

# Evaluation of educational content of YouTube videos relating to neurogenic bladder and intermittent catheterization

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Cite as: *Can Urol Assoc J* 2015;9(9-10):320-4. <http://dx.doi.org/10.5489/cuaj.2955>  
Published online October 13, 2015.

## Abstract

**Introduction:** Many patients conduct internet searches to manage their own health problems, to decide if they need professional help, and to corroborate information given in a clinical encounter. Good information can improve patients' understanding of their condition and their self-efficacy. Patients with spinal cord injury (SCI) featuring neurogenic bladder (NB) require knowledge and skills related to their condition and need for intermittent catheterization (IC).

**Methods:** Information quality was evaluated in videos accessed via YouTube relating to NB and IC using search terms "neurogenic bladder intermittent catheter" and "spinal cord injury intermittent catheter." Video content was independently rated by 3 investigators using criteria based on European Urological Association (EAU) guidelines and established clinical practice.

**Results:** In total, 71 videos met the inclusion criteria. Of these, 12 (17%) addressed IC and 50 (70%) contained information on NB. The remaining videos met inclusion criteria, but did not contain information relevant to either IC or NB. Analysis indicated poor overall quality of information, with some videos with information contradictory to EAU guidelines for IC. High-quality videos were randomly distributed by YouTube. IC videos featuring a healthcare narrator scored significantly higher than patient-narrated videos, but not higher than videos with a merchant narrator. About half of the videos contained commercial content.

**Conclusions:** Some good-quality educational videos about NB and IC are available on YouTube, but most are poor. The videos deemed good quality were not prominently ranked by the YouTube search algorithm, consequently user access is less likely. Study limitations include the limit of 50 videos per category and the use of a de novo rating tool. Information quality in videos with healthcare narrators was not higher than in those featuring merchant narrators. Better material is required to improve patients' understanding of their condition.

## Introduction

The Internet is ubiquitous, most particularly social media. Given the popularity and use of the Internet as a source of information, it follows that users frequently consult familiar sources when looking for health information.<sup>1</sup> According to a 2011 survey, 80% of Internet users look online for information on health topics.<sup>2</sup> A high proportion of patients state that Internet-derived information empowers them to communicate with their physicians and helps them make health decisions<sup>1</sup> and nearly half will consult Internet sources before their physicians on health-related questions.<sup>3</sup> Consequently, physicians should be aware of the quality and veracity of the information their patients are acquiring online.

Patients conduct Internet searches to manage their own health concerns, to decide if they need professional help, and to corroborate information obtained in clinical encounters. Good information can improve patients' understanding of their condition and their self-efficacy.<sup>1</sup> We explored the information available via YouTube videos on intermittent catheterization (IC) in the context of spinal cord injury (SCI). The prevalence of patients with SCI in Canada was 85 556 in 2010, with 4259 new cases per year.<sup>4</sup> Of these, 70% to 84% will develop a neurogenic bladder (NB).<sup>5</sup> According to the European Association of Urology (EAU), the gold standard in the management of NB patients who cannot empty their bladders is intermittent catheterization (IC).<sup>6</sup> Catheterization and self-catheterization can be difficult to master, and patients could benefit greatly from related quality online video resources.<sup>7</sup>

YouTube, a video-sharing Internet website started in 2005, receives the most traffic of all video websites on the Internet and the third-most of all websites;<sup>8</sup> therefore, this platform was the one used in our study. The purpose was to conduct an integrative review the quality of information currently available on YouTube videos on IC in the context of NB after SCI.

## Methods

### Search strategy

On June 29, 2014, a YouTube search was conducted using the following 2 search terms: “neurogenic bladder intermittent catheter” and “spinal cord injury intermittent catheter.” After setting the YouTube search tool to sort results from most to least relevant, the first 50 results for each search term were collected. Videos were excluded if they were longer than 10 minutes or if they lacked narration in English or English subtitles. If videos appeared under both search terms, they were assigned to the search term under which they appeared closest to the top of the ranking list, and deleted from the other search term’s results. After removal of duplicate and excluded videos, 71 videos remained. We recorded each video’s rank or numeric position in the YouTube-generated list of results.

