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Prevalence and predictors of continence containment products and catheter use in an acute hospital: A cross-sectional study

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Abstract

Although incontinence is common in hospital, the prevalence and predictors of continence aid use (continence wear and catheters) are poorly described. A one-day cross-sectional study was conducted in a large university hospital assessing consecutive inpatients (≥55) for their pre-admission and current use of continence aids. Barthel Index, Clinical Frailty Scale and Charlson Co-morbidity scores were recorded. Appropriateness was defined by local guidelines. 355 inpatients, median age 75±17 years, were included; 53% were male. Continence aid use was high; prevalence was 46% increasing to 58% for those ≥75. All-in-one pads were the most common, an overall prevalence of 31%. Older age, lower Barthel and higher frailty scores were associated with continence aid use in multivariate analysis. Inappropriate use of aids was high at 45% with older age being the only independent predictor. Continence aids are often used inappropriately during hospitalisation by older patients. Concerted efforts are required to address this issue.

Key words: Continence, pad, urinary catheter, hospital, prevalence, frailty

Introduction

Incontinence is common but varies by age, sex, setting and definition used.[1-3] Incontinence rates are highest in healthcare settings and among older adults.[4] In hospitalised patients, the prevalence ranges from 10-35% for urinary incontinence (UI) and 4-30% for faecal incontinence (FI), rising to 77%-85% for UI and 3-46% for FI among nursing home residents.[4-10] Urinary and faecal incontinence are disruptive and disabling conditions. They have significant physical and psychological consequences, negatively impacting upon skin integrity, functional status, mood, quality of life and discharge destination.[11-18] In addition, many older adults find it difficult to regain their continence post discharge, contributing to caregiver strain and increased risk of institutionalisation.[12] Despite the importance of incontinence, it is under-detected and under-treated, particularly in acute care settings.[19-22] Continence management options include pharmacotherapy, surgery, physiotherapy, neuromodulation and behavioural interventions such as prompted voiding and scheduled toileting among older adults. Despite this, the use of continence aids is the most prevalent strategy employed in hospitals.[23-25] Interdisciplinary continence management is often not seen as a priority.[26-27] As the population ages, the number of older people with continence issues and their associated costs will increase significantly, if not managed appropriately.[25]

Continence aids broadly describe devices used to contain urine and/or faeces. Those most commonly used in acute healthcare settings include wearable absorbent pads and urinary catheters (UC). Wearable absorbent pads are disposable devises used to contain urine or faeces and prevent unwanted leakage.[28] They can promote social continence but are not a substitute for full assessment and corrective treatment.[27-28] Pads can vary in size and absorbent quality with the most frequently used in acute care settings described as adult briefs or “all-in-one” pads.[28] Indications for use include FI,

particularly among the most functionally dependent patients and they should not be offered in the long-term unless other treatments have failed.[29] UC are medical devices used to drain the bladder but again do not treat the underlying incontinence. Their use is also indicated in a finite list of medical circumstances including measuring urine output, in the presence of a pressure ulcer and acute urinary retention.[30]

Continence aid use is associated with the development of pressure ulcers, dermatitis, recurrent urinary tract infections, functional decline during hospitalisation and increased healthcare costs.[31-38] Individuals using continence aids have increased odds of developing UI compared to those self-toileting.[36] Many consider using continence aids embarrassing and the majority of older hospitalised patients (64%) prefer scheduled toileting.[16,36,38,40] Despite this, there is evidence that they are used inappropriately with many older patients.[36,41] One study, directly assessing the appropriateness of continence wear in hospital, found that nearly one-third (30.1%) were inappropriately used.[42] Up to one-third (34.4%) of all hospital inpatients use continence pads; one-third (28.8%) of these for the first time, with most (74.6%) starting on day one and continuing throughout admission.[23,42] UC are also highly prevalent among hospitalised adults with rates varying from 12-26%.[43] Many of those inserted remain in place longer than required, while 30-54% of UC are inserted without clinical indication.[44,45] The inappropriate and overuse of UC has since received considerable attention.[34,46] Inappropriate usage has since decreased and a more recent study found this figure had reduced to 7.5%.[29] Similar efforts have not been implemented with regards to absorbent pads and clinical inertia continues to exist in this area.[47] Reported reasons for over-reliance on continence pads during hospitalisation include staff-specific factors such as lack of assessment and reassessment.[23] Continence status is often not documented in nursing or medical notes

and insufficient time, support, and prioritisation all contribute to a culture of over-reliance on their use.[35,48] In addition, staff cite patient-specific factors for the use of aids including disorientation and reduced mobility, albeit these are not consistent with clinical guidance.[23,36,42,49,50]

