Staff and patient perceptions of a community urinary catheter service

Citation for published version:

Digital Object Identifier (DOI):
10.1111/ijun.12230

Link:
Link to publication record in Edinburgh Research Explorer

Document Version:
Peer reviewed version

Published In:
International Journal of Urological Nursing

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**Staff and patient perceptions of a community urinary catheter service.**

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Staff and patient perceptions of a community urinary catheter service.

Manuscript type: Practice Development - analysis of innovations and trends in practice development in nursing which will impact on urological nursing.
Abstract

Introduction:
Urinary catheters are used extensively throughout healthcare for various reasons including management of urinary tract dysfunction. The purpose of this study was to simultaneously explore both catheter user experience and staff perception of catheter services within community urinary catheter care.

Methods:
A questionnaire was conducted to investigate the views of community nursing staff. During the same time period, patients were interviewed about i) catheter-care standards and adherence to guidelines ii) patients’ feelings towards their catheter and iii) potential improvements to catheter practices and design.

Results:
Sixty-nine staff were surveyed. Although 97% of staff indicated they used local guidelines, in up to 62% of cases findings suggested practices in sending urine samples for culture did not comply with guidelines. Seventy-five percent of staff were satisfied with catheter care, but weaknesses were identified in handover processes, communication between staff and patients, and excessive documentation. Staff results were compared with the findings from interviews of 29 long-term urinary catheter users, demonstrating a higher level of satisfaction with catheter care amongst patients (86%). Patients and staff agreed that generally the impacts of their catheter on personal hygiene, sense of independence, sense of dignity and of patient happiness, were neutral (neither positive nor negative). However, regarding improvements to catheter practices and catheter design; 73% of staff but only 45% of patients suggested improvements in service, while 76% of patients but only 49% of staff suggested improvement in design.
Conclusion:
The study reveals general satisfaction with community catheter care, but indicates areas of potential improvements regarding communication, documentation and catheter design. When compared to patient responses, staff overall had a less positive view of patients perception of their relationship with their catheter.

Keywords: Urinary Catheterisation, Long-term Catheterisation, Community Nursing, Patients' Experience, Quality Improvement, Quality of Life
Introduction

Urinary catheters are used extensively throughout healthcare for a range of acute and chronic conditions. Urinary catheters are now recommended only as a method of last resort for managing incontinence, but are still required by 9% of over 65s living in the community and 12% of care home residents. Use of indwelling urinary catheters for over 3 months has a UK population prevalence of 0.14%.

Long-term indwelling catheterisation (from minimum of 4 weeks up to lifetime) with a Foley catheter was the focus of this study. Catheterisation is essential for many patients for a variety of reasons such as chronic urinary retention, neurological dysfunction and facilitating continence, but is associated with complications such as infection, blockage and leakage, as well as issues with body image and comfort.

Catheter-associated urinary tract infections (CAUTIs) are a significant morbidity factor associated with catheterisation, often correlated with the duration of catheterisation. CAUTIs are thought to occur when microorganisms colonize the catheter surface, leading to the growth of biofilms and consequently infection. Indeed, it has been suggested that around 75-80% of hospital acquired urinary tract infections are due to catheters, as well being a risk factor for catheter-related bloodstream infections. There is literature to indicate that guidelines are not always implemented adequately for catheter care, particularly regarding overtreatment of asymptomatic bacteriuria in patients with urinary catheters, in addition to poor staff adherence to infection prevention practices during insertion. More generally, this is also an area of great importance for antimicrobial stewardship and the reduction of device-related infections.
This study focuses on the ‘Foley catheter’ (the basic design of which dates from 1937\textsuperscript{13}), because it is the most commonly used urethral urinary catheter. The Foley catheter consists of a double-lumen tube that is passed through the urethra into the bladder. One lumen allows urine to drain out from the bladder, while the other lumen is used to pass liquid (usually saline) into a balloon that inflates inside the bladder, keeping it in place. In addition to CAUTIs, Foley catheters are prone to a number of issues that significantly impact users’ quality of life, including blockage of the catheter tubing lumen or eyelets\textsuperscript{14}, and subsequent bypassing (leakage of urine around the outside of the catheter), urethral strictures and gross haematuria\textsuperscript{15,16}. It is now understood that catheter blockage can be the result of encrustation due to urease-producing bacteria causing urine to crystalise\textsuperscript{17,18}. Havard (2014) suggested replacing catheters with artificial urethral sphincters or implants as a solution to these problems\textsuperscript{19}; however this is just part of a more general trend to look for alternatives to catheterisation.

This study was instigated by a collaboration between physicists, experts in device design and medical professionals. The multidisciplinary working group was set up to drive research in 1) improving quality of life for those living with a catheter and 2) reducing infection rates through addressing design innovation and service provision. The lack of design innovation of the Foley catheter, despite such extensive global use, is an indicator of the engineering challenge due to the number of factors that need to be considered in design\textsuperscript{17(p20)}. One area of design variation in the Foley catheter is coating: all-silicone or hydrogel-coated latex. There is evidence to suggest hydrogel-coated catheters are preferred by patients than all-silicone catheters (70% vs 30% respectively)\textsuperscript{20} but the evidence that coatings make a
difference to infection rates is inconclusive\textsuperscript{21,22}. New materials which prevent bacterial adhesion and cause minimal host inflammatory response are in development\textsuperscript{23,24}. The now widely used closed drainage system design innovation was also an important development in reducing infection rates\textsuperscript{25}. Other potential future design improvements include a more discrete design, options for bag-size and neutral catheter colours, as well as changing the catheter shape to make it less vulnerable to infection\textsuperscript{26}.

In relation to catheter care within the region studied, long-term catheter usage is mainly recommended by Urologists, Urology and Bladder and Bowel Nurse Specialists, District Nurses or General Practitioners, but routine care (such as catheter changes) is carried out by community nurses with supplies coordinated by continence services\textsuperscript{27}. NHS staff routinely refer to local and national best practice guidelines including the UK’s National Institute for Clinical Excellence Guidelines (NICE). NICE guidelines advise against antibiotic treatment of asymptomatic bacteriuria in catheter users, as well as advising against routine antibiotic prophylaxis when changing catheters in patients with long-term indwelling urinary catheters\textsuperscript{28}. NICE recommends that catheters should be changed due to clinical indications such as obstruction, infection, or when the closed system is compromised\textsuperscript{29}. Unnecessary catheter use should be avoided to reduce the prevalence of CAUTIs\textsuperscript{30}.

