University of Alberta

Securement of the Indwelling Urinary Catheter: A Prevalence Study

by

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Dedication

This thesis is dedicated to my mother Olivia. Your love, wisdom and strength are my constant inspiration.

Abstract

Experts in urology recommend stabilizing of indwelling urinary catheters (IUCs) following urethral catheterization to prevent urethral injury and patient discomfort. However, catheter securement practices have not been well studied and there is some evidence that practices are not consistent. In this one-day prevalence study, conducted at one tertiary care hospital in Edmonton, Alberta, data was collected on 21 medical and surgical units. Convenience sampling was used to obtain adult participants with urinary catheters who could provide written informed consent or had a family caregiver available for proxy consent. From a total of 72 patients with IUCs 44 participated; 39% (17) were from medicine and 61% (27) from surgery units. The overall prevalence of catheter securement was 18% (n=8/44). The results from this study demonstrate that stabilizing urethral catheters is not a common occurrence for individuals at the centre surveyed. Further research is needed to explore factors that impact securement practices.

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I would like to extend my gratitude to the members of the Urology Nurses of Canada, Edmonton Chapter, for their involvement in formulating the research question and assistance during the study. Lastly, I would like to acknowledge the financial support from the Urology Nurses of Canada.

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Glossary of Terms

1) Indwelling Urinary Catheter: A thin hollow tube that passes through the urethra, which continuously drains urine from the bladder.
2) Catheter Securement Device: A product that is used to externally immobilize and support an indwelling urinary catheter, examples include tape, Velcro®, elastics and commercialized catheter fixation devices.
3) Nurse: For the purpose of this study any reference to nurse includes a Registered Nurse (RN) or Licensed Practical Nurse (LPN), since in the acute care setting a RN and LPN can be a primary nurse that provides catheter care.
4) Family Caregiver: A designated person who is the most appropriate to make a decision for a patient who is cognitively impaired or lacks the capacity to consent.

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Chapter 1

Introduction

As a common procedure done by nurses, urinary catheterization requires proper technique and appropriate catheter care (Fisher, 2010; Gould, Umscheid, Agarwal, Kuntz & Pegues, 2010; Madeo & Roodhouse, 2009). Although strong evidence exists to avoid unnecessary catheterization, indwelling urethral catheters will always be a necessary part of some patient's care (Chenoweth & Saint, 2011; Gotelli et al., 2008; Saint & Lipsky, 1999). Indications for indwelling urinary catheterization (IUC) include management of bladder dysfunction, monitoring urine output in acute or critically ill patients, patients with acute medical conditions such as urinary tract obstruction, bladder hemorrhage or patients requiring surgery (Holroyd-Leduc et al., 2005; Madeo & Roodhouse, 2009; Parker et al., 2009). Urinary catheters are typically inserted through the urethra and left in place with a small balloon inflated with approximately 10cc-30cc of sterile water (Gould et al., 2010). The balloon is intended to keep the catheter in the bladder and prevent potential dislodgement. Following insertion, catheters are connected to a closed urine drainage collection system, which is secured below the height of the bladder.

Catheter securement is a fundamental aspect of catheter care and is an important strategy in preserving urethral integrity, patient comfort and reduction of catheter-associated complications (Senese, Hendricks, Morrison & Harris, 2006; Billington, Crane, Jownally, Kirkwood & Roodhouse, 2008). Appropriate securement of urinary catheters can prevent common and traumatic

complications, including: catheter dislodgement, urinary tract infections (UTIs), urethral trauma and bladder injury (Madeo & Roodhouse, 2009; Pratt & Pellowe, 2010) (See Figure 1-1).

Figure 1-1: Catheter Related Penile Trauma and Epididymo-orchitis. Source file Katherine Moore, University of Alberta. Reprinted with permission.

Unintentional dislodgement of the catheter can also significantly impact patient comfort and dignity associated with re-insertion (Orme, Smith & Berry, 2008). According to Buchmann and Stinnett (2011) establishment of best practice standards is one way to facilitate better outcomes for patients with IUCs. Failure to maintain appropriate standards increases the physical burden and the financial cost associated with treatment of preventable complications (Hanchett, 2002). In a descriptive review on catheter securement, Madeo and Roodhouse (2009) state that a key factor in preventing trauma and urinary tract infections in patients with indwelling catheters is securing catheters appropriately (Madeo & Roodhouse, 2009). The authors indicate that unintentional dragging or pulling of catheters may occur as a consequence of improper securement, resulting in increased

catheter tension and pain. Repeated catheter tugging facilitates catheter movement against inflamed tissues, increasing friction from catheter movement and causing urethral tears (See Figure 1-2).

Figure 1-2: Iatrogenic Hypospadias from Catheter Tension. Source file Katherine Moore, University of Alberta. Reprinted with permission.

The Canadian Continence Foundation and the Centers for Disease Control and Prevention (CDC) recommend the securement of IUCs as a standard protocol following catheterization (Gould et al., 2010; Harrison, 2005). Common securing methods used in clinical practice include adhesive tape, Velcro® straps, and commercially produced catheter securement devices (see Figure 1-3 for one method of securement). Although securing is best practice, anecdotal evidence suggests catheters are not routinely secured and that practices are inadequate and inconsistent (Cochran, 2007; Darouiche et al., 2006; Freeman, 2009; Gray 2008; Siegel, 2006). Presently, there are no Canadian statistics on how frequently IUCs are inserted and no estimates of the prevalence of catheter securement. In the

United States (U.S.) approximately 4 million people undergo catheterization each year and approximately 1 in 5 patients admitted to an acute care hospital have an IUC (Gray, 2008; Saint, Meddings, Calfee, Kowalski & Krein, 2009). In comparison, this would be equivalent to approximately 400,000 catheterizations yearly in Canada.

Catheter securement has not been well investigated; however there is some evidence that UTIs are lower in individuals with properly secured catheters (Billington et al., 2008; Darouiche et al., 2006). A randomized controlled study by Darouiche et al. (2006) reported a 45% reduction rate of symptomatic urinary tract infections in patients who had catheter securement. Additionally, one author reported that catheter securement is an essential strategy in reducing catheter-associated urinary tract infections (CAUTIs) (Slater, 2011). New data on the benefits of catheter securement supports further examination into the prevalence of this practice.

Problem Statement

The CDC guideline for prevention of CAUTIs recommends catheter securement as a Category I (strongly recommended for adoption) practice (Gould et al., 2010). In a 2006 prevalence study on catheter securement, Siegel found that urethral catheters are not consistently stabilized and described a dearth of knowledge on this topic. Moreover, several authors reported that there have been few studies on catheter securement and noted that a lack of evidence-based research on this topic has resulted in limited knowledge for care providers

(Billington et al., 2008; Fisher, 2010; Freeman, 2009; Gray, 2008; Nazarko, 2008).

To date the prevalence of catheter securement remains largely unknown and current knowledge on the impact of catheter stabilization is primarily subjective. Siegel's (2006) study is the only known prevalence study to date. Findings from Siegel's study indicate that catheter securement practices are inadequate in the acute care setting. Additionally, there was significant incongruence between nurse's perception of securement practices and the actual practice of catheter securement.

Policies on catheter securement are not standard across hospitals. Institutional guidelines for catheter care are developed independently within each province and clinical recommendations may vary. In Alberta, Canada, Alberta Health Services (AHS), the provincial health board outlines clinical guidelines for all clinical procedures, including management of urethral catheters. According to the patient care procedure policy (5.3.1), Indwelling Urethra Catheters: General Care (AHS, 2008), which outlines the proper insertion and management of urethral catheters; urinary catheters must be appropriately secured following insertion. Thus far the consistency of this practice has not been studied in a Western Canadian tertiary hospital.

Research Question

The purpose of this study is to examine the use of catheter securement in an acute care hospital setting, in Western Canada. The following research question was explored:

What is the prevalence of securement for adult medical and surgical patients with indwelling urinary catheters at one tertiary care hospital in Edmonton, Alberta?

Purpose of the Study

This prevalence study developed as a collaborative project between the research team at the University of Alberta and the Urology Nurses of Canada, Edmonton Chapter. The purpose of this study was to examine the use of catheter securement in a tertiary care hospital setting, in Western Canada. This type of study provides quality assurance data regarding the prevalence of catheter securement in the acute care area and helps increase knowledge on the subject. According to Boslaugh and Watters (2008) the purpose of a prevalence study is to examine specific phenomena or conditions at one point in time in order provide a reference of current practice. This is particularly important to support evidence-based practices in the area of urologic nursing. Prevalence measures the occurrence of a condition in a population and refers to the proportion of individuals who have the condition within a specific point in time (Baumgarten, 1998; Porta, 2008). In this study the term prevalence will be used throughout.

Catheter Securement

Inappropriate catheter securement contributes to urethral and bladder neck trauma, urinary tract infections, and loss of patient dignity (Freeman, 2009; Hanchett, 2002; Orme et al., 2008; Yates, 2008). Securement is known to reduce the risk of catheter-associated complications (Darouiche et al., 2006). Research addressing urethral catheter securement is limited but similar studies on

stabilization of venous catheters have demonstrated a reduction in blood stream infections, catheter dislodgement and increased patient comfort (Yamamoto et al., 2002). Such awareness has led to advancements in peripheral and central venous catheter infection control and prevention of catheter-related complications (Frey & Schears, 2006a). It is reasonable to extrapolate these findings to urethral catheters and consider that complications would be similarly reduced. There is a paucity of evidence on best securement method or product and decision-making around securement.

Clinical Guidelines

This study will provide a foundation for future investigations and identify whether quality assurance interventions are required to change existing practices. In their study on the prevalence and duration of urethral catheters, Van de Broek et al. (2011) suggests that applying recommendations of national guidelines can result in decreased cost and an improved adherence to clinical practices. Using the Dutch Working party on Infection (WIP) guideline, a nationally recognized set of protocols, the authors examined the efficacy of three educational initiatives aimed at improving adherence to policy recommendations to reduce the use of urethral catheters in ten hospitals over 17 months. An insignificant decrease in the prevalence of catheters was found, however there was a significant decrease in the duration of catheterization (Van de Broek et al., 2011).

The findings from this study could be used as preliminary research to explore decision-making by nursing staff. This would be the foundation for future

practice changes. Findings could be utilized nationally to improve institutional policies, nursing practices, and the quality of care for patients with IUCs.

Complications of Indwelling Urinary Catheters

The 2009 Guideline for Prevention of Catheter-Associated Urinary Tract Infection (CAUTI) issued by the CDC in the United States (U.S.) reported that IUCs account for virtually all healthcare-associated UTIs in acute care (Gould et al., 2010). CAUTI are serious hospital-acquired infections which are often difficult to treat and can exacerbate common medical conditions (Chenoweth & Saint, 2011). Inappropriate catheterization accounts for millions of catheter-associated deaths each year and several million U.S. dollars spent in patient treatment (Holroyd-Leduc et al., 2007; Loeb et al., 2008; Saint et al., 2009).

The presence of a catheter is a known risk factor for CAUTI. However less emphasis is placed on the increased risk for trauma when catheters are not secured. Unsecured catheters have the potential for migration where movement of the catheter increases friction forces on penile or labial skin (Billington et al., 2008). The movement of unsecured catheters can cause irritation and inflammation of the urethra, compromise the urothelium and increase the likelihood of bacterial invasion (Hanchett, 2002). Furthermore, catheter migration may be a risk for dangerous complications, such as Carignan's syndrome, a condition that can occur post-operatively when urinary catheters are dislodged into the bladder neck resulting in burning, bladder spasms, extreme pain and agitation (Carignan & Nelson, 2000). Stabilization of urinary catheters leads to

improved patient comfort and facilitates psychological well-being (Billington et al., 2008; Fisher, 2010; Madeo & Roodhouse, 2009; Orme et al., 2008).

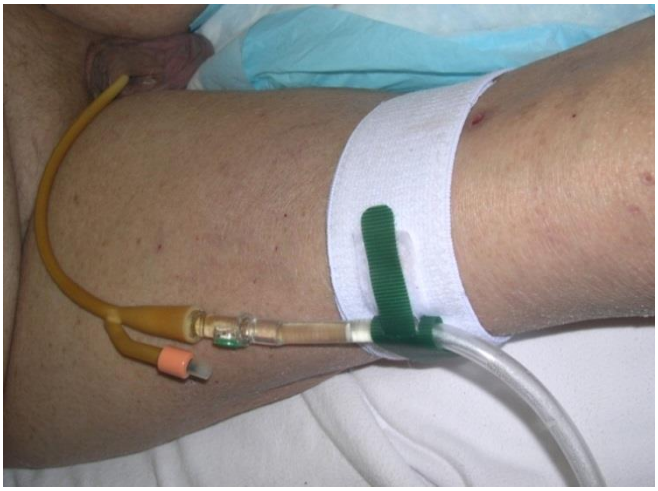

Figure 1-3: One Method of Catheter Support. Source file Katherine Moore, University of Alberta. Reprinted with permission.

