Introduction

- Intermittent catheterisation (IC) is preferred over indwelling catheters for bladder emptying in people suffering from chronic urinary retention, owing to its numerous medical and social utility benefits. However, performing IC multiple times per day also brings potential challenges, such as pain/discomfort during insertion of the catheter, increased risk of urinary tract infections (UTIs), stigma related to the process, and to carrying around catheters, preparation of the catheter, and is a costly multiple-use catheter, efforts involved in storage, cleaning and drying of catheters after each use. Additionally, many catheters contain chemical softening agents which, if accidentally ingested, could be potentially harmful to the human health.

- The negative aspects of IC influence the user's quality of life and increase the risk that users change to other bladder emptying methods with more complications. Innovations in catheter design and technology have consequently focused on making the IC process easier; more discreet, less painful and on an improvement of potentially harmful risks in the catheter material.

- In health economic evaluation such outcome differences are normally measured using general QoL measures (such as EQ-5D) that estimate a single utility score which can be used to calculate Quality-Adjusted Life Years (QALYs). But these general measures may not be sensitive to all relevant aspects of QoL affected by intermittent catheters.

- Amongst the alternative methods for eliciting utility values, the valuation of health states (or vignettes) using the Time Trade-Off (TTO) approach is widely used and is well-suited to assessing the utility impact of specific treatment packages.

- The TTO method determines value by understanding the extent to which a person is willing to trade duration of survival.

- Using the TTO method, three surveys were conducted with the aim to estimate health state utility values related to IC as described by the following features and aspects:
  - Access to a support service,
  - The use of catheters as multiple-use catheters,
  - The usage of catheters that are of a compact design,
  - Steps required for IC,
  - Time needed for IC process,
  - Pain related to IC, and
  - Frequency of UTIs.

Materials and Methods

TTO method

- The TTO method is used for eliciting utility values ranging from 0-1 by asking respondents to trade a part of their remaining life against a gain in quality of life (QoL) related to IC and described by different health state scenarios. A health state, or vignette, is a description of how it is to live with the specific health condition and focusing on some of the characteristics related to the study area.

Participants

- The three surveys were conducted in 2017 in representative populations aged over 18 years from Canada and the UK. All respondents provided demographic (age, gender, employment, household) and socioeconomic characteristics (income) along with their attitudes regarding experience with IC.

- The surveys were internet-based, and used the members of an existing panel of research participants, who were compensated for their time ($15). Each respondent could participate in one survey only.

Statistics

- All statistical analyses were performed using SAS® version 9 statistical software. Utilities were calculated for each health state.

- Bootstrapping was used to simulate standard errors and confidence intervals (CI) for the mean TTO values.

- The 5% most extreme values were excluded from the base analysis to ensure better confidence in the results. A sensitivity analysis was carried out to investigate the consequences of outliers on the utility values.

The survey and health states

- The health state descriptions were developed based on published literature regarding IC and were reviewed by medical doctors amongst the authors, who all have extensive experience with the use of IC.

- The respondents were first presented with a health state scenario designed as a “warm-up” exercise to familiarize them with the subject and the TTO methodology. (See “warm-up” description in Figure 1 and example of TTO procedure in Figure 2).

Figure 1: Description of what it means to use an intermittent catheter

<table>
<thead>
<tr>
<th>Health State</th>
<th>Canada</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheter with catheter</td>
<td>0.91</td>
<td>0.91</td>
</tr>
<tr>
<td>Catheter with catheter and support</td>
<td>0.80</td>
<td>0.80</td>
</tr>
<tr>
<td>Catheter with catheter and support</td>
<td>0.70</td>
<td>0.70</td>
</tr>
</tbody>
</table>

- The sensitivity analysis showed that exclusion of any sample had a minor impact on the quality of data, such as mobility, social activities, pain, discomfort and psychological impact (depression or anxiety) for measuring QALYs. However, there is an increasing recognition that EQ-5D is not always sufficient for identifying the specific benefits that innovations in bladder management technologies may provide to the user.

- The surveys implemented the vignettes methodologies using the TTO method to estimate the value of intermittent catheter aspects, which typically falls outside of the health dimension measured by the EQ-5D.

- The current results confirm that the TTO vignette method be used as an alternative when the standard general methods for assessing impact at QALYs are not sensitive to relevant aspects of QoL.

- To conclude, the investigation attributes of compact catheter design, phytates, stepwise need, pain related to catheterisation and frequency of UTIs have a significant value in health utilities, which highlight the value of catheter innovation in the area.

Acknowledgements

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References

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12. Life Tables at WHO member states, 2014.