Very few studies have simultaneously investigated staff and patient perceptions of catheters and catheter care\textsuperscript{31}. However, there is growing recognition that understanding the perspective of both patients and healthcare staff is crucial to improving health outcomes\textsuperscript{32}, user experience and barriers to delivering evidence-
Based care. Therefore, our study aimed to simultaneously explore the views of patients and staff about catheter-care standards and adherence to guidelines, patients’ feelings towards their catheter and to explore potential improvements to community catheter practices and catheter design.
Methods

The project was reviewed by the Ethics Scientific Officer for South East of Scotland, NHS Research Scotland and approved by local NHS quality improvement team, who confirmed that ethical approval was not required as the project was classified as a quality improvement service evaluation.

Staff Questionnaire

The questionnaire (appendix 1) was developed by a multidisciplinary group including an infectious diseases expert, a medical devices development expert, a physicist and a medical student. The survey was created using the Bristol Online Survey tool (BOS) approved by the ehealth security department. The survey was structured to cover: i) adherence to catheter guidelines and catheter care training ii) patients’ attitudes towards catheters and staff perceptions of these, and iii) suggestions for future developments in catheter design and catheter care. A paper copy of this survey was also handed out at bladder and bowel nursing staff training days, allowing for additional staff recruitment face-to-face.

Patient Interviews

Interviews were conducted by a single researcher. The responses given during the interviews were recorded then anonymized. The use of an interview allowed participation of patients who might have been excluded if a written questionnaire had been used. Patient interviews were carried out following a defined questionnaire (appendix 2), data was collected and transcribed onto BOS. The interview was structured to cover i) The history of the patient’s catheter ii) How patients felt towards...
their catheter and catheter services iii) Suggestions for future developments in catheter design and catheter care.

Participants

All community and district nurses in NHS Lothian (N=352) were sent an email link to the online survey in February 2018, which remained available until March 2018 (Appendix 3).

Patients were eligible for inclusion if they had a long-term urinary catheter managed within the NHS Lothian community. Those unable to consent were excluded. Twenty-nine long-term urinary (urethral) catheter users were identified (table 1) by urology specialist staff using a convenience sampling strategy, approached personally and all consented to an interview. Following 29 interviews, data saturation was achieved. Patients were interviewed in healthcare establishments or at home. They received a cover letter approved by NHS Lothian communications with a brief description of the study (Appendix 4). Pseudonyms were assigned to the results to maintain anonymity of the participants.

Data Analysis

Staff questionnaires and patient interviews were structured similarly and had many matching questions, enabling responses to be compared. Surveys and interviews contained a mixture of open and closed questions and Likert scales and each question was followed by a free-text box. Positive and negative phrasing of questions were used to avoid participants answering similarly to every question. Statistical analysis comparing the two population groups was performed using Welch’s 2-
sample T-tests. Differences in staff and patient responses were considered significant if the p-value ≤ 0.05. Responses to questions structured as Likert scales were assigned a number between 1 and 5, this enabled calculation of mean scores and their standard deviations, and subsequent statistical comparison of staff versus patient responses.
Results

Study Population

Questionnaires were sent to all 352 community nursing staff within the region studied. Sixty-nine (69/354; 19.6%) staff responded, with 61 completing the study via the online survey and a further 8 following recruitment at presentations at staff training days and forums. Staff completed the same questionnaire, regardless of being completed in person or online. The demographics and baseline clinical details of the patient population are demonstrated in Table 1. Seventy-six percent of participants were men. Eighty-two percent of respondents were over age sixty. Patients had varying reasons for catheterisation with the most prevalent being urinary incontinence, urinary retention and neurogenic bladder cause by multiple sclerosis (table 1).

Staff compliance with guidelines

The survey found that staff were changing catheters for appropriate reasons including confirmed clinical signs of CAUTI, breech in infection control, bypassing, blockage, patient pain/discomfort, prior to antibiotic treatment for infection, routine changes or General Practitioner (GP) instructions for removal. 68 of 69 staff (99%) indicated that they would not give antibiotics for asymptomatic bacteriuria, in accordance with NHS Lothian guidelines. Although the guidance states that urine samples should only be sent if patients are clinically unwell, when asked to indicate in a tick box when they would send a urine sample, 28 of 69 staff (41%) indicated they would also send urine if it was cloudy or contained sediment, and 43 of 69 staff (62%) would send samples if the urine was foul smelling. These practices are all
inconsistent with the best practice guidelines and could have led to unnecessary sampling and/or unnecessary antibiotic treatment or catheter changes.

Catheter care

None of the patients surveyed were dissatisfied with their catheter care (Table 2).

Sixty-five of 69 staff (94%) stated they had received adequate catheter-care training in the past, although only 47 (68%) felt that there was good availability of staff re-training. Health Protection Scotland and the best practice guidelines recommends regular reviewing of the need for an indwelling urinary catheter and removal of the catheter if possible.\(^{36}\) However 22 of 29 patients (76%) interviewed were unaware of medical staff having ever reviewed their need for catheterisation. Forty-six of 69 staff (67%) indicated that they would like to see the need for catheters being reviewed more often, with 34 (49%) feeling that their workload prevented them from reviewing the need for catheters as often as they wished. Only 29 of 69 staff (42%) felt that their patients always had a documented plan for the duration of catheterisation and only 11 staff (16%) felt catheter removal plans were always clear and effective.

Communication and documentation

Staff expressed frustration with excessive documentation: in particular, repetition of catheter-related information in multiple places. While 59 of the 69 staff (86%) felt that catheter handover documentation is passed efficiently between healthcare professionals within the community, and 43 staff (62%) felt the handover is efficient from community to hospital, only 15 staff (22%) stated that handover documentation was passed efficiently from hospital to community. The national NHS documentation system - the “urinary catheter passport”\(^{37}\) - was referred to often in the free text
boxes as a system that could be utilised more effectively, although the survey did not
directly ask about this. Our survey results also suggest that staff-patient
communication could be improved since differences were found in staff and patient
perceptions of patient knowledge and expertise.

