

# Development and Validation of an Age-Appropriate Website for Children Requiring Clean Intermittent Catheterization

Marla Andréia Garcia de Avila<sup>1</sup>, PhD, Thaís Rabello<sup>1</sup>, RN, Maria Paula Bortoleti de Araújo<sup>1</sup>, RN, João Luiz Amaro<sup>2</sup>, PhD, Denise de Cássia Moreira Zornoff<sup>3</sup>, PhD, Ana Silvia Sartori Barraviera Seabra Ferreira<sup>3</sup>, PhD & Ananda Stefani de Oliveira<sup>1</sup>, RN

## Abstract

**Purpose:** This study describes the development and validation of an age-appropriate website for preschool children who require clean intermittent catheterization (CIC).

**Methods:** An age-appropriate website was developed at an academic medical center in Brazil and included child-friendly characters, details of the urinary system anatomy and physiology, hand-washing, and the CIC procedure. Content was validated by physicians, nurses, and health informatics professionals. Face validity was assessed by parents.

**Findings:** Content and face validity indices were 0.94 and 0.92, respectively.

**Conclusions:** The free website ([www.doutorbexiga.com.br](http://www.doutorbexiga.com.br)) was successfully validated and considered suitable and user-friendly for the health education of children requiring CIC.

**Clinical Relevance:** Physicians and nurses can use the website as a model for developing similar materials. The website can be a resource for health professionals and parents of children with spinal cord injury or other neurological disorders to encourage children to learn about CIC through animated educational materials.

**Keywords:** Child; health education; intermittent urethral catheterization; parents; rehabilitation nursing.

## Introduction

The rehabilitation of children who require clean intermittent catheterization (CIC) is a challenge faced by nurses. Self-administered CIC is necessary to maintain autonomy, privacy, and social inclusiveness. Children need to be prepared and trained to perform self-catheterization. Each child requires an individualized strategy, as many have skill deficits and cognitive difficulties.

It is especially important for nurses to be engaged in the entire process of rehabilitation of children requiring CIC. Those actions include health education (Faure, Peycelon, Lallemand, Audry, & Forin, 2016; Mazzo, de Lima, Carvalho, Weissheimer, & Soares, 2017; Zanollo et al., 2015), management of material resources, clinical and quality-of-life assessments (Fumincelli, Mazzo, Martins, Henriques, & Orlandin, 2017), skill checking, and identification of technical and emotional difficulties in learning (Cobussen-Boekhorst et al., 2010; Faleiros et al., 2018; Mazzo et al., 2017). This process promotes an increase in confidence for performing the procedure (Holland et al., 2015; Silva et al., 2015) and teaching and correcting errors in performing CIC.

Printed materials for health education, such as manuals, leaflets, brochures, booklets, flip charts, and guidebooks, are accessible alternatives to in-person training by nurses. These materials could supplement verbal guidelines provided by the healthcare team to address doubts and help decision-making (Amaro, Alves, Avila, & Uezono, 2015; Benício et al., 2018; Faure et al., 2016). Typically, written communication does not attract the attention of children, especially those who are illiterate.

**Correspondence:** Marla Andréia Garcia de Avila, Departamento de Enfermagem, Universidade Estadual Paulista—Campus de Botucatu, Distrito de Rubião Jr, s/n CEP 18618-686, São Paulo, Brazil. E-mail: [marla.avila@unesp.br](mailto:marla.avila@unesp.br)

<sup>1</sup> Department of Nursing, Botucatu Medical School, Universidade Estadual Paulista, São Paulo, Brazil

<sup>2</sup> Department of Urology, Botucatu Medical School, Universidade Estadual Paulista, São Paulo, Brazil

<sup>3</sup> Center of Distance Education and Information Technology in Healthcare, Botucatu Medical School, Universidade Estadual Paulista, São Paulo, Brazil  
Copyright © 2020 Association of Rehabilitation Nurses.