Catheter Securement and Economic Impact

In Canada the Canadian Institute of Health Information (CIHI) provides the most current cost estimates of hospital care. CIHI (2008) reported that length of hospital stay is predictive of increased health care costs. Urinary catheterization is known to contribute to increased length of patient recovery thus having a significant impact on U.S. health economics (Holroyd-Leduc et al., 2007; Saint, 2000). The cost associated with insufficient catheter securement has not been adequately examined in Canada thus far; however, one can hypothesize the potential economic value of appropriate catheter care.

Summary

As a standard of care, indwelling urinary catheters must be properly anchored following catheterization. Lack of securement or improper catheter

securement are unsafe nursing practices and there is some evidence that unsecured catheters may result in catheter related complications. Currently, there is very little research on how often catheter securement occurs in the clinical setting. Many researchers suggest that a lack of standardized guidelines and limited scientific evidence may influence the low adherence to securement (Orme et al., 2008; Siegel, 2006). In the following section I will present a literature review exploring existing data on catheter securement.

Chapter 2

Literature Review

The securement of indwelling urinary catheters is recommended as part of diligent catheter management. There is evidence that stabilizing catheters may decrease the risk of adverse events caused by tension and movement of the catheter (Billington et al., 2008; Hanchett, 2002). Failure to anchor urinary catheters may increase the risk of urethral trauma and aide in the introduction of bacteria into the bladder (Bell, 2010; Newman, 2007). Several methods have been used to stabilize catheters; however securement practices are not consistent and have not been well studied (Freeman, 2009; Gray, 2008; Siegel, 2006).

Current evidence suggests that improved catheter care could reduce morbidity and mortality and could also decrease the economic burden associated with catheterization (Foxley, 2011). Empirical data on urinary catheter securement is limited. However, in studies on vascular catheter securement there is strong evidence that good catheter securement significantly reduces overall catheter-related complications and dislodgements (Frey & Schears, 2006b; Yamamoto et al., 2002).

To examine current literature on catheter securement, an electronic search was conducted using the PUBMED CINHAL, OVID, PUBMED, Cochrane Collaboration and EBSCO databases November 2010 to February 2013. The following key terms were used: indwelling urinary catheter care, urinary catheter, indwelling urinary catheter, catheter securement, prevalence, and catheter care separately and combined. The key terms were entered into all databases without

any search year parameters. Exclusion criteria included articles that were: 1) printed in a non-English language, 2) pediatric studies, 3) not related to indwelling urinary catheters, 4) unavailable in Canadian libraries, and 5) unpublished. This preliminary scan identified 52 articles that met the criteria for a first read of the abstract only. The abstracts were assessed for the following inclusion criteria: 1) specifically referred to urinary catheter securement anywhere in the text or 2) discussed urinary catheter care or catheter management. This analysis identified 36 potentially relevant articles. An online folder in an electronic reference manager was created where duplicate studies and articles could be identified and removed.

There were 36 studies found that were relevant to the literature review: three quantitative (Darouiche et al. 2006; Siegel, 2006; Tracy, 2000), three clinical practice guidelines (Gould et al., 2010; Pellowe, 2009; Senese et al., 2006); one case study (Bell, 2010); 24 reviews summarizing the literature on catheter care issues (Billington et al., 2008; Chenoweth & Saint, 2011; Cochran, 2007; Fisher, 2010; Freeman, 2009; Gray, 2008; Hanchett, 2002; Harris, 2010; Madeo & Roodhouse, 2009; Moore & Rayome, 1995; Nazarko, 2008; Nazarko, 2010; Newman, 2007; Orme et al., 2008; Parker, 1999; Parker et al., 2009; Pomfret, 2010; Pratt & Pellowe, 2010; Rebmann & Greene, 2010; Reilly et al., 2006; Smith, 2003; Todd, Turner, Anderson, Mhoon & Brendler, 2000; Wilson, 2008; Willson et al., 2009); two consumer pamphlets (Harrison, 2005; Trumbull, 1998); and three abstracts (Hagg, 2009; Hardenstine, Rivera, Fowler & Wolfgang, 2010; Kula, Nix, Rolstad & Bryant, 2009). The review findings indicated that

current catheter securement practices are inadequate and suggested that there was a need for additional research. Of the three quantitative studies, one was a U.S. prevalence study by Siegel (2006), which specifically investigated the use of catheter securement devices; the second was an investigation of the relationship between catheter securement and the incidence of CAUTIs (Darouiche et al., 2006). The third study by Tracy (2000) used a quasi-experimental design to examine the effect of different securement products on catheter stabilization, patient comfort, and skin reaction. Two key themes emerged from the literature review which could direct further exploration of catheter securement:

1. Catheter securement and catheter-related complications.
2. Catheter securement and evidence-based practice (EBP).

Catheter Securement and Catheter-Related Complications. As stated above**,** three quantitative studies investigated the relationship of catheter securement and catheter-related complications (Darouiche et al., 2006; Siegel, 2006; Tracy, 2000). A single day prevalence study done by Siegel (2006) examined the relationship between catheter securement and clinical practice. Using a convenience sample consisting of 68 patients, the author investigated the securement practices of 82 medical-surgical and critical care nurses at a community medical centre in the U.S. Anecdotal reports of catheter-related urethral trauma, pain and impairment of urinary flow of indwelling urinary catheters prompted an evaluation of securing practices. Additional patient observations included pressure ulcers to the buttocks and thighs and urethral tears.

Prior to data collection nurses were asked to complete a survey on catheter securement. The survey evaluated the nurses' perception of occurrence of catheter stabilization in their individual practice and the results were used as a comparison against the actual prevalence observed during the study. Survey results suggested that 98% of nurses believed they had good adherence to catheter securement, however only 2% of IUCs were found to be secured (Siegel, 2006). Following the study nurses were provided with education sessions regarding catheter care and after 3 months the prevalence study was repeated. There was only a 12% increase in prevalence of catheter securement.

Siegel's (2006) study was the only prevalence study found in the review of the literature. The author described potential complications that may arise from failure to stabilize urethral catheters and suggests that the risk for complications may be reduced through proper securement. Similar anecdotal observations have been presented by clinical experts in the area of urology (Bell, 2010; Billington et al., 2008; Hanchett, 2002). In a case series of four participants, Bell (2010) described the risk for urethral erosion and pressure ulcers resulting from unsecured catheters. Over a three month period Bell (2010) observed four elderly men residing in a long-term care facility that were referred to a wound care specialist for erosive urethral trauma. In her report, the author recommended improvement in securement practices to mitigate the risk for pressure injury. Additionally, Hanchett (2002) and Freeman (2009) reported that urethral trauma, urethritis and accidental dislodgement of catheters may occur from lack of catheter stabilization.

Some have suggested that improper securement of catheters can result in catheter migration and increased traction or pulling on the catheter (Newman, 2007; Senese et al., 2006; Yates, 2008). Others state that unsecured catheters can cause increased friction to the urethral mucosa causing injury to penile or labial tissue (Billington et al., 2008; Hanchett, 2002; Orme et al., 2008; Rebmann & Greene, 2010). Carignan and Nelson (2000) identified a syndrome at one hospital in British Columbia, Canada, which caused extreme pain for patients post-operatively, resulting from inadequately secured indwelling urinary catheters. The authors reported that inadvertent displacement of the catheter into the bladder neck resulted in patient discomfort, agitation and high blood pressure. A search for more recent studies similar to Carignan and Nelson's (2000) did not yield current results, however, most authors agree that securing urinary catheters can improve patient comfort (Bell, 2010; Billington et al., 2008; Freeman, 2009; Hanchett, 2002; Newman, 2007; Tracy, 2000). Currently, most anecdotal reports have not been validated and few studies have investigated the potential risks of unsecured catheters. This may be due to the overall lack of research examining catheter securement (Billington et al., 2008) or possibly a complacency towards this practice as not an important aspect of catheter care. Additionally, older methods of securing catheters have been described as unreliable or uncomfortable for patients (Hanchett, 2002; Todd et al., 2000).

In her study, Siegel (2006) described the dearth of clinical studies on catheter-related complications, as a potential barrier for adherence to stabilizing urethral catheters. Siegel (2006) argued that nurses may not recognize the

importance of securing catheters due to the limited amount of evidence to support the practice. Anecdotal findings such as Siegel's (2006) offer an important insight into the potential risks associated with unsecured catheters and also present more questions regarding the factors that influence securing behaviours.

A second study was found that investigated the relationship between catheter securement and catheter-related complications. In a prospective, multi-centre randomized controlled trial in the U.S. Darouiche et al. (2006) examined the impact of catheter securement on the incidence of CAUTI in acute care spinal cord injured patients. Based on the theory that securing IUCs reduces the risk of CAUTIs, the authors examined the occurrence of symptomatic CAUTIs when securement devices were used in comparison to patients without securement. Symptomatic CAUTI was defined as the presence of bacteriuria ($>10^4$ cfu/ml) and pyuria (>10 WBC/hpf) plus 1 or more clinical signs and symptoms of infection including, fever (oral temperature $>100^o$ F), suprapubic or flank pain, bladder spasm, increased spasticity, and worsening dysreflexia. Adult patients diagnosed with neurogenic bladder requiring long-term indwelling catheters were randomized into 1 of 2 groups: 1) the experimental group which urinary catheters were held in place with a commercial securement device, and 2) the control group who continued pre-existing practices which ranged from catheter securement with tape, Velcro® straps and no securement. From a total of 127 potential participants, 118 patients participated in the study, 60 in the experimental group and 58 in the control group. Nine patients were excluded, 5 from the experimental group (2 voluntarily withdrew and 3 did not meet inclusion criteria), and 4 in the

control group (1 withdrew from the study and 3 did not meet inclusion criteria). Urine samples were sent for culture and indwelling catheters were also cultured. Results demonstrated a 45% decrease in CAUTIs in the securement group. The reduction in infection demonstrated promising results and suggested a relationship between catheter securement and CAUTIs. Although the results were not statistically significant (p= .16) the findings are potentially clinically significant and suggest that larger clinical trials are necessary.

A third study was discovered which examined the relationship between the method of securement and catheter-related complications, such as patient discomfort and catheter dislodgement. In a quasi-experimental study comparing securing devices, Tracy (2000) described the variation between securement practices. The author hypothesized that nurse's selection of a securement method was dictated by individual preference, knowledge of securing and availability of securing products. Tracy's (2000) study, conducted in a large urban acute care facility, explored if using differing methods of catheter securement affected patients' comfort, prevented movement and displacement of IUCs or caused skin irritation. Using a convenience sample, the author categorized participants into two groups of 20 participants each. A satisfaction questionnaire was used to compare two methods of catheter securement: 1) the control group, using a tape and pin method and 2) the experimental group using a commercialized securing device. Patients were asked to rate the comfort and movement of the product, if they felt that their catheter was secure or if they had any skin irritation. Findings suggested that there was no difference in catheter displacement or patient comfort

between the two groups. Also, participants in both groups reported no skin irritation. The author reported that using simple measures of securement significantly reduced displacement of urinary catheters in 100% of participants from the control group, $p < 0.0001$ whereas commercial securing devices remained in place for less than 100% of participants in the experimental group. Findings from Tracy's (2000) study suggests that securing catheters with either product can provide comfort to patients and prevent movement of their catheter, without skin irritation. Although this study did not include a comparison group consisting of participants with no securement, it provides some evidence on the benefits of securement. The literature search did not yield additional studies to compare Tracy's (2000) findings. However, the author noted that further studies comparing various methods of securement would be helpful to assist in the selection of the most appropriate product.

Catheter Securement and Evidence-Based Practice. According to Adams and Cooke (1998) EBP can be seen as any form of evidence or research that is applied in order to benefit the health and well-being of patients. A recurrent theme in the literature was the association of EBP with catheter care. Two important findings related to this theme were 1) most researchers viewed EBP as an important and standard aspect of catheter care and 2) there was a lack of guidelines to support EBP in catheter securement.

Nazarko (2010) described the use of clinical evidence as essential in catheter care and stated that EBP is necessary in order to reduce the risks of infection and complications.

EBP promotes a set standard of care and is important to safe practice (Adams & Cooke, 1998; Billington et al., 2008; Haag, 2009; Nazarko, 2008; Newman, 2007). Also, clinical evidence provides the basis for clinical guidelines and may be used to direct educational initiatives (Pellowe, 2009). According to Madeo and Roodhouse (2009) evidence-based guidelines allow health professionals implement best practice consistently.

A lack of quantitative evidence on catheter securement has been identified in a number of reports and reviews on this topic. Several reviews discuss the potential of catheter securement in reducing catheter-related complications and suggest that additional research is needed to establish the basis for EBP in this area (Bell, 2010; Billington et al., 2008; Cochran, 2007; Nazarko, 2008; Parker et al., 2009; Reilly et al., 2006; Tracy, 2000; Smith, 2003).

Although there were few studies on EBP and catheter securement, in a review of the literature three abstracts were found which explored evidence-based initiatives on catheter care (Hagg, 2009; Hardenstine et al., 2010; Kula et al., 2009). These U.S. based projects highlighted the value of continuing education and research on catheter management and concluded that continuing nursing education is a key element to promote adherence to EBP.