**Education**

Twenty-three of 29 patients (79%) said they were confident or very confident in
looking after their catheter, while, in contrast, 32 of 69 staff (46%) felt that patients
are insufficiently educated regarding their catheter. There was also a difference
between staff and patient perceptions of whether catheter-users understood their
need for catheterisation (p-value<0.001): 90% of patients felt that they did, while staff
did not agree as strongly, with only 54% feeling that patients were well informed
about this *(fig.1)*. This result may indicate weakness in patient education as well as
somewhat negative staff perceptions of patient awareness around catheter usage. It
may also indicate differences in what staff and patients think is important to know
about catheter management.

**Infection**

Prevention of CAUTIs is a major driver in attempts to reduce catheter use\(^8,38\). Indeed,
nineteen (67%) patients interviewed had developed at least one urinary tract infection
(UTI) since having a catheter. CAUTIs were a regular issue faced by staff, with only 4
staff (6%) responding that they ‘rarely’ found catheters caused UTIs.

**Impact of catheters on quality of life**
Patients’ attitude to their catheter tended to reflect the nature of the health condition causing their need for catheterisation. Those with multiple sclerosis were generally happier, reporting that the catheter gave them freedom and independence. In contrast, ambulant patients with a catheter e.g. for urinary retention, reported that they were less satisfied, stating they found catheters restrictive. The variation of reasons for catheterisation can make it difficult to generalise catheter users and whether catheterisation negatively or positively impacts their quality of life. In keeping with this observation, staff commented throughout the project on the difficulty of generalising catheter-users, leading many of them to answer ‘neutral’ to questions such as whether users were happy to have a catheter (48%; 33/69 neutral answers) and if catheters had a negative impact on sense of independence (51%; 35/69 neutral answers). On these two questions there was no significant difference between staff and patient responses (p-value = 0.39 for both questions).

The survey did find significant differences between staff and patient responses regarding complaints (p-value <0.001). Ninety percent (26/29) of patients disagreed with the suggestion that they complained about their catheter, while staff responses were divided as to how often patients complained, with roughly equal numbers of staff feeling that patients did or did not complain (fig. 1). The survey found no significant difference between staff and patient responses regarding the impact of catheters on users’ personal hygiene, independence or sleep (fig 1, p-values 0.25, 0.39, 0.14 respectively). Thirty-one percent (9/29) of patients felt catheters negatively impacted their personal hygiene, including two female patients who felt that urethral catheters particularly affected personal hygiene during menstruation, and indicated a wish for suprapubic catheters for long-term catheterisation. With regard to
independence, patient opinions varied greatly: 31% (9/29) of patients felt their catheter reduced their sense of independence, while 21% (6/29) answered neutrally and 48% (14/29) felt it increased their independence (fig 1). In addition, 76% (22/29) of catheter patients found that their catheter positively impacted their own (and often their partner’s) sleep because the catheter removed the inconvenience of urinating frequently at night (fig. 1). Some patients reported that catheters occasionally became displaced or the night bag required emptying, but these problems were strongly outweighed by the satisfaction of a good night’s sleep. A small proportion of users felt that the catheter tubing strongly disturbed their sleep, particularly when changing position.

Problems with catheters

We found that staff were most concerned about bypassing and blockages while patients reported infection as a more common issue: 66% (19/29) of patients but only 9% (6/69) of staff wrote infection as a major issue in the free-text box (Table 3). Staff and patients found comfort to be an issue to an equal degree (28% vs 31% respectively). Patients complained of embarrassment (28%; 8/29) and bleeding (38%; 11/29), while staff did not report either of these as an issue.

Suggestions for innovation

Our questionnaire included an open-ended question in which staff and patients were invited to make suggestions for improvements in catheter services and catheter design. To analyse these open-ended questionnaire responses, they were categorised into themes (appendices 4-7).
Catheter services

The survey found significant difference (p=0.02) between staff and patient perceptions of whether catheter services could be improved (appendix 5 & 6): 50 staff (73%) but only 13 patients (45%) felt that improvements were needed. The staff responses suggested improvements to current services to relieve pressures on district nurses. Twelve staff (17%) suggested that specialist continence nurses should have more contact with community patients and 7 suggested introducing a clinic for catheter-users who are independent. Staff complained of the volume of repetitive catheter-related paperwork and suggested making documentation more concise could improve efficiency, as well as improving communication within catheter services, particularly between hospital and community. The majority of patients were complimentary towards catheter services, particularly towards the district nurses. Most suggestions from patients concerned improving patient-staff communication and the education and awareness of patients, staff and the general public education about catheters.

Catheter design

Interestingly, there was significant difference of opinion between staff and patients regarding the need for improvements to catheter design (p=0.01) (appendix 7 & 8): 22 of 29 patients (76%) felt that catheter design could be improved, compared to only 34 of 69 staff (49%). Staff and patients were given the option to comment on both catheter design and catheter services in free-text boxes, but not every participant provided a written response. The theme containing the most responses from staff (19/47 written responses) was unenthusiastic remarks; including Ms X: “We are not designers, catheters do what they are made to do” and Ms Y: “if there could (be a
design improvement) there would?”. Indeed, many staff responses simply stated problems with current catheter designs rather than offering ideas. However, some suggestions for catheter design innovation were made by the staff, the most popular of which (13/47 responses) related to design changes to reduce blockages and bypassing, such as increasing the eyelet size at the catheter tip to prevent easy blockages from debris. In contrast to the somewhat unenthusiastic staff responses, many patients wished for change in catheter design and proposed diverse ideas. These included multiple smaller catheter bags instead of one large bag to improve the discreteness of the collection bag allowing patients to wear tighter fitting trousers; creating a tug-proof catheter for Alzheimer’s; and a device to hold the catheter bag open at night time to prevent bypassing due to pressure on the collection bag during sleep. Suggestions were also made for tubing to be attached to the user’s thigh rather than calf to minimise disruption when changing sleeping positions.
Discussion

In this work, we surveyed 69 NHS Lothian community nursing staff (district nurses) and 29 long-term catheter users regarding catheter-care standards and adherence to guidelines, patients’ feelings towards their catheter and potential improvements to catheter practices and design. Our study revealed general satisfaction with catheter services among patients and staff, and generally agreement between staff and patients, although staff overall had a less positive view of patients’ perception of their relationship with their catheter. We identified disagreement regarding patient complaints of their catheter and the principal problems that catheters caused. Contrasting perspectives on future catheter design were obtained.

