Point prevalence survey of indwelling urinary catheter use and appropriateness in patients living at home and receiving a community nursing service in Ireland

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Abstract

Background: Indwelling urinary catheters (IUC) are reported as the most common indwelling device in hospitals and residential/care home settings.

Aim: The aim of this study was to assess the prevalence and appropriateness of IUCs in people living at home and receiving a community nursing service.

Methods: An IUC self-report questionnaire was sent to 66 community nurses in one community care area. A second questionnaire was completed by the researcher on each patient ($n = 80$) identified by the community nurses. Data were analysed using descriptive statistics and the chi-square test was used to test associations between patient demographics, catheter changes and nurses documentation.

Results: The self-report questionnaire was completed by 46 of the 52 areas (88% response rate). The overall prevalence of IUCs was 1.9% with a higher prevalence among men (70%) and in the over-85-years age group (31%). The mean age was 76 years (age range = 34–98 years) and duration of use was approximately four years. Routine IUC changes were carried out by community nurses (52%), in the acute hospital (25%) or by general practitioners (20%) and the type of catheter influenced person/location of catheter changes ($P = 0.001$).

Discussion: This study adds to the understanding of IUCs in patients at home and is the first to investigate if the IUC is appropriate in this setting. It prompted a review of current guidance and development of standard documentation for IUC management locally to ensure that the IUC in use is appropriate. It also suggests that there is a need for internationally accepted, appropriate indications for long-term IUC use to facilitate consistency and allow comparison across studies in future.

Keywords

Indwelling urinary catheter, long-term, prevalence, community

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Background

Urinary tract infection (UTI) has been identified as one of the most common healthcare-associated infections (HCAI) acquired by patients, up to 56% associated with indwelling urinary catheter (IUC) use in a prevalence study which included Irish acute hospitals (Smyth et al., 2008). Catheter-associated urinary tract infections (CAUTI) are associated

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with increased patient morbidity and mortality resulting in increased healthcare use and cost (Lo et al., 2014). Prevalence studies report that 12–21% of patients in acute hospitals and 6–13% in the community have an IUC, making it the most common indwelling device in use (Health Protection Surveillance Centre [HPSC], 2012, 2013; Miliani et al., 2015; Royal College of Physicians [RCP], 2012).

The duration of catheterisation greatly increases the risk of developing a CAUTI (Nicolle, 2014). A point prevalence study of 101 patients at home in the UK reported a CAUTI prevalence rate of 5% (Getliffe and Newton, 2006) whereas a European study reported that patients with an IUC were 6.5 times more likely to experience a UTI than those without (Sorbye et al., 2005). CAUTI risk is illustrated over the long term when Wilde et al. (2010) reported that over their eight-month study, 70% of patients with long-term IUC self-reported a history of CAUTI. CAUTI surveillance in patients living at home is difficult due to a lack of an agreed case definition and the logistical challenges in accessing these patients or their medical/nursing records in real time (Getliffe and Newton, 2008).

However, the most important method of prevention of CAUTI is to use an IUC only when necessary (appropriate) and to remove them when no longer indicated (Meddings et al., 2014). Inappropriate urethral catheterisation use is well documented in the literature in both acute (Chang, 2014; Gokula et al., 2004; Jansen et al., 2012; Tiware et al., 2012) and long-term care settings (Chen et al., 2009; Dingwall and McLafferty, 2006; Lomas et al., 2009; McNulty et al., 2006). Gokula et al. (2004) report inappropriate use in 54% of catheterised patients, and of those catheterised only 13% had an explicit documented reason. Similarly, McNulty et al. (2008) reported varied catheterisation rates (0–43.8%) between UK care homes while Sorbye et al. (2005) noted that the IUC prevalence rate varied across 11 countries (0–23%) in people aged over 65 years receiving home care.

