

**Title:**

Supporting patients with long term catheterisation to reduce risk of catheter associated urinary infection.

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## **Abstract**

Average long-term catheter prevalence in the adult population in the United Kingdom (UK) is over 90,000 people. It has been estimated that 24% of them will develop symptoms of catheter-associated urinary tract infection (CAUTI), associated with reduced quality of life, risk of hospitalisation and increased mortality.

Aim: To identify how nursing staff can support catheterised patients to maintain effective catheter care in order to reduce the risk of CAUTI.

Methods: An integrative literature review was used to answer the research question and twelve studies were selected for the review.

Results: Four themes emerged: education, knowledge, empowerment and communication.

Conclusion: Consistent knowledge, clear communication and treating patients like partners in the decision making process could help to build trust and allow full patients consultation. In turn empowering patients to make safe and healthy choices about their catheter, particularly focused around personal hygiene and optimal fluid intake, as a key to reducing the risk of CAUTI.

**Key words:** support, long-term catheter, self-management, CAUTI

**Introduction:**

Indwelling urethral or suprapubic catheters are common and not restricted to the hospital setting (NHS Improvement, 2018). The Health Protection Agency (HPA) (2012a) suggests that catheters are often used in the community setting and usually are left in place for at least 28 days. Gage et al, (2016) estimated that there are over 90,000 long-term catheter users in the United Kingdom (UK). Although many patients have neurological reasons (62.9%), Gage et al. (2016) found that prevalence increases with age and catheters are used relatively frequently in patients with dementia, prostate disease and incontinence of urine (Department of Health [DH], 2013). Unfortunately, long-term catheterisation (LTC) is seldom trouble free, with the majority of patients experiencing recurring problems, with blockage of urinary flow and CAUTI (Tay et al., 2016; Maeda et al 2013; Wilde et al., 2013).

CAUTI accounts for approximately 43-56% of all urinary tract infections (UTI) in England (HPA, 2012a; Loveday et al., 2014) and is a common nosocomial infection, the second after respiratory tract infection, in older patients in England, comprising 17.2% of the total (HPA, 2012a; Loveday et al., 2014). The Department of Health (DH) (2013) reports that CAUTI is associated with extended hospitalisation, readmission and increased mortality. This is due to bacteriuria which is found in one-third of patients after 2-10 days from catheterisation (Loveday et al., 2014) and in all patients catheterised for >30 days, even when aseptic, closed catheter drainage system is maintained (European Association of Urology [EAU], 2015). The presence of bacteriuria and bacteria in the urine is asymptomatic in most cases, however approximately 24% of these patients will develop symptoms of CAUTI which consequently cause serious complications in approximately 3.6% patients, who

develop life-threatening infections with the mortality rate ranging between 10-33% (Shuman and Chenoweth, 2010; Chang et al., 2011; HPA, 2012b; National Institute for Health and Care Excellence [NICE], 2012). Furthermore, CAUTI can lead to delirium, increased risk of falls (Hazelett et al., 2006) and the development of antimicrobial resistance due to increased use of antibiotics for treatment of CAUTI (Centres for Disease Control and Prevention [CDC], 2018; DH, 2013).

Catheter-related problems contribute to the financial burden on the NHS due to unscheduled visits to emergency services, patients' hospitalisation or delayed discharge from hospital, antimicrobial treatment and staff resources (Tay et al., 2016; Loveday et al., 2014). Although the robust economic assessments of the cost of catheter-related problems are not available, it has been estimated that treatment of CAUTI accounts for £99 million per year (approximately £1,968 per episode) (Loveday et al., 2014). Tay et al., (2016) indicated that 75% of patients who attended ED with catheter problems, could have been treated at home. This highlights the need to improve the quality of care and move towards a model that is based in the home to enable patients to self manage their catheter and reduce risk of CAUTI.

## **Aim**

The aim of this review was to identify ways that nursing staff can support catheterised patients to maintain effective catheter care in order to reduce the risk of CAUTI.

## **Method**

### **Study design:**

A critical integrative literature review has been chosen to facilitate the investigation of the topic from objective and subjective perspective by incorporating qualitative, quantitative and mixed method studies.

### **Inclusion and exclusion criteria:**

Inclusion and exclusion criteria were formulated to specify the remit of the project.

The following inclusion criteria were chosen. Published, journal and peer-reviewed primary research related to the adult (>18 years old) patients with long-term indwelling catheters were used. Articles written in English language and published after 2007 were selected because originality and topicality of the research can be ensured by establishing the most recent studies.