In one abstract on best practice for IUCs, Kula et al., 2009, described results of a 6-month CQI project that investigated the use of catheter stabilization devices in an acute care setting. The authors provided education, improved the accessibility of securing products and provided on-site support through unit-based skin care experts. The primary outcome measure was the use of catheter

stabilization products and researchers found a 66% increase in use. Researchers later compared seven different methods of securement, including stabilizers with Velcro® straps and a catheter holder with clamps. Findings from this comparison revealed no significant differences between the seven securement products, however anecdotal reports indicated staff preference for certain products over others. A majority of staff preferred the catheter holder with clamps (88%) rather than Velcro® straps. There were no further reports on alternative securement methods.

In the second abstract, a multidisciplinary team, consisting of nurses, urology physicians and infection control experts, examined the level of adherence at one centre to policies and procedures on catheterization (Hagg, 2009). The team provided medical and nursing staff with education on catheter care, and implemented daily electronic reminders that required staff to complete a list of catheter-related assessments and record their compliance to EBP. Although staff reported 100% compliance to EBP, only 50% of patients had secured catheters. There was no report of the proportion of patients with secured catheters prior to the intervention. Also, the author did not indicate the rate of infection prior to the educational initiatives, however reported that there were no statistically significant differences found in rates of infection following the intervention.

The third abstract described interventions led by a multidisciplinary team who used monthly CAUTI prevention reminders in electronic format, interactive education sessions and electronic CAUTI risk nursing care plans to inform nursing staff on evidence-based catheter management (Hardenstine et al., 2010).

The aim of this project was to decrease length of catheter days and improve compliance with catheter securement devices. Outcome measures were the rate of CAUTIs and the use of catheter securement devices. Random audits were employed to evaluate compliance. Two months following the education interventions there were significant reductions in the number of days patients had IUCs (p= 0.00) and the use of securement devices significantly increased (p= 0.015). No statistically significant differences were found between pre-intervention and post-intervention rates of CAUTIs (p= 0.1660).

Evidence-based catheter care provides rationale that influence practices which can reduce rates of complications (such as CAUTIs and urethral trauma) (Orme et al., 2008; Rebmann & Greene, 2010; Smith, 2003). Researchers suggest that there are adequate resources available to influence securement practices and potentially reduce catheter-related complications; however in several reviews experts indicated that there may be low adherence to recommended securement practices (Billington et al., 2008; Nazarko, 2008; Nazarko, 2010; Orme et al., 2008; Pratt & Pellowe, 2010). Siegel (2006) suggests that low adherence may be influenced by the lack of quantitative data on the benefits and risks of catheter securement. Current data are largely anecdotal and may be perceived as having less scientific merit. This is supported by the finding of only three quantitative studies (Darouiche et al., 2006; Siegel, 2006; Tracy, 2000) and three multidisciplinary initiatives targeting catheter care (Hagg, 2009; Hardenstine et al., 2010; Kula et al., 2009) supporting EBP of catheter securement. In a review of best practice, Freeman (2009) suggests that catheter securement should be a

national recommendation and that individual health professionals are responsible for familiarizing themselves with policies and equipment to ensure that securement occurs. EBP provides direction and guidance to clinician decision-making, which is important for promoting safe patient care. EBP should promote and set a standard of practice thereby creating consistency in care (Fisher, 2010; Freeman, 2009; Hyrkas & Rhudy Jr, 2013).

Two narrative reviews on catheter securement suggest that a lack of standard guidelines for catheter care indicate an absence of EBP and a reliance on practical knowledge for securement practices (Gray, 2008; Newman, 2007). Despite this finding, most authors consider catheter securement best practice and indicate the importance of EBP in facilitating education on catheter securement (Billington et al., 2008; Cochran, 2007; Fisher, 2010; Gould et al., 2010; Harrison, 2005; Senese et al., 2006; Willson et al., 2009). The results of the literature review indicate that securing catheters reflects a consensus on best practice. However, many recommendations for securement are based on minimal evidence-based research and are largely subjective. To ensure EBP in the acute care setting, it is pragmatic to continue to research catheter securement and catheter care.

Multiple authors of review articles recommend securing catheters to minimize the risk of complications (Billington et al., 2008; Darouiche et al., 2006; Madeo & Roodhouse, 2009; Senese et al., 2006; Tracy, 2000). In a review on management of indwelling urinary catheters, there are compelling arguments that excessive tension on unsecured catheters can lead to inadvertent dislodgement

(Freeman, 2009; Newman, 2007). They also point out that traumatic removal of the catheter may result in urethral trauma and cause patient discomfort.

Pragmatic concerns regarding length of hospital care associated with catheter complications were also explored. Billington et al., (2008) suggests that adoption of routine catheter stabilization may minimize the economic burden experienced in acute care. A review by Fisher (2010) suggests that although securement may not help avoid all catheter-related complications, minimizing the potential risks for infection and trauma is significant to patients. Figure 2-1 shows one commercial product for securing catheters.

Figure 2-1: A Catheter Securement Device. Source file Katherine Moore, University of Alberta. Reprinted with permission.

In summary, several reviews on catheter securement indicate that securing urinary catheters can reduce the incidence of catheter dislodgement, tissue trauma and inflammation (Hanchett, 2002; Fisher, 2010). Compared to the three studies conducted on adults in acute care, the majority of data on the relationship between catheter securement and catheter-related complications is anecdotal. In spite of this, important clinical issues were raised. In a descriptive review Newman (2007) reports that CAUTIs and urethral trauma are two significant complications

associated with IUCs. Similar reviews report that current catheter care is inadequate and associated this with increased risk of complications (Fisher, 2010; Madeo & Roodhouse, 2009; Newman, 2007). This is the strongest argument to support further investigation on catheter securement.

The positive effect of catheter securement in minimizing urinary complications is frequently hypothesized although little supportive data is provided (Gray, 2008; Madeo & Roodhouse, 2009; Siegel, 2006). Conversely, other causative factors are considered to influence complications other than catheter securement, such as patient condition and the shape of the urethral meatus, which could also impact the incidence of catheter-related complications. External factors, such as length of catheter, catheter size, and procedural technique may also play a role (Fisher, 2010). There was no substantial data that accept or refute Newman (2007) and Fisher's (2010) findings.

Summary of Findings

The literature review identified three research studies, three clinical guidelines, one case study, three abstracts and 24 reviews of the literature on the topic of catheter securement. The reviews all conclude that catheter securement is an expected but often unfulfilled part of nursing practice and further, that not secure catheters places patient's at risk for significant complications that could potentially extend hospital stay. Strong arguments were presented that indicated empirical data on catheter securement is important for EBP and to support existing data to reduce catheter related complications. Whether catheter securement is an issue in acute care in Edmonton has not been explored. If,

indeed, catheters are not being secured, then patients are placed at unnecessary risk. A prevalence study will help identify current practice and assist managers in determining whether further exploration of the topic is required. In the following section I will outline the design of the research study which examines the research question:

What is the prevalence of securement for adult medical and surgical patients with indwelling urinary catheters at one tertiary care hospital in Edmonton, Alberta?

Chapter 3

Methods

Design

The purpose of this prevalence study was to derive baseline information regarding the practice of catheter securement in an adult acute care population. The prevalence design allowed us to record common securement practices at one specific site during a specific period of time. Data was also collected on variables that could impact the occurrence of catheter securement.

Setting. This study took place at one urban tertiary care hospital in Edmonton, Alberta, Canada. This large acute care hospital has 11 adult medical and 10 adult surgical units, each with 18-beds. This setting was chosen because it is representative of the general inpatient population in acute care facilities across Alberta and most of Canada (CIHI, 2011).

Sample. The population was adult medical and surgical patients in a tertiary care setting in Edmonton, Alberta, Canada. Burns and Grove (2011) state that there is no clear definition of an adequate sample size for a prevalence study; therefore a convenience sample was used. A convenience sample ensured that the maximum number of potential participants was obtained.

Study Participants. Out of a total of 72 patients with indwelling urinary catheters on the 21 units, 44 individuals from medical and surgical units agreed to participate. Two participants required proxy consent. All participants (or proxy caregivers) met the inclusion criteria, listed below.

Inclusion Criteria.

Adult medical or surgical patients age 18 and over who had:

- any type of indwelling catheter draining the bladder (silicone, red rubber, latex-based and non-latex based) on the day of the study;
- capacity to provide written informed consent, or if lacking capacity (e.g. cognitive impairment), had a family caregiver who was able to provide informed consent in person or by phone;
- accessible to the research team on the study day (e.g. not away from the unit for diagnostic testing, treatments or surgery)

Exclusion Criteria.

- not on the designated medical or surgical units on the day of the study;
- unable to provide consent independently or by proxy;
- intensive care unit (ICU) patients

The University of Alberta Health Research Ethics Board (HREB) approved this study. As noted in the inclusion criteria, participants had to meet capacity requirements to provide consent as outlined by the University of Alberta Standards for the Protection of Human Research Participants (University of Alberta, 2011). The HREB defines capacity as the ability of a participant to reasonably understand relevant information related to the study and appreciate the potential benefits and consequences of participating or not participating (University of Alberta, 2011). For those who did not have capacity to provide informed consent (e.g. cognitive impairment) proxy consent was obtained from

the most appropriate person such as a spouse or adult child (family caregiver) either in written format or by phone. If proxy consent could not be obtained the patient was not enrolled in the study.

The importance of including the proxy consent was to include vulnerable patient populations. It is known that the prevalence of many urinary conditions increases with age and increasing frailty (Zarowitz & Ouslander, 2006). Many older adults with cognitive impairment are diagnosed with conditions such as urinary incontinence and as such are at increased risk for more catheterizations than other groups (Inelmen, Sergi & Enzi, 2007). Lee and Mallat (2011) state that patients with cognitive impairment, such as dementia, have a disproportionably high probability of having urinary catheters. This can result in a higher risk for catheter-related complications. Additionally, these findings suggest that exclusion of patients who have cognitive impairment could underestimate the target demographic that predominates the use of urinary catheters.

Participant and Family Caregiver Consent

Prior to obtaining consent an information letter was provided to participants and caregivers. This information letter had a description of the study, information regarding the participant role and clear statement that participation was voluntary and could be withdrawn at any time (See Appendix A and B for participant and family caregiver information letter respectively). Three separate consent forms were developed for participants:

1) with capacity to provide written informed consent (See Appendix C for participant consent form),

2) who required proxy consent and the family caregiver was present on the day of the study to provide written consent; (Appendix D) and

3) who required proxy consent by telephone as the family caregiver was not present (Appendix E).

Data Collection Tool. In a comprehensive review of the literature no available research tools were found that could be utilized for data collection specific to this study. The Edmonton Chapter of the Urology Nurses of Canada (UNC)/ Urology Interest Group were contacted and provided assistance in the development the data collection tool. The tool consists of a one-page document that includes 13 key items (See Appendix F). To establish face and content validity the data collection tool was pre-tested by nurse experts familiar with indwelling catheters on one Urology unit at the University of Alberta Hospital in Edmonton, Alberta. Data recorded on the form included:

- Date of data collection
- The admitting medical or surgical unit (patient care record)
- Date of birth (patient care record)
- Sex (observation)
- The admission date to the hospital (patient care record)
- The unit number (patient care record)
- The type of catheter (observation)
- The indication for catheter insertion (patient care record)
- The unit where the catheter was inserted
- The type of securement/fixation device (observation)

- The presence and location of the securement/fixation device (observation)
- If presence of catheter securement, correct or incorrect securement (observation)
- Presence of catheter securement devices on the unit (observation)

Executive Directors. Executive Directors of Inpatient Medicine, Surgery and Transplant Services and Unit Manager (UM) on each of the participating medical and surgical floor were approached directly to inform them of the intent for the study. A formal letter was sent to each Executive Director describing the purpose and design of the study (See Appendix G). Also, Executive Directors were provided with a template for a support letter, which was included in the ethics application for the HREB (See Appendix H). One week before the date of the study Executive Directors and UMs were sent an information letter as a reminder for the study (See Appendix I). The letter contained information provided to data collectors and study participants and the following documents:

1) A copy of administrative, operational, and HREB study approval;

2) A copy of the data collection tool;

3) The timeline for the data collection;

A week prior to the study the principal investigators attended a formal meeting with the Executive Directors and UMs to review data collection methods. One day before data collection UMs were provided with an additional review of study procedures.

Data Collection Procedures

The date for the data collection was negotiated with the Directors of Medicine, Surgery and Transplant Services. Six volunteer registered nurse data collectors, several of whom were members of the Edmonton UNC/Urology Interest Group, were recruited prior to the study date.

Training Session for Data Collection. Training of the data collectors was conducted by the principal investigators and occurred at the academic institution in Edmonton, Alberta, Canada. Two days prior to data collection, data collectors were asked to attend an orientation, organized by the principal investigators, to review data collection procedures and evaluate their understanding of the use of the data collection tool. Two simulation stations were organized displaying two common urinary catheter securement methods and a demonstration of correct and incorrect catheter securement. Afterwards the data collectors attended two simulation stations, designed by the research team, where each simulation mannequin had an IUC and demonstrated a method of catheter securement.

The first station displayed a male mannequin who had a urethral catheter, correctly secured to one upper thigh using tape method. The second station was developed using a female mannequin, who had a urethral catheter, correctly secured to one upper thigh using a commercial securement device. Using a sample data collection tool data collectors were required to correctly identify the type of securement observed and identify that each catheter was correctly secured at each simulation station. All data collectors correctly identified the type of securement product and indicated that each catheter was correctly secured.

