Impact of Practice on Quality of Life of those Living with an Indwelling Urinary Catheter– An International Evaluation

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Introduction

Patients using indwelling urinary catheters often experience complications, which have the potential to negatively impact quality of life. As limited evidence exists to inform and guide urinary catheter management, especially in those with long-term catheters, patient care varies.

Purpose

This study compared the characteristics and quality of life of patients living with a long-term indwelling urinary catheter in the United Kingdom and the United States where catheter care policies differ with respect to types and routes of catheterization and timing of catheter changes. Quality of life was determined by utilizing the International Consultation on Incontinence Long-term Catheter Quality of Life Questionnaire.

Methods

A cross-sectional study of long-term urinary catheter users in the United Kingdom and the United States, male and female, able to speak and read English, age >=18 years, using a urethral or suprapubic catheter for >1-year. Participants completed a questionnaire and relevant catheter-related data were extracted from their medical records.

Results

Participants (n=190, 51% from United States) were recruited, largely from the home health setting. Most (n=136, 71.6%) were male, with a mean age of 72.8 years. The majority used an indwelling urethral catheter, but this varied by country and was more common in the United

Kingdom. The number of urinary tract infections and catheter changes was significantly higher in the United States ($p < 0.001$). The catheter function score was significantly worse in the United Kingdom participants but there was no difference in life impact score between countries.

Conclusions

Approaches to indwelling urinary catheter care differed in the two countries, as did catheter complications and some aspects of quality of life. Further analysis will explore how these factors interact.

Level of Evidence: Level III-A – Cross-sectional Study *Source:* Johns Hopkins Hospital/Johns Hopkins University, 2016.

Authors' Note: This study was supported by the Society of Urologic Nurses and Associates (SUNA), The Allergan Foundation, and Hollister, Incorporated.

Findings of the study do not necessarily reflect the opinions of SUNA. The views expressed herein are those of the authors and no official endorsement by SUNA is intended or should be inferred.

Abstract:

The numerous complications associated with long-term indwelling urinary catheter use can impact patients' everyday lives. This is the first international study to compare catheter care, complications, and the quality of life (QoL) of patients from the United Kingdom and the United States.

Key Words: home health nurses, urology, urethral catheter, suprapubic catheter, urinary catheter care

Acknowledgements

The authors wish to thank all the community nurses from the National Health Service (NHS) Lanarkshire; Danielle Flynn, RN, MSN, Maria Buccafuri, PT, MSPT, CLT-LANA and the clinical nurses from Penn Medicine Home Health who helped recruit to this study, all the patients who participated, and George Lin and Hanna Stambakio, research coordinators at the University of Pennsylvania.

Indwelling urinary catheters (IUC) are necessary to treat urinary retention and incomplete bladder emptying in men and women. In the United Kingdom (UK), prevalence studies report that 6-13% of individuals in the community have a urinary catheter (Health Protection Surveillance Centre 2012, Royal College of Physicians 2012). In the United States (USA), 9% of older adults receiving home health services (2007-2012) reported using an IUC to manage urinary incontinence (UI) (Gorina et al 2014) although IUCs are not recommended for use in individuals with UI (Gould et al., 2009). Between 15% and 25% of hospitalized patients may receive short-term IUCs and emergency departments are a major source of urinary catheters (Schuur et al., 2014). Moreover, up to 13% of men and 12% of women in the USA have an IUC on admission to a nursing home and long-term use has been reported to be 5% to 8% (Castle et al., 2017; Roger et al., 2008; Tsan et al., 2010). However, the overall prevalence of long-term IUCs is not known.

With a rise in both the aging population and the number of people living with chronic health-related conditions (often more than one), it is likely that nurses (e.g., hospital, home health nurses and/or those specializing in urology) will continue to be the healthcare professionals responsible for most care in individuals with long-term IUCs. In the UK, 10.8% of community nurses' caseloads are patients with urinary catheters, mostly men aged over 70-years (Prieto et al 2020). For more than a decade, hospital-, state-, and national-level initiatives in the USA have aimed to standardize IUC use, especially the 2009 Centers for Disease Control and Prevention (CDC) guidelines (Gould et al., 2009) and the 2013 Choosing Wisely initiative (ABIM Foundation). In many cases, urology nurses initiate initial insertion and management of an IUC but in cases of long-term IUCs, general nurses, specifically home health nurses, remain the primary clinician for their care.