### Content evaluation

Each video was viewed and the content independently rated by 3 investigators who each completed a written questionnaire (Appendix 1). The questionnaire assessed the following features:

- A. The background of the video’s main narrator
- B. The declared or apparent purpose of the video
- C. The relevance of content to the topic of urethral IC
- D. The quality of the description of the process for clean IC
- E. The comprehensiveness/accuracy of the IC procedure depicted
- F. The quality/accuracy of information on NB
- G. The presence and extent of catheter marketing

Topic D was scored on a 10-point scale, with points awarded for inclusion of statements derived from the EAU guidelines on the clean technique for IC and management of NB.<sup>7</sup> Topic F was also scored on a 10-point scale rating the inclusion of statements about the consequences and management of neurogenic bladder based on established best clinical practices.

### Evaluation process and analysis

The three investigators were briefed on the questionnaire. Each of them independently viewed the videos in randomized order and rated the videos. They later reviewed the evaluation data jointly. If there was disagreement on a particular question, the response entered for analysis reflected the greatest degree of consensus; if there was no consensus, a rating of “indeterminate” was assigned. Inter-rater reliability of the questionnaire responses was analyzed via Rust

and Cooil’s Proportional Reduction in Loss method,<sup>9</sup> with the reliability of each question averaged across all 71 videos rated. Data were then summarized and significance was tested via t-test.

## Results

In total, 71 videos met the eligibility criteria for this study. Twelve videos (17%) addressed the process of IC (Table 1). We tallied the ratings for the quality of information of the videos; the mean score was 5.4/10 (Table 2). The videos ranked by the YouTube search tool for relevance from 1 to 25 had a mean score that was not significantly different to those that appeared in from 26 to 50 (5.3 vs. 5.5,  $p = 0.91$ ) (Table 3). Videos featuring IC instruction by a healthcare professional scored significantly higher than those narrated by a patient (7.1 vs. 2.2,  $p = 0.02$ ), but did not score higher than videos with instruction from a merchant (7.1 vs. 7.0,  $p = 0.89$ ). There was no difference between the scores of videos that depicted male versus female IC (5.4 vs. 6.2,  $p = 0.65$ ). The mean inter-rater reliability was 0.9 to 1.0, except for questions 15, 23, 25, 28 and 29, which ranged between 0.74 and 0.89.

The criterion that videos most commonly neglected to address was “note volume of urine collected;” 5 of the 12 (42%) contained information that directly contradicted the EAU guidelines for IC. The most common contradictory information was reuse of a catheter, which appeared in 3 of these 5 videos. The second most common was improper cleansing technique of the urethra and surrounding area, which appeared in 2 of 5 videos.

Of the 71 videos, 50 (70%) contained information on NB. The mean score for quality of NB information was 1.5/10.

**Table 1. Summary of general video information**

Category	No. videos (%)
Relevance	
Described process of IC	12 (17)
Total relevance to IC	29 (41)
Relevant to other form of catheterization	8 (11)
Relevant to urology	17 (24)
Relevant to SCI	13 (18)
Not relevant to any of above	1 (1)
Indeterminate*	4 (6)
Narrator	
Healthcare	29 (41)
Patient	13 (18)
Merchant	17 (24)
News agency	3 (4)
Uncertain	5 (7)
Indeterminate*	4 (6)

IC: intermittent catheterization; SCI: spinal cord injury. \*A video was classified as indeterminate if there was no consensus among reviewers.