After the training session, inter-rater reliability was assessed. Inter-rater reliability was used to estimate the index of equivalence or agreement (Loiselle, Polit & Beck, 2011). Kappa's measure of agreement was used to assess inter-rater agreement. A Kappa value of 1.0 was calculated ($r=1.0$, $p< 0.00$) indicating that there was 100% agreement amongst data collectors. This level of agreement provided sufficient reliability of the data collection tool.

Recruitment. On the day of the study, each medical and surgical unit manager created a list of patients with IUCs. The lists were distributed to data collectors by the charge nurse on each unit. The charge nurses approached potential participants, provided them with an information letter, and obtained verbal consent to have the researchers approach them. For patients unable to consent on their own, the charge nurse contacted the designated family caregiver for the patient on the unit or by phone. If the family caregiver agreed to speak with the data collector assigned to the unit, information on the study was provided and consent was obtained from this person either in writing or over the phone. Participants that were able to consent were asked for written informed consent.

Data Collection. On the day of the study the principal investigators reviewed the correct method of data collection with the data collectors. Once informed consent was obtained data collectors were instructed to check if the catheter was secured and documented each item on data collection tool. Demographic data was obtained from the participant's personal care record.

Data Analysis. Data was coded (See Appendix J for data coding scheme) and entered into Predictive Analytics Software (PASW) Statistics 18, a statistical

software package. Data was summarized using descriptive statistics including: frequency, measure of central tendency, comparison of female versus male securement and ratio of correct versus incorrect securement. Chi-square analysis was used to determine the prevalence of catheter securement including estimates based on sex and type of inpatient unit.

Outcome Measures

The primary outcome variable for this study was the prevalence of catheter securement. After reviewing literature on appropriate catheter securement it was evident that not all securement was correct. Therefore a secondary outcome measure was added with regards to whether catheters that were secured were correctly secured.

Data collectors documented whether the catheter was secured correctly or incorrectly and had received training in a simulation lab to evaluate their knowledge of correct catheter securement. Following the simulation exercise, photos of correct securement were attached to the data collection tool as a reference tool during data collection. A number of variables that may be associated with catheter securement were explored. The nine key variables that were examined included: age and sex, type of unit, length of stay, type of catheter, type of securement, anatomical location of securement, correct versus incorrect securement and unit supply of securement devices and participant location when catheterized. Additional variables were identified on the data collection tool.

Key Variables

Age and Sex. A comparison between male and female participants was analyzed to determine if sex influenced prevalence rates. Also, data were analyzed using age as a dichotomous variable with the minimum age requirement for inclusion being 18. Alberta Health Services defines adult according to the legal age of consent to treatment, age 18 years and older (Alberta Health Services, 2011). Participants were grouped into two age categories to determine if the age of the participant influenced the prevalence of securement: 1) age younger than 65 years and 2) age equal to and older than 65 years.

Type of Unit. Data was separated by unit in order to determine if type of unit appeared to influence the prevalence of securement.

Length of Stay. Length of stay was recorded as the date of admission to the hospital until the day of data collection.

Type of Catheter. Data collectors were asked to identify if catheters were secured or unsecured. Once a catheter was identified as secured data collectors documented the type of product used for securement and the anatomical location of securement.

Type of Securement. The data collectors were instructed to document one of five different types of securement: 1) tape, 2) StatLock™ securing device, 3) secure commercial product, 4) other, and 5) no device.

Anatomical Location of Securement. Data collectors were instructed to record the anatomical location of secured catheters. The locations that were indicated on the data collection tool were, leg, abdomen and other.

Correct versus Incorrect Securement. Data collectors were required to correctly identify the type of securement observed and identify that each catheter was correctly secured.

Participant Location When Catheterized. The location that participants were located when their catheter inserted was recorded and choices included: 1) inpatient unit, 2) ER, 3) OR, 4) home, and 5) unknown.

Unit Supply of Securement Devices. A key question was whether catheter securement devices were available to staff on the unit. Data collectors examined the supply carts of each unit and recorded if catheter securement devices were supplied on the shelves and noted the ease of finding securement devices. If the securement devices could not be found a staff member was asked about the location.

Ethics Approval

Ethics approval for this study was obtained from the University of Alberta-Alberta Health Services Health Research Ethics Board (HREB). Operational approval was granted from the Northern Alberta Clinical Trials and Research Centre (NACTRC).

Confidentiality

In order to maintain confidentiality all participants were assigned a number during data collection. Only participant numbers were on the data collection tool for data analysis. A master list of the participant names and assigned numbers was stored in a locked file drawer in the principal investigator's (thesis supervisor) office. Data will be stored in a separate locked drawer in the

office of the principal investigator and kept for 5 years. Any reports or publications will include only aggregated data; no individual participants will be identified in any way.

Chapter 4

Results

The purpose of this study was to assess the prevalence of securement at one academic tertiary care hospital. A prevalence study was done to estimate the number of patients on medical and surgical wards with indwelling urinary catheters and determine the number of secured catheters. The study findings will be presented, first by describing demographic data on participants, followed by a summary of each variable. The chapter concludes with anecdotal reports added by the data collectors during data collection.

Setting

Data collection occurred on December 12, 2012 over a 6-hour period on 11 medical and 10 surgical inpatient units at one large tertiary care hospital in Edmonton, Alberta Canada (total number of patients on the two types of units 370). Intensive care units were not included. Six Registered Nurses (RNs) with experience in urology collected data. They were assigned specific inpatient units and evaluated eligible participants to determine if they met the inclusion criteria.

Participants

There was a total of 19% (72/370) patients with indwelling catheters on the day of data collection. Of these 44 participated, 17 from medical units and 27 from surgical units (See Table 4-1).

Medical Unit Participants. The total number of patients on medical units was 198; of these, 27 had indwelling urethral catheters, 19 males and 8 females. Of the 27 eligible participants, 17 agreed to be in the study (63%). Ten (37%) did not participate due to: cognitive impairment with no family caregiver available (2), not interested (2), palliative care (3), off unit (2) and other (1). The mean age of participants was 73 years (16.6 SD), median of 78, mode of 62, range 27 to 94 years. Male participants had a mean age of 71 years (17.5 SD), median of 75, range 27 to 88 years. The mean age of female participants was 77 years (15.4 SD), median 79, range 55 to 94 years.

Surgical Unit Participants. The total number of patients on the surgical units was 180; of these, 45 had indwelling urethral catheters, 36 males and 9 females. Of the 45 eligible participants, 27 consented to be in the study (60%). Eighteen (40%) did not participate due to: cognitive impairment with no family caregiver available (3), not interested (8), palliative care (1), off unit (2) and other (4). The mean age of participants was 66 years (17.4 SD), median of 68 range 25 to 89 years. The mean age of male participants was 66 years (17.6 SD), median 69, range 25 to 88 years. The mean age of female participants was 65 years (18.1 SD), median of 66, range 28 to 89 years.

Participant Consent. Two different consent forms were used for enrollment, standard consent (n=42) and a proxy consent (n=2), for those who were unable to provide their informed consent. The few numbers of participants who required proxy consent prevented us from conducting statistical analysis

examining an association between prevalence rates of catheterization and type of consent.

Data Collection Findings

Data collectors were asked to identify if catheters were secured or unsecured. The overall prevalence of catheter securement was 18% (n=8/44). The majority of participants with urinary catheters did not have secured catheters (n=36/44, 81%). On medical units prevalence was 6% (n=1/17) and on surgical units 26% (n=7/27) (See Table 4-2 and Table 4-3). Male participants were the only group who had secured catheters on medical and surgical units (n=1/11 and n=7/18 respectively). No female participants had secured catheters.

Key Variables

Nine variables were examined to determine if they influenced prevalence rates.

Age and Sex. Although the ratio of males to females on medical and surgical units was similar, with females representing one third of participants on each unit, participants on medical units were older (73, 16.5 SD) than on surgery units (65, 17.4 SD). To investigate whether one age group was more likely to have indwelling urinary catheters, participants were divided into two age categories: age less than 65 years and age over 65 years (See Table 4-4). A Chi square test for independence was conducted to examine the relationship between the prevalence of catheterization and age group. The predominant age group with catheters were over age 65 (n=29, 66%), a smaller percentage of participants were below this age

(n=15, 34%). To assess whether age was associated with catheter securement, two age groups were defined: 1) age younger than 65 years and 2) age equal to and older than 65 years. A Chi square test of independence was conducted and results indicated no significant association between catheter securement and age, X^2 (1, *N*=44)=2.13, *p*=.14, phi=.28 (See Table 4-5). Nonetheless, 33% of participants in this study below age 65 had secured catheters whereas only 10% of participants 65 and older had secured catheters.

Type of Unit. The sample was obtained from all the non-intensive care medical and surgical units. Surgical unit participants (n=7/27, 26%) had a higher prevalence of secured catheters than those on medical units (n=1/17, 6%). Although this study had a small sample population we conducted a statistical analysis to examine if a relationship existed between the type of unit (medicine versus surgery) and catheter securement.

Length of Stay. Length of stay was recorded for 43/44 participants. There was missing data for one participant's LOS was reported as the date of hospital admission until the date of data collection. Mean LOS was 10 days (10.9 SD, range 1 to 39 days). Participants on medical units had slightly longer length of stay (14, 11.6 SD, range 1 to 37) than those on surgery units (9 days; 10.1 SD, range 1 to 39) (See Table 4-1). Participants with secured catheters had a slightly longer LOS (13 days, 12.6 SD, range 2 to 37) than those with unsecured catheters (10 days, 10.5 SD, range 1 to 39). Participants who had been in hospital greater than one week (n=5, 63%) were more likely to have secured catheters than those

in hospital one week or less (n=3, 37%), however these results did not approach statistical significance X^2 (1, *N*=43)=.10, *p*=.75, phi=-.11).

Using the data collection tool as a guide, the following headings address the research question and the eight variables that were collected by the data collectors (see Appendix F for data collection tool).

Type of Catheter. In all but two cases, participants had two way indwelling urethral (Foley) catheters (n=42/44, 98%). One participant had continuous saline bladder irrigation with a correctly secured three-way indwelling urinary catheter and another had an indwelling catheter via a Mitrofanoff conduit, which was not secured. On medical units all participants had indwelling urethral catheters (n=17).

Type of Securement. The primary method of securement was with StatLock™ securing device (n=6, 75%). Two other methods were observed for participants on surgical units, one with adhesive tape alone and the other with adhesive tape and a safety pin. The surgical participant with the tape and pin method had a complex wound in which a surgical dressing encompassed a large portion of his abdomen and upper legs.

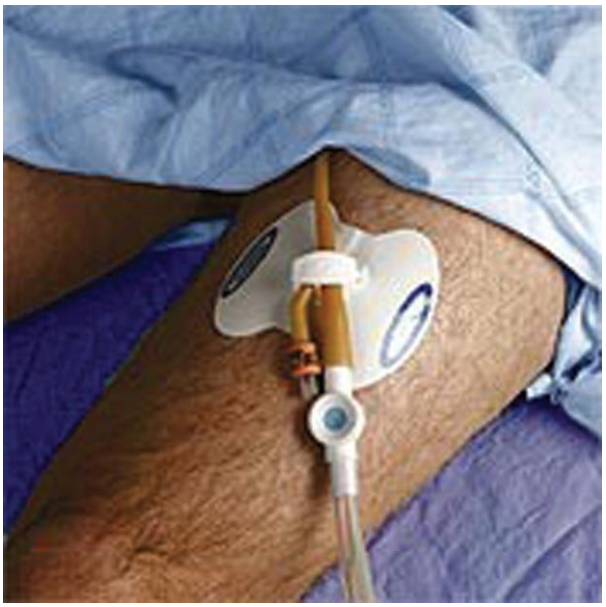

Figure 4-1: StatLock™ Foley Stabilization Device. © 2012 C. R. Bard, Inc. Used with permission. Bard is a registered trademark of C. R. Bard, Inc.

Anatomical Location of Securement. The three locations for catheter securement were the: 1) upper thigh 2) abdomen and 3) other. The majority of catheters were secured on the upper thigh (n=7). One participant had an extensive wound dressing that covered his abdomen and lower extremities therefore nursing staff created a unique securement method, using a tape and pin, anchoring his catheter to the dressing material. No other securement sites were reported.

Correct versus Incorrect Securement. Seven of the eight secured catheters were assessed as correct (88%). Of correctly secured catheters six were secured with StatLock™ devices and one was stabilized with a tape and pin. One catheter was assessed as incorrectly secured. The participant was on a surgery unit and had the catheter inserted in the ER and secured with adhesive tape to the

upper thigh; the data collectors described it as incorrect and 'too tight'. On medicine units, there was one secured catheter with StatLock™ securing device (n=1/16).