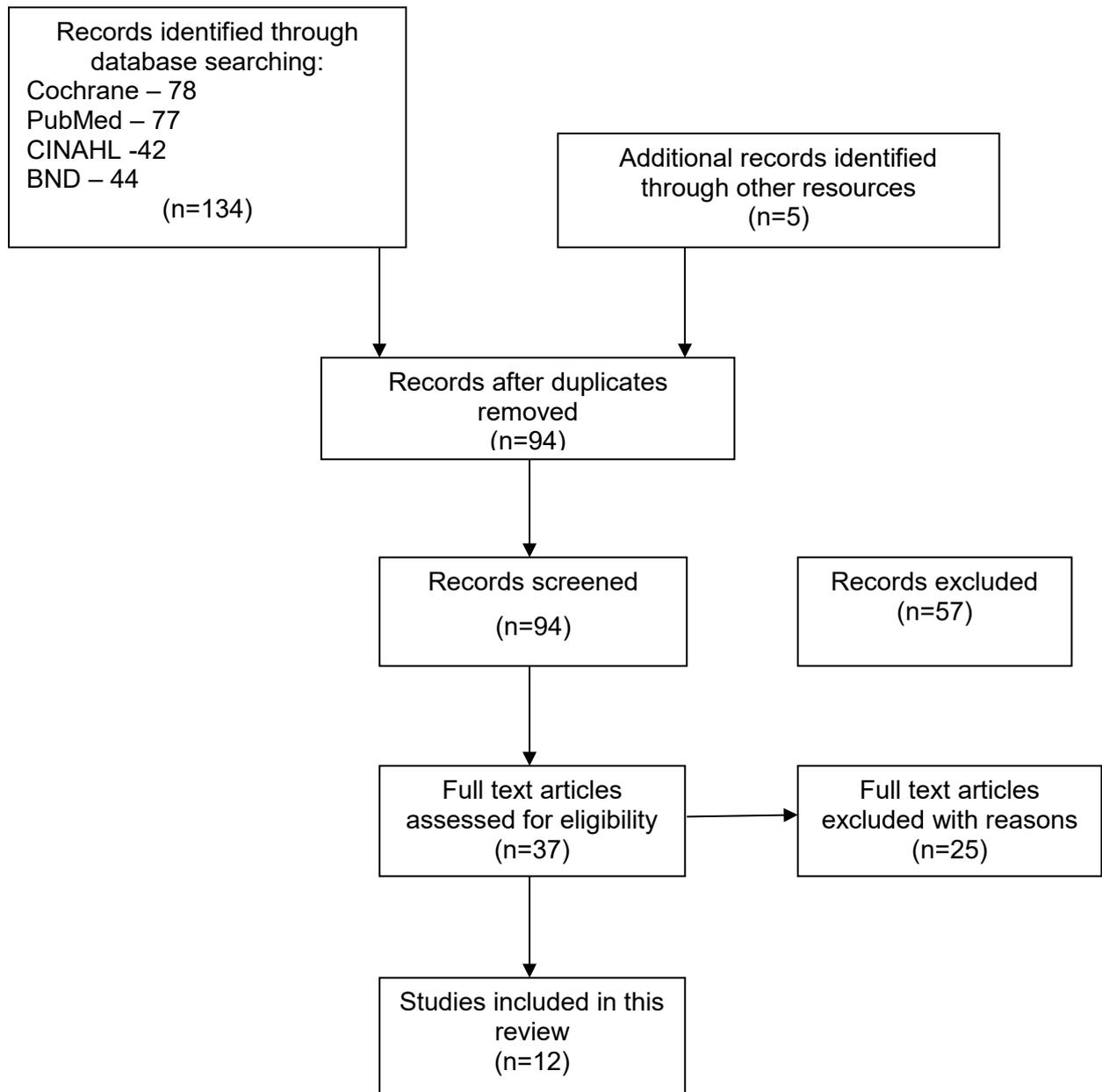
Research related to children (<18 years old), patients with the short-term catheters in situ or patients using intermittent catheterisation were deemed not relevant to the research question and were excluded during the screening process. Additionally, the following exclusion criteria were also used. Grey literature was excluded. Not-primary research articles, unpublished articles and not peer-reviewed articles were excluded due to lack of rigour. Non-English language studies were excluded due to limitation of time and translation services. With the advances in healthcare technology, studies written more than 10 years ago, were excluded.

### **Search strategy:**

Four databases were used to obtain relevant studies, namely the Cochrane Library, the British Nursing Database, CINAHL and PubMed. The following keywords were developed: support; long-term catheter; self-management; catheter-associated urinary tract infection. Boolean operators AND, OR, and NOT, truncation (using '\*' to ensure that all possible endings of the key terms were found) were used while searching for the articles using the search terms: support\* OR help\* OR train\* OR educat\* OR teach\* OR inform\* OR aware\* OR knowledge AND long-term catheter\* OR urinary catheter\* OR urethral catheter\* OR indwelling catheter\* AND self-manag\* OR self-care OR self-efficacy OR efficacy AND CAUTI OR infect\* OR UTI OR bacteriuria.

A total of 139 articles were found to be appropriate for the review [see search outcome – fig 1]. 94 records remained after duplicates were removed. 57 primary studies were excluded, due to failing to meet the inclusion criteria. Furthermore, 37 articles were assessed for eligibility out of which 25 were excluded for not meeting the inclusion criteria. Twelve manuscripts were included in this review, which were critically appraised for their robustness, validity and quality using selected critiquing frameworks.

Figure 1. PRISMA Flow Diagram (Moher et al., 2009)



### **Quality appraisal:**

The articles selected for this review were critiqued using different appraisal frameworks. The CASP (Critical Appraisal Skills Programme) tool was used to appraise qualitative research (CASP, 2017). For critiquing of quantitative research studies, Coughlan et al. (2007) appraisal tool was used and Pluye et al. (2011) tool was used for appraising mixed methods.

### **Data extraction:**

On the basis of the recommendation by Whittermore and Knafl (2005) data from primary sources were divided into logical subgroups according to the type of evidence they embodied and then sequentially analysed. For each subgroup, relevant data were extracted from primary sources and compiled into a matrix by first author, date and country; the title; the aim of the study; a description of the study design; sample size and the key findings. This was the starting point for the interpretation process (Table 1).

Each paper was individually read and reread to achieve further understanding of the findings. Following that, data from individual sources were combined into a display by subgroups to devise patterns and relationships. Then the data was compared to identify emerging themes based on their similarities and differences. Developed themes were then available for grouping into hierarchical subtheme structures represented by grouping in a force-field analysis (Figure 2). Visualising and comparing the data in this way provided clarity to early and empirical interpretation.

Table 1. Summary of included studies

No.	Author (year), country	Title	Aim	Study design	Sample size	Key Findings
1.	Fowler et al. (2014), UK	Living with a long-term, indwelling catheter. Catheter users' experience	To interpret what are the experiences and priorities of long-term catheter users.	<u>Qualitative study.</u> In-depth semi-structured interviews with open-ended questions.	Purposive sampling strategy including 27 adults between 22 and 96 years old with LTC.	-The profound effect of catheter problems such as CAUTI; -struggling to manage the catheter bag away from home; -lack of awareness about implications of poorly secured catheter bag; -importance of support from community nurses; -awareness about the positioning of catheter bag.
2.	Godfrey, H.(2008), UK	Living with a long-term urinary catheter: older people's experience	To understand older people's experiences related to LTC and to develop theory grounded in their realities.	<u>Qualitative study.</u> Grounded theory approach; two-phased in-depth interviews.	Purposive sampling strategy; 13 participants aged >60 years old, using urinary catheters for >3 months.	-The need of understanding of the reason for catheterisation and its performance; -the need for good interaction and relationship with healthcare providers to engage actively.
3.	De Jaeger et al (2017), UK	A qualitative study exploring the value of catheter passport	To investigate an effect of a patient-held catheter passport on patients leaving the hospital with IUC and to explore the experiences of hospital nurses who discharge the patients and community nurses who provide ongoing care to these patients.	<u>Qualitative study.</u> Structured interviews, questionnaires and focus groups.	Purposive sampling strategy; 9 adult patients who took part in the interviews; 5 community nurses and 6 hospital nurses who took part in the interviews and focus groups; and 38 hospital nurses who completed the questionnaire.	Catheter passport: -improved nurses' and patients' knowledge about the catheter; -supported transition of care between acute and community setting; -improved catheter care -promoted self-management.
4.	Prinjha et al (2016), UK	Exploring the information needs of people living with a long-term indwelling urinary catheter: a qualitative study	To explore what are the information needs of long-term urinary catheter users, how these needs can be met and what are the consequences of inadequate information.	<u>Qualitative study.</u> In-depth interviews.	A maximum variation sample; 36 participants, age 22-96, living in the community with a LTC.	Participants felt that they have been told very little about the catheter when it was first fitted; they need more technical information about the catheter and how to prevent complications and more information to help prevent catheter-related physical problems.
5.	Kralik et al (2007), Australia	Managing the self: living with an indwelling urinary	To explore the perspectives of living with a urinary catheter; to raise awareness of long-term	<u>Qualitative study.</u> Structured interviews and	Purposive sample; 21 participants aged between 24 and 82 years living with	The biggest concern for participants was the risk of infection making them aware of the importance of self-care