**Table 2. Scoring characteristics of videos on IC information**

Video category	No. videos	Mean IC score/10 (95% CI)
All videos with IC information	12	5.4 (3.9, 7.0)
Ranking		
Ranked 1–25	5	5.3 (3.6, 7.1)
Ranked 26–50	7	5.5 (3.1, 8.0)
Type of narrator		
Healthcare	5	7.1 (6.1, 8.1)
Patient	2	2.2 (0.0, 6.4)
Merchant	2	7.0 (7.0, 7.0)
Unknown	2	2.0 (1.3, 2.7)
Indeterminate	1	7.33
Male-female split		
Videos depicting male IC	6	5.4 (3.1, 7.8)
Videos depicting female IC	5	6.2 (4.1, 8.3)
Videos depicting IC with no specific gender	1	4.7 (4.7, 4.7)

IC: intermittent catheterization; CI: confidence interval.

Videos ranked 1 to 25 by YouTube did not score higher than those ranked 26 to 50 (1.7 vs. 1.2,  $p = 0.30$ ) (Table 4). Videos primarily narrated by healthcare professionals did not score higher than those narrated by patients (2.1 vs. 1.1,  $p = 0.10$ ), but did score higher than videos narrated by merchants (2.1 vs. 0.6,  $p = 0.04$ ). There was no significant difference between videos with patient and merchant narrators (1.1 vs. 0.6,  $p = 0.19$ ) (Table 5).

Of the 71 videos, 43 (61%) mentioned or depicted catheters; 20 (46%) referred to a particular catheter product or company; and 11 (15%) advertised a specified feature claimed to make the catheter superior to that of their competitors. No videos mentioned the cost of purchasing the advertised catheters (Table 6).

**Table 4. Scoring characteristics of videos on NB information**

Video category	No. videos	Mean NB score/10 (95% CI)
All videos with NB information	50	1.5 (1.1, 1.9)
Ranking		
Ranked 1–25	32	1.7 (1.1, 2.3)
Ranked 26–50	18	1.2 (0.6, 1.7)
Type of narrator		
Healthcare	25	2.1 (1.4, 2.8)
Patient	10	1.1 (0.5, 1.6)
Merchant	8	0.6 (0.4, 0.8)
News agency	1	3.0
Unknown	4	0.4 (0.3, 0.5)
Indeterminate	2	1.0 (0.5, 1.5)

NB: neurogenic bladder; CI: confidence interval.

**Table 3. Significance testing for IC information**

Comparison 1	Comparison 2	<i>p</i> value
Rank 1–25	Rank 26–50	0.91
Healthcare source	Patient source	0.02
Healthcare source	Mercantile source	0.89
Patient source	Mercantile source	0.16
Male IC	Female IC	0.65

IC: intermittent catheterization.

## Discussion

We evaluated YouTube videos containing information relating to NB and IC. Our analysis indicated that overall the quality of information is poor, misleading or irrelevant, with a few videos containing high-quality information. This phenomenon of overall poor quality is echoed in other studies of health information on social networks, particularly YouTube, with regards to urological<sup>10</sup> and non-urological<sup>11–14</sup> topics. This highlights a challenge for healthcare providers caring for patients and families who could benefit from accessing NB and IC information on the Internet.

Success can be achieved with online health education where good quality information is used.<sup>15</sup> Internet-based applications are proving to be novel, convenient and affordable mechanisms for health education. Even in the developing world, positive experiences are widely reported. Traditionally problematic topics for health promotion have been addressed successfully, with knowledge about sexual health and access to sexual health services improved among adolescents in many countries, better management of diabetics achieved, and continuing education for midwives delivered effectively.<sup>15–17</sup>

Patients with NB and those requiring IC represent a significant population and yet the available online resources require improvement. Only 17% of videos contained a description of the IC process and only half scored 7 or above when graded for content based the EUA recommendations for IC. More videos contained NB information (70%), but the overall quality of the information was poor (mean score 1.5/10) and only 1 video scored over 7/10.

In this study, the quality of videos was compared to their rank based on the YouTube search-ranking tool, from most to least relevant. How high a video is ranked is relevant to potential educational impact, as users are more likely to select and view videos that appear earlier in the list. This

**Table 5. Significance testing for NB information**

Comparison 1	Comparison 2	<i>p</i> value
Rank 1–25	Rank 26–50	0.30
Healthcare narrator	Patient narrator	0.10
Healthcare narrator	Mercantile narrator	0.04
Patient narrator	Mercantile narrator	0.19

NB: neurogenic bladder.