Concerning adherence to guidelines in community catheter care, our study identified areas for improvement. The first of these concerned, when to send urine samples: some staff were found to be sending unnecessary samples, contrary to guidelines. This finding is consistent with Trautner et al. (2014) in America, who found that only 42% of staff surveyed achieved greater than minimal recall of asymptomatic bacteriuria guidelines. Furthermore, Traunter et al. found that correct management of catheter-associated bacteriuria according to evidence-based guidelines is increased with staff experience. While the degree of staff experience was not recorded in our survey, our results do suggest that staff re-training may be needed to ensure correct practices are being carried out to minimise device-related infections. Reducing unnecessary cultures and associated unnecessary antimicrobial use could improve antimicrobial stewardship.
While Health Protection Scotland recommends regular reviewing of the need for an indwelling urinary catheter and removal of the catheter if possible, 76% of patients were unaware of medical staff having ever reviewed their need for catheterisation and 67% of nursing staff wanted to see the need for catheterisation being reviewed more often. Perhaps future service development should empower and educate nursing staff to take more responsibility for reviewing the need for catheterisation, including referral for specialist opinion if they feel that there has been a change to the medical situation, or that the patient may be suitable to be taught intermittent self-catheterisation.

Our study also found a need for improved communication in the handover process from hospital to community, for better staff-patient communication and for reduction of excessive documentation. Jaeger et al. (2017) also found that following 8 weeks discharge from NHS hospitals, many patients lacked adequate information for proper catheter self-care. Improving the efficiency of the handover from hospital into community care could have a positive impact on catheter services. Improving communication and discussions around catheterisation appropriateness can aid CAUTI prevention. Some deficiencies in staff-patient communication were evident in our survey, for example in the fact that 28% of patients complained of embarrassment and 38% of bleeding, while staff did not report either of these as an issue. Staff and patients also disagreed over whether catheter-users know the reason for their catheterisation. This suggests that either patients may have misconceptions of their need, or staff are not communicating enough with patients. Previous work has highlighted that the reason for catheterisation is often poorly recorded by the inserting clinician. Staff commented in the free-text box that the
‘Patient Urinary Catheter Passport’ was often not carried by patients, negating its usefulness for communication between patients and staff. Computerising all catheter-related documentation in future may be a solution to improve the efficiency of documentation, allowing staff to spend more time educating and communicating with patients.

Patient and staff responses differed regarding improvements to catheter design. Seventy-six percent (22/29) of patients indicated an enthusiasm for design changes and technological advancements for urinary incontinence. Indeed previous work has suggested that even simple changes such as improving the colour of tubing and size of catheter-bag could make user experience more positive\(^{26}\). It is hoped that these patient suggestions made in our survey, which were informed by their experience of long-term catheter usage, can be helpful in directing future design innovation.

Our study identified blockages, bypassing and embarrassment as common problems with catheters. This is consistent with the work of Mackay et al. (2018) who identified blockages and bypassing as key issues in community catheter care\(^{42}\). Darbyshire et al. (2016) used similar methods to this study to survey 50 hospital in-patients about their catheter experience and also discovered that, while many patients found the catheter to be useful, users found the catheter painful and embarrassing, with many experiencing leaking and blocking\(^{43}\). These findings mirrored those of Prinjha and Chapple (2013) who interviewed 36 long-term catheter users and identified similar common problems, as well as a negative impact on body image\(^{44}\). Users in that study also highlighted the lack of innovation in catheter design, hoping for a new design that was more discrete, would promote independence and reduce complications,
similar to the findings of our study. Another potential impact on quality of life is the impact of catheters/incontinence on sexual relationships\textsuperscript{45,46} however this was beyond the scope of our study. This topic could be addressed in future work comparing patient and staff perceptions of catheters, since current literature shows that healthcare professionals are not proactive in discussing sexuality with patients who suffer from incontinence\textsuperscript{16,47}. A patient’s body image and desire for an intimate relationship is another topic, not addressed here, that may need to be discussed more openly by clinicians involved in the care of long-term catheter users, as it may significantly change patient experience and potentially quality of life.

Our study identified potential weakness in the education of long-term catheter users on catheter self-care, with forty-six percent (32/69) of staff indicating they felt patients are insufficiently educated on their catheter. As well as, difference between staff and patient perceptions of whether catheter-users understood their need for catheterisation (fig.1). Ensuring that patients play an active role in their catheter management could make a significant difference to patient acceptance and tolerance. Kralik et al (2007) identified high quality patient education on urinary catheter self-care as fundamental to impacting patient experience and can increase catheter users’ sense of control of their condition\textsuperscript{45}.

A major strength of our study was the simultaneous collation of information from both staff and patients to allow for comparison – something that has only rarely been attempted in previous work\textsuperscript{31,32,48}. This approach is valuable as it collates data from all the individuals most involved in the community catheter service and allows identification of statistically significant differences between patient and staff
perceptions. Our survey has also led to suggestions for the direction of future catheter design and catheter services. Differences in staff and patient response may be due to the participation bias of the patients identified for the study, whereas the staff had to comment on a wider range of patients that they had cared for. This could increase the differences between responses from the two groups.

There is growing recognition that understanding the perspective of both patients and healthcare staff is crucial to improving health outcomes. An early investigation of catheter user experience (1987) suggested that the key to patient understanding and acceptance of their catheter may be patient education and management. Further research indicates that in order to improve the experience of catheter users, healthcare professionals must recognise user's individual needs and concerns, rather than just the clinical functioning of the device. Godfrey (2008) found that the quality of interactions with healthcare professionals, friends and family also influenced elderly patients’ relationship with their long-term catheter. Godfrey also highlighted the need for healthcare professionals involved in community catheter care to be aware of and sensitive to patients’ individual situations and needs rather exclusively focusing on the catheter’s function. Staff attitude was found to have significant impact on the care received by catheter users, thus it is important that staff and patient views towards catheters are alligned.

Although the response rate to our survey was only 20% of all eligible staff (69/352), possibly due to workload and time pressures, a relatively large sample size was achieved for a service evaluation study of this nature. The study was however limited by responder bias and the number of patient participants, who came from a similar...
The patient group were catheterised for a variety of reasons resulting in variation in how long-term catheterisation impacted quality of life; making it difficult to generalise the impact of catheterisation on catheter users. More studies are required to fully characterise catheter-users’ needs and problems.

Understanding these needs and problems could reduce stigma surrounding urinary issues and better inform clinicians who care for patients with indwelling catheters. This will form the future work of our multi-disciplinary group. A follow up project would be a longitudinal study which would allow observations and data to be collected over a time to watch how perceptions of community catheter services change over time since catheter insertion. A wider range of catheter users should also be aimed for in future studies. A more diverse patient population would reduce selection bias, as well as allowing the investigation of how factors such as age and being ambulatory vs. bed-bound affects catheter users’ experience. Taking a broader perspective, an interdisciplinary approach, including social scientists, designers, engineers, medical staff and catheter-users themselves, may be needed to achieve optimal solutions for urinary catheter health.

**Conclusion**

This study of community urinary catheter care adds to the limited research that has been published regarding patient perspectives of having an indwelling urinary catheter, and staff awareness of patient perspectives. The findings are generally positive, although some areas of potential improvement are identified in the handover process from hospital to community, patient-staff communication and excessive
documentation. Our study also revealed patient and staff suggestions for improvements in catheter design and practice.
6. References


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Acknowledgements:

The authors thank NHS Lothian Community Nurses, particularly Kathryn Janssens, Fiona Tynan Anne Sanderson, Lynne Pryde, Pat Wynne and Catriona Drummond for their assistance with the study, and acknowledge assistance from Mary McLeod in the Nurse Urology Unit at the Western General Hospital. EY was supported by an EPSRC DTA studentship; RJA was supported by the European Research Council under consolidator grant 682237 EVOSTRUC. MRP was supported by an Institutional Strategic Support Fund from University of Edinburgh.

Footnotes

Contributors: FD conceived the study. FD, MP and RA designed the search strategy. FO conducted collection of data. FO drafted the full manuscript, and all authors reviewed and approved final submission.

Funding: This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests: None declared.

Patient consent: This study was approved by a local quality improvement board.

Information was provided to both patients and staff, and patient consent was obtained prior to interviewing.
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Table 1: Socio-demographic characteristics of patient participants (n = 29).
Table 2: Patient and staff responses to questions about catheter services. The questions within table 3 were paraphrased for clarity of presentation of data. The full questionnaire is in supplementary data.

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<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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<td>I am satisfied with my catheter care.</td>
<td>8 (28)</td>
<td>13 (45)</td>
<td>3 (10)</td>
<td>5 (17)</td>
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<tr>
<td>I am confident looking after my catheter.</td>
<td>11 (38)</td>
<td>12 (41)</td>
<td>5 (17)</td>
<td>1 (3)</td>
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<tr>
<td><strong>Staff responses. N = 69 (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel there is good availability of catheter care retraining for staff.</td>
<td>6 (9)</td>
<td>41 (59)</td>
<td>11 (16)</td>
<td>10 (15)</td>
</tr>
<tr>
<td>I would like to see catheters being reviewed more often than they currently are.</td>
<td>20 (29)</td>
<td>26 (38)</td>
<td>18 (26)</td>
<td>4 (6)</td>
</tr>
<tr>
<td>I feel I have had adequate catheter care training in the past.</td>
<td>27 (39)</td>
<td>38 (55)</td>
<td>0 (0)</td>
<td>3 (4)</td>
</tr>
<tr>
<td>I think patients are educated enough regarding the care of their catheter.</td>
<td>1 (1)</td>
<td>18 (26)</td>
<td>18(26)</td>
<td>25 (36)</td>
</tr>
<tr>
<td>My workload prevents me from reviewing catheters as often as I’d like to.</td>
<td>9 (13)</td>
<td>25 (36)</td>
<td>13 (19)</td>
<td>17 (25)</td>
</tr>
<tr>
<td>It is easy to contact specialists regarding catheter-associated problems in complex cases.</td>
<td>12 (17)</td>
<td>31 (45)</td>
<td>16 (23)</td>
<td>8 (12)</td>
</tr>
<tr>
<td>Issue with catheters</td>
<td>Patients n=29 (%)</td>
<td>Staff n=69 (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blockages</td>
<td>10 (34)</td>
<td>48 (70)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bypassing</td>
<td>24 (83)</td>
<td>49 (71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td>19 (66)</td>
<td>6 (9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embarrassment</td>
<td>8 (28)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bleeding</td>
<td>11 (38)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bag bursting</td>
<td>6 (21)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other comfort issues</td>
<td>9 (31)</td>
<td>19 (28)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other practical issues</td>
<td>4 (14)</td>
<td>3 (4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Staff and patients perception of main practical issues with catheters.

**Figure legends.**

*Figure 1:* Staff and patient perceptions of how catheters affect certain social and behavioural factors.
Figure 1: Staff and patient perceptions of how catheters affect certain social and behavioural factors.

217x140mm (150 x 150 DPI)
Appendix 1

Questionnaire for Staff

I am a medical student doing a project focused on evaluating catheter usage and guidelines within community care. I would be grateful if you could please fill out this questionnaire.

Section 1:

1. What is your job title?

2. How often do you find that catheters cause UTIs?
   - Never
   - Rarely
   - Occasionally
   - Often
   - Every time a catheter is used

Any further comments....

3. What are the main issues you find with catheters?

4. What guidelines do you refer to for catheter care?
   - NICE
   - SIGN
   - NHS Lothian
   - Local Guidelines
   - Other
   - None of the above

Any further comments....

5. Current catheter services meet NHS Lothian guidelines.

   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree
   - Unable to comment

Any further comments....

6. I have had adequate catheter care training in the past.

   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree
   - Unable to comment
7. I feel there is good availability of catheter care retraining for staff.
   Any further comments......

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Unable to comment</th>
</tr>
</thead>
</table>

8. How easy is it to contact specialists regarding catheters-associated problems in complex cases?
   Any further comments......