No.	Author (year), country	Title	Aim	Study design	Sample size	Key Findings
		catheter	catheterised patients' experiences in order to inform community nursing practice.	observations.	a LTC.	and taking control.
6.	Wilde and Brasch (2008a), USA	An intervention to teach self-monitoring of urine flow in long-term catheter users	To assess the participants' perceived value of carried out intervention of urine-flow self-monitoring to reduce episodes of CAUTI.	<u>Qualitative study.</u> Interview and over the phone questionnaire.	Purposive sample; 11 participants were included.	The intervention was perceived easy to use and participants benefited from it as it helped them to understand the importance of urine flow and increased awareness of their own patterns.
7.	Lee et al (2015), Taiwan	A nurse-family partnership intervention to increase the self-efficacy of family caregivers and reduce catheter-associated urinary tract infection in catheterised patients	To evaluate whether a nurse-family partnership model will support family caregivers' self-efficacy and result in protecting patients against CAUTI.	<u>Quantitative study.</u> A randomised controlled study.	Purposive sample; 61 participants, (30 participants in the experimental group and 31 in control group); patients without symptoms of CAUTI catheterised for >5 days	The incidence of CAUTI was lower among experimental group (20%) than the control group (38.8%).
8.	Khan et al. (2010), UK	Strategy to control catheter encrustation with citrated drinks: a randomised crossover study	To determine whether the activity of urease producing bacteria can be controlled by increasing the fluid intake with citrated drinks.	<u>Quantitative study.</u> A randomised crossover study.	21 participants (mean age of 63 years) with LTC.	The simple addition of citrated drinks to the patients' diet may decrease the risk of encrustation hence other related catheter problems such as CAUTI.
9.	Wilde et al (2016), USA	Testing a model of self-managing of fluid intake in community-residing long-term urinary catheter users	To determine whether catheterised patients' self-management practices concentrated on fluid intake would be linked with self-efficacy toward decreasing CAUTI and/or catheter blockage.	<u>Quantitative study.</u> A randomised controlled trial.	180 participants, aged between 19 and 95 years, with LTC.	Fluid intake self-management was not associated with either frequency or the presence or absence of CAUTI. Fluid intake self-management predicted less frequency of catheter blockage but did not predict the presence or absence of blockage.
10.	Wilde et al (2015), USA	Self-management intervention for long-term indwelling urinary catheter users	To examine the effectiveness of a self-management intervention in the prevention of adverse outcomes (CAUTI, blockage, and accidental dislodgement). To determine whether teaching catheter users self-management	<u>Quantitative study.</u> A randomised clinical trial.	220 participants (mean age 61) with LTC.	CAUTI rate of 6.93/1000 catheter days decreased to 4.89 (a 29% relative reduction) in full 12 months.