Possible explanations to varied catheterisation rates revealed in the literature include an institutional culture that indicates staff preference or acceptance as their use facilitates 'convenience of care' (Hu et al., 2014; Pfisterer and Oster, 2005). Dingwall and McLafferty (2006) observed that elderly patients are often catheterised during an acute illness and discharged without any documentation for continued use or review of the catheter. Maeda et al. (2013) report the second most common reason for IUC use in home care was to reduce caregiver burden and recommended that appropriateness of IUC in home care warranted further investigation.

In Ireland, home nursing care is coordinated by a Public Health Nurse (PHN) for a geographical area and patients' nursing care records are kept in health centres where a number of nurse's work. As there were no data on either the prevalence or appropriateness of IUC available for patients living at home locally and no known studies carried out in Ireland, this study was initiated to address this gap.

The aims of this study were: (1) to determine the prevalence of IUC use in people living at home who receive a

community nursing service; and (2) to determine if the documented reason for the IUC is appropriate according to nationally agreed indications (HPSC, 2011).

Methods

Study design

A descriptive cross-sectional study was carried out. To overcome the challenges of patient access, this study was undertaken in collaboration with the community nursing service which is responsible for urinary catheter management and represents 4% of their workload (Getliffe and Newton, 2006; Maeda et al., 2013; Sorbye et al., 2005).

The setting

The setting was a community care area in Ireland with a population of 181,802 (Health Atlas, 2011) with 4764 people receiving a community nursing service. The area is divided into five defined geographical sectors (A–E) with a designated Assistant Director of Public Health Nursing (ADPHN). Each sector is then subdivided into different areas with a designated PHN.

Inclusion criteria were people with an IUC living at home and receiving a community nursing service.

Exclusion criteria were patient with an IUC but did not receive a community nursing service or carried out intermittent self-catheterisation.

Pilot study

Two questionnaires were developed in consultation with senior community nurses, infection prevention and control, and urology nurse specialists. The data collection tools were piloted in a different locality to assess clarity and feasibility of data access and reporting. This was a two-step approach of (1) requesting nurses to complete a self-report questionnaire to determine prevalence and (2) the researcher completing an appropriateness questionnaire for a sample of the patients. However, due to a poor response rate (40%), incomplete data and the time taken (over three weeks), changes to the data collection tool and process were required. These changes included identifying who or where the IUC was changed routinely as it appeared that male urethral catheterised patients were the remit of either the GP or the acute hospital and that the appropriateness questionnaire would be completed by the researcher on all patients as opposed to a sample as originally considered.

Data collection

To garner support, each ADPHN was contacted to arrange convenient dates and times to meet and explain the study. The prevalence questionnaire, study information sheet and

Table 1. Data collected on each patient with an IUC.

- Sector (urban or rural)
- Patient identification
- Gender
- Age
- Type of catheter
- Duration of catheterisation
- The documented indication
- Location of insertion
- Person/location of IUC change

health centre visit date was then emailed to 66 PHNs representing 52 areas. If the questionnaire was not returned before the researcher visited, staff could complete it during the health centre visit. The questionnaire asked the number of patients in their caseload by age category and gender and the number of male/female patients with either a urethral or suprapubic urinary catheter. However, patient caseload data were not maintained continuously in this area but collected and reported annually. Therefore, to reduce staff burden the 2014 area profile statistics were used to calculate prevalence.

The appropriateness questionnaire was completed by the researcher on each patient with an IUC at the health centre visit (n=16). This approach improved the response rate and reduced selection bias by all patients being included. A standardised tool was used for each review of the nurses' patient notes to ensure validity (Table 1). Missing data were checked at the time of collection or subsequently by phone or email.

Indications for appropriate IUC are not delineated between short-term and long-term use in urinary catheter guidelines. Therefore, appropriate indications for long-term use were adapted from national Irish guidelines for the prevention of CAUTI (HPSC, 2011) (Table 2). Confidentiality and anonymity of patients was maintained by assigning study numbers to questionnaires, data collected was held by the researcher and results are reported in the aggregate. The survey period, including data cleaning and input, was undertaken in August/September 2015.

Data analysis

Descriptive statistics were used to summarise and analyse the data using the statistical software Stata version 13.1

(StataCorp, TX, USA). Analysed data are presented as either percentages or as numbers in frequency distribution tables and prevalence rates with 95% confidence intervals (CI). Age group, gender, person or location of IUC change was tested for an association against the presence of an IUC using the chi-square test. Chi-square was used to test associations between the IUC being appropriate against a documented indication and a review of the continued need. Finally, the sector, either urban or rural, was tested for an association with person or location of IUC change. Statistical significance was set at $P < 0.05$.

Ethical approval

Permission to conduct the study was granted by the area Director of Public Health Nursing and ethical approval was obtained from the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

Results

Prevalence

Questionnaires for 46 of 52 areas were returned representing a response rate of 88%. The overall point prevalence of IUC was 1.9% (95% CI = 1.5–2.3). Of the 4674 patients, 87 had an IUC with 38% of patients with a urethral (95% CI = 27–49) and 62% (95% CI = 51–73) with a suprapubic catheter. Prevalence ranged across the five sectors at 1.3–3%, varied across age groups with the highest in the over-85-year age group at 31% (95% CI = 22–42) and the female-to-male ratio for all catheter use was 1:2 (Table 3). Although IUC use was greater amongst men (70%) and 60% in the over-76-year age group, this was not statistically significant ($P = 0.179$ and $P = 0.583$, respectively). The ratio for female-to-male urethral catheter use was 1:2 and slightly higher for suprapubic at 1:2.6; finally, 22% (19/87) of patients were aged under 65 years and highlights their inclusion as relevant in patients receiving home care as prevalence could be underestimated.

Appropriate use of IUC

Indications for appropriate use were collected for 80 of the 87 patients with an IUC. Nursing notes for seven patients were not accessible on the prevalence date and as further

Table 2. Indications for indwelling urinary catheter use.*

- To relieve acute urinary retention or bladder outlet obstruction
- To assist healing of an open sacral or perineal wound
- To monitor urinary output (e.g. in critically ill patients or when a patient is unable or unwilling to collect urine)
- To assist in achieving patient immobilisation (e.g. required for unstable thoracic, lumbar spine or pelvic fractures)
- For patient comfort during end-of-life care

*Adapted for people living at home with an IUC from HPSC (2011) Guidelines for the Prevention of Catheter-associated Urinary Tract Infection.

Table 3. Patient characteristics (n = 87).

Patient variables	n (%)
Age (years)	
< 65	19 (22)
66–75	16 (18)
76–85	25 (29)
> 85	27 (31)
Gender	
Male	61 (70)
Female	26 (30)
Urethral urinary catheter	
Male	22 (25)
Female	11 (13)
Suprapubic urinary catheter	
Male	39 (45)
Female	15 (17)

Table 4. Patients' age and duration of catheter use (n = 80).

Variables	Mean (95% CI)	Range
Age (years)	76 (73–79)	34–98
Duration (months)	47 (31–58)	1–240

follow-up failed, these patients were excluded in the analysis of appropriateness (Table 4).

In this study, 49% (95% CI = 37–59) of patients had a documented indication for IUC use. In all, appropriate indications were recorded for 42 patients (53%) as some were reported verbally with either urinary retention or bladder outlet obstruction being the most frequent indication. Other reasons provided were spinal cord injury, multiple sclerosis (MS), neurogenic bladder, overactive bladder, sphincter instability or cerebrovascular accident (CVA). Although medical diagnoses affecting bladder function such as spinal cord injury and MS are reported in some studies for IUC use (Wilde et al., 2010, 2013), they are not listed as appropriate indications in Irish guidelines (HPSC, 2011) and were therefore not accepted as appropriate in this study.

For a patient with an IUC, a care plan detailing how the increased risk of infection would be reduced should be part of the patient's nurses' notes. In total, 34% (95% CI = 24–45) of patients had a care plan (Table 5). Of those who had a care plan, 43% (7/16) of patients whose IUC is changed by their GP had care plans compared with 33% (14/42) and 25% (5/15) of patients whose IUC change was carried out by either the nurse or in the acute hospital, respectively. The association between having a nursing care plan and the discipline/location of IUC change was not statistically significant ($P = 0.650$).

The patient's continued clinical need for IUC was documented as either: (1) pending urology review or (2) a trial

of voiding urine without the IUC and failed. Only 45% (n = 36) (95% CI = 34–56) of all patients had a documented review and indicated a continued clinical need for 36% (13/36) of urethral and 63% (23/36) of suprapubic catheters (Table 5). In addition, 50% (2/4) of the patients with either a sacral or perineal wound did not have a documented review. An association between a documented indication for IUC and a documented review of the continued need was statistically significant ($P = 0.01$).

Routine IUC changes

Table 6 outlines the person/location of routine IUC changes. When considering the type of catheter, nurses changed 68% of suprapubic compared with 27% of urethral catheters. The association between the person/location of IUC change and the type of catheter was statistically significant ($P = 0.001$). However, the influence of an urban vs. rural location on person/location of IUC change was not statistically significant ($P = 0.057$). Finally, one female urethral catheter change was carried out by a friend and another female suprapubic change was carried out by the patient.

Discussion

This is the first known Irish prevalence study of IUC use in home care. The overall prevalence of IUC use of 1.9% in this study is considerably lower than other reported studies of 5.4%, 6% and 13%. This may be due to patients recruited from different home-based populations, e.g. dedicated home healthcare agencies or hospital home-based care and therefore comparisons are not applicable (Miliani et al., 2015; RCP, 2012; Sorbye et al., 2005). The mean age of people in our study and the prevalence of suprapubic catheters were higher than that reported in similar sample populations by Wilde et al. (2010, 2013), with a larger number of men than reported by Getliffe and Newton (2006) and Wilde et al. (2013).

Appropriate indications for IUC use is a well-researched aspect of acute and more recently of long-term care (Jansen et al., 2012), although little is known about patients living at home (Maeda et al., 2013). In their audit, Kneil et al. (2009) included a chart review of 30 patients that were selected by nurses. Their findings are in stark contrast since 89%, 90% and 93% of patients had a documented indication, care plan and review of IUC use, respectively. However, their audit did not investigate if IUC indications documented were appropriate. This study's findings are more similar to acute hospital appropriateness studies, with only 49% of patients having a documented indication, 53% with an appropriate indication (includes verbal indications) and 45% a documented review for continued use. The variation in results may be due to this study including a larger study population (80 patients vs. 30) and the researcher collecting the data as opposed to nurses either self-selecting

Table 5. Indwelling urinary catheter documentation.

	Documented indication, n (%)	Nursing care plan, n (%)	Review continued clinical need for IUC, n (%)
All urinary catheters (n = 80)	39/80 (49)	27/80 (34)	36/80 (45)
Urethral catheter (n = 30)	11/30 (37)	8/30 (27)	13/30 (43)
Suprapubic catheter (n = 50)	28/50 (56)	19/50 (38)	23/50 (46)

Table 6. Routine indwelling urinary catheter changes by discipline, hospital or other.

Catheter changes	Nurse, n (%)	General practitioner, n (%)	Acute hospital, n (%)	Other, n (%)
IUC catheter changes (n = 80)	42/80 (52)	16/80 (20)	20/80 (25)	2/80 (3)
Urethral catheter changes (n = 30)	8/30 (27)	7/30 (23)	14/30 (47)	1/30 (3)
Suprapubic catheter changes (n = 50)	34/50 (68)	9/50 (18)	6/50 (12)	1/50 (2)

patients charts for researcher review or nurses volunteering to participate and self-reporting, respectively (Kneil et al., 2009; Maeda et al., 2013).