To date, few studies have examined factors associated with the inappropriate use of continence aids in hospitals. Proposed factors include older age, female sex, multi-morbidity and prolonged length of stay.[42] While frailty, a multi-factorial age-associated risk state, is associated with both incontinence and adverse outcomes in older adults, it has not been previously explored as a factor associated with continence aids.[51,52] As the inappropriate use of aids contributes to the development of new incontinence and is associated with the negative sequel outlined above, identifying patients most at risk may allow for targeted interventions to prevent or minimise unnecessary use and improve their outcomes.

Given the importance of incontinence, the paucity of data on continence aid use in hospital and the suspicion that inappropriate use of continence aids is highly prevalent in hospital, we aimed to (1) investigate the point prevalence of continence aid (wearable absorbent pads and UC) use, and (2) identify the proportion of these that were inappropriate among older inpatients. Further, given the lack of data on factors associated with the use of continence aids in hospital and that a better understanding of these will increase awareness of those at risk and promote interventions to reduce inappropriate utilisation, we also aimed to (3) examine whether specific factors including frailty are associated with their use among hospitalised older adults.

Materials and methods

Design and sampling

This study was designed as a cross-sectional observational point prevalence study. The methods have been reported elsewhere.[53] In summary, consecutive inpatients where invited to participate on a single day in August 2017 in two sites of a university teaching hospital (Galway University Hospital), a 693-bed teaching hospital (University Hospital Galway) and a 34 bed off-site geriatric rehabilitation unit (Merlin Park University Hospital) in the West of Ireland. The hospital provides a comprehensive range of specialities including emergency and elective services for the region, the province of Connaught, with a population of 550,742 people, predominantly Caucasian (84%), according to the 2016 census. Patients were included if they were (1) admitted to on-site general hospital wards (medical, surgical, oncology and infection control units) including those awaiting admission from the acute medical assessment unit and emergency department, (2) English speaking, (3) aged ≥55 years and (4) consented to participate. Patients were excluded if they (1) declined, (2) were off the ward at time of assessment, (3) were deemed medically unstable according to nursing staff or (4) were currently in coronary care, intensive care and high-dependency wards due to their critical medical status. Off-site paediatric, obstetric and psychiatric wards were not covered by the ethics approval and were also excluded. In total, 452 patients were available. Of these, 95 patients were excluded because they were either aged <55 (n=82), off ward (n=9), too medically unwell (n=1), non-English speaking (n=1), refused to participate (n=2) or no collateral was available, though this was required (n=2). This resulted in 355 patients being assessed (Figure 1).