Background of the Problem

Indwelling urinary catheters are used extensively throughout healthcare for a range of acute and chronic bladder conditions. Although the most common route of an IUC is urethral (referred to as transurethral), there is an increased preference by patients for suprapubic catheters for long-term bladder management. Information on suprapubic catheter care is lacking; however, professional organizations are developing consensus guidelines for nurses (Continence Nurses Society Australia, 2021). Considerable variation exists in long-term IUC management guidelines implemented by nurses worldwide, largely due to insufficient high-quality evidence on which to base policies in nursing practice. Indwelling urinary catheters are prone to several issues that can significantly impact a person's QoL. A catheter-associated urinary tract infection (CAUTI) is the most common problem seen with IUCs. A CAUTI refers to a person with a IUC in situ for a 48-hour period before the onset of a symptomatic urinary tract infection that presents with bacteriuria with counts of colony-forming units/ml of 10^3 cfu/ml of a principal pathogen in a clean, sterile collected urine sample. Signs and symptoms associated with a CAUTI include dysuria, fever (not attributed to any other cause), suprapubic tenderness, costovertebral angle pain or tenderness and new onset urinary frequency or urgency. (The Center for Disease Control and Prevention [CDC], 2009; The European Association of Urology (EAU), 2023) Other catheter-related problems include blockage of the catheter tubing lumen or eyelets (Feneley et al., 2012), with subsequent bypassing (leakage of urine around the outside of the catheter), urethral strictures and gross hematuria (Hollingsworth et al., 2013; Wilde & Cameron, 2003).

Consensus on many catheter care practices is limited, such as the optimal interval between catheter replacements (Cochran, 2007, Gould et al., 2009, Newman et al., 2018, Shepherd et al., 2017). For example, some guidelines suggest that catheters should not be

routinely changed (EAU, 2023) but changed when there is an infection or obstruction (ANZUNS Guideline 2013; Gould et al., 2009); others suggest a scheduled change in anticipation of obstruction (Grabe et al., 2015). There are also recommendations (Royal Cornwall Hospitals NHS Trust 2015; NICE 2017) that the IUC is changed according to the maximum time that the manufacturer allows; and many guidelines followed by nurses in the UK advocate that the optimal time lapse between changes is 12-weeks (recognizing that this might not always be possible). In the USA, some home health agencies have written policies in place for changes or replacement of IUCs at fixed intervals (Harrison et al., 2022), but they are most often changed every four weeks as catheter changes are usually driven by medical insurance coverage. The Society of Urologic Nurses and Associates (SUNA) guidelines (2015) note that current practice is to replace long-term IUCs every four weeks but suggest that catheter replacement should be individualised and based on clinical symptoms (e.g., encrustations, leakage, CAUTIs) rather than rigid timings.

Catheter blockage has been associated with CAUTIs (Wilde et al., 2003) and they account for many of the unplanned visits made by home health nurses during evenings and weekends. Mackay et al (2018) reported that 20% of community nurses unscheduled visits were triggered by urinary catheter problems with bypassing and blockage accounting for 72% of these visits.

Crystalline biofilm formations, the cause of many clinical complications, are rapidly established following catheter insertion (Pelling et al 2019, Stickler 2014). Regular catheter changes may reduce the impact of biofilms on CAUTI's and blockages, however catheter changes themselves are uncomfortable for patients (Newman, 2017).

Roe and Brocklehurst (1987) reported that catheter changes were painful in 61% of long-term IUC users with 30% saying they were dreading the change procedure. An increased risk of infection, urethral trauma, and long-term histological changes have been associated with routine monthly catheter replacements (Cottenden et al., 2017).

Purpose or Research Questions/Problems/Hypotheses

This cross-sectional study, **IM**pact of **P**ractice on **L**ife with an **I**ndwelling **C**atheter - intern**AT**ional **E**valuation (***IMPLICATE***), aimed to compare the QoL of community-dwelling individuals with a long term ICU in the UK and USA where catheter care policies differ with respect to types and routes of catheterization and timing of IUC changes.