## Cite this article as:

de Avila, M. A. G., Rabello, T., de Araújo, M. P. B., Amaro, J. L., Zornoff, D. C. M., Ferreira, A. S. S. B. S., & de Oliveira, A. S. (2021). Development and validation of an age-appropriate website for children requiring clean intermittent catheterization. *Rehabilitation Nursing*, 46(2), 65–72. doi: 10.1097/mj.0000000000000253

## Background

Websites involve a compelling grouping of related content, such as multimedia, images, games, and information, accessible on the Internet through a particular address. The use of websites can be empowering for patients, promoting their proactive role in health care, which can start in childhood. Health education technologies, particularly websites including educational videos, may appeal to children's interest in such communication formats. Incorporating these technologies into interventions and strategies regarding CIC education can facilitate children's adherence to day-to-day CIC procedures (Lima et al., 2017). Multimedia content includes text, images, and videos (with or without sound), slide presentations (with or without narration), and animations. Although the use of multimedia content does not necessarily guarantee improved learning, such material can increase user satisfaction (Mayer, 2009).

The authors examined online health education of various chronic diseases. A systematic review of interactive multimedia used to teach parents of children with chronic diseases (e.g., asthma, diabetes, and leukemia) concluded that such materials can be useful for teaching parents about the child's condition. Furthermore, children who are inspired by their parents' attentiveness tend to be more interested in learning about their own disease (Annaim, Lassiter, Viera, & Ferris, 2015). However, few studies have examined the effects of using websites for the rehabilitation of children with neurogenic bladder disorders.

The use of educational videos, interventions, and orientations for parents contribute to healthcare professionals' educational practices and promote adherence to proper CIC procedures (Lima et al., 2017). In addition, encouraging self-care is an opportunity to provide early guidance in the journey of self-management and transition to adulthood (Castillo et al., 2017). A randomized controlled trial with 140 children between the ages of 5 and 10 years found that the use of an animated bladder training video was effective in reducing bladder–bowel dysfunction symptoms, with outcomes comparable to those of standard individualized urotherapy (Braga et al., 2017).

One integrative review identified 13 articles assessing factors regarding patients' and caregivers' CIC knowledge. The authors suggested the importance of using websites to help educate children about CIC (Benício et al., 2018). Factors that made it more difficult to perform CIC included lack of information, inability or insecurity regarding the procedure, feelings of embarrassment, feelings of pain and a sense of loss, psychological aversion, and inadequate coping mechanisms. Factors that made the procedure easier included clear and appropriate language, use of informative flyers and practical instructions for

the procedure, and providing patient safety education (Benício et al., 2018).

The project aimed to develop an age-appropriate website to encourage children's participation in their own self-care and stimulate their motivation to learn self-catheterization. Researchers have suggested the need for educational material developed by a specialized health-care team to assist patients, facilitate communication, and address doubts regarding the reliability of information (Tavares, Hamamoto Filho, Ferreira, & Avila, 2018). In addition, the validation of content and appearance is essential to ensure the quality of educational material (Polit & Beck, 2011).

The use of strategies involving play to prepare children for future self-catheterization is important for their health education. They are excellent tools for strengthening the bonds between children, family, and health professionals and to significantly help children to understand and live with the condition (Lima et al., 2017). In this article, methods are presented that were used in the creation of an age-appropriate website for educating preschool children requiring CIC.

The key targets of managing pediatric neurogenic bladder include preserving the upper and lower urinary tracts and optimizing the quality of life throughout childhood and into adulthood (Sturm & Cheng, 2016). Many children undergo catheterization throughout their lives; however, there is a lack of appropriate educational materials for children available in Portuguese. Thus, this study aimed to describe the development and validation of an age-appropriate website for preschool children requiring CIC.

## Methods

This descriptive study was approved by the research ethics committee. There were two phases: (1) website development and (2) website validation. This study was conducted in an academic medical center in Brazil between March 2017 and October 2018.

### Website Development

The website content was developed by a team of two physicians (in the fields of urology and general practice), four nurses (two in pediatrics, one in perioperative health, and one general nurse), and one publicity specialist. In accordance with the recommendations for the development of an effective educational website proposed by Cook and Dupras (2004), the website development followed seven recommended steps:

1. Analysis of needs, goals, and objectives. The study considered the needs of children with spinal cord injury and other

neurological disorders resulting in the need for CIC and their parents. Those needs were identified during nursing and medical consultations and from the researchers' expertise on the subject. An important barrier to address was parents' potential difficulty in accepting that children could learn about CIC, especially when parents may be overprotective. Thus, the online educational material targeted preschool children or children who had not yet begun self-catheterization. All content was freely accessible and easy to follow, allowing for visitor autonomy. In addition, the website was developed in accordance with the clinical recommendations of the Brazilian Society of Urology on CIC (Nardi et al., 2014).