While documented indications are low, it is reassuring that incontinence was neither recorded nor reported by nurses as an indication for catheter use. As a result, appropriate indications may be underestimated as some reasons indicating urinary retention, such as spinal cord injury, MS, CVA etc. provided and reported elsewhere (Wilde et al., 2013), did not comply with national guidelines and were therefore not accepted. These results triggered the need for a review of guidance locally, development of agreed standardised documentation such as care plans, catheter change records and further education on appropriate IUC indications according to the described clinical need outlined in national guidelines as opposed to the underlying medical diagnoses. However, appropriate indications for long-term IUC use, although included in national and international guidelines, are not clearly defined. International consensus for appropriate indications for long-term IUC use is a fundamental starting point needed to reinforce appropriateness and, when consistent indications are used, to facilitate comparison across future studies.

This study demonstrates an association between those who had a documented indication and a documented review for the continued need of their IUC. As catheter management is recognised as primarily the remit of nursing, the nursing profession is well placed to advocate reducing IUC use. This is particularly relevant to community nursing where it is reported that an IUC is inserted during an acute hospital stay (Dingwall and McLafferty, 2006). Furthermore, 45% of patients returned to either the

acute hospital or their GP for routine IUC changes which increases to 70% for male urethral changes and there were 3% of patients in this study that either the IUC was changed by themselves or by a relative and is in contrast to 16% of patients reported by Wilde et al. (2013). These findings warrant further investigation under integrated care for better patient outcomes (Health Service Executive, 2014) as to the opportunities available to reduce hospital and patient burden. A nurse-led, community-based specialist service could possibly serve as the link for community nurses and the acute hospitals establishing and driving better long-term IUC care through: (1) initiating a catheter review at home with a trial of void without the IUC; (2) exploring the potential for patients to change their own catheter; (3) advocating for better communication across settings through either an electronic health record or a patient held urinary catheter passport (Codd, 2014) to empower patient self-care; (4) reducing the need for patients to return to acute hospitals or their GP for routine changes; and (5) developing a more widespread implementation of an extended nurses role to undertake male urethral catheter changes as carried out elsewhere (Regan, 2015; Wilde et al., 2013).

Limitations

There are a number of limitations in our study to be acknowledged. First, as this is a small-scale study in a defined geographical area, the results may not be generalisable. Although given the high response rate and the method of data collection, findings may be indicative of IUC use to a wider population in Ireland. However, an increased

sample size including areas where nurses undertake male catheterisation routinely would be interesting to compare results and may reflect a more generalisable national portrayal of IUC use and management. Second, the IUC prevalence calculation may be underestimated as there may be patients at home with an IUC that attend their GP only and are not accounted for. To overcome this limitation, future studies should include GPs, Consultant Urologists/ and Urology Nurse Specialists in the acute hospitals. Third, catheter change records were not included as part of the documentation but recommended to be included to ensure documentation completeness in future. Finally, this study did not determine if the indication provided was still valid and the continued clinical reason should be included in future studies in assessing appropriateness.

Conclusion

This prevalence study adds to the understanding of IUC use in patients living at home and is the first to investigate if the IUC indication documented was appropriate. International consensus on defining appropriate indications for long-term IUC are suggested which would provide consistency and facilitate comparisons across studies. Innovative ways to improve organisation of patient care using a specialised community-based nurse-led service to reduce hospital and patient burden is outlined. These improvements are needed to ensure that an IUC is used appropriately and, if used, that there is a plan of care documented to decrease the associated risks. To conclude, since the risk of infection increases the longer the IUC is in place, such strategies are essential to provide safe patient care and should be hallmarks of a quality home care service.

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Declaration of conflicting interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: The author is an Infection Prevention and Control Nurse with a remit for the community care area involved in this study and the PHNs are employed in this geographical area.

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