Methodology

Design

Participants were recruited from either home health agencies or outpatient urology practices. In the UK, community nurses from primary care clinical practices in one National Health Service (NHS) Health Board area identified potential long-term IUC users and informed them of the study. In the USA, long-term IUCs users were recruited from a home health care agency and a large urban academic urology practice. Home health nurses in both countries were informed of the study and enrolment criteria. Participants were provided with an information sheet describing the study and those that were interested in taking part were contacted by telephone by a member of the research team who checked that inclusion/exclusion criteria were met (see Table 1), provided further information, answered any questions, and then sought verbal informed consent.

Ethical approval for the study was granted from the University of Pennsylvania Institutional Research Board (#834082) in the USA and from the London-Chelsea Research

Ethics Committee (REC Ref: 19/LO/1752, IRAS project ID 263507, approved 17 Dec 2019) via the IRAS system in the UK.

Outcome Measures

Participants received either a one-time face-to-face visit or a telephone call by the research assistant and community nurse (UK) or home health nurse (USA). Participants were asked, either at this visit or later by telephone, to complete the International Consultation on Incontinence Questionnaire –Long-term Catheter Quality of Life (ICIQ-LTCqol) questionnaire; approximate time for completion=10 minutes. The ICIQ-LTCqol is a comprehensive, validated, universally accepted, self-completion questionnaire to assess the impact of living with a long-term IUC. It consists of two scored domains: catheter function and concern (9 items; score range 0-42; higher scores, worse QoL) and lifestyle impact (3 items; score range 3-15; higher scores, worse QoL) and four stand-alone items relating to continence pads, pain, sexual activity, and bladder spasm. Developers of this questionnaire report acceptable internal consistency reliability (Cronbach's alpha 0.76 and 0.74 for each of the two domains) (Cotterill et al., 2016).

Demographic details, pertinent health history, catheter problems and complications for the past 12-months (e.g., blockage, dislodgement, bypassing, CAUTI) and catheter care practice data (e.g., change schedule, irrigation) were extracted from medical records and at the face-to-face visit.

Sample Characteristics

We aimed to recruit 122 participants in each country. Data on catheter care variables and QoL for 122 long-term IUC participants per country would allow us to detect a moderate difference between the countries (8% of the theoretical range of the catheter function sub-score

of 0-42) (Cotterill et al., 2016) as described by Sloan et al., (2003) with 90% power at the 5% level of significance.

Data Analysis

Descriptive statistics were used to summarise the demographic characteristics, reason for having a long-term ICU, type and size, duration of catheter use, catheter-related problems and complications, frequency and reason for catheter change, and catheter-related QoL of the cohort of participants recruited in each country. Inferential statistical tests (Mann Whitney U, Chi-Square) were used to assess differences between countries in these variables.

Results

Recruitment took place from November 2021 to March 2022. In total, 190 participants were recruited, 93 (49%) in the UK and 97 (51%) from the USA and. The SARS-CoV-2 pandemic caused major disruptions to the study progress, limiting the opportunity to recruit individuals in their home setting. The mean age of participants was and 76.1 years (SD 12.2, range 38-95) and 69.5 years (SD 17.5, range 19-99) for the UK and USA, respectively. Most participants were male (72% overall: 74% UK, 69% USA) (Table 2).

Most participants were using a urethral catheter (66% urethral vs 34% suprapubic) but this varied by country (92% urethral in the UK vs 30% urethral in the USA). The most common reason for having an IUC in both countries was urinary retention/incomplete bladder emptying (42%: 61% UK, 33% USA,), but this information was often not available. Most commonly, USA participants had been using a long-term IUC for 1-2 years (33%), whereas in the UK, 5-10 years was the most common duration (24%).

The number of CAUTIs in the last 12-months for people with IUC or suprapubic catheters reporting symptoms compatible with UTI and prescribed an antibiotic was significantly higher in USA participants (median=2/range 0-12 U.S. vs median=1/range 0-5 UK, MWU z=-5.062, $p < 0.001$) (see Figure 1). In the USA site, participants with suprapubic catheters were often prescribed prophylactic antibiotics the day of the catheter replacement. The number of catheter changes in the last 12-months was significantly higher for USA versus UK participants (median 11/range 1-11 USA vs median=5/range 2-13 UK, MWU z=-6.051, $p < 0.001$) (see Figure 2).