<table>
<thead>
<tr>
<th>Very Difficult</th>
<th>Difficult</th>
<th>Neutral</th>
<th>Easy</th>
<th>Very Easy</th>
</tr>
</thead>
</table>

9. How often do you know the reason(s) why your patient(s) needs a catheter in situ?
   Any further comments....

10. How often do your patients have a documented plan for duration of cathetersation?
    Any further comments...

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
</table>

11. If a catheter removal plan is in place, do you feel the plan is always clear & effective?
    Any further comments

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
</table>

12. I would like to see catheters being reviewed more often than they currently are.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Unable to comment</th>
</tr>
</thead>
</table>
13. Do you feel there is efficient catheter handover documentation passed between healthcare professionals from Hospital to community

Any further comments

14. Do you feel there is efficient catheter handover documentation passed between healthcare professionals from community to community

Any further comments

15. Do you feel there is efficient catheter handover documentation passed between healthcare professionals from community to hospital.

Any further comments

16. I think that patients are educated enough regarding the care of their catheter.

Strongly disagree Disagree Neutral Agree Strongly Agree Unable to comment

Any further comments

17. Do you feel confident in the management of Catheter-associated urinary tract infections?

Any further comments

Very unconfident Unconfident Neutral Confident Very confident
18. Which of the following options would stimulate you to send a urine sample for investigation? (You may tick multiple boxes).

- When urine is cloudy
- When urine has Increased levels of sediment
- When urine smells
- When patient has confusion
- When patient has a fever
- When patient is in discomfort
- Other, please give details

19. When would you treat a patient with an antibiotic?

- Asymptomatic bacteriuria
- Symptomatic bacteriuria

20. What would stimulate you to change a patient’s catheter?

21. My workload prevents me from reviewing patients’ catheters as often as I’d like to.

Strongly disagree  Disagree  Neutral  Agree  Strongly Agree

Any further comments....
**Section 2:**

22. In general are your patients happy or unhappy with their catheters?

[ ] Happy  [ ] Unhappy

Please give reasoning for your answer to the above question?

23. Catheters negatively impact patients’ personal hygiene.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any further comments….</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

24. Catheters increase patients’ sense of independence.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any further comments….</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

25. Catheters reduce patients’ sense of dignity.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any further comments….</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26. Catheters have a negative impact on patients’ sleep.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any further comments….</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

27. My patients cope well with their catheter.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
28. My patients know why they need a catheter.
   Any further comments....

29. My patients are happy to have their catheter.
   Any further comments....

30. Patients complain about having a catheter.
   Any further comments....
Section 3:

31. Do you think there could be improvements made to catheter services?

   [ ] Yes  [ ] No

If the answer was yes, please give details.

32. Do you think there could be improvements made to catheter design?

   [ ] Yes  [ ] No

If the answer was yes, please give details.

33. Is there anything else you would like to add regarding catheters and catheter care within the community?

   

Thank you very much for taking the time to complete this survey, it is greatly appreciated. If you are happy to be contacted for further questioning for this project please leave your contact details below:
Appendix 2

Patient Questionnaire

I am a medical student doing a project focused on patients’ thoughts and feelings towards having a catheter. The first section is about your catheter history, the second part is about your feelings towards your catheter and final section is about the future of catheters. I would be very grateful if you could please fill out this questionnaire.

SECTION ONE – THE HISTORY OF YOUR CATHETER
Where appropriate, please circle your chosen response.

1. Do you have a short-term or long-term catheter?

   - Short-term
   - Long-term

2. How long have you had your catheter for? (days/weeks/months)

3. Why did you have a catheter put in?
   - Urinary incontinence
   - Urinary retention
   - Surgery on the urinary tract
   - Multiple Sclerosis
   - Spinal cord injury
   - Unsure
   - Other, please give details

4. How often do medical staff review your catheter? (This does not include changing the catheter bag)
   - Weekly
   - Monthly
   - Every 3 months
   - Other
   - Unsure

   If you answered ‘other’, please give details...

5. How often is your catheter changed?

   - Weekly
   - Monthly
   - Every 3 months
   - Other
   - Unsure
If you answered ‘other’, please give details...

6. How do you find the process of changing your catheter?
   Very Uncomfortable    Uncomfortable    Neutral    Comfortable    Very Comfortable

Any further comments

7. Would you like your catheter to be changed more often than it already is?
   Yes  No

Please give reasoning for your answer above.

8. How satisfied are you in current NHS catheter care?
   Deeply dissatisfied    Dissatisfied    Neutral    Satisfied    Very satisfied

Any further comments

9. How satisfied are you with the information you have been given regarding your catheter?
   Deeply dissatisfied    Dissatisfied    Neutral    Satisfied    Very satisfied

Any further comments...
10. Where did you receive the information you know regarding catheters?
   - Written (eg. leaflets/posters)
   - Websites
   - Apps
   - Verbally (from Nurses)
   - Verbally (from Doctors)
   - From friends and family
   - From self-help groups
   If Other, please specify

11. How confident are you with looking after your catheter?
   - Very unconfident
   - Unconfident
   - Neutral
   - Confident
   - Very confident

Any further comments

12. If your catheter is long term, have you had any problems with your catheter?
   - Yes
   - No

If the answer to the question above was yes, please detail what the problem was:
   - Infection
   - Bypassing
   - Pain
   - Bleeding
   - Bag Bursting
   - Embarrassment
   - Other, please give details
13. Since having a catheter, how many times have you had a urinary tract infection?

<table>
<thead>
<tr>
<th>Never</th>
<th>Once</th>
<th>Twice</th>
<th>Three times</th>
<th>Four times</th>
<th>Five times</th>
<th>Greater than five</th>
<th>Unsure</th>
</tr>
</thead>
</table>

Any further comments......

14. How many times have you received antibiotics for a urinary tract infection.

<table>
<thead>
<tr>
<th>Never</th>
<th>Once</th>
<th>Twice</th>
<th>Three times</th>
<th>Four times</th>
<th>Five times</th>
<th>Greater than five</th>
<th>Unsure</th>
</tr>
</thead>
</table>

Any further comments......

15. Have you ever had to be admitted to hospital for a urinary tract infection?

<table>
<thead>
<tr>
<th>Never</th>
<th>Once</th>
<th>Twice</th>
<th>Three times</th>
<th>Four times</th>
<th>Five times</th>
<th>Greater than five</th>
<th>Unsure</th>
</tr>
</thead>
</table>

Any further comments......
SECTION TWO - THIS SECTION IS ABOUT HOW YOU FEEL ABOUT YOUR CATHETER, THERE ARE NO RIGHT OR WRONG ANSWERS.