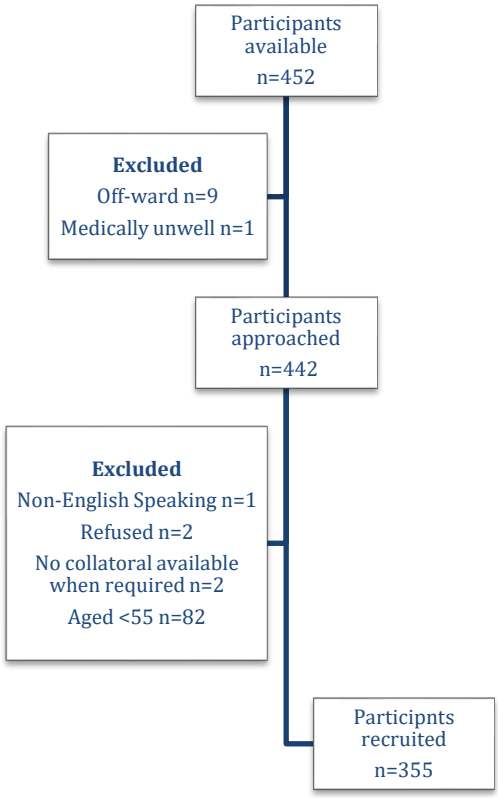

Figure 1. Flow diagram detailing study recruitment

Data collection

Patients' medical and nursing notes were examined and a brief patient interview (study assessment instrument) was conducted to collect data. This was used to obtain demographic details and clinical features. The data collection team consisted of 12 members of the interdisciplinary frailty team including medical, nursing, physiotherapy and occupational therapy staff. All raters were trained and the study assessment instrument was piloted and amended based on feedback. Inter-rater reliability (IRR) was assessed on a random sample of three patients reviewed by each rater. A debrief session was conducted to clarify any remaining ambiguous issues and ensure standardisation between data collectors. Fleiss' kappa (for multiple raters) was used to ascertain IRR. Overall agreement was moderate to perfect depending on the item rated, ranging from 76% for the CCI (K=0.52) and 86% the type of continence aid worn (K=0.71), to 100% for baseline BI and CFS (K=1).

Ethical issues

Informed verbal consent was sought from all patients. Ethics approval was granted in advance from the local research ethics committee (Ref: C.A. 1806). As this was a one-day point prevalence survey of practice with a low risk of harm and minimal patient involvement, the committee approved our request to seek verbal consent rather than written consent.

Outcome measures

Demographics and clinical features

Baseline characteristics including age, sex, presenting complaint and co-morbidities were extracted from their medical records. The Combined Age Charlson Co-morbidity Index (CCI) was used to measure overall burden of co-morbidity.[54] The CCI is a measure of weighted comorbidities recorded from one to six plus one point for every decade over 40 as a valid way to quantity disease burden and predictor of mortality with good IRR.[55] The presence of a cognitive impairment was rated on a subsection of the CCI. Frailty status was measured on the Rockwood Clinical Frailty Scale (CFS).[56] The CFS is a validated nine-point frailty scale scored from one (very fit) to nine (terminally ill) with scores of five or more indicating a patient is frail; below this score patients are considered fit (scores 1-3) or vulnerable/pre-frail (score of 4).[56] While usually completed after a comprehensive geriatric assessment, it can be used as a brief screening instrument with moderate to strong IRR and good predictive validity for geriatric admission, inpatient mortality and length of stay.[57-59] Pre-admission and current activities of daily living (ADL) function were measured using the 20-point Barthel Index (BI).[60] The BI is a measure of basic ADL scored from zero indicating

complete functional dependence to twenty, complete independence.[60] The BI is widely used and has good IRR.[61]

Continence status and aids

To identify self-reported continence status, the bowel and bladder sub-sections of the BI were used. Baseline and current UI and FI were characterised by a score of zero (indicating severe, complete incontinence such that they are unable to manage including catheterised patients rather than those with an occasional accident) on the BI continence sub-questions. Self-report is an acceptable method of assessing continence status.[62] The use of continence aids was documented according to type: all-in-one, shaped or micro pads, and indwelling or condom UC. All-in-one pads are a type of continence wear akin to disposable briefs, which have absorbent material in the crotch area and have elastic sides or adhesive tape to close the sides. There are deemed suitable for immobile patients and those with FI.[28] Shaped pads are anatomically shaped absorbent pads that can be used with elasticated net pants and manage moderate to heavy UI. Micro pads are smaller, lighter absorbent pads for managing light UI. They can be worn inside the patient's own underwear.[28] An indwelling urinary catheter is a flexible tube inserted to carry urine out of the bladder, while a condom catheter is worn externally. Both collect urine in a drainage bag.

Appropriateness of continence aids

For the purpose of the analysis, the use of all-in-one pads was deemed appropriate for patients only if they fulfilled either of the two following categories: (1) they scored zero on the bowel section of the BI, indicating FI and/or (2) they scored zero on the transfer section of BI, indicating they require major assistance of up to two people or a hoist to

transfer from bed to chair. This was based on local hospital policy and is consistent with the UK's NICE guidelines and those used in previous research on the topic.[29,42] The appropriateness of shaped and micro pads were not explored as the nature of the data collection was inadequate in differentiating between light and moderate UI and thus, their appropriateness. Indwelling UCs were deemed appropriate for patients if used (1) post-operatively, (2) when receiving critical or end-of-life care, (3) for neurogenic bladder, (4) to instil drugs, (5) to relieve urinary retention, (6) to assist healing of open sacral or perianal wounds, (7) for those with medical conditions warranting measurement of urinary output, (8) long-term for medical reasons and (9) other appropriate justification for UC placement in the medical notes. These were based on guidelines from Ireland's Health Protection Surveillance Centre and again in keeping with hospital policy.[63]

Data analysis

Data were analysed using the Statistical Package for Social Sciences V25.0 (SPSS Inc., Chicago IL, USA). The Shapiro-Wilk test was used to test for normality and found that most data were non-parametric. Distributions were compared using Pearson's Chi Squared tests (categorical outcomes). Unadjusted associations were identified using the Mann–Whitney U test. Data were correlated with Spearman's rho. Binary logistic regression was used to examine the association between categorical variables using the Forward method. The first models assessed the unadjusted association. The second models adjusted for age, sex, frailty status, BI and CCI as potential confounders. These factors were selected as they have previously been associated with inappropriate use of continence aids (older age, sex, co-morbidities and length of stay) or with the development of incontinence (physical function, cognitive impairment, and frailty

status).[23,42,49,51] Frailty (CFS score) was considered as both a continuous and categorical variable, dichotomised into non-frail (fit or vulnerable but not frail) (<5/9) or frail (≥5/9) to exclude a non-linear relationship. The use of continence aids was categorised as inappropriate if either the use of pads and/or UCs were deemed inappropriate according to the approach detailed above. Models were assessed using the Hosmer–Lemeshow goodness of fit test. All statistical tests were two-sided with a p-value of <0.05 considered statistically significant. To detect an estimated 30% prevalence of inappropriate continence aid wear, a sample size of 226 inpatients was required to produce a 95% confidence interval estimate with a specified margin of error (precision) of 5%.[42]

Results

Baseline characteristics

Three hundred and fifty five patients from medical, surgical, oncology and infection control wards, and the medical assessment unit and emergency department were included in this study. Demographic data are presented in Table 1. Seven participants were included in the presentation of point prevalence data but were excluded from further statistical analysis due to some missing data.

Baseline characteristics

The median current length of stay on assessment was 9 days, interquartile range (IQR) ±19. The median age of those included was 75±17 years and 80% (283/355) were aged ≥65 years. Most were male (53%). Co-morbidity was common, median CCI score of 6±3. The available sample had a median baseline CFS score of 4±2 and current CFS score of 5±2. Current CFS scores were significantly higher than baseline scores

(p=<0.001). Frailty, as stratified by the baseline CFS was common with 21% scoring four (pre-frail) and 29% scoring five or more (established frailty). UI (occasional or persistent according to the current BI) among inpatients was 43% (153/355) compared to 24% (84/355) reporting UI at baseline, (p<0.001). FI (occasional or persistent) was present for 22% (77/355) and this was also significantly higher than baseline, 8.7% (31/355), (p<0.001).

Prevalence of continence aids

Where known, 20% (70/350) of all current inpatients used continence aids pre-admission; no baseline information was available for five patients. In all, 46% (163/355) of all inpatients were currently using at least one type of continence aid. The proportion increased to 49.8% (141/283) for those ≥65 and to 57% (102/179) for those ≥75 years. Those currently using any continence aid were statistically significantly older (median age 80 versus 71 years, p<0.001) than those not using them. Although more females were using continence aids in hospital, there was no significant difference in the proportion by sex, p=0.07. Those using continence aids were also more likely to be frail and cognitively and functionally impaired. The characteristics of those currently using continence aids compared to those not using them are presented in Table 1.

The all-in-one pad was the most commonly used with 31% (111/355) of all inpatients currently wearing one, with (urinary, n=24 or condom, n=1) or without a catheter; the prevalence increased to 45% (80/179) for those aged ≥75. All-in-one pads represented the majority, 68% (111/163), of all continence aids. In all, 52/355 (15%) inpatients used catheters: 51 patients had an indwelling UC, one patient had a condom catheter. The breakdown of continence aid by type is presented in Table 2.

Appropriateness of continence aids

Based on the assessment, 57% (93/163) of patients using a continence aid did not have or use them pre-admission. Inappropriate use of continence aids (either the all-in-one pad and/or UC) was high at 45% (74/163) based on the criteria agreed a priori. The current use of all-in-one pads was inappropriate for 64% (71/111) of those wearing them. As described in the methods section, inappropriate use was indicated if all-in-one pads were used among patients without FI based on the bowel section of the BI and/or used by those who were able to transfer without major assistance (two people) or a hoist based on the transfer section of the BI. This was based on local policy, previous research and international guidelines.[28,29,42] Inappropriate use of all-in-one pads was statistically significantly associated with being less frail (p=0.003) and with less functional impairment as judged by the BI, at review (p<0.001) or at baseline (p=0.003). Of the UC, all but four were considered appropriate. Inappropriate use of UC was statistically significantly more common in those who were older (p=0.04), who had higher frailty scores (p=0.03) and functionally impaired at baseline (i.e. lower BI scores) (p=0.03). Binary logistic regression taking 'use of continence aid' as the dependent categorical variable and age, sex, cognitive impairment, CCI scores and CFS and BI at baseline as independent variables showed that older age, odds ratio (OR) 1.03 95% confidence interval (CI): 1.00-1.07 (p=0.03), higher baseline frailty (CFS scores) (OR 1.28 95% CI: 1.00-1.63, p=0.046) and lower functional status (BI scores) (OR 1.20 95% CI:1.09-1.35, p<0.001) were statistically significantly associated with current use of any continence aid. Age (older) was the only statistically significant predictor of inappropriate use of any continence aid (OR 1.06, 95% CI:1.02-1.11, p=0.007).

Discussion

The results of this cross-sectional point prevalence study show the high prevalence of continence aid use among inpatients of all ages and how this increases with age. The study suggests that age, functional status and frailty are important predictors of aid use. The study also highlights the high proportion of patients, particularly older patients, using inappropriate continence aids, predominantly the all-in-one pad type. In this cohort, where continence aids were specified as wearable absorbent pads and UC, the use of continence aids in hospital was high with a significant increase from pre-admission usage. These findings are in line with prevalence figures reported in an Italian hospital with similar definitions among a similar sized cohort (n=396) with comparable age profile, sex and length of stay. Prevalence rates were lower in studies that focused distinctly on the prevalence of wearable absorbent pads in Spain (36%), despite having an older cohort (mean age 79.9 years) or UC (21.1%) in a large (n=14,252) multi-site study in The Netherlands with a similar age and sex profile.[23,30,42] All studies demonstrated an increase in continence aid use from pre-admission to in-hospital rates.[23,30,42] Differences in prevalence rates can be explained by the definitions used and the time at which the assessment was competed.[23,30,42]

A kin to this study, similar research reported continence aids are more likely to be used with older patients with physical and cognitive impairment, multiple co-morbidities and a longer length of stay.[30,42,49] That our results replicate those of studies conducted almost ten years ago, suggests that there has been no improvement in the use of incontinence pads in acute hospital settings, despite increased awareness of our ageing population and the harm associated with the use of continence aids.[49,63] More specific to wearable absorbent pads, those with physical and cognitive impairment were at highest risk of absorbent pad use.[29,44,57] While female sex, limited mobility, cognitive

impairment and co-morbidities have all been previously linked with continence aid use, this is the first study, to the best of our knowledge, recognising frailty as a factor associated with continence aid use.[23,42] Indeed, frailty, not age, has been recommend to guide treatment decisions regarding UI.[50] If managed appropriately, frail older adults can make improvements in continence and subsequent improvements in their quality of life.[66] In-hospital continence aid use is directly and indirectly, through its relationship with mobility, related to functional decline at discharge.[37] Such findings along with the addition of our results may indicate that frailty, functional impairment, cognitive impairment and the use of continence aids should be addressed simultaneously during hospital admission to prevent adverse events.[37] Identification of these risk factors will allow hospitals to target quality improvement initiatives to potentially reduce the inappropriate use of absorbent pads and improve broad based outcomes for the frail patient cohort.[50] While UI is more common among females, in this study sex did not emerge as a significant predictor of continence aid usage.

Continence aid use often begins on day one of admission and while it may be initially appropriate, their use may continue beyond the indicated time.[49] The rationale for pad use by nursing staff is often not in keeping with recommendations from guidelines and similarly, in our study only a small proportion of patients met the requirement for the use of such aids.[23,29] Few studies have evaluated the appropriateness of wearable continence aids and definitions and type of continence aids examined vary. Our results support the scarce literature on the topic, highlighting the common and often unjustified use of continence aids in acute hospitals.[30,36,42] Functionally and cognitively impaired patients are at most at risk of complications of continence aids such as skin integrity problems, hospital acquired infections, indignity and a cycle of encouraging immobility.[65] Despite this, our results indicate continence aids, particularly the all-in-

one pad type are often inappropriately used with older age being the only statistically significant independent predictor. This is consistent with two other studies, one examining the appropriateness of UC [30] and the other the use of continence pads [42] that associated age with inappropriate use in acute hospitals.

In recent years, there have been significant efforts to successfully reduce the inappropriate usage of UC and increase documentation for the reasons for insertion.[67] Previous research has shown that well-organised interventions can reduce the prevalence of inappropriate UC usage.[68,69] Much less attention has been paid to the inappropriate use of absorbent pads and we can hypothesize this is the reason for the higher prevalence of inappropriate pad use compared with inappropriate UC use. Insufficient staffing, suboptimal documentation and staff inertia have been cited as reasons for continence aid use.[23,47] In this current study, the hospital had a continence policy in place but results indicate it was not adhere to. The adherence to clinical guidance detailing the use of, and maintaining the use of, continence aids needs to routinely adapt within the institution through continuous audit. One small study in the United Kingdom showed positive improvements in appropriate pad use following regular ward-based teaching and demonstrations lead by a continence nurse specialist.[70] In Ireland, the Continence Interest Group are advocating for a continence nurse specialist in all hospitals following a hospital audit in 2007, however, little progress has been made and there in no continence nurse specialist in the hospital during the time of data collection.[71] This suggests that sustained efforts including educational interventions and quality improvement cycles are needed to minimise inappropriate use of wearable continence pads. Further large scale research is required to develop and evaluate continence management improvement initiatives and support the need for a continence nurse specialist.

Limitations

Several limitations should be noted. This study was conducted in a single region in one country and although likely to be representative of hospitals in Ireland, these data are unlikely to be representative of hospitals internationally. Similarly, this study presents point prevalence data captured in a moment in time further reducing generalisability. In an Irish setting, the population has similar demographics and levels of frailty as similar recent studies.[72] Nevertheless, clinicians need to use their judgment when extrapolating the findings and applying them to their own context. The study had a cross-sectional design, limiting the ability to infer causation. Every effort was made to recruit eligible patients; however, the study was conducted on a single day, a Saturday, when several patients were off ward or out on day leave. This may have introduced selection bias, potentially increasing the point prevalence of continence wear as those in better health with lower levels of frailty and better functional status may have been more likely to be off the ward. Data as to why patients refused to participate was not recorded. Furthermore, patients in the ICU, coronary ICU and high dependency unit and a small number of medically unwell patients were excluded from the study, again potentially influencing prevalence proportions. This study may also have been prone to reporting bias; to minimise this, the BI index, a validated scale for measuring ADL was used to establish the suitability criteria for use of all-in-one pads and a collateral was obtained where deemed necessary. Another limitation was that no formal detailed assessment to confirm frailty status was conducted i.e. comprehensive geriatric assessment. This was related to time and resource restrictions necessitated by the study design – a point prevalence study. Similarly, frailty, as determined by a brief assessment by the study team incorporating discussion with nursing staff, patients and collaterals if available on the study day and more detailed chart (medical and nursing) review, and

then stratified on the CFS, was not based on a gold standard assessment. That said, definitions of frailty remain inconsistent with no accepted consensus and the CFS is shown to be an accurate measure of frailty in hospital inpatients.[59,73]