**Table 6. Video marketing characteristics**

Category	No. videos (%)
Video mentioned or depicted catheters	43 (61)
No. of the videos mentioning or depicting catheters	
Advertised at least 1 product or category	20 (46)
Claimed superiority to other products based on a particular catheter feature	11 (15)
Advertised the specific cost of the catheter	0 (0)

is partly out of convenience and partly out of perceived significance. However, for both IC and NB, the videos that appeared in the top half of the YouTube results list did not contain significantly higher-quality information than those that appeared in the bottom half. For example, the video that contained the best IC information was ranked 33 out of 50, with 3 of the 4 next-highest scoring ranked 27 or lower. This system of ranking can compromise effective sourcing of accurate, higher-quality resources on IC and NB by patients and practitioners.<sup>18</sup> Both patients and practitioners need to be made aware that rank does not equal quality. Practitioners should be prepared to direct patients who have gleaned incomplete or incorrect information from the Internet to material that does have good educational quality.

The video presenter is relevant. Although videos narrated by healthcare providers had the highest mean quality scores for both IC and NB, the information contained was not always of significantly higher quality than those narrated by patients, or merchants. Some healthcare-narrated videos achieved alarmingly low scores. This is potentially problematic because a viewer with limited knowledge of the topic could be more inclined to trust a video that featured a healthcare narrator.

A secondary objective of this study was to evaluate whether marketing practices existed and their impact on the overall message of the videos. Almost half the videos that mentioned catheters named a specific product or company, and 15% cited a particular feature as an advantage of a certain product (e.g., a hydrophilic catheter designed for use by people with limited hand function). The effect of such commercialization on IC is uncertain, but from an educational standpoint it is suboptimal that nearly half featured an advertisement.

Our study has its limitations. The cut-off for 50 videos in each category was selected based on a realistic number that an individual would logically search, and not on a formal power calculation, thus statistical inferences from the data are limited. The metrics and criteria by which we evaluated video quality were self-selected as no validated tool was available. Some reservations exist regarding the results as this is a de novo tool, although we based the evaluation criteria for IC on EUA recommendations and the NB criteria were generated based on what the authors agreed an informative video should include. We also only includ-

ed two search terms, choosing those we thought patients most likely to use; however, it became clear during the study that even small variations in the search term would induce some change in the content and order of the results YouTube generated. Hence, the list of videos generated for our sample, although representative, may not have captured the full diversity of videos with IC and NB content that can be sourced on YouTube.

Importantly, it is evident that both the quality of information available in YouTube videos on IC and NB and the way in which search engines prioritize this material when patients are seeking to learn via the Internet warrants improvement.

## Conclusion

Some good-quality and educational videos about NB and IC are available on YouTube, but most are incomplete, uninformative, or misleading. Videos we evaluated to have good or high quality content were not prominently positioned in the rank order displayed by the YouTube search algorithm, consequently user access to them is less likely. The quality of information in videos with healthcare narrators was not consistently higher than in those featuring patient or merchant narrators. About half of videos featuring catheter use also contained some kind of advertisement.

**Competing interests:** The authors declare no competing financial or personal interests.

This paper has been peer-reviewed.

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## Appendix 1. Video evaluation questionnaire

### Basic information

Select one answer for the following questions:

**Q1. The main voice in this video seems to be a:**

1. Healthcare provider
2. Health advocacy group
3. Patient
4. Merchant
5. News agency
6. Uncertain

**Q2. The main purpose of this video is:**

1. Education other than depiction of surgical techniques
2. Advertisement or publicity
3. Depiction/description of surgical techniques

### Relevance

**Q3. Please select only the FIRST option that applies:**

1. Video PRIMARILY addresses intermittent urethral catheterization or related topics (including catheters)
2. Video PRIMARILY addresses a different form of catheterization, such as Foley catheterization or suprapubic/stomal catheterization, or related topics
3. Video PRIMARILY addresses a urological topic
4. Video PRIMARILY addresses spinal cord injury
5. None of the above

### Quality of Information – Catheterization

**Q4. Does the video specifically show or describe the process of INTERMITTENT URETHRAL catheterization (i.e., more than just mentioning steps in passing)?**

If NO, proceed to Q19.