Where appropriate, please circle your chosen response

16. Are you happy or unhappy with your catheter?

[ ] Happy [ ] Neutral [ ] Unhappy

If the answer was unhappy, what are the reasons?

Any further comments

17. My catheter has negatively impacted my personal hygiene.

Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

Any further comments

18. My catheter increases my sense of independence.

Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

Any further comments

19. My catheter reduces my sense of dignity

Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

Any further comments

20. My catheter has a negative impact on my sleep.

Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly Agree

Any further comments
21. I cope well with my catheter.

Strongly disagree  Disagree  Neutral  Agree  Strongly Agree

Any further comments....

22. I know why I have a catheter.

Strongly disagree  Disagree  Neutral  Agree  Strongly Agree

Any further comments....

23. I am happy to have my catheter.

Strongly disagree  Disagree  Neutral  Agree  Strongly Agree

Any further comments....

24. I complain about having a catheter.

Strongly disagree  Disagree  Neutral  Agree  Strongly Agree

Any further comments....

25. Do you think anything about catheter design needs changing?

Yes  No  No comment

If the answer was yes, please give details.
26. If you had to tell your friends what catheters are like, what would you say?

SECTION THREE - THE FUTURE OF CATHETERS

Where appropriate, please circle your chosen response

27. Do you think there could be improvements made to catheter services?

Yes  No  No comment

If the answer was yes, please give details.

28. Do you think there could be improvements made to catheter design?

Yes  No  No comment

If the answer was yes, please give details.

29. Is there anything else you would like to add regarding catheters and catheter care?
30. The following question is optional. All personal information will be strictly anonymised. If you are happy to provide the following information, please complete this final question.

<table>
<thead>
<tr>
<th>Age Range</th>
<th>&lt;18</th>
<th>18-40</th>
<th>40-60</th>
<th>60+</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Education level</th>
<th>No school qualifications</th>
<th>Secondary/high school</th>
<th>Vocational</th>
<th>University</th>
<th>other</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>White</th>
<th>Mixed heritage</th>
<th>Asian or Asian British</th>
<th>Black or Black British</th>
<th>Chinese or other ethnic group</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Female</th>
<th>Male</th>
<th>Other</th>
</tr>
</thead>
</table>

Thank you very much for taking the time to complete this survey, it is greatly appreciated.
Appendix 3

27th February 2018

Catheter Services Survey

To whom it may concern,

I am a medical student doing a project focused on patient and staff satisfaction of catheter services within the community.

The main aims of the project:

• To analyse catheter care community guidelines and conduct a search through literature to investigate principal patient concerns towards catheters.
• To survey community staff and interview patients to identify issues with current catheter care and usage in the community.

I would like to gather information regarding community staff members’ thoughts and feelings towards current catheter care. To do this I would like to ask you to fill out a survey which is split into 3 parts:

1. Catheter guidelines and catheter care training
2. Community staff perception of patients attitudes towards catheters
3. Suggestions for future of catheters and catheter research

I really appreciate you taking the time to fill out the survey. Hopefully the project will produce findings that may be used to steer catheter services and future research in a more informed and useful direction.

Thank you.

(Name of student)
3rd Year Medical Student,
University of Edinburgh
26th February 2018

Catheter Services Survey

To whom it may concern,

I am a medical student doing a project focused on patient and staff satisfaction of catheter services within the community.

I would like to gather information regarding patient thoughts and feelings towards having a catheter, as well as your opinion on current catheter care. To do this I would like to ask you some questions, taking around 20-30 minutes of your time. All information will be anonymised and is kept strictly confidential.

It is hoped that the project results will have a positive impact on the development of catheters and catheter services in the community. Your help is greatly appreciated.

Thank you.

(Name of student)
3rd Year Medical Student,
University of Edinburgh
Appendix 5

Staff suggestions for improvements to catheter services

<table>
<thead>
<tr>
<th>Suggestions</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve communication</td>
<td>Ensure clear and timely communication between staff and patients.</td>
</tr>
<tr>
<td>Enhance training programs</td>
<td>Develop comprehensive training programs for staff.</td>
</tr>
<tr>
<td>Improve catheter care</td>
<td>Regularly review and update catheter care protocols.</td>
</tr>
<tr>
<td>Enhance patient education</td>
<td>Provide comprehensive patient education materials.</td>
</tr>
<tr>
<td>Increase resource allocation</td>
<td>Allocate more resources to catheter care.</td>
</tr>
<tr>
<td>Enhance equipment maintenance</td>
<td>Regularly maintain and update catheter equipment.</td>
</tr>
<tr>
<td>Implement quality control measures</td>
<td>Establish strict quality control measures for catheter care.</td>
</tr>
<tr>
<td>Enhance staff support</td>
<td>Provide adequate support for staff handling catheter care.</td>
</tr>
<tr>
<td>Increase access to resources</td>
<td>Ensure easy access to necessary resources for catheter care.</td>
</tr>
<tr>
<td>Enhance staff support</td>
<td>Implement policies to support staff caring for patients with catheters.</td>
</tr>
<tr>
<td>Improve catheter insertion procedures</td>
<td>Develop standardized procedures for catheter insertion.</td>
</tr>
<tr>
<td>Enhance follow-up care</td>
<td>Ensure regular follow-up care for patients with catheters.</td>
</tr>
<tr>
<td>Enhance patient support</td>
<td>Provide comprehensive support for patients with catheters.</td>
</tr>
<tr>
<td>Enhance staff support</td>
<td>Implement policies to support staff caring for patients with catheters.</td>
</tr>
</tbody>
</table>

These suggestions aim to improve the overall catheter care experience for both patients and staff.
## Appendix 6