Participant Location When Catheterized. Locations for catheter insertion for all patients were inpatient unit (20), ER (11), OR (10), home (1) and unknown (1). For medical patients the most common locations were inpatient unit (n=11/17, 65%), ER (n=5/17, 29%) and home (n=1/17, 6%). For surgical participants, catheterization occurred in the OR (n=10, 37%), inpatient unit (n=9/27, 33%), ER (n=6/27, 22%), home (n=1/27, 4%) and other (n=1/27, 4%). A Chi square test for independence indicated no significant association between the prevalence of catheter securement and the location where the participant was catheterized, X^2 (4, *N*=44)=4.61, *p*=.33, phi=.32. Overall, participants were primarily catheterized on inpatient units but this did not influence the prevalence of secured catheters.

Unit Supply of Securement Devices. A key question was whether catheter securement devices were available to staff on the unit. Approximately 75% of units had securement products: 47% of medicine units and 92% of surgical units. The most common securement device was a StatLock™ securement device. All participants with stabilized catheters had securement products on their unit including the one medical participant with a secured catheter. A Chi square test for independence indicated that there was no association between catheter securement and a unit supply of securement products, X^2 (1, *N*=44)=1.83, *p*=.18, phi=.27.

Anecdotal Statements

Medicine Unit Comments. Interestingly, several nursing staff reported knowledge of securement devices, however many were unaware that they were supplied on their unit. On one medical unit, a RN stated, "we never have catheter securement products, we usually borrow some from [nearby] other units". However, data collectors reported that securement products were stocked on this specific unit. On another medicine unit, a RN remarked that securement products were "not easy to find", and stated that tape was used to secure catheters if necessary. Data collectors were unable to find securement products on this unit.

Surgical Unit Comments. One male surgical participant with an IUC had an alternative fixation device constructed by nurses due to a complex and bulky dressing which covered his lower limbs and abdomen. He described the catheter as "much better now [rather] than when they just put tape across it, that [catheter] pulled". There were other similar reports. Two surgery participants reported that securement reduced discomfort; one described significant pain at the catheter insertion site associated with the slightest movement of the catheter tubing the other male participant had continuous bladder irrigation with a Foley catheter correctly secured with a StatLock™ device and described relief following stabilization. On another surgical unit data collectors noted that a paraplegic male participant with decreased sensation to his lower legs was lying on his catheter tubing. Data collectors reported that the unsecured catheter tubing had migrated beneath one of his legs and pressure indentations were observed where the tubing pressed against the thigh. On a different unit a female palliative participant was

observed lying on her unsecured catheter tubing. One male participant with a Mitrofanoff catheter had an unsecured catheter, which normally should be secured to the abdomen. Additionally, two participants from differing surgical units had combined urethral catheter-temperature probes, which were unsecured. A male participant post-nephrectomy was catheterized in the operating room. A StatLock™ device was correctly applied to the upper thigh to stabilize the catheter.

A key variable that was examined was if catheter securement devices were supplied on the shelves and noted the ease of finding securement devices. Data collectors reported difficulty locating securement products (2 reports). Another data collector could not find securement products even when listed on the supply cart inventory on one unit.

Summary

To date, this is one of the few studies to examine the prevalence of catheter securement in a North American adult medical and surgical population. During a 6-hour period, 72 individuals were found to have indwelling urinary catheters and from this total, 44 agreed to be enrolled in the study. Only 8 participants had secured urinary catheters. The overall incidence of catheter securement was low, 18%. The rate of securement was 26% on surgical and 6% on medical units; no female participants had secured catheters. StatLock™ devices were the most prevalent method of securement and were the most correctly applied. Each participant with a secured catheter had securing products

supplied on their unit. Surgical units had a greater supply of securing products than medical units. The results of our study identified a deficiency in catheter securement practices and are consistent with estimates reported in the literature.

Chapter 5

Discussion

Indwelling urinary catheters (IUCs) should be properly secured following insertion to prevent urethral injury and patient discomfort. Although this practice is strongly recommended in clinical guidelines, few studies have investigated the prevalence rate of catheter securement. To our knowledge, this is one of the first studies in North America to examine the prevalence of catheter securement and the only one conducted in Canada. The aim was to examine the number of medical and surgical patients with IUCs and determine the prevalence of catheter securement. The overall findings of this study are discussed in this chapter.

This prevalence study provided a simple and inexpensive method of determining the proportion of people in one urban acute care hospital with IUC securement. Prevalence is defined as the number of cases that exist in the population of study at a particular point in time (Boslaugh & Watters, 2008). These types of studies can help illustrate current clinical practice and be useful for planning future resource allocation as well as comparing a centres practice with published rates. This can be particularly useful when attempting to investigate the incidence of a condition or practice in the future. Addressing the prevalence of disease, or in this case clinical practice, is an effective strategy to determine the number of potentially at risk individuals for a specific condition. Although prevalence studies are useful for clinical practice, they must be viewed with caution when attempting to predict behaviour or conditions in larger populations (Patte et al., 2004). Minor methodological differences and unpredictable

conditions, could influence the findings resulting in differences between studies. One example would be the setting in which a prevalence study occurs. Tertiary care facilities have a wide spectrum of specialized services and benefit from access to products to care for patients with catheters that may not be accessible to those in primary care sites. Further, the type of units included in data collection could influence prevalence estimates. Indwelling urinary catheters are frequently used for accurate monitoring of urine output for critically ill patients, such as those in ICUs. It would be inaccurate to compare the prevalence of securement in areas with high occurrence of catheterized patients, such as ICUs, to units in which patients do not routinely have catheters, such as medicine units. Other influencing variables include the sample size, the center's practice policies and the attitudes of staff in differing facilities towards securement. The following discussion reflects practice in the sample population. The results indicate that secured catheters are not highly prevalent and female participants are the most at risk for unsecured catheters.

Discussion of Major Findings

The overall prevalence of catheter securement was 6% for medical unit participants and 26% for surgical unit participants. Study findings were consistent with those reported by Siegel (2006) who reported a 4.4% to 14% securement rate amongst medical and surgical patients at one U.S. acute care hospital. Siegel reported that 3 of the 68 (4.4%) patients with IUCs had anchored catheters while in our study only 8 of 44 (18%) had secured catheters. Despite increased literature on the importance of catheter stabilization there has been no significant

increase in securement rate (Fisher, 2010; Freeman, 2009; Slater, 2011). One reason for the low prevalence of catheter securement found in both Siegel's study and this present study could be the lack of national standardized recommendations on catheter care (Gould et al., 2010; Newman, 2007; Polit & Beck, 2010; Senese et al., 2006; Smith, 2003). Limited clinical evidence adds to the ambiguity in what is considered "best practice" for catheter management resulting in sub-optimal adherence to catheter securement (Bell, 2010; Tracy, 2000). Although our primary objective was to determine the number of stabilized catheters we also collected data on variables that could be associated with securement practices. Following a description of demographic data these variables will be explored in greater depth.

Participant Demographic Data

The two types of consent used in this study were: 1) standard participant consent and 2) proxy consent. The provision of proxy consent was important to the study recruitment; proxy consent was used to collect data on patients who lacked capacity (e.g. dementia or delirium). Ninety-five percent of participants were able to provide their own consent (n=42/44) and two were enrolled via proxy consent, one male and one female patient, both of whom appeared to have some form of cognitive impairment, which was identified by the UMs. As reported in literature, individuals who lack capacity, such as those with cognitive impairment, are disproportionably affected by complications associated with indwelling urinary catheters (Lee & Malatt, 2011). Unfortunately, a small sample size precluded us from conducting further analysis between participants that lack

capacity and the prevalence of catheter securement. In spite of this study limitation, it is notable that both proxy participants had unsecured catheters.

In this present study the mean age of participants was 69 years, 66% were over age 65 (n=29, 66%) and 34% were under the age of 65. Most were male (n=29/44, 66%) and only 34% were females (n=15/44). The predominance of older adults in our sample population was consistent with estimates reported in literature as the population most likely to be catheterized. Hazelett, Tsai, Gareri and Allen (2006) illustrated this in their retrospective chart review on the incidence of catheterization at one U.S. emergency department. The authors found that 73% of patients who received an indwelling urinary catheter were older than 65. The patients at risk for urinary catheter insertion, based on the review of the literature, are older women on surgical units although our study results suggest men on surgical units were at higher risk for catheter insertion. However the small sample size limits this finding.

Prevalence of Catheter Securement

Clinical guidelines and nurse experts in the field of urology recommend securing IUCs appropriately to decrease the risk of bleeding, trauma, meatal necrosis, and bladder spasms from increased catheter pressure and tension (Hanchett, 2002, Gray, 2008, Senese et al., 2006). Although several clinical experts indicate that the risk of CAUTI increases when catheters are not secured, there have been no studies evaluating this relationship (Billington et al., 2008; Freeman, 2009; Gray, 2008; Newman, 2007). In this study there was low adherence to catheter securement on both medical and surgical units. Nearly 82%

of participants had unsecured catheters. Our findings are similar to anecdotal findings in literature reviews on catheter care (Billington et al., 2008; Cochran, 2007; Freeman, 2009) and the one prevalence study on catheter securement (Siegel, 2006). In her study, Siegel reported observations from Registered Nurses (RNs) who noted that a majority of catheters in their institution were not secured. The RNs noted that patients with unsecured catheters also had various catheter-related complications, including trauma at the urinary meatus, urethral trauma, pressure ulcers in areas where catheter tubing was kinked, and obstruction to urinary drainage due to the catheter tubing. Similar to Siegel's study we found some participants at risk of complications as a consequence of not having stabilized catheters. For example, a 69 year old male surgical participant with paraplegia and limited sensation of both lower legs had reddened marks on one of his legs, in the location where his catheter tubing had migrated beneath. In another case, a 66 year old female surgical participant receiving palliative care had an unsecured catheter that had been displaced beneath her body. It has been recognized that patients with spinal cord injury are frequently vulnerable to pressure ulcers on localized areas of soft tissue compression, often over bony prominence (Fife et al., 2001; Sivaraman, Taly, Roopa & Murali, 2001). Experts on catheter management suggest that IUCs are often overlooked as the source of pressure ulcers and argue that any medical device, which exerts continuous pressure, can cause a pressure ulcer and lead to other forms of urethral or soft tissue trauma (Bell, 2010; Sivaraman et al., 2001).

Patient comfort has often been regarded a primary reason to secure urinary catheters (Billington et al., 2008; Fisher, 2010; Freeman, 2009; Tracy, 2000). In this study one surgical participant stated that when unsecured, his IUC caused significant pain and discomfort. Stabilized catheters can provide comfort to patients with IUCs who experience irritation and pain due to movement at the site of insertion (Freeman, 2009; Madeo & Roodhouse, 2009) and prevent undue discomfort to patients who do not have catheter-related pain (Hanchett, 2002).

Unlike our one-day study, Siegel (2006) replicated the prevalence study three months following a poster education session for nurses and found a 9.6% improvement rate. Even with additional staff education, training alone appears insufficient to change practice. Findings from Siegel's (2006) study highlighted the possibility that other variables could exist, such as the attitudes of nursing staff towards catheter securement. Other variables could include the type of educational interventions, as there may be different methods used to promote adherence to securement. This current prevalence study was not designed to explain the low rate of catheter securement. It does expose the severity of the problem and present the possibility of underlying factors that may influence securement practices other than staff education.

Catheter Securement and Key Variables

A secondary goal of our study was to examine associations between catheter securement and various independent variables such as age, sex, type of unit, LOS, type of catheter, type of securement, anatomical location of securement, correct versus incorrect securement, and participant location when

catheterized. Age and sex were discussed in the section above, the following is a discussion of the remaining variables.

Type of Unit. Medical and surgical admissions constitute the largest patient population in most tertiary care facilities (CIHI, 2012a). In order to collect the most data on catheter securement we chose to collect data from medical and surgical units. A large proportion of participants were from surgical units (n=27, 61%), with fewer participants from medical units (n=17, 38%). The sample size was not sufficient for a statistical analysis exploring the association between the type of unit and catheter securement. Although there was no significant difference between medical and surgical participants, those on surgical floors were more likely to have secured catheters than participants on medical units. No previous studies have been conducted which compare the prevalence of securement between medical or surgical patient populations.

Surgery is often cited as an appropriate indication for catheterization. Rebmann and Greene (2010) in an executive summary on CAUTI prevention reported that patients on surgical or intensive care units were more likely to have urinary catheters. One possible explanation for our results could be that surgery patients undergoing invasive procedures often require close monitoring of urine output whereas medical patients are often receiving supportive treatment. Surgical procedures, such as urological procedures, may require strict management of urinary catheters, prompting greater diligence to securement. In our study the surgery units had a greater number of patients with IUCs, which may have influenced an observation of higher prevalence of catheter securement. Also, of

surgical participants with secured catheter, most had their catheter inserted in the OR. Attitudes towards securement and the type of procedures that surgical patients with secured catheters had may also contributed to the higher prevalence of securement than medical participants.

Inappropriate catheterization may be more common in medicine patients (Chenoweth & Saint, 2011; Holroyd-Leduc et al., 2007). Another possible explanation is the introduction of standing orders for prompt removal of urinary catheters following a designated period of time on many medical and surgical units (Cornia & Lipsky, 2008). In this study we did not record which units implemented this form of reminder. Rebmann and Greene (2010) stated that a prevalence study is a step forward towards identifying specific units that require target interventions. Though a closer examination of unit specific catheterization practices is indicated, further prevalence studies could add support to the estimates found in our study.