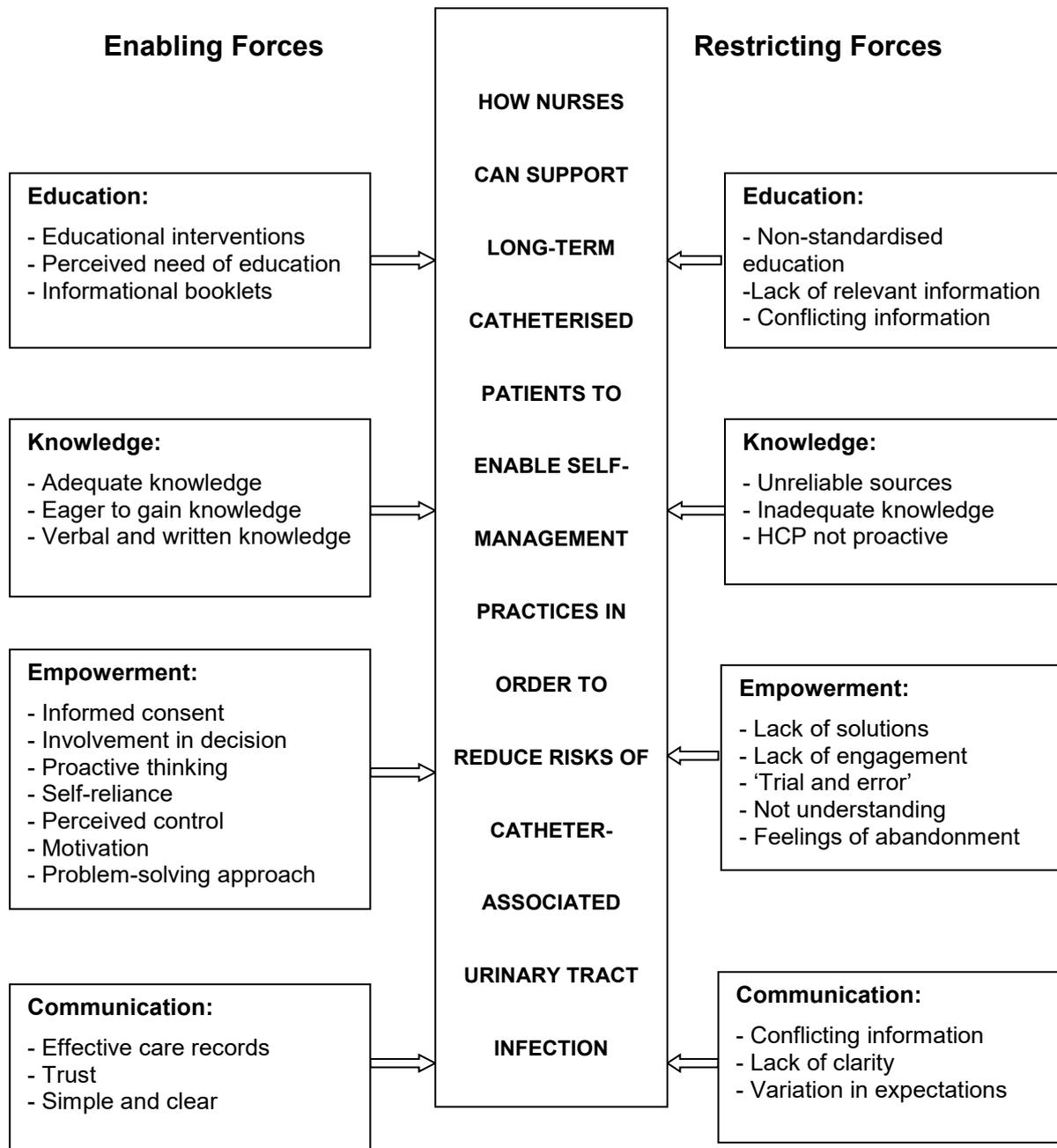
No.	Author (year), country	Title	Aim	Study design	Sample size	Key Findings
			skills could decrease short-term, catheter-related problems and whether improvements could be sustained over 12 months			
11.	Wilde and Brasch (2008), USA	A pilot study of self-monitoring urine flow in people with long-term urinary catheters	To evaluate the feasibility of the intervention of self-monitoring of urine flow in catheterised patients; to assess the effect of the intervention on CAUTI, blockage and participants' quality of life; to evaluate the formulated instruments to measure awareness, self-monitoring, and self-management of urine flow.	<u>Quantitative study.</u> A pre-post single-group design.	11 participants aged 28-70 years old, with LTC.	Cases of UTI reduced by about 50%.
12.	Mackay et al (2017), UK	Living with an indwelling urethral catheter in a community setting: exploring triggers for unscheduled community 'out-of-hours' visits.	The qualitative aim of the study was to investigate the experiences of catheterised community patients and those caring for them. The quantitative objective of the study was IUC-related consequences on a community nursing unscheduled service.	<u>Mixed-method study.</u> Semi-structured interviews with open-ended questions;. Quantitative data was retrieved electronically.	Purposive sample strategy; 15 participants: 6 catheterised patients aged between 68-86 years old; 2 community nurses; 3 augmented home carers; 2 relative carers; 1 healthcare assistant	The quantitative data revealed that 20% of unscheduled visits done by community nurses were related to the urethral catheters. The qualitative data found that catheterised patients and their carers felt inadequately equipped to deal with the catheter-related problems, consequently, they were learning on their own mistakes, which sometimes caused unsafe decisions made by the patients or their carer's.