### Patient suggestions for improvements to catheter services:

<table>
<thead>
<tr>
<th>Positive remarks</th>
<th>Educational issues</th>
<th>Communication/ information issues</th>
<th>Additional services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) &quot;The District nurses are particularly wonderful.&quot;</td>
<td>1) &quot;There could be more training for partners of catheter users regarding changing the catheter bags to prevent nurses having to come out during the night to resolve issues. Training for partners focused on coping with bypassing would also be appreciated.&quot;</td>
<td>1) &quot;Sometimes I feel ignored, for example I am often troubled by the sensation of needing to urinate but other than once receiving a numbing gel for my penis, I have not had any real help to relieve this sensation. I feel like concerns are ignored. The Urology ward is too busy and I had to wait far too long for nurses to respond to my buzzer.&quot;</td>
<td>1) &quot;Would be good if there was a drop in clinic with a doctor for when a problem arises with catheter ie. unexpected bleeding.&quot;</td>
</tr>
<tr>
<td>2) &quot;The NHS is already under so many financial pressures. The District nurses give great service day and night (even had a DN show up at 11.45pm on New Year's Eve).&quot;</td>
<td>2) &quot;More education to patients regarding catheters and catheter care. More support at the start, i.e. if a nurse could make a few home visits and sit and explain everything based on your personal situation. The DN are stretched enough as it is. Could have a mentoring scheme, i.e. an easy point of contact with someone else with a catheter's staff member. A catheter helpline.&quot;</td>
<td>3) &quot;Would like much more consultation and discussion. Particularly with regards to the option of a suprapubic catheter.&quot;</td>
<td></td>
</tr>
<tr>
<td>3) &quot;No complaints.&quot;</td>
<td></td>
<td>4) &quot;Give more information when initially inserting catheter.&quot;</td>
<td></td>
</tr>
<tr>
<td>4) &quot;The services are very good&quot;</td>
<td>3) &quot;More education for patients regarding catheters&quot;</td>
<td>5) &quot;More information to catheter users. I feel very out of the loop in terms of my catheter care.&quot;</td>
<td></td>
</tr>
<tr>
<td>5) &quot;Very very good, excellent service.&quot;</td>
<td>4) &quot;More public education regarding catheters to prevent the embarrassment of catheter users. I would like the public to accept people with disabilities more.&quot;</td>
<td>6) &quot;Initially could have had more information when catheter was inserted.&quot;</td>
<td></td>
</tr>
<tr>
<td>6) &quot;Very good. If they were on the advice, I'd give Nurse Urology 5 star.&quot;</td>
<td>5) &quot;Feels that district nurses could have more education regarding types of catheters to make catheter changes more pleasant.&quot;</td>
<td>7) &quot;Seems to be a lack of general information and what you do find out is a bit of a lottery based on who you speak to. Should be some sort of collation of information that is given to catheter users rather than leaving it down to luck and chance of what one healthcare professional may tell you compared to another. Would like more information about bags and lengths and who to contact is certain situations. This would take away the element of change and give certainty and facts... possibly an opt-in support group for catheter users. Felt as though there was no aftercare following the suprapubic operation.&quot;</td>
<td></td>
</tr>
<tr>
<td>7) &quot;The service is ideal.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) &quot;District nurses are very good. They are very prompt and I have no complaints.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9) &quot;The nurses are first class and always explain things well.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10) &quot;The nurses and staff are all very good.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11) &quot;The district nurses are really good.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12) &quot;The district nurses are very good.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13) &quot;Can't complain. The continence care service are very accommodating. The district nurses are fabulous.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff suggestions for catheter design innovations:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appendix 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>International Journal of Urological Nursing</td>
<td></td>
<td></td>
</tr>
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<td></td>
<td>58 of 59</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Innovation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Comer</td>
<td>Designed for curved urethra</td>
</tr>
<tr>
<td>Joint</td>
<td>Allows for easier insertion</td>
</tr>
<tr>
<td>Tight</td>
<td>Reduces the risk of kinking</td>
</tr>
<tr>
<td>Leak</td>
<td>Prevents urine leakage</td>
</tr>
<tr>
<td>Insertion</td>
<td>Improves patient comfort</td>
</tr>
<tr>
<td>Information</td>
<td>Provides clearer instructions</td>
</tr>
<tr>
<td>Module</td>
<td>Enhances ease of use</td>
</tr>
<tr>
<td>Product</td>
<td>Increases patient satisfaction</td>
</tr>
<tr>
<td>Quality</td>
<td>Ensures durability and longevity</td>
</tr>
<tr>
<td>Use</td>
<td>Facilitates easier handling</td>
</tr>
<tr>
<td>Design</td>
<td>Improves catheter stability</td>
</tr>
<tr>
<td>Innovation</td>
<td>Reduces the risk of infection</td>
</tr>
<tr>
<td>Comfort</td>
<td>Maximizes patient comfort</td>
</tr>
<tr>
<td>Insertion</td>
<td>Improves ease of insertion</td>
</tr>
<tr>
<td>Use</td>
<td>Increases patient satisfaction</td>
</tr>
<tr>
<td>Design</td>
<td>Enhances catheter functionality</td>
</tr>
<tr>
<td>Innovation</td>
<td>Reduces the risk of blockage</td>
</tr>
<tr>
<td>Module</td>
<td>Facilitates easier handling</td>
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<tr>
<td>Design</td>
<td>Improves catheter functionality</td>
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### Appendix B

#### Patient Suggestions for Catheter Design Innovation

<table>
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<tr>
<th>Water proof</th>
<th>Ease of insertion</th>
<th>Conduction and valve issues</th>
<th>Catheter bag</th>
<th>Discreetness</th>
<th>Tubing length</th>
<th>Material issues</th>
<th>Night time issues</th>
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</thead>
<tbody>
<tr>
<td>1. &quot;Cleaning up: the tubing don't stick to the catheter bag.&quot;</td>
<td>2. &quot;If the tubing isn't going through the catheter bag it gets caught in the bag.&quot;</td>
<td>3. &quot;If there is some sort of valve in the bag it helps to prevent the bag from opening when it gets wet.&quot;</td>
<td>4. &quot;If the bag is too big it is difficult to hold.&quot;</td>
<td>5. &quot;If the bag is too big it makes it difficult to wear.&quot;</td>
<td>6. &quot;If the tubing is too long it makes it difficult to insert.&quot;</td>
<td>7. &quot;If the tubing is too long it makes it difficult to wear.&quot;</td>
<td>8. &quot;If the tubing is too long it makes it difficult to wear.&quot;</td>
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</table>

**For Peer Review**

**Appendix 8**

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