Length of Stay. On average, the length of stay (LOS) in hospital did not appear to influence securement for medical or surgical participants. According to the most recent Alberta acute care hospital census, the average length of inpatient stay in 2011 was approximately 7.7 days (CIHI, 2012b). In this study, the mean LOS in hospital for participants on medical and surgical units was higher than provincial estimates (14 days, 11.60 SD and 9 days, 10.17 SD respectively); however our sample population was smaller likely more acute than the 2011 study since the setting is a major specialty referral centre. Participants on medical units had slightly higher length of stay (13.5, 11.60 SD, range 1 to 37) than those on

surgery units (9 days; 10.17 SD, range 1 to 39). In one prospective cohort study patients who were catheterized had a longer LOS than catheterized patients. Additionally, catheterized patients had a higher LOS when coupled with a confounding factor of older age (Holroyd-Leduc et al., 2007). In another study, presence of IUCs increased patient LOS significantly and was one of the strongest predictors for a patient discharge to a nursing home (Wald, Ma, Bratzler & Kramer, 2008). There is general consensus that urinary catheterization may contribute to increased days in hospital. There have been no recent studies which have established the association between the types of unit to which a patient is admitted and LOS. There are other overt and underlying risk factors that influence LOS. Further studies are needed to explore this topic.

Type of Catheter. Several types of short term indwelling urethral catheters are currently available. The most common in acute care facilities are standard indwelling catheters made from various materials such as plastic or latex (Schumm & Lam, 2008). Traditionally, choice in selecting a particular type of catheter is based on patient-specific conditions, taking into account institutional care policies and manufacturer's recommendations to ensure appropriate use (Madeo & Roodhouse, 2009). In this study, participants were catheterized with standard indwelling catheters urethrally (n=43, 85%) or via Mitrofanoff (n=1); one post-operative patient had a three-way indwelling catheter for continuous bladder irrigation.

Type of Securement. The most common method of securement was with a StatLock™ securing device (n=5, 71%). Other securement methods were with

tape (14.3%, n=1) and other form of securement was with tape and pin method (n=1, 14.3%).

The only known study comparing securement products is by Tracy (2000). In this quasi-experimental New Zealand study, the author examined catheter stabilization, patient comfort and skin irritation by comparing two types of securement, tape with a pin and a commercial catheter securement product. No significant differences in securement or comfort were noted.

Hanchett (2002) described a variety of catheter securement methods in a review of stabilization practices. Tape was the most traditional method of securement. Similar to our study this author found that taping urethral catheters to the skin resulted in inadequate securement. Although relatively inexpensive, anecdotal observations suggest that tape loosens easily and can cause skin irritation. Some experts suggest that securing with tape may increase risk for bacterial colonization, increasing the risk of CAUTI (Hanchett, 2002; Newman, 2007); however there is no evidence that taping catheters affects infection rates.

A limitation of this study is that we were unable to determine if there was an association between the type of securement and the sex of the participant; no females had secured catheters. The absence of stabilized catheters for females was a concerning finding since they represent a group that is often inappropriately catheterized (Bhatia, Daga, Garg & Prakash, 2010; Holroyd-Leduc et al., 2005). Most studies do not differentiate the risk associated with unsecured catheters for men and women but literature on catheter management describes more direct implications for male patients, in terms of iatrogenic hypospadias. Bell (2010)

described the potential for urethral erosion for men with unsecured catheters and Harrison (2005), in the Canadian Continence Society guideline for catheter care, stressed the importance of securing catheters for men. This raises a question regarding nurses' perceptions of the risk of unsecured catheters by sex. It also brings attention to the lack of research on female catheter-related complications. The wide prevalence of catheterization for both men and women and the low levels of securement for both sexes indicate that improvement in catheter management is needed.

Anatomical Location. Data collectors were asked to record the securement site on the participant: the leg, abdomen and other locations. In this study, all those with secured catheters had anchoring to the upper thigh. This location for catheter securement is recommended in nursing fundamental text and clinical guidelines. Experts state that catheters should be stabilized in a way that avoids increased tension on the bladder neck. For male patients, some recommend securing the catheter and penis to the abdomen (Bell, 2010; Moore & Rayome, 1995). There has yet to be conclusive evidence of the most effective form of securement and also the anatomical location. The Society of Urologic Nurses and Associates, institutional guidelines and most clinical experts recommend that urethral catheters be secured to a patient's thigh or abdomen (Alberta Health Services, 2008; Gray, 2008; Hanchett, 2002; Harrison, 2005; Newman, 2007; Senese et al., 2006). The most important consideration is a loosely looped catheter with no tension on the bladder neck and meatus, as well as tension with position change (Hanchett, 2002; Moore & Rayome, 1995; Yates, 2008)

Correct versus Incorrect Securement. Although seven of the eight (88%) participants had an appropriately anchored catheter, one participant had excessive tension on the catheter which was also incorrectly secured with tape. In the only known study comparing securement products, Tracy (2000) found no significant difference in efficacy between tape method of securement and commercial securing devices, if used correctly. However, in her study, tape and pin were used in combination to prevent migration of the catheter and was found to significantly secure catheters in place up to 24 hours following application. In our study one surgical participant had a correctly stabilized catheter using the pin and tape method. Other methods of catheter securement that have been recommended in nursing texts, such as the Canadian Fundamentals of Nursing, instruct nursing students to anchor urinary catheters using tape or non-adhesive devices such as Velcro® or elastic straps following catheterization (Milne & Hunter, 2009). This reduces catheter tension and decreases pressure on the urethra, thus minimizing the possibility of tissue injury.

When used correctly, tape is an effective securement method (Tracy, 2000), however, Billington et al. (2008) stated that tape is an inadequate and ineffective method of catheter securement, preferring a commercial securement device, such as StatLock™ securing device. The author noted that tape do not adhere adequately to catheters, loosen quickly on skin surface causing irritation and increases the risk of bacteria to colonize and ascend to the bladder. In a review on catheter stabilization methods, Hanchett (2002) also described tape as a less effective method of securement. Gray (2008) reported effective securement

using Velcro® elastic strap devices for patients with IUCs requiring short period of catheterization. Overall, experts agree that while there is no ideal method of securement, the most important facet of catheter stabilization is correct application of the product of choice (Bell, 2010; Fisher, 2010; Freeman, 2009; Newman, 2007; Tracy, 2000).

Participant Location When Catheterized. Most participants were catheterized on inpatient units (n=20, 45%). Other areas included: ER (n=11, 25%), OR (n=10, 23%), home (n=2, 5%), and unknown (n=1, 2%). Participants with secured catheters were most likely to be catheterized in the operating room (4), inpatient unit (3) and emergency room (1). The results of a Chi square analysis found no statistical association between the location of initial catheterization and the prevalence of securement. Despite this finding, our results show that there are several locations in which medical and surgical participants are catheterized and do not receive proper stabilization.

Unit Supply of Securement Devices. Common forms of catheter securement include tape, commercial securement products and non-adhesive products such as Velcro® devices (Freeman, 2009; Gray, 2008; Hanchett, 2002; Todd et al., 2000; Tracy, 2000). Although tape is an acceptable method of securement, it is multi-purpose and not exclusive for securement of catheters, as such focus was placed on studying commercial securement devices to explore the association between access to securing products and catheter securement. In this study securement devices were located on most units and on all units where participants had secured catheters. Almost all surgical units had securement

devices (92%) in contrast to medical units where 47% had securement products shelved. Accessibility to securement devices has been cited as a possible influencing factor on the choice of securement product (Kula et al., 2009; Tracy, 2000) and may influence adherence to securement. Anecdotal reports from nursing staff suggested that locating securement products was sometimes challenging. In the review of literature, no studies were found that investigated the association between accessibility to securing products and catheter securement practices. In this present study data on staff perception of access to securement products was not examined, however this would be a useful area of future study.

Strengths

Findings from this present study show that very few medical and surgical patients in one Western Canadian tertiary care hospital have stabilized catheters. The results expose inadequate securement practices and provide justification to support further education on securement. Another strength of this study is it is one of the few investigations to focus on catheter securement, which has been shown to impact patient quality of care (Tracy, 2000). The results of this one-day prevalence study are consistent with the findings of the only known prevalence study on securement (Siegel, 2006) and add support to anecdotal statements reported in the literature (Billington et al., 2008; Freeman, 2009; Hanchett, 2002). The study indicates that examination of practice by physicians and nurses is warranted and helps establish the foundation for future examinations of catheter securement.

Limitations

There were 3 main limitations to this study: 1) the study method, 2) sample size, and 3) staff influence.

Study Method. In this study we collected data from a total of 21 medical and surgical units. This action may have excluded unique patient populations, including patients in ICU, those on medical transition units, and those admitted but had not physically reached an inpatient ward (e.g. from the ER). This is considered a common weakness in prevalence studies; in a given period of time during a one day data collection there may be slight variations in patient population that are not accurately reflected in the sample population. This action may have contributed to the low number of female participants.

Another limitation was the lack of differentiation between long-term and short-term catheterization. Short-term indwelling catheters are defined as persisting for two weeks or less whereas long-term catheters usually remain in place for greater than one month (Parker et al., 2009). The inclusion criteria defined in our methods restricted participants to patients with urethral catheters inserted at the time of data collection. Although we did report where the patient was initially catheterized (e.g. from inpatient unit, home) we did not report the duration of catheterization, the indication for the catheter, if there was an order for catheter insertion, and if there was a 'stop order' on the personal care record. Comparison of participants with short-term versus long-term catheters could have been undertaken to explore the association with the prevalence of securement.

Sample Size. A small patient sample size reduced the ability to undertake statistical tests to address associations between catheter securement and the seven variables that were examined. This may affect generalizability of our findings. Due to time and resource limitations we were unable to include patients from other areas that have a high occurrence of patients with IUCs, such as the ICU. Rebmann and Greene (2010) state that surgical and critical care patients are more frequently catheterized than any other patient group in the hospitals. While a rich source of information was collected from surgical participants, exclusion of ICU patients may have overestimated or underestimated the extent of non-securement.

Staff Influence. The day prior to data collection, each unit manager (UM) identified potential participants and created a list for data collectors to review on the study day. UMs that were unprepared or unfamiliar with the study may not have included all potential participants and subsequently could have reduced the sample population size. Also, data collectors noted that some RNs excluded potential participants based on various assumptions. One example was a patient who was perceived as combative and routinely refused nursing interventions and another who had previously refused to participate in an unrelated research project. Other examples were UMs who excluded potential participants based on the type of admission such as palliative care or those with cognitive or physical disabilities. Although the UMs were provided with an information session and written document describing the inclusion criteria, inconsistency with identifying potential participants may have impacted the quantity of data that was collected.

Because of the ethics approval parameters it was not possible to follow up with UMs or patients who were not included on the list.

Variations in the identification of potential participants could be in part affected by the contextual influences that are present on each unit, including the unit culture and the attitudes towards catheter securement. This study highlights only one day of clinical practice and potential contextual influences could affect results. The study was not designed to assess nursing or physician attitudes or practice knowledge on catheter securement. Factors that influence the decision to secure or not secure catheters were not investigated. However, before practice can change it is critical to understand this context. Furthermore, we were unable to examine the relationship between the prevalence of catheter securement and the two themes identified in the literature review: 1) evidence-based practice and 2) catheter-related complications. However comments from nursing staff indicated that further exploration of these areas could help improve securement practices.

Evidence-Based Practice. Evidence-based practice (EBP) plays an important role in the utilization of diligent catheter care. In the review of the literature EBP was found to contribute to safe and standardized care. It was beyond the scope of this study to evaluate the role of EBP in the prevalence of catheter securement and we did not investigate the availability of clinical guidelines for staff on each unit. Additional information, such as the staff access to evidence-based clinical guidelines may have been valuable in determining if organizational factors were associated with the prevalence of catheter securement. Anecdotal findings in several reviews on catheter securement indicate that access

to evidence-based research is not the only predictor influencing stabilizing practices therefore additional studies are required to explore potential factors.

Catheter-Related Complications. In this study, unsecured catheters were associated with a variety of complications including increased tension of the catheter tubing, risk of early stage pressure ulcer on a participant's leg, and kinked catheter tubing which could contribute to reflux of urine into the bladder resulting in the development of CAUTI (Cochran, 2007; Madeo & Roodhouse, 2009). Due to the research design we were unable to investigate the relationship between the prevalence of securement and catheter-related complications. In spite of this, findings provide support to previous claims reported in literature indicating that unsecured catheters can result in patient discomfort and urethral trauma.

Implications of the Study

This prevalence study was a joint interest between the research team and the Urology Nurses of Canada, Edmonton Chapter. It was an effort to continue relevant clinical research in catheter care and develop knowledge in the prevention of catheter-related complications. In 1985, two experts in urology, Dr. Slade and Dr. Gillespie (Slade & Gillespie, 1985), stated: "It is important that doctors and nurses be trained in the techniques and management of catheterization so that the infective and non-infective hazards may be minimized" (p. 1).