## Results

The 4 themes identified within the selected articles are presented below (Figure 2):

- education,
- knowledge,
- empowerment,
- communication.

Figure 2. Emergent themes



## **Education**

The studies by Wilde and Brasch (2008), Wilde et al. (2015), Lee et al. (2016) and De Jaeger (2017) agree that both informational booklets and educational interventions instructing as to what to look for while self-monitoring urine flow or how much to drink, could reduce risk of CAUTI in patients. The evidence showed that being aware of urine flow, its smell and colour and keeping a good fluid intake will alert early signs of infection and blockage and enhance self-management practices to avoid future problems (Lee et al., 2016; Wilde et al., 2015; Khan et al., 2010).

Wilde and Brasch (2008) created educational materials to facilitate the learning of how to be mindful of urine flow and discovered that a six-month intervention reduced the incidence of CAUTI by 50% and increased self-management habits; for example noticing the colour of the urine on a routine basis as well as increasing fluid intake. According to the model of self-management of fluid intake created by Wilde et al. (2016), confidence about urine intake lead to positive self-management behaviours concerning fluid intake. This in turn is directly connected to diminished rates of catheter blockage and indirectly to fewer CAUTI incidents. The effect was the minimisation of CAUTI prevalence by 29%. Even though the results were statistically not compelling, the decrease in CAUTI rate was clinically relevant since it resulted in a 14.1% reduction in UTI related hospital admissions in 14 months (Wilde et al., 2016; Wilde et al., 2015). A similar educational process was done by Lee et al. (2016), focusing on family-carers. Despite the fact that a 20% reduction in CAUTI was not statistically significant, the study shows the importance of nurse-carers' interaction in managing indwelling urinary catheters. Interestingly, according to Fowler et al. (2014) patients with spinal cord injury, who benefitted from support and

education from a spinal cord centre, seemed more self-reliant and knowledgeable of the catheter. In contrast, Mackay et al. (2017) discovered that there was no standardised approach to the way in which patients and their carers' were offered relevant information or educational materials regarding their catheter and thus frustration and confusion developed about conflicting or superficial guidance received from healthcare practitioners.

### **Knowledge**

Patients' knowledge is closely connected to education, which contributed to the findings of Godfrey (2008), and Prinjha et al. (2015), as patients developed proficiency in recognising the signs and symptoms of infection, whilst others emphasised the dilemma of antibiotics treatment, versus the risk of developing resistance (Fowler et al., 2014; Godfrey, 2008). Prinjha et al (2015), found that catheter users desired to become knowledgeable on avoiding infections, and asked for information on hygiene, fluid intake, kidney physiology, follow up appointments with the urologist, and the long-term effects of intermittent use of antibiotics (Prinjha et al., 2015). However, guidance and information had been given reactively and superficially (Mackay et al., 2017) by nurses. For example, the inability to quantify *'drink plenty'* or *'just make sure it is kept clean'* were vaguely phrased and thus could lead inadvertently to detrimental effects, when the patient had positive motivational intentions.

Without timely information catheter care was sought through *'trial and error'*, or by seeking information through invalidated internet sources. Some patients emptied their catheter bags at the first signs of urine and restricted their liquid intake when

travelling long distances. Additionally, using inappropriate cleaning methods to prevent blockages and lack of care to the bladder neck by using an unsecured bag, (Prinjha et al. 2015) were prime reasons for infection. Mackay et al. (2017) reported that patients often forgot or misinterpreted advice, however, this was simplified by the use of a patient catheter passport (Jaeger et al., 2017), which offered reassurance following discharge. However, some patient's preferred face-to-face interaction with HCPs to understand catheter management, aided with step-by-step instructions, troubleshooting guidance and graphics this helped with understanding (Jaeger et al., 2017; Mackay et al. 2017). Evidently, catheterised patients need nurses to support them in broad dissemination of CAUTI knowledge through education.

