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Major article

Sustained reductions in urinary catheter use over 5 years: Bedside nurses view themselves responsible for evaluation of catheter necessity

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Background: Multiple approaches are needed to improve urinary catheter use and sustain compliance with the appropriate indications for catheter use.
Methods: We evaluated the effect of 3 interventions over 5 years: a nurse-driven multidisciplinary effort for early urinary catheter removal, an intervention in an emergency department to promote appropriate placement, and twice-weekly assessment of urinary catheter prevalence with periodic feedback on performance for nonintensive care units. We also assessed the views of bedside nurses, case managers, and nurse managers with respect to appropriate catheter use, how often need is assessed, and who they consider responsible for the evaluation of urinary catheter need.
Results: There was a significant reduction in urinary catheter use from 17.3%-12.7% during the 5-year period (linear regression with time as independent variable, R^2, 0.61; $P < .0001$). Of bedside nurses responding to the questionnaire, 222 of 227 (97.8%) identified themselves as responsible or as sharing the responsibility for catheter necessity evaluation, 223 of 229 (97.4%) were confident in their knowledge, and 166 of 222 (74.8%) viewed physicians as receptive to their requests for catheter removal >70% of the time.
Conclusions: A multifaceted approach to promote appropriate urinary catheter use is associated with sustained reductions in catheter use. Bedside nurses view themselves responsible for the evaluation of catheter presence and need.

Urinary tract infections (UTIs) account for about one-third of all hospital-acquired infections,[1] with catheter-associated UTI representing a significant proportion of cases. The best way to prevent catheter-associated UTI is to not have a urinary catheter inserted, or if placed, to remove it when no longer needed.[2] Interventions to reduce the unnecessary use of urinary catheters should help prevent infectious and noninfectious complications.[3-5] We have previously conducted interventions to reduce unnecessary urinary catheter placement in non-ICUs[6] and to avoid placement in an emergency department (ED).[7] As a result of our interventions we incorporated an evaluation for urinary catheter necessity during nursing rounds and created a mechanism for nurses to report twice-weekly catheter use in non-ICUs. Here, we describe the improvement in urinary catheter use over 5 years and the perception of bedside nurses, case managers, and nurse managers regarding who is responsible for the evaluation of urinary catheter necessity in their units.

METHODS

The interventions

Our facility is an 804-bed tertiary care teaching hospital. As part of a quality improvement process, urinary catheter use from non-ICUs was collected prospectively from March 2006-June 2011. Initially, weekly prevalence was obtained (March-August 2006), and then twice-weekly prevalence data was collected through the rest of the 5-year period. Unit-specific urinary catheter prevalence rates were posted on the hospital's intranet site and the Infection Prevention and Control Department periodically addressed increasing trends in use with the different units.

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We briefly summarize 2 previously reported interventions that addressed removal of unnecessary urinary catheters and avoiding unnecessary placement. Between May 2006 and April 2007, we implemented a nurse-driven intervention to remove unnecessary urinary catheters.[6] Nurses were educated on appropriate urinary catheter placement indications and provided with alternatives to catheter use. The multidisciplinary rounds included all bedside nurses, a case manager (ie, a nurse with no clinical responsibilities who is responsible for discharge planning), a nurse manager or nurse leader, a social worker, and a mid-level provider if available. Bedside nurses were expected to incorporate assessment of urinary catheter necessity into their daily multidisciplinary rounds. The second intervention involved establishing institution-based guidelines for urinary catheter placement in our ED and ED physician education during December 2007.[7] An ED physician champion encouraged her colleagues to comply with the acceptable institutional indications for placement. The program was implemented in 2008 (January-December).

We evaluated the changes in urinary catheter use in non-ICUs over time (March 2006-June 2011). The urinary catheter prevalence rate was defined as the number of urinary catheter-days/number of patient-days (or utilization ratio) × 100. No patient identifiers were collected. We also examined the associated changes with the implementation of the nurse-driven evaluation of urinary catheter necessity, the ED physician intervention, and the effect of evaluation of the urinary catheter presence in the inpatient setting, looking at individual years from 2006-2011.

The questionnaire

Our second objective was to assess the perception of bedside nurses, case managers, and nurse managers regarding who they consider responsible for evaluation of urinary catheter necessity in non-ICUs. They were also asked when and how often urinary catheterization necessity is evaluated by their unit and how confident they are in their knowledge of appropriate indications for catheter use. This was done using an anonymous questionnaire that included 11 questions directed to the nurses and case managers and 9 questions directed to nurse managers. Nine questions were identical on the 3 questionnaires. No unit identifiers were collected from case managers and nurse managers to ensure anonymity and encourage sincere responses. Participation was voluntary.