This is an accurate statement in our current health system. Although there are active efforts to avoid unnecessary catheterization, each year many patients will undergo urinary catheterization while hospitalized (Gould et al., 2010; Saint et al., 2009). Indwelling urinary catheters can be useful tools to alleviate a variety

of bladder related conditions and are often essential for care of critically ill patients; however, the risks associated with catheters have been well documented (Holroyd-Leduc et al., 2005; Pomfret, 2010; Saint & Lipsky, 1999). As such it is important to conduct research that aims to reduce the risk of catheter-related complications and improve catheter management. In a statement on quality improvement and patient safety, administrators in Alberta Health Services (2011) described the development and implementation of standardized clinical process to reduce risk to patient safety. Properly securing urethral catheters reflects evidence-based practice and is considered the standard of care for patients with IUCs. This is strongly recommended as good practice by the several clinical practice guidelines and nursing experts (Harrison, 2005; Gould et al., 2010; Gray, 2008; Newman, 2007; Senese et al., 2006).

In this study we found a low prevalence of catheter securement at one large Western Canadian tertiary care hospital. This is consistent with other publications. Traditionally securement practices have been guided by expert opinion and clinician observations. Only in recent years has there been demand for high-quality evidence to support anecdotal observations. A prevalence study by Siegel (2006) and one randomized trial by Darouiche et al. (2006) are the only known studies that have assessed securing practices and the impact of securement on patient health. The direct implications to clinical practice are the exposure of unsafe practices and the opportunity to highlight this issue to RNs that provide catheter care. This study can build the foundation for future studies that have practical and economic benefits. Future studies could examine the physical and

financial burden resulting from a lack of securement and determine what strategies would help to improve adherence. Most importantly future research should assess healthcare professional's understanding of all aspects of catheter-related care.

A limitation of prevalence studies is that although they can provide a glimpse into current clinical practice they cannot explain the rationale behind certain behaviours. The results from this study can form the basis for future qualitative studies that explore the attitudes and beliefs surrounding securing urethral catheters. This study has the potential to facilitate the development of standardized guidelines. Also, the practical significance of this study includes the opportunities to develop strategies to improve current practice. In a randomized, retrospective chart review of 124 patients examining inappropriate Foley catheter use in medical, surgical, trauma and ICUs, Reilly et al., (2006) examined baseline Foley catheter days and factors that influenced the length of catheter use. Using regression analysis the authors found that the most significant factor prolonging the duration of a catheter was the failure of nurses and physicians to discontinue the catheter once it was no longer necessary. Following preliminary results, several interventions were implemented to reduce the number of days patients had urinary catheters, such as daily catheter checklist to remind staff to note the indication for catheterization. Although not statistically significant, results of this initiative had important clinical implications and the authors observed a 10% decrease in the device-day to patient-day ratio. Implementing a checklist on the chart of each catheterized patient that includes an area to record if the catheter is

secured, such as in Reilly's study, is an example of one strategy to improve adherence to catheter securement.

Implications for Nursing Practice

The results of this study develop existing knowledge on catheter securement practices and provide baseline information to support future studies in this area. Moreover, these results expose unsafe nursing practice, provide justification for additional education on catheter securement and encourage routine assessment of patients with urethral catheters. If stabilizing urethral catheters is considered to be an important aspect of evidence-based catheter care, why are catheters not routinely secured? Although this question was not answered in this study a number of variables may influence securing practices. This present study also provides the basis for future research on this topic with the purpose of uncovering attitudes or other variables that influence the adherence to good catheter care such as knowledge and comfort of staff in using securement products, the reliability of differing securing methods, and the availability of securing products on nursing units. Future studies could investigate if the perception of patient comfort influences the decision to secure catheters.

Additional studies may help clinicians adapt education that targets these factors and provides rationale to advocate for resources to expand existing knowledge on catheter securement. Lastly, the findings provide a basis for dialogue in the clinical setting regarding catheter care and may encourage clinicians and nursing educators to explore the underpinnings that influence evidence-based practice in their individual setting.

Dissemination of Findings

Findings from this study will be used in a variety of educational initiatives in an effort to improve existing securement practices. Along with direct feedback to administrators and nursing managers on the units studied, an educational presentation will be provided to nursing staff. A poster presentation will be included at a national conference, the Urology Nurses of Canada's annual conference, and an article will be submitted to a peer reviewed nursing journal for publication.

Conclusion

Indwelling urethral catheterization is a common procedure for many hospitalized patients. Appropriate management of urinary catheters can reduce morbidity and mortality from common catheter-related complications and result in improved patient comfort (Bell, 2010; Billington et al., 2008; Nicolle, 2005). Not only is catheter securement a part of several nationally recognized clinical guidelines, it is also considered to be a part of evidence-based care (Alberta Health Services, 2008; Harrison, 2005; Newman, 2007; Senese et al., 2006). This present study is the first prevalence study conducted in Canada to evaluate catheter securement practices in a tertiary care hospital. We found a low prevalence rate and found female patients were particularly at risk for having unsecured catheters. Our results are similar to the one known U.S. based prevalence study (Siegel, 2006). The results of this study indicate that catheter securement practices are inadequate amongst those who provide catheter care for medical and surgical patients at one tertiary hospital in Edmonton, Alberta.

Summary

The results from this study demonstrate that stabilizing urethral catheters is not a common occurrence for hospitalized individuals at the centre surveyed. Our findings clearly indicate that more guidance is needed to improve catheter securement. With the collaborative efforts between researchers, clinical experts and nursing educators we can work towards safe care for patients with urethral catheters.

Table 4-1- Demographic Characteristics of the Sample Population

Participants n=44	Total (n)	Age (mean; SD)	Length of Stay in Hospital in days (mean; SD)
Medicine			
Total (n)	17/44	73.2 (16.58)	13.5 (11.60)
Male	11/17	71.1 (17.53)	13.7 (13.60)
Female	6/17	77.1 (15.40)	13.3 (7.78)
Surgery			
Total	27/44	65.8 (17.41)	8.8 (10.17)
Male	18/27	66.3 (17.57)	6.6 (6.50)
Female	9/27	65.0 (18.10)	13.7 (15.04)

Mean (95% confidence interval)

Table 4-2- Catheter Securement (Medicine)

Medicine participant (n=1)	Sex	Unit catheter inserted	Type of catheter	Type of securement	Anatomical location	Correct	Unit supply
1	Male	Inpatient	Foley	StatLock™	Leg	Yes	Yes

Table 4-3 - Catheter Securement (Surgery)

Surgery participant (n=7)	Sex	Unit catheter inserted	Type of catheter	Type of securement	Anatomical location	Correct	Unit supply
1	Male	OR	Foley	StatLock™	Leg	Yes	Yes
2	Male	OR	Foley	StatLock™	Leg	Yes	Yes
3	Male	Inpatient	Foley	StatLock™	Leg	Yes	Yes
4	Male	ER	Foley	Tape	Leg	No	Yes
5	Male	OR	Foley	StatLock™	Leg	Yes	Yes
6	Male	OR	Foley	StatLock™	Leg	Yes	Yes
7	Male	Inpatient	Foley	Other	Leg	Yes	Yes

Table 4-4 - Descriptive Analysis of Age Groups

Age Groups (years)	N	Mean	SD	Range	
				Min	Max
Total (n)					
age < 65	15	49.8	14.2	25	64
age ≥ 65	29	78.5	8.23	66	94
Age Group <65					
Medicine Male	3	49.3	19.40	27	62
Medicine Female	2	58.5	4.95	55	62
Surgery Male	7	49.1	15.04	25	64
Surgery Female	3	46.3	16.07	28	58
Age Group ≥65					
Medicine Male	8	79.4	7.09	70	88
Medicine Female	4	86.5	6.25	79	94
Surgery Male	11	77.3	7.13	68	88
Surgery Female	6	74.3	10.37	66	89

Table 4-5- Age Group and Catheter Securement

Age Group and Catheter Securement	Yes Securement	No Securement	Total (n)
Age Group < 65 years	5 (33.3%)	10 (66.7%)	15
Age Group ≥ 65 years	3 (10.3%)	26 (89.7%)	29

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Appendix A

Participant Information Letter

Title of Research Study: Securement of the Indwelling Urinary Catheter: A Prevalence Study

Principal Investigator: Dr. Kathleen Hunter (Assistant Professor, Faculty of Nursing, University of Alberta)

Co-Investigator: Yvonne Appah (MN Student, Faculty of Nursing, University of Alberta)

Background: Securement of indwelling urinary catheters is a part of good catheter care. Studies show that good catheter care can help prevent catheter related complications. Indwelling urinary catheters are flexible tubes used for draining the urinary tract system. Securing the catheter involves using a device that is approved by the hospital to hold the catheter in place on a persons' body. Researchers do not know how often health care staff are securing catheters. Researchers would record the number of catheters that are secured at one point in time in one hospital.

Purpose: The purpose of this study is to review the number of catheters secured with a securement device during a 24-hour period. As part of my graduate nursing

studies the information will be used to inform clinical practice and add support to existing research.

Procedures: Being in this study will involve: Allowing data collectors (nurses) to look at your catheter one time and he or she will fill out a checklist about the catheter. We would need to look at your catheter drainage tubing to see if your catheter is secured and if so, where it is secured such as to your leg or stomach. We would also like to know the type of material used to secure it. This would take less than 5 minutes. Also, we would need to look as some data in your care record that tells us when you were admitted to the hospital and what unit you were on when your catheter was inserted. No other information would be collected from your personal care record.

Possible Benefits: You will be assisting helping us understand current clinical practice, which will help improve patient quality of care.

Possible Risks: There are no risks expected with this study.

Confidentiality: All personal health records relating to this study will be kept private. Your name will not be disclosed outside the research study. Data collected will be kept in a locked file cabinet in the researcher's office at the Faculty of Nursing. Access to data will be restricted to the research team. Data will be securely stored for 5 years at which time it will be destroyed. There will be

no records kept that have any personal information. Any report published as a result of this study will not identify you by name. By signing the consent form you give permission to the study staff to access any personally identifiable health information, which is under the custody of other health care professionals as deemed necessary for the conduct of the research

Voluntary Participation: You are free to withdraw from the research study at any time. If any information gained from this or any other study becomes available which could influence your decision to continue in the study, you will be promptly informed.

Reimbursement of Expenses: You will not be paid to take part in this study.

Contact Names and Telephone Numbers:

If you have concerns about your rights as a study participant, you may contact the University of Alberta Research Ethics Office at (780) 492-2615.

If you have any concerns about any aspect of this study, you may contact the following:

Dr. Kathleen Hunter, RN, PhD, Principal Investigator	(780) 492-8941
Yvonne Appah, RN, MN Student Co-Investigator	(780) 492-4618

Appendix B

Family Caregiver Information Letter

Dr. Kathleen F. Hunter PhD RN NP GNC(C) NCA
Assistant Professor, University of Alberta Faculty of Nursing
Level 3, Edmonton Clinic Health Academy
11405 87 Avenue
University of Alberta
Edmonton Alberta, Canada
T6G 1C9
Kathleen.Hunter@ualberta.ca

Yvonne Appah, RN, MN Student Co-Investigator

Title of Research Study:

Securement of the Indwelling Urinary Catheter: A Prevalence Study

Your family member is being asked to take part in this study by the University of Alberta, Faculty of Nursing. We want to know how often indwelling urinary catheters are being secured for adult patients on medical and surgical units. It is hospital policy to secure urinary catheters for all patients who have them. At present we do not know how often catheters are secured; we would like to find out how often they are secured and how they are being secured. We want to see if your family member has their catheter secured and if so, where it is secured such as to their leg or stomach. We would also like to know the type of material used to secure it. This would take less than 5 minutes. Also, we would need to look as some data in your family member's personal care record that tells us what day

they were admitted to the hospital and what unit they were on when their catheter was inserted. No other information would be recorded.

This information helps us to know the prevalence of catheter securement at one centre and may result in improving future securement practices. Study results may also provide the basis for a variety of future research on urinary catheters and patient care.

Your family member can be withdrawn at any time. This will not affect their current and future hospital care. If you decide to withdraw your family member from the study we will ask if we can use the data that is already collected. If you agree, we will destroy the information at the end of the project. If you do not agree we will destroy any information collected right away.

We will protect the privacy of your family member at all times. His or her name will only be visible to the research team. All data will be kept in a locked file at the researcher's office at the University of Alberta for 5 years after which it will be destroyed.

If you have any questions or concerns pertaining to your family member's rights as a study participant you may contact the University of Alberta Research Ethics Office at (780) 492-2615.

