patient > 65 years of age, the indwelling urinary catheter needs to be in place for more than 2 consecutive days in an inpatient location on date of event and is either still in place OR was removed the day before the day of event.
    - suprapubic tenderness with no other recognised cause
    - costovertebral angle pain or tenderness with no other recognised cause
    - urinary urgency ^
    - urinary frequency ^
    - dysuria ^
3. Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of $\geq 10^5$ CFU/ml.

^ These symptoms cannot be used when catheter is in place. An IDC in place could cause patient complaints of "frequency" "urgency" or "dysuria".

ETHICAL CONSIDERATIONS

Ethics approval

Human Research Ethics Committee approval will be sought from Metro South and Griffith University.

Informed consent

Informed written consent will be obtained from all participants as described above before any data is collected. Participation is entirely voluntary and decision not to participate will not impact on the relationship with the hospital or staff in any way.

Risks

There is low to negligible risk to participants. Participants are at minimal risk of a breach of patient confidentiality. All data will be coded, and any patient identifiers will be destroyed following provider feedback. The last four numbers of the patient's unit record number will be used to link the patient with the providers' responses, then these will be removed and links destroyed.

Benefits

There will be no direct benefit to the participants. Following this project, strategies will be devised for future implementation to ensure timely removal of IDCs with the aim of reducing CAUTI and its complications, leading to improved patient outcomes and reduced healthcare costs.

Confidentiality and Privacy

Data collected during this study will be treated confidentially. Only study investigators will have access to the final dataset.

Statistical Analysis

Analysis and reporting will follow the SQUIRE 2.0 guidelines[15]. Descriptive statistics for patient (age, gender, specialty) and provider characteristics (role designation) will be used to define study samples. The primary outcomes of interest are (1) patient experience of having a IDC and (2) healthcare provider IDC awareness and understanding of IDC appropriateness. Results will be depicted as percentage of provider-patient observations that were incorrect about the presence of an IDC. This percentage will also be assessed after stratifying by the level of training (senior medical officer, registrar/principal house officer, senior house officer, junior house officer, intern, student and nurses), patient age and sex, and the appropriateness of catheterisation. Given the categorical nature of the data, differences among provider types and training levels will be compared using chi-square test; two-sided testing with $P < 0.05$ will be considered significant in this analysis.

Data storage and Record retention

Stringent processes will be used to ensure that the data of participants are kept confidential. Computer data will be password-protected and stored in Research Space, a secure Griffith University data repository, accessible only by the principal investigators. Information will be stored for a mandatory period of 7 years in accordance with the Griffith University research policy. Any research data kept on site at the hospitals will be kept for 5 years, as per Queensland Health policy. Method of destruction of data: Electronic records will be deleted, and hard copy will be shredded.

DISSEMINATION OF FINDINGS

Results will be published in peer-reviewed journals (e.g., *Medical Journal of Australia*) and presented at hospital meetings and national conferences (e.g., Australasian College of Infection Prevention and Control).

REFERENCES

1. Australian Commission on Safety and Quality in Health Care. Healthcare-associated infections 2018 [Available from: https://www.safetyandquality.gov.au/publications/hacs-information-kit-fact-sheet-healthcare-associated-infection/.
2. Mitchell BG, Shaban RZ, MacBeth D, Wood CJ, Russo PL. The burden of healthcare-associated infection in Australian hospitals: A systematic review of the literature. Infect Dis Health. 2017;22(3):117-28.
3. Bursle EC, Dyer J, Looke DF, McDougall DA, Paterson DL, Playford EG. Risk factors for urinary catheter associated bloodstream infection. J Infect. 2015;70(6):585-91.
4. Gardner A, Mitchell B, Beckingham W, Fasugba O. A point prevalence cross-sectional study of healthcare-associated urinary tract infections in six Australian hospitals. BMJ Open. 2014;4(7):e005099.
5. Russo PL, Stewardson AJ, Cheng AC, Bucknall T, Mitchell BG. Prevalence of device use and transmission based precautions in nineteen large Australian acute care public hospitals: Secondary outcomes from a national healthcare associated infection point prevalence survey. Infect Dis Health. 2020.
6. Laan BJ, Nieuwkerk PT, Geerlings SE. Patients knowledge and experience with urinary and peripheral intravenous catheters. World J Urol. 2020;38(1):57-62.
7. Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards (2nd ed) 2018 [Available from: https://www.safetyandquality.gov.au/our-work/assessment-to-the-nsqhs-standards/nsqhs-standards-second-edition/.
8. Galiczewski JM. Interventions for the prevention of catheter associated urinary tract infections in intensive care units: An integrative review. Intensive Crit Care Nurs. 2016;32:1-11.
9. Lo E, Nicolle LE, Coffin SE, Gould C, Maragakis LL, Meddings J, et al. Strategies to prevent catheter-associated urinary tract infections in acute care hospitals: 2014 update. Infect Control Hosp Epidemiol. 2014;35(5):464-79.
10. Carter EJ, Pallin DJ, Mandel L, Sinnette C, Schuur JD. Emergency department catheter-associated urinary tract infection prevention: multisite qualitative study of perceived risks and implemented strategies. Infect Control Hosp Epidemiol. 2016;37(2):156-62.
11. Durant DJ. Nurse-driven protocols and the prevention of catheter-associated urinary tract infections: A systematic review. Am J Infect Control. 2017;45(12):1331-41.
12. Saint S, Wiese J, Amory JK, Bernstein ML, Patel UD, Zemencuk JK, et al. Are physicians aware of which of their patients have indwelling urinary catheters? Am J Med. 2000;109(6):476-80.
13. Adams D, Bucior H, Day G, Rimmer J-A. HOUDINI: make that urinary catheter disappear – nurse-led protocol. Journal of Infection Prevention. 2012;13(2):44-6.
14. Centers for Disease Control and Prevention. Urinary Tract Infection (Catheter-Associated Urinary Tract Infection [CAUTI] and Non-Catheter-Associated Urinary Tract Infection [UTI]) Events 2020 [Available from: https://www.cdc.gov/nhsn/pdfs/pscmanual/7psccauticurrent.pdf.
15. Ogrinc G, Davies L, Goodman D, Batalden P, Davidoff F, Stevens D. SQUIRE 2.0 (Standards for QUality Improvement Reporting Excellence): revised publication guidelines from a detailed consensus process. BMJ Qual Saf. 2016;25(12):986-92.