We obtained multiple approvals from the St John Hospital and Medical Center Institutional Review Board for the interventions described, the questionnaires for health care workers, and the analysis of urinary catheter prevalence data over the 5 years.

Statistical analysis

Basic statistical analyses were done using SPSS version 19.0 (2010, IBM, Armonk, NY). Changes in urinary catheter use during the 5 years were assessed using analysis of variance and regression analysis. For the questionnaire results, we reported the numbers of the different answers of the health care workers to the each of the questions. For each response we used as the denominator the total number of completed responses to each question to calculate percentages.

RESULTS

Urinary catheter prevalence over >5 years (64 months)

We collected urinary catheter prevalence in non-ICUs between March 2006 and June 2011; the evaluation included 22,633 catheter-days and 158,771 patient-days for an average prevalence of 14.2%. Using analysis of variance, we compared the mean urinary catheter prevalence rate for each year of the study. The mean urinary catheter prevalence was 17.3% in 2006, 16.4% in 2007, 14.2% in 2008, 12.7% in 2009, 13.0% in 2010, and 12.7% in 2011 (F, 33.2; $P < .0001$). Multiple pairwise comparisons using the Bonferroni correction indicated significant differences between data for the year 2006 and each of the years 2008-2011 ($P < .0001$), 2007 and each of the years 2008-2011 ($P < .0001$), and between 2008 and 2009 ($P = .03$). No significant differences in prevalence were found for 2009-2011.

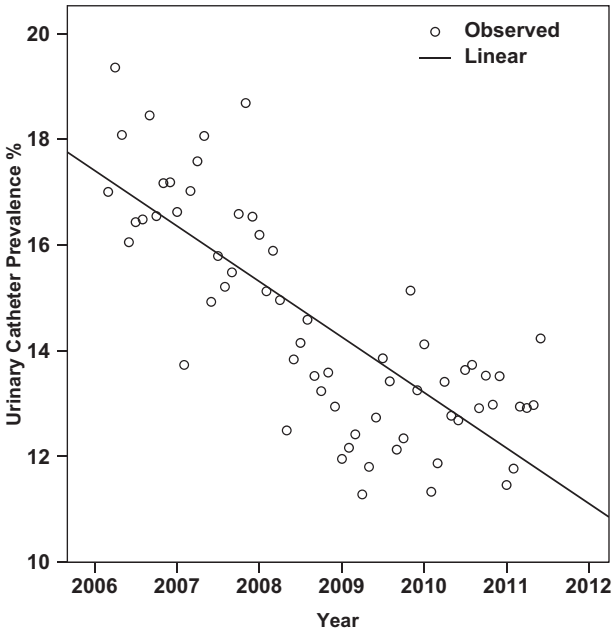

Fig 1. The change in urinary catheter prevalence over time. NOTE. The solid line represents linear regression; the circles represent observed mean monthly prevalence.

For the regression, we first analyzed the data using the SPSS time-series modeler for any evidence of periodicity or seasonality. Because there was no evidence of periodicity or seasonality, we opted to use a simple linear regression of urinary catheter prevalence rate versus time. Figure 1 shows the observed values and the regression line generated by the model. The R^2 for the model was .61 ($P < .0001$).

Health care workers' response to questionnaires

Two hundred fifty-seven of 402 (63.9%) health care workers completed the questionnaire (229 of 373 [61.4%] bedside nurses, 16 of 16 [100%] case managers, and 12 of 13 [92.3%] nurse managers). The bedside nurses' response per unit ranged between 35% and 100% (median 74%). The 9 questions and answers provided by each group of health care workers are listed in Table 1.

Bedside nurses

When asked who should be the champion to evaluate the necessity of urinary catheter placement, 108 of 227 (47.6%) bedside nurse respondents believed that nurses, case managers, and nurse managers are all responsible. However, 222 of 227 (97.8%) bedside nurses believed they were either responsible or shared the responsibility for evaluation. In addition, 190 of 228 (83.3%) bedside nurses stated that the evaluation for necessity of catheter presence occurs during all shifts, and 205 of 227 (90.3%) bedside nurses stated that their unit evaluates the presence and need for urinary catheters daily. Bedside nurses valued multidisciplinary rounds (190 of 228 [83.3%] respondents) and the twice-weekly urinary catheter prevalence evaluation (151 of 225 [67.1%] respondents). The vast majority of bedside nurses (223 of 229 [97.4%] respondents) were confident in their knowledge related to indications for