If you have any questions or concerns regarding any aspect of this study you may contact:

Dr. Kathleen Hunter, RN, PhD, Principal Investigator	(780) 492-8941
Yvonne Appah, RN, MN Student Co-Investigator	(780) 492-4618

Appendix C

Participant Consent Form

RESEARCHER

Title of Project: Securement of the Indwelling Urinary Catheter: A Prevalence Study

Principal Investigator(s): Dr. Kathleen Hunter
Phone Number(s): (780) 492-8941

Co-Investigator(s): Contact Names: Yvonne Appah
Phone Number(s): (780) 492-4618

PARTICIPANT/SUBJECT

	Yes	No
Do you understand that you have been asked to be in a research study?	☐	☐
Have you read and received a copy of the attached Information letter?	☐	☐
Do you understand the benefits and risks involved in taking part in this research study?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Do you understand that you are free to withdraw from the study at any time, without having to give a reason and without affecting your future medical care?	☐	☐
Has the issue of confidentiality been explained to you?	☐	☐
Do you understand who will have access to your records, including personally identifiable health information?	☐	☐
Do you want the investigator(s) to inform your family doctor that you are participating in this research study? If so, give his/her name _____	☐	☐

Who explained this study to you?
_____

I agree to take part in this study: YES ☐ NO ☐

Signature of Research Subject
_____

(Printed Name)
_____

Date:_____

Signature of Witness
_____

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee_____ Date _____

Appendix D

Caregiver Proxy Consent Form

Part 1 (to be completed by the Principal Investigator):
Title of Project: Securement of the Indwelling Urinary Catheter: A Prevalence Study

Principal Investigator(s): Dr. Kathleen Hunter
Phone Number(s): (780) 492-8941

Co-Investigator(s): Contact Names: Yvonne Appah
Phone Number(s): (780) 492-4618

Part 2 (to be completed by the FAMILY CAREGIVER research participant):

	Yes	No
Do you understand that your family member has been asked to be in a research study?	☐	☐
Have you read and received a copy of the attached Information letter?	☐	☐
Do you understand the benefits and risks for taking part in this research study?	☐	☐
Have you had a chance to ask questions and talk about this project?	☐	☐
Do you know that you are free to withdraw your family member from the study at any time, without having to give a reason?	☐	☐
Has confidentiality been explained to you?	☐	☐
Do you know who will have access to the information from this project?	☐	☐
Have all your questions been fully answered?	☐	☐

Who explained this project to you?_____

Family Member's Name_____

I agree for my_____to take part in this project: YES ☐ NO ☐

Signature of Family Caregiver Proxy_____

(Printed Name) _____Date& Time:_____

Signature of Witness _____

I believe that the person signing this form understands what is involved in the project and voluntarily agrees to participate.

Signature of Investigator or Designee_____ Date& Time _____

THE INFORMATION SHEET MUST BE ATTACHED TO THIS CONSENT FORM AND A COPY GIVEN TO THE PROJECT PARTICIPANT

Appendix E

Telephone Consent Form

Title of Project: Securement of the Indwelling Urinary Catheter:

A Prevalence Study

Principal Investigator(s): Dr. Kathleen Hunter

Phone Number(s): (780) 492-8941

Co-Investigator(s): Contact Names: Yvonne Appah

Phone Number(s): (780) 492-4618

Hello, my name is Yvonne Appah, and I am a Graduate student from the Faculty of Nursing at the University of Alberta. I am calling you today because we were told that you have agreed to speak with a researcher about a study that we will be doing. We want to know the prevalence of catheters securement for patients with indwelling urinary catheters. We have chosen specific adult medical and surgical units at the University of Alberta Hospital and we want to ask all adult patients located on these units who have urinary catheters.

I am calling to see if you are willing to provide informed consent for your family member to join the study. The consent process will take less than 10 minutes of

your time. During this call I will provide information about the study and what is involved for your family member to be part of the study, may I proceed with this call? Yes___No___.

In order to be included in a study a researcher must explain the study and obtain informed consent from a person willing to take part in the study. When a patient is unable to give informed consent, due to conditions such as Dementia and Delirium, family caregivers may provide proxy consent. In providing proxy consent you will allow the researcher to confirm if your family member has a secured catheter or not. There would be no further contact besides this one time observation. Also, the researcher would gather data from your family member's care record including their age, gender, date of birth, location of catheters, and the unit in which the catheter was inserted. Only the researcher will have access to the care record. Data collected would be recorded on a form that will be kept private. There is no risk in joining in this study. Participating in this study may result in assisting researchers in increasing knowledge on catheter care, which may lead to improved catheter care practices.

Do you know that you are being asked on behalf of your family member to be in a research study? Yes___No___

Has the researcher explained the study and offered to provide a copy of the information sheet? Yes___No___

Do you know the benefits and risks involved in your family member taking part in this research study? Yes___No___

Have you had a chance to ask questions and discuss this study? Yes___No___

Do you know that you are free to withdraw your family member from the study at any time without having to give a reason and without affecting their future medical care? Yes___No___

Has the issue of confidentiality been explained to you? Yes___No___

Do you know who will have access to your family member's care record, including health data? Yes___No___

Do you want the researcher(s) to inform your family member's primary care doctor that they are joining this research study? Yes___No___If so, give his or her name_____

"Do you have any questions?"

[ ]Yes If Yes...Continue

[ ] No If No...Complete the remainder of the form and say good-bye.

Who explained this study to you?_____

I agree to for my family member to participate in this study: YES___ NO___

Name of Family Caregiver_____Date:_____

Signature of Witness_____

I believe that the person providing informed consent understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee_____

Date_____

Appendix F

UNIVERSITY OF ALBERTA

Data Collection Tool: Indwelling Urinary Catheter Prevalence Form

Date: _____ Medicine____ Surgery____ Participant #: _____

DOB: _____ Sex: ☐ Male ☐ Female

Admission Date: _____ Unit: _____

Type of Catheter	☐ 1. Foley ☐ 2. Suprapubic ☐ 3. Other _____
Location Catheter Inserted	☐ 1. OR ☐ 2. ER ☐ 3. Clinic ☐ 4. Home ☐ 5. Inpatient Unit # _____
Catheter fixation device	☐ 1. Tape ☐ 2. Bard StatLock ☐ 3. Secure Commercial Product ☐ 4. Other _____ ☐ 5. No Device
Where is catheter secured?	☐ 1. Leg ☐ 2. Abdomen ☐ 3. Other _____
Is catheter secured correctly?	☐ 1. Correct ☐ 2. Incorrect
Catheter Securement Devices supplied on the Unit?	☐ 1. Yes ☐ 2. No
Comments	

Appendix G

Letter to Administration of the University of Alberta Hospital Medical and Surgical Departments

Executive Director, Inpatient [*Department*] Services

University of Alberta Hospital

8440 112 Street NW

Edmonton, Alberta

T6G 2B7

October 13, 2012

Dear Executive Director,

I am writing to seek your support for a study that I would like to conduct within 21 adult medical and surgical inpatient units at the University of Alberta Hospital. The topic of my research study is the prevalence of urinary catheter securement for adult medical and surgical patients with indwelling urinary catheters in an acute care hospital. The proposed research study is a minimally invasive, low-cost investigation that would explore catheter securement practices at one site during a designated period of time. Urinary catheterization is a common procedure done for patients in acute care facilities. There is strong evidence that correlates urinary

catheters with urinary infections and catheter-related complications in patients. All catheters must be secured following insertion as an important element of catheter care and mandated in clinical policy guidelines by Alberta Health Services.

The specific purpose of this study is to determine current securement practices. This study would involve collecting and documenting specific data from potential participants such as the presence of catheter securement device, the location of securement and if there is correct securement. A data collection tool has been developed, and once approved by the University of Alberta Health Research Ethics Board (HREB) will be used for data collection. Unit Managers from the designated units will be asked to identify potential participants on the day of the study and approach them to obtain verbal consent, in person or by telephone (in the case where proxy consent must be obtained from designated family caregivers) for researchers to discuss the study. If the potential participant meets the inclusion criteria, a researcher will speak with the participant (or family caregiver if the patient can not provide informed consent) and obtain informed written consent. The participants will be given an information letter and a copy of the consent form. Family caregivers who provide consent over the telephone will have an information letter and a consent form mailed to them. Confidentiality will be maintained at all times. At the completion of the study results may be included in an academic paper or a journal publication. Findings could also be used to provide education to nursing staff in the future.

I am seeking your permission to speak with the managers of the intended units (*Unit Name*) and ask them to assist the research team on the day of the study. This study will have minimal interruption to the nursing units and there will be little impact on your resources by participating with this study. The anticipated date is December 11, 2012. I will not proceed until I have received ethical approval. I will provide you with a copy of ethics approval for your files.

I appreciate your time and look forward to your support for my project. Please do not hesitate to contact me if you would like further information.

Sincerely,

Sincerely, Yvonne Appah, RN, MN Student
Faculty of Nursing, University of Alberta
appah@ualberta.ca /(780) 421-9231

Appendix H

Administrative Support Letter

Date:

Dear

I am writing in support of the research proposal application entitled, Securement of the Indwelling Urinary Catheter: A Prevalence Study. As Executive Director of [Insert Department] at the University of Alberta Hospital I have administrative authority over resources that may be involved during this study. The University of Alberta Hospital is one of Canada's leading health institutions, recognized for a wide range of treatments, diagnostics and specialized services. As a prominent teaching facility, the University of Alberta is renowned for significant support towards clinical research. This study will involve some support from [Insert Department and Unit Managers] however I feel that the findings may be of considerable value to patient care.

The Department of [Insert Department] has maintained a dynamic relationship with researchers at the Faculty of Nursing. The progressive nature of evidence-based practice requires a collective effort from health providers and researchers to support relevant research topics. Patients with indwelling urinary catheters are at

risk for catheter-associated urinary tract infections and other complications that can impact their medical care. There are growing efforts to minimize the use of urinary catheters however patients that do have urinary catheters require interventions that reduce their risk for complications. Ongoing research, such as this study, is needed to validate current practices and support safe practice for patients with urinary catheters.

A prevalence study on catheter securement would provide data on current clinical practice. Assessment of securement practices could identify if there is a need for additional education and may provide the foundation for future investigations. The topic proposed is relevant to the mandate of Alberta Health Services: To provide patient-focused, quality health care and improve existing practice. Although primarily focused on catheter stabilization the research study aims to optimize quality service and underlines the principle of evidence-informed care.

This department will provide support from Unit Managers and provide the research team access to the unit on the day of the study. We have agreed to have the Unit Managers of [Insert Medical or Surgical] identify potential participants for this study and assist with obtaining consent. To date, my staff has had meetings with the researchers to discuss the proposal and determine how we might work together during the study. We developed the work plan appended to the study design with the researchers.

We are looking forward to working with the research team on this exciting project and anticipate the potential impacts the findings may have to advancing patient care.

Appendix I

Information Letter

University of Alberta

Surgical Unit

Attention: Executive Director/Unit Manager

Re: Securement of the Indwelling Urinary Catheter: A Prevalence Study

My name is Yvonne Appah and I am a graduate student at the University of Alberta, Faculty of Nursing. I wanted to inform you that I have obtained permission by the University of Alberta Health Research Ethics Board (HREB) to conduct a research study on your unit during a 24-hour period on December 11, 2012. The research study titled, Securement of the Indwelling Urinary Catheter: A Prevalence Study, has received administrative and operational approval from the appropriate designees at the University of Alberta. The research design will have minimal disruption to your unit and there would be limited patient contact. The HREB categorizes the intended research design as: non-invasive human research. Undertaking research such as this requires the support and resources from an entire team. We are asking for partnership between the research team and your unit and hope that you will be able to provide some assistance on the day of the study. Specifically, we are asking for your help to identify patients that meet the inclusion criteria that could potentially participate in the study.

Your help would include reviewing the ward census on the day of the study and asking patients that meet inclusion criteria for verbal consent for data collectors to approach them. A data collector recruited by the research team would then obtain appropriate consent to the study. Your assistance is completely voluntary however if you choose to help in the study your assistance would be invaluable and you would be part of innovative research that could have significant impact on improving patient care.

Enclosed are:

1) A copy of administrative and operational approval letters.
2) A copy of the data collection tool and proposed timeline for the data collection.
3) A copy of the information letter that will be provided to participants or caregivers.

Thank you for your support,

Sincerely, Yvonne Appah, RN, MN Student, Faculty of Nursing, University of Alberta

If you have any concerns about any aspect of this study, you may contact the following: Yvonne Appah, RN, MN Student (780) 421-9231

Dr. Kathleen Hunter, RN, PhD, Supervisor (780) 492-8941

Appendix J

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Data Coding

Variable	SPSS variable name	Coding instructions
Identification number	ID	Number assigned to each survey
Sex	Sex	1= Males 2=Females
Age	Age	Age in years
Type of Unit	Unit	1=Medicine 2=Surgery
Length of Stay in Hospital	LOS	Length of Stay in Days
Type of Catheter	CathType	1=Foley 2=Suprapubic 3=Other
Participant Location When Catheter Inserted	CathLoc	1=Home 2=OR 3=ER 4=Inpatient Unit 5=Other 6=unknown
Catheter Secured	CathSecure	1=Yes 2=No
Type of Catheter Securement	SecureType	1=Tape 2=StatLock 3=Commercial Securement device 4=Other 5=none
Anatomical Location of Securement	SecureLoc	1=Leg 2=Abdomen 3=Other 4=na
Correct vs. Incorrect Securement	CorrSecure	1=Yes 2=No 3=na
Unit Supplied With Securement Product	Supply	1=Yes 2=No
Type of Consent	Consent	1=Participant 2=Proxy
Age group	*Agegroup1 Agegroup 2*	*Agegroup1<65 years, Agegroup2 ≥65 years*
Length of Stay in Hospital Group	*LOSgroup1 LOSgroup2*	*LOSgroup1≤7 days, LOSgroup2 >7 days*