If YES, select each of the following that are specifically defined or depicted in the video:

- Q5.** Use of a single-use, sterile catheter
- Q6.** Cleaning of hands with soap and water or alcohol rub prior to catheterization
- Q7.** Cleansing of urethra and surrounding area, from urethra outwards
- Q8.** Accurate description/demonstration of positioning (penis stretched, perpendicular to body) and exposure of urethra (retraction of foreskin, spreading of labia)
- Q9.** Lubrication of catheter with single-use lubricant; or a pre-lubricated catheter
- Q10.** Description/demonstration of insertion of catheter, advancement until uroflow
- Q11.** Removal of catheter once uroflow has ceased
- Q12.** Note volume of urine or reference to volume being under 400 mL
- Q13.** Video mentions that proper catheterization reduces risk of UTI
- Q14.** Video mentions that catheterization should be done multiple times per day

Continued on page 354



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**Appendix 1. Video evaluation questionnaire (cont'd)**

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**Quality of Information – Neurogenic Bladder**

Answer yes or no to the following:

**Q15.** Does any information shown in the video SPECIFICALLY contradict any of the statements from **Q5-Q14** (i.e., does the video say anything that goes against **Q5-Q14**)?

**Q16.** Does the video depict male or female catheterization?

**Q17.** Does the video depict pediatric catheterization?

**Q18.** Does the video specifically depict self-catheterization?

For each of the following criteria, assign points based on the guidelines below:

**Q19.** Defines neurogenic bladder

0 pt: Does not mention neurogenic bladder

1 pt: Mentions but does not explain neurogenic bladder, or alludes to bladder changes after nervous system damage

2 pts: Defines neurogenic bladder as a state of bladder dysfunction after damage to nervous system

**Q20.** Defines types of neurogenic bladder (does not need to mention specific names below)

0 pt: Does not differentiate types of neurogenic bladder

1 pt: Defines one of hypoactive and hyperactive bladder

2 pts: Defines both hypoactive and hyperactive bladder

**Q21.** Defines effects of neurogenic bladder (does not need to mention specific names below)

0 pt: Does not mention any consequences

1 pt: Defines one of incontinence or urinary retention

2 pts: Defines both incontinence and urinary retention

**Q22.** Defines complications associated with neurogenic bladder

0 pt: Does not mention any dangers

1 pt: Mentions one of: UTI, autonomic dysreflexia, vesico-ureteral reflux/hydronephrosis

2 pts: Mentions more than one of above

**Q23.** Describes/depicts management of neurogenic bladder

0 pt: Does not mention management

1 pt: Mentions one of: catheterization (any type), drugs affecting continence, urinary diversion surgery

2 pts: Mentions more than one of above

**Prevalence and Extent of Marketing**

**Q24.** Does the video SPECIFICALLY mention or depict catheter(s) (i.e. more than just mentioning it in passing)?

If no, proceed to **Q30**. If yes, continue to **Q25**.

**Q25.** Does video advertise at least one specific brand of catheter or company?

**Q26.** Does video claim superiority of a catheter based on certain features of that catheter?

**Q27.** Does video advertise the specific cost of the catheter to the patient?

**Q28.** Does video offer financial incentive to choose one brand or company over others? (Directly claims to cost less than competitors, offers special pricing/discounts, etc.)

**Q29.** Does video target product to a specific demographic?

**General**

**Q30.** Does the video DESCRIBE or DEPICT a spinal cord injury/urological therapy other than intermittent urethral catheterization?

Select all that apply:

1. Foley catheterization
  2. Suprapubic catheterization
  3. Condom catheterization
  4. Stem cell therapy
  5. Botox
  6. Other
-