### **Empowerment**

Kralik et al. (2007) highlighted the need for patients to be involved in decisions pertaining to catheter care, and thus enabled them to accept and recognise cues of catheter function. Patients benefited from the control gained from monitoring their urine flow, and observing for signs of blockage or infection which fostered confidence in their own ability to take decisions (Lhussier et al., 2015; Wilde and Brasch, 2008). Godfrey (2008) warned that not understanding the need for the catheter led to a decrease in involvement and to feeling discouraged. Moreover, limited consultation resulted in dissatisfaction and feelings of coercion into accepting a catheter. Validated by Mackay et al. (2017) some patients felt abandoned rather than empowered. For example, nurses said these problems just happen without offering a solution or any help.

De Jaeger et al. (2017) stated that nurse participants hoped a catheter passport would bolster the patients' ownership of their catheter, making them feel in control and confident. Interestingly, patients used the passport as reassurance, educating themselves in particular around basic hygiene knowledge. Other patients used the passports proactively, finding answers and options to problems such as positioning and drainage.

### **Communication**

Communication was a key topic in the studies reviewed. This referred to many aspects of communication, including if the information shared between carers, nurses and patients was useful, adequate, relevant, fragmented or timely. However, Mackay et al. (2017) stressed that patients and relative-carers agreed they had received conflicting information from HCPs. This was a decisive factor that caused confusion and frustration among patients and their relatives and sometimes appeared to create a dilemma, regarding trust and reliable information. The burden of responsibility on the patient was accompanied with feelings of vulnerability with regards level of knowledge, and the lack of clarity concerning role responsibility of catheter care (Mackay et al., 2017).

The catheter passport did bridge the communication gap between the community and acute settings, and between patients and nurses (De Jaeger et al., 2017) and there was an awareness of the information gaps when patients were discharged with a catheter. Therefore, the catheter passport was an up-to-date safe record of patients' catheterisation, which could be shared across various settings to communicate when and why a patient was given a catheter but also a tool to better

communicate with patients, encouraging them to ask about catheter issues (De Jaeger et al., 2017).

## **Discussion**

There is a lack of research that could guide practice in catheter care, as much of the guidelines are based on expert opinions, and not on the methodologically robust randomised controlled trials (RCTs) (Cottenden et al., 2013). Moreover, nearly all the evidence based practice focuses on the prevention of CAUTI in short-term catheters (Pickard et al., 2012); additionally, most of the intervention research that aimed to reduce prevalence of CAUTI in the past was hospital-based and nurse-focused but none was patient-led (Anderesseen et al., 2012; Fuchs et al., 2011; Jenkinson, 2005). This might be because CAUTI was seen as a nosocomial infection and most of the national initiatives were associated with reducing CAUTI rate in acute settings by introducing 'bladder bundles' and educating nurses about preventative measures, such as early catheter removal, aseptic technique and maintaining closed drainage system (Meddings et al., 2013; Saint et al., 2009).

While multiple strategies are required to reduce CAUTI prevalence, the findings strongly indicate that patients want to become more empowered and therefore, nurses' support in improving patients' knowledge, skills and confidence is a prerequisite to reducing the risk of CAUTI and successful catheter management. These findings are supported by Orem (2001), who shows that improving patients' knowledge about the condition enhances their ability to self-care (Orem, 2001). Nurses' role in assessing patients' needs and ensuring ongoing education and support cannot be replaced. LTC inevitably require lifestyle changes and affects the behavioural, cognitive and emotional responses needed to sustain a satisfactory life.

Living with or offering support and care for people with LTC is an intricate experience. However, society at times forgets about LTC users because the problems they face on a regular and recurrent basis cannot be seen as life-threatening (Mackay et al., 2015). Yet, infections were repeatedly cited as issues experienced by the LTC patients, greatly affecting the quality of their life (Godfrey 2008; Kralik et al., 2007; Prinjha et al., 2015). Patients felt insufficiently prepared to manage LTC when something went wrong, and usually learned through experience (Fowler et al., 2014). Therefore, such practice limits the ability to self-manage and contradicts the evidence, which encourages support and information for catheterised patients (WOCN, 2016).

While included studies offer the solution and example of educational interventions, such as teaching of urine self-monitoring or filling fluid input/output chart, they do not provide information about feasibility and the cost-effectiveness of these programmes for use in the UK (Lee et al., 2014; Wilde and Brasch 2008; Wilde et al., 2015). Robinson (2004) prompted nurses to accept training and knowledge limitation regarding catheter problems, because managing LTC is an intricate process led by the culture where care is given, local service provision, health policies and available resources that are normally finance-dependent (McEvoy 2014).

These policies determine people with a chronic condition to become more responsible for its management. Thus, while it should start with nurses offering adequate information, knowledge alone is insufficient and cannot enable optimal self-management. Patients need to learn how to express their needs, find and analyse

health information from a variety of sources, and know more about available treatments and the HCPs' role. Suboptimal health literacy will hinder many patients from having an active role in managing their condition, even if they desire it (Coates, 2017). Thus, advocating catheter self-care is not only about educating the patients about their condition or providing relevant information, and the correct response to take. Positive interactions and clear communication between HCPs and patients can help develop confidence and motivate patients to use their own skills to effectively take control of their situations (De Jaeger, 2011). Patients view catheterisation as a very personal matter, and can associate it with their sexuality, body image and desirability. Therefore, from this sensitive example nurses need to work towards a transparent, open and trustworthy relationship to encourage patients to be honest about their catheter self-care to reduce the risk of CAUTI (Box 1).

### **Box 1. Supporting patients' self-management practices in order to reduce risks of CAUTI**

**Step 1:** Offer an individual training session. Build trust and discuss with the patient their common goals and patients worries, challenges and expectations, acknowledging patient's role in preventing the incidence of CAUTI.

**Step 2:** Make patients alert to signs of infection:

Urine change (colour of urine, presence of sediment, mucus, blood clots); malaise; weakness; pain in bladder; burning; bladder spasm; chills; fever; pain in back/side; muscle spasm; mental changes; leakage.

**Step 3:** Emphasise following preventative measures:

- Using proper hygiene;
- Securing the catheter;
- Using a closed drainage system (empty the catheter bag when it is 2/3 full and attach night bag to the leg bag at night; replace leg bag every 7 days or as per manufacturer's recommendations);
- Placing the bag below the level of the bladder;
- Avoid kinking, tension on the catheter tubing;
- Monitor urine output (commence fluid input/output chart);
- Maintaining a good fluid balance even when out, avoiding caffeinated drink and introducing citrated drinks (lemon);
- Avoiding constipation;
- Avoiding routine use of bladder washout solutions.

**Step 4:** Make a written action plan to follow when faced with the early symptoms of UTI. Provide catheter passport and relevant phone numbers to the community nursing team and community continence nurses. Offer follow up phone calls and follow up visits when necessary. Provide reassurance and encourage a patient to take control.

### **Limitations of review**

To further enable true transparency, limitations must be acknowledged. Concerning the process of obtaining the data, the inclusion and exclusion criteria place ample limitations on the types of studies retrieved, which may lead to relevant studies being ignored and findings within the selected studies might have been influenced by publication bias. All the studies in this review were in English, so that pertinent

studies in other languages might have been overlooked. Findings using thematic analysis are also prone to interpretation, and this is also a limitation of this study.

## **Conclusion**

The findings showed that practical information and education on managing LTC and CAUTI would be valued by catheter users. The evidence showed that extensive written, verbal and visual information about the catheter and living with would be advisable (De Jaeger et al., 2017). Furthermore, written advice when discharged, including a catheter passport, will increase patients awareness of catheter issues and problem solving (De Jaeger et al., 2017; Wilde and Brasch 2008). These simplistic changes can help detect and quickly treat early signs of infection. Additionally, the decision making process, does require a collaborative relationship to enhance self-care problem-solving strategies. This provides the basis to introduce educational resources which are key in providing well received information on self-care. This could be enhanced if the patient can access a self-help group which should enable them to cope with their LTC.

## **Key points and Recommendations for Practice**

1. While good self-management can minimise or prevent CAUTI, making catheter users aware of what to look out for can mean that problems are identified early and effective responses made.
2. Self-management combines awareness of the medical situation with communication and cooperation with healthcare professionals.

3. Appropriate care and vigilance might make it possible for patients to prevent CAUTI, and to start treatment early enough to avoid presenting to ED.
4. Patient education is therefore important for successful care of an indwelling catheter because understanding the catheter and its function means greater acceptance and better management.
5. Nurses should work with patients to manage issues related to catheters, to be in charge of individual problems, and promote adjustments.

### **CPD reflective questions**

Consider what could you do to provide catheterised patients with more information regarding CAUTI prevention.

Reflect on how nurses could encourage catheterised patients to maintain effective catheter care in order to reduce risk of CAUTI.

Think about the barriers that stop catheterised patient from self-care practices and how nurses could alleviate these barriers.

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