Conclusion

Continence aid use is highly prevalent among hospitalised adults. Being frail and functionally impaired was predictive of continence aid use. The results of this study support previous literature highlighting the inappropriate use of continence aids, in particular the all-in-one absorbent pads. Older adults were more likely to receive aids inappropriately. As older patients are at the highest risk of complications associated with continence aid use, concerted efforts are required to address the issue. Further research is needed to develop, disseminate and examine the effectiveness of staff education initiatives to ensure compliance with accepted standards for managing continence and indications for continence aid use. Special attention needs to focus on those with cognitive decline including delirium, new onset of frailty and functional impairment from admission, particularly amongst the oldest inpatients. This should improve patient care and minimise the risks associated with incontinence and the inappropriate use of continence aids.

Declaration of interest

None.

Acknowledgments

All the nursing staff in University Hospital Galway who supported the study.

Tables

Table 1. Comparison of the characteristics of all hospitalised inpatients and those currently and not currently using continence aids (CA).

Variable	**Total** (n=355*)	**Using CA** (n=163)	**Not using CA** (n=192)	P value
Age (years) Median	75	80	71	p<0.001
Sex (% Male)	53%	47%	57%	p=0.07
CCI Median	6	6	5	P=0.001
Cognitive impairment (% Known)	20%	30%	11.5%	p<0.001
CFS (Baseline)* Median	4	5	3	p<0.001
CFS (Current)* Median	5	6	4	p<0.001
Frail* (% Baseline CFS ≥5)	29%	51%	11%	p<0.001
Pre-Frail* (% Baseline CFS =4)	21%	20%	21%	p=0.9
Barthel Index (Baseline)* Median	20	18	20	p<0.001
Barthel Index (Current)* Median	15	8	19	p<0.001
CCI = Charlson Co-morbidity Index; CFS = Clinical Frailty Scale *Missing data as described in the results section				

Table 2. Current and baseline characteristics of inpatients (n=355*) according to their continence status and the proportion using continence aid products.

Variable (n=355*)	**Current** n= (Percentage, %)	**Baseline** n= (Percentage, %)	**P value**
Bladder Continence (According to the Barthel Index)			
Incontinent or Occasional Accident	153 (43%)	84 (24%)	p<0.001
Incontinent	101 (29%)	41 (12%)	p<0.001
Occasional Accident	52 (15%)	43 (12%)	p=0.4
Continent	199 (56%)	267 (75%)	p<0.001
Missing	3 (1%)	4 (1%)	p=0.7
Bowel Continence (According to the Barthel Index)			
Incontinent or Occasional Accident	77 (22%)	31 (9%)	p<0.001
Incontinent	42 (12%)	16 (5%)	p<0.001
Occasional Accident	35 (10%)	15 (4%)	p=0.002
Continent	275 (78%)	320 (90%)	p<0.001
Missing	3 (1%)	4 (1%)	p=0.7
Continence Aid Use			
No Continence Wear	201 (57%)	280 (79%)	p<0.001
Continence Wear	154 (43%)	70 (20%)	p<0.001
Missing	0 (0%)	5 (1%)	p=0.03
Continence Aid Product Type (Total proportion, alone or combination)			
All-in-one	111 (31%)	27 (8%)	p<0.001
Shaped	12 (3%)	19 (5%)	p=0.2
Micro	12 (3%)	15 (4%)	p=0.4
Indwelling Urinary Catheter	51 (14%)	15 (4%)	p<0.001
Condom Catheter	1 (<1%)	0 (0%)	p=0.3
Missing	0 (0%)	5 (1.5%)	p=0.03
* Some missing data as described			

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