Catheter sizes ranged from 12 to 30 Fr. The most common size of catheter used in the USA was 16 Fr, for both urethral (18/34, 52.9%) and suprapubic catheters (22/62, 39%). In the UK, 12 Fr was the most common size for urethral catheter (52/88, 59.1%) and 16 Fr suprapubic (3/5, 60.0%) (see Table 2). There was a statistically significant trend towards larger catheters in the USA (12Fr vs 14Fr or greater, Chi-Square 36.26, df=1, $p<0.001$).

Over 60 percent of participants (104/163, 63.8%, n=27 missing reason) had a change of catheter at some point due to a catheter problem (e.g. CAUTI), while the remainder had exclusively routine catheter changes (59/163, 36.2%). Exclusive routine catheter changes were more common in the USA than in the UK (43/80 (53.8%) vs 16/83 (19.3%), Chi-Square=20.96, df=1, $p<0.001$). Blockage/bypassing was a common reason for catheter change, for example, focusing on the first catheter change, this was the reason given for 6% (5/80) and 29% (24/83) of USA and UK participants respectively. The reason for catheter change was often not available: 11% (10/93) UK and 18% (17/97) USA.

Two ICIQ-LTCqol domain scores were compared between countries: catheter function and concern score (see Figure 3) and life impact score (Figure 4). The catheter function score

was significantly worse in UK versus USA participants (median 16 vs 13, MWU z=-2.107, p=0.035), but there was no significant difference in lifestyle impact score between countries (median 9 vs 8, MWU z=-1.189, p=0.235).

Discussion

We recruited almost 200 long-term IUC users from community-dwelling men and women in the UK and the USA. We believe this is the first study to investigate and compare the QoL of long-term IUC users across two countries using different catheter management guidelines. Our findings add to the limited evidence regarding international long-term IUC catheter care and the impact on patients' lives.

The higher prevalence of catheter use among men (72% overall, 74% UK, 69% USA is similar to that reported by Prieto et al (2020) where 76% of UK community district nurses' catheter patients were male. Similarly, Forde and Barry (2017) note a ratio of 2:1 male to female catheterised patients living at home. Shackley et al (2017) contribute this higher prevalence in males, especially for the use of long-term IUCs, due to male susceptibility to prostate disease, longer urethras and higher risk of urinary retention, especially postoperatively. In this study, the main indication for the initial long-term IUC placement was urinary retention.

Despite the CDC guidelines for prevention of CAUTIs (2009) recommending that catheters are not changed at fixed intervals, over half of USA participants had routine catheter changes exclusively. This compared to around 20% of those in the UK, reflecting the known difference in policies in the two countries.

The size of catheter used differed between the countries, as size inserted was larger in the USA than in UK. Differences in catheter size may be a consequence of the differing policies in the two countries. In the UK, routine catheter sizes for adult male and female patients are 12Fr,

14FR and 16Fr. In the USA, most experts recommend using the smallest size catheter that allows for adequate bladder drainage (Averch et al., 2015; Newman et al., 2018; Newman, 2017). For participants with a suprapubic catheter, no less than a size 16 Fr catheter should be used to avoid insertion and removal trauma (NHS Lanarkshire, 2022). In the UK, most community nurses will start with the smallest catheter and increase size based on advice from urology. However, with the smallest catheter size in situ, there is a potential for increased urine bypassing whereby QoL may be impacted.

Quality of life related to catheter function was worse in UK participants; however, QoL related to life impact of the catheter was comparable in the two countries. Reasons for the first catheter change showed that in the UK, participants experienced more catheter blockage compared to participants from the USA. Formation of encrustations on the inner and outer surfaces of the catheter are very common with nearly half of all people with an indwelling catheter experiencing problems with blockages (Shepherd et al 2017). In our study, CAUTIs were more common in the USA than the UK (median=2/range 0-12 U.S. vs median=1/range 0-5 UK, MWU $z=-5.062$, $p < 0.001$). Possible reasons (e.g., environment) driving this difference are difficult to determine.