2. Determination of technical resources and needs. The researchers selected an online portal that was able to host robust educational content, such as multimedia and printed materials. The proposal was taken to the advertising and communication group to ascertain the best way to develop the printed and video materials. A web designer was hired to create illustrations and 2D and 3D animation.
3. Evaluation of preexisting software. A literature search was conducted for national and international scientific publications in nationally recognized databases. We did not find any existing health technology in Portuguese (website, applications, or videos) that could help teach CIC to children.
4. Securing commitment from all participants and identifying and addressing potential barriers to implementation. The project provided continuous monitoring of the environment, participation of the entire group during different stages of the study, and early identification of technical difficulties. To achieve this, the research team, composed of physicians, nurses, an informatics technician, an advertising professional, and nursing students, held regular meetings to present the evolution of the content, design of the website and plan subsequent steps.
5. Developing content in coordination with the site design. The development of the website was based on a previously created comic book that was successfully implemented by the research team (Amaro et al., 2015). The courseware was composed of an age-appropriate website with different didactic resources, including educational videos, coloring games, a memory game, a comic book magazine, animations, and a blog for communication between the children/parents and researchers. The content included child-friendly characters and covered the anatomy and physiology of the urinary system, assembly of materials used during CIC, hand-washing, hygiene of genitalia, actual procedure (catheterization techniques for both boys and girls), and care during CIC. The comic book and animation included the same topics, and the main character was a child with myelomeningocele. The main goal of the comic book and animation was to stimulate children's empathy for the character to arouse their interest in learning how to self-catheterize (Figure 1).
6. Encouraging website use. A room in the outpatient clinic, with a computer and Internet access, was provided, and parents with their children were invited to explore and navigate through the website with the help of a nurse.

7. Making the website accessible and user-friendly. Simple resources were developed with content appropriate for the target audience so that the website could be used during in-person consultations and by other family members at home. Printed content was designed for patients who did not have Internet access.

### **Website Validation**

To assess the quality of the developed website, a two-step validation process was conducted. Content validity was assessed by physicians, nurses, and health informatics professionals, and face validity was assessed by parents. Content validation was determined according to the representativeness or relevance of the website elements/items. Face validation was defined as a layperson's acceptance that a statement was sound and relevant (Lynn, 1986). The number of judges selected for this task was based on the recommendation of specialists, who suggest a minimum of 5 and a maximum of 10 evaluators (Lynn, 1986).

A content validity index (CVI) was used to measure the proportion or percentage of judges' agreement (Polit & Beck, 2011). This method allowed the analysis of individual items using the item-level CVI (I-CVI), as well as the global instrument scale-level CVI (S-CVI). The following content and face validation domains were used: content and language, illustrations and layout, reliability, and didactics. For the validation in each domain, the judges selected one of the following options: "I totally agree" (5 points), "I agree" (4 points), "I do not agree or disagree" (3 points), "I disagree" (2 points), and "I totally disagree" (1 point).

The calculation of the I-CVI was carried out by dividing the number of responses considered adequate (4 and 5) by the total number of responses. The S-CVI was the mean of the global I-CVI for each domain. Items with scores of 1 or 2 were then reviewed or eliminated. Final I-CVI and S-CVI scores ranged from 0 to 1 (Polit & Beck, 2011). The website was considered valid if the global S-CVI was greater than or equal to 0.80 (Grant & Davis, 1997).