Despite their being insufficient high-quality evidence to suggest that the use of antibiotics at the time of catheter replacement helps to reduce infection (Cooper at al 2016), prophylactic antibiotics were often prescribed in the USA during suprapubic catheter change. Although there is no evidence to suggest a positive effect of antibiotic use, this may have provided some UTI protection, however in this study more infections were treated in the USA despite prophylaxis. Catheters in the USA were also changed more regularly, presumably to help reduce chances of build-up of bacterial and fungal colonization, an effect noted by Singh et al (2010) when

catheters were changed every three weeks. But it was difficult to determine if the more regular catheter changes were the normal practice or if catheter changes were impacted by SARS-CoV-2 restrictions. Therefore, the drivers of the higher CAUTIs observed in the USA study population when compared those in the UK study population will require further investigation.

The differences in the incidence of catheter blockage (11% (10/93) UK; USA=6% [5/80]) may have been driven in part by urinary catheter change policies, specifically, a standard of care for shorter time to change in the USA compared to the UK. Future research should address the evidence for more or less frequent, planned IUC changes, and if appropriate, updated UK and or US guideline recommendations.

Our findings provide a critical first step in describing nursing practices and patient-related outcomes of long-term IUC use in the UK and USA. Differences in key health outcomes such as UTI incidence and IUC blockage highlight the need for additional studies. We recommend a continued focus on learning from international urologic nursing colleagues to foster best practices for catheter care and education, support studies of larger sample sizes, and build on the findings reported in this study.

Limitations

The study was limited by responder bias and the number of long-term IUC participants who came from a similar ethnic group, especially in the UK where over 86% of the participants were white (see Table 2). Also, the UK group had 53.1% with their catheter in-situ greater than 7 years compared to the USA who had 73.1% less than five years which may have impacted the results. Participants were catheterized for a variety of reasons resulting in variation in how long-term IUCs impacted QoL, making it difficult to generalize the impact of catheterization on catheter users.

Another limitation was the timing of this study as it was conducted during the SARS-Co-V-2 pandemic. This caused a significant intermittent pausing in participant recruitment and enrollment, especially in the home health setting. In the USA, this shifted enrollment to include recruitment of patients returning to outpatient urology for catheter changes. This likely resulted in a higher number of study participants using long-term suprapubic, rather than urethral catheters, leading to differences in complications. Enrolling participants using suprapubic catheters can be seen as a strength because of limited information on long-term catheter management in this population; however, the large number of suprapubic catheters may not be a true representation of patients cared for by home health nurses. In addition, the SARS-Co-V-2 restrictions altered routine catheter care and changing patterns in both home health and outpatient urology settings.

Conclusions

In the UK and USA, long-term IUC use, most often via urethral or suprapubic catheters, is common and managed by home health and urologic nurses. Patients experience challenges with catheter function and negative impacts on QoL. Similarities and differences exist between the UK and USA; therefore, additional studies from an international perspective and inclusive of a diverse patient population are needed to more fully characterize long-term IUC-users' needs and urologic nursing best-practices to address these problems. In addition, larger studies in home health settings are needed, but gaining access to clients may continue to be problematic. Further analysis of these data is needed to explore the interactions between variables and their combined impact on catheter-related QoL. This international study of long-term IUCs adds to the limited evidence regarding patient perspectives of having a long-term IUC.

Nursing Implications

This study indicates that current practice policy impacts QoL of this population of long-term IUC users and there is a further need to explore current nursing practices in both the UK and USA. Monitoring catheter insertion and catheterization techniques, as well as prompt IUC removal are all essential elements for consideration by nurses caring for patients with a long-term IUC. There are indications that current practice impacts QoL of the population and there is a further need to explore current practices widely in the UK. Any changes to practice will require a robust education rollout to all nurses involved with catheterization. Monitoring catheter insertion and catheterization techniques as well as prompt removal and catheter management are all essential elements for consideration of QoL.

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Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Male and female patients English speaking 18 years or older Use either a urethral or suprapubic LTIUC (use of an indwelling urinary catheter for ≥1 year duration) Be able to provide informed consent
Exclusion Criteria	Duration of urethral or suprapubic IUC < 1 year Using an intermittent urethral catheter Unable to complete questionnaires or provide informed consent.

Table 2

	USA N (%)	UK N (%)
Mean Age	69.5	76.0
Male	67 (69.1)	69 (74.2)
Female	30 (30.9)	24 (25.8)
Ethnicity		
American Indian	1 (1%)	0 (0%)
Asian	1 (1%)	0 (0%)
Black	34 (35.4%)	3 (3.2%)
White	56 (58.3%)	80 (86.0%)
Other or Declined	4 (4.2%)	10 (10.8%)
Reason for Catheter		
Urethral stricture	8 (8.9%)	0 (0%)
Urethral obstruction	2 (2.2%)	0 (0%)
Augmented bladder/Neobladder	1 (1.1%)	0 (0%)
Stroke	2 (2.2%)	2 (2.2%)
MS	10 (11.1%)	6 (6.5%)
Cerebral palsy	1 (1.1%)	1 (1.1%)
Spina Bifida	2 (2.2%)	0 (0%)
Parkinson's disease	0 (0%)	1 (1.1%)
Spinal cord Injury, tetraplegia	1 (1.1%)	4 (4.3%)
Spinal cord Injury, paraplegia	7 (7.8%)	5 (5.4%)
Retention/incomplete bladder emptying	30 (33.3%)	46 (49.5%)
Neurogenic bladder	20 (22.2%)	1 (1.1%)
Other	6 (6.7%)	11 (11.8%)
Not known	0 (0%)	16 (17.2%)
Catheter Types by Gender		
Urethral	23 (24.0%) Male 11 (11.5%) Female	67 (72.0%) Male 21 (22.6%) Female
Suprapubic	43 (44.8%) Male 19 (19.8%) Female 96 (100%) Total	2 (2.2%) Male 3 (3.2%) Female 93 (100%) Total
Catheter by Type and Size		
Urethral*		
12 Fr	5 (14.7%)	52 (59.1%)
14 Fr	1 (2.9%)	28 (31.8%)
16 Fr	18 (52.9%)	6 (6.8%)

18 Fr	6 (17.6%)	__
20 Fr	2 (5.9%)	1 (1.1%)
Unknown	2 (5.9%)	1 (1.1%)
Suprapubic		
12 Fr	8 (12.9%)	1 (20.0%)
14 Fr	1 (1.6%)	1 (20.0%)
16 Fr	22 (35.5%)	3 (60.0%)
18 Fr	7 (11.3%)	
20 Fr	9 (14.5%)	
22 Fr	7 (11.3%)	
24 Fr	5 (8.1%)	
30 Fr	1 (1.6%)	
Unknown	2 (3.2%)	

Length of time catheter in-situ		
1-2 yrs	32 (34.4%)	6 (7.4%)
2-3 yrs	15 (16.1%)	16 (19.8%)
3-5 yrs	21 (22.6%)	21 (25.9%)
5-10 yrs	19 (20.4%)	22 (27.2%)
>10 yrs	6 (6.5%)	16 (19.8%)

*No catheter sizes were found for 22, 24, and 30 Fr

Figure 1. Box and whisker plot of number of UTIs in the last 12 months by country

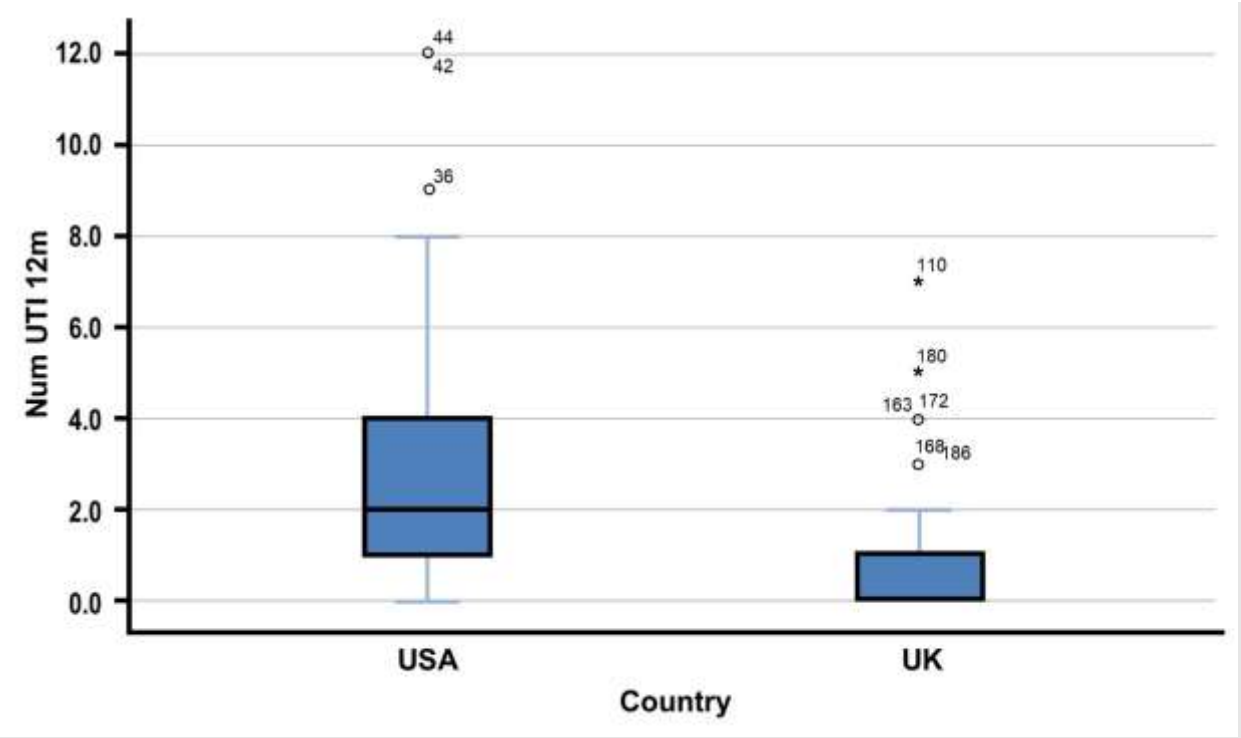

Figure 2. Box and whisker plot of number of catheter changes in the last 12 months by country

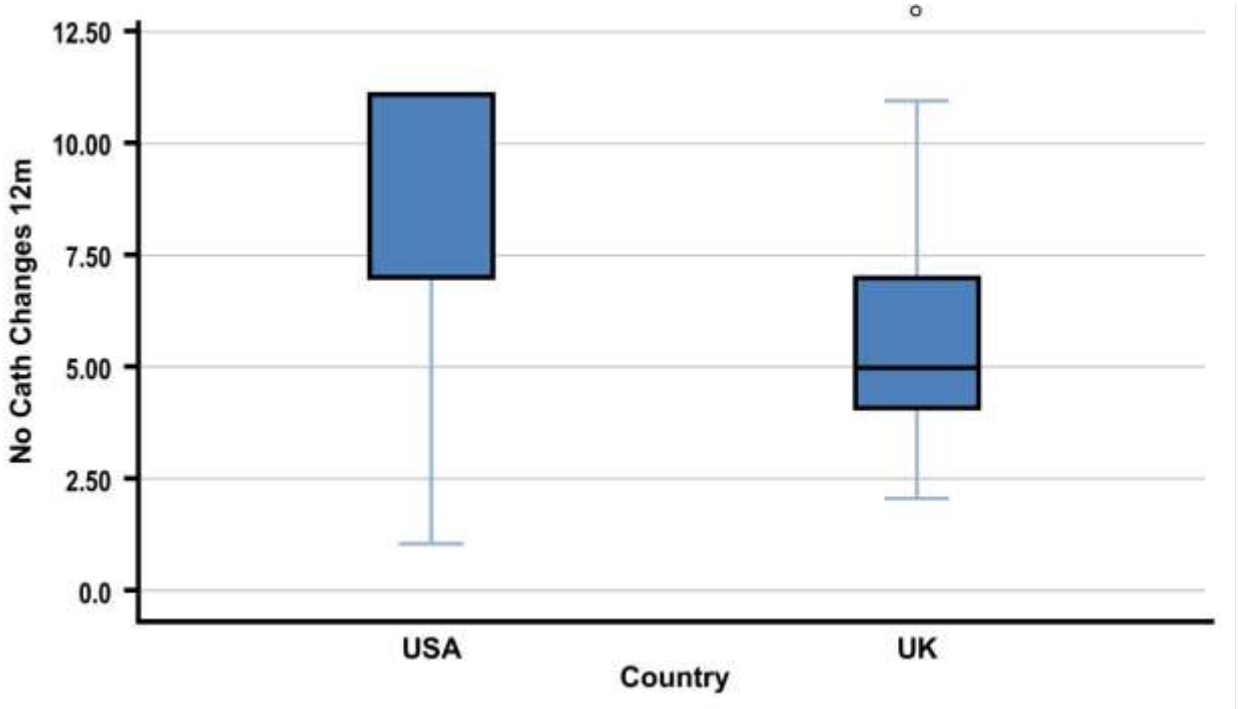

Figure 3. ICIQ-LTCqol Function Score

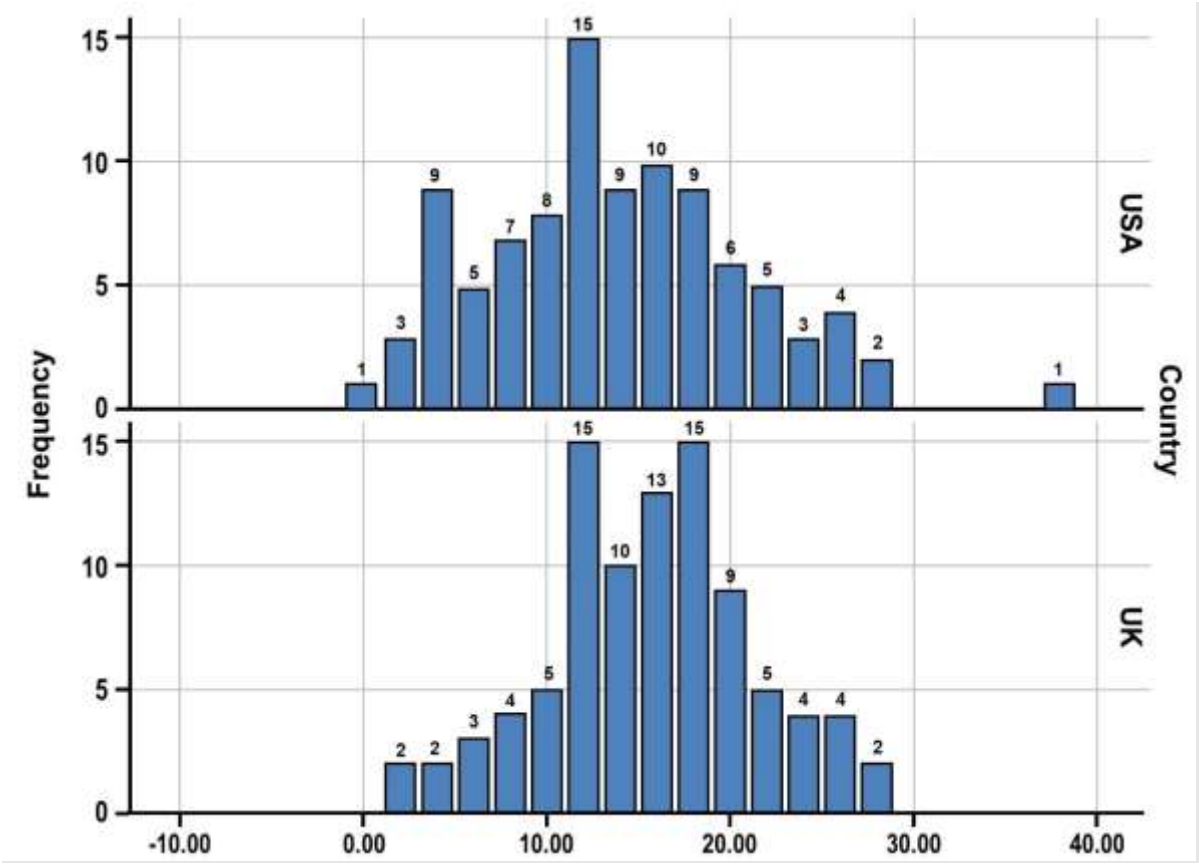

Figure 4. ICIQ-LTCqol Life Impact Score