Content judges were contacted via e-mail, and the educational material was submitted to each specialist with an evaluation form. The form was used in a previous study in the development and validation of educational material using the Lime Survey platform ([www.limesurvey.org](http://www.limesurvey.org); Tavares et al., 2018). Physicians and nurses were selected using a database of Brazilian researchers ([www.lattes.cnpq.br](http://www.lattes.cnpq.br)). Seven healthcare professionals participated in the content validation, whereas two health informatics professionals participated in the technical validation. Of the seven content judges, six were nurses: three working in rehabilitation departments and the others in urology,



Figure 1. Images from the website's homepage.

pediatrics, and stomal therapy. The other content judge was a physician working in pediatric nephrology. All judges were women who had an average age of 40 years (31–59 years), an average of 17 years of professional experience (8–37 years), and an average of 15 years of experience in the urology field (3–33 years). Three judges had PhDs, two had master's degrees, and two were post-doctoral fellows. The health informatics judges (one woman and one man) had 7 and 21 years of experience, respectively. It should be noted that the health informatics professionals evaluated only the illustrations and layout domain.

To conduct face validation, we selected parents who cared for children with neurogenic bladder who require CIC. We recruited the parents after the medical and nursing appointments of children at a pediatric urology service. Only parents who reported that they had sufficient computer skills to access the website and who confirmed their interest in participating in the study were selected. Finally, 10 mothers (with an average age of 36 years) participated in face validation. A self-report form was used to describe the participants and to evaluate their agreement with the contents of the website.

## Results

Regarding website validation, most of the content and technical judges agreed with the majority of the self-report items. Table 1 presents results of the item validity indices for each domain as well as the overall S-CVI. The validation of the website was satisfactory with no CVI value under 0.8 (overall S-CVI = 0.94). Regarding the website's language, the judges found that the videos' download time was too slow (I-CVI = 0.85), and one judge stated that some of the content was repetitive (I-CVI = 0.85). Some suggestions were made and incorporated into the website.

The website's display showed attractive visual images and was considered to be favorable for learning (I-CVI = 1).

The information presented on the website was reliable (I-CVI = 1), and the website organization was easy to navigate (I-CVI = 1). However, some content judges encountered difficulties when navigating between pages, and some of the links did not function properly (I-CVI = 0.88) when using Internet Explorer. These problems will be addressed by the company that built the website.

After content validation, the website was reviewed for face validation. The variables related to the website's content language showed satisfactory results, and the evaluation resulted in a minimum I-CVI of 0.7 (the weblinks work properly) and a global S-CVI of 0.92. The information was considered well organized and easily understandable. The website illustrations and layout were deemed acceptable (I-CVI = 1.0), as were the didactics (I-CVI = 0.9). In general, the website was considered easy to navigate and capable of assisting with the CIC learning process (Table 2).

## Discussion

This study assessed the development and utility of a website designed to facilitate children's learning of the performance of CIC procedures. The website was composed of different age-appropriate and attractive materials to offer healthcare professionals various choices for teaching children about CIC. As the content is free, users can revisit the material at their leisure.

Research suggests that judges from different areas can be quite useful for validating educational materials (Lima et al., 2017; Tavares et al., 2018). The technical and content judges made important contributions regarding the organization of the site content, including videos, educational flyers, and games. Furthermore, the judges suggested that the presentation be built for smartphone formats, the most common way individuals currently access the Internet. One of the judges mentioned that some



**Table 1** Content Validity Index of the Website According to the Content and Technical Judges

Variable	TD	D	NAND	A	TA	I-CVI
Language and content ( <i>N</i> = 7)						
1. Information is shown in a relevant context to the target audience.	0	0	0	1	6	1.0
2. Information is organized in such a way as to be easily understood by the audience.	0	1	0	0	6	0.85
3. Information is shown in a clear and objective way.	0	1	0	0	6	0.85
4. The language is understandable and accessible to the target audience.	0	0	0	0	7	1.0
S-CVI domains						0.92
Illustrations and layout ( <i>N</i> = 9)						
5. There is a clear indication about the authors of the website.	0	0	1	0	8	0.88
6. There is enough information making it possible to establish contact with the authors.	0	0	1	0	8	0.88
7. The website design promotes learning.	0	0	0	1	8	1.0
8. Images add knowledge to the text.	0	0	0	1	8	1.0
9. The images correspond to the related text.	0	0	0	0	9	1.0
10. The user can easily navigate between pages.	0	1	0	1	7	0.88
11. The website links work properly.	0	1	0	2	6	0.88
12. The website looks attractive to the target audience.	0	0	0	0	9	1.0
13. The website is organized for easy use.	0	0	0	3	6	1.0
14. The display contributes to the website's access.	0	1	0	2	6	0.88
S-CVI domains						0.94
Reliability ( <i>N</i> = 7)						
15. The information presented on the website is reliable.	0	0	0	0	7	1.0
16. The information contributes to knowledge construction on clean intermittent catheterization in a playful way.	0	0	0	2	5	1.0
17. The information provided is updated.	0	0	0	0	7	1.0
18. The website text does not contain grammar errors.	0	1	0	0	6	0.85
S-CVI domains						0.96
Didactic ( <i>N</i> = 7)						
19. The website fulfills its role as a playful tool.	0	1	0	0	6	0.85
20. The website can be used as a playful reference tool.	0	0	0	0	7	1.0
21. Would you use or recommend the website to your patients?	0	0	0	0	7	1.0
S-CVI domains						0.95
S-CVI global						0.94

Note. TA = totally agree; A = agree; NAND = I do not agree or disagree; D = disagree; TD = totally disagree; I-CVI = item-level content validity index; S-CVI = scale-level content validity index.

of the site's content was repetitive, namely the presentation of educational videos and flyers that contained the same information. However, this repetition was maintained, as not all patients will have access to the Internet. Furthermore, educational flyers are helpful to nurses and physicians during face-to-face consultations.

The characteristics of the parents participating in this study revealed a predominance of mothers as the primary caregivers, which is consistent with the results of other studies (Lima et al., 2017; Tavares et al., 2018). It was noted that mothers generally cared for the child, regardless of age, even if the mother worked outside the home; these women often quit their jobs and assumed the exclusive role of caregiver. The face validity provided by the mothers complemented the content validation process. It is noteworthy that three mothers chose "disagree" about the item "the weblinks work properly" for the illustrations and layout domain. This may be because of difficulties in accessing the links and downloading the videos. Previous studies have determined that parents should be included

in the process of constructing and validating educational materials (Lima et al., 2017; Tavares et al., 2018). In addition, parents contributed to our validation procedures by pointing out the necessary changes in the color or font type of text on the flyers. Online educational material about CIC techniques was developed for both boys and girls. Parents requested that the comic book, illustrated with a boy, could also have an additional version with a female and teenagers as the main characters, which was not possible with the initial design.

There is no consensus in the literature regarding the best approach for teaching children about self-catheterization. Furthermore, there is no information regarding the ideal age for such instruction or reasons why certain educational strategies work whereas others do not. However, previous studies have highlighted the importance of educational interventions that are culturally appropriate during childhood to encourage early independence (Castillo et al., 2017). Assessment of self-catheterization training conducted with 60 boys in a

**Table 2** Content Validity Index of the Website According to Parents

Variable	TD	D	NAND	A	TA	I-CVI
Content and language						
Understood all the words and phrases on the website.	0	2	0	0	8	0.8
Easily found contact information on the website.	0	1	0	0	9	0.9
S-CVI domains						0.85
Illustrations and layout						
Understood all animations, videos, and images from the website.	0	0	0	0	10	1.0
The weblinks work properly.	0	3	0	0	7	0.7
Could use all the games.	0	0	0	1	9	1.0
S-CVI domains						0.9
Reliability						
Want to access the virtual environment with your child.	0	0	0	0	10	1.0
S-CVI domains						1.0
Didactic						
Considers it easy to navigate the website.	0	1	0	0	9	0.9
Do you think the virtual environment can prepare your child for future self-catheterization or to understand its importance?	0	0	0	1	9	1.0
S-CVI domains						0.95
S-CVI global						0.92

Note. TA = totally agree; A = agree; NAND = I do not agree or disagree; D = disagree; TD = totally disagree; I-CVI = item-level content validity index; S-CVI = scale-level content validity index.

rehabilitation program operated by urotherapy nurses revealed that the median age for starting CIC (performed by another person) was 8.2 years (ranging from 1.2 to 18 years). Didactic materials included anatomical drawings, informational flyers, and dolls. Self-catheterization only began when the child felt safe with the procedure, with 42 boys self-catheterizing at a median age of 10.8 years (ranging from 5.9 to 18.4 years). The switch to self-catheterization occurred after a median of 2.1 years (ranging from 2 months to 7.8 years; Faure et al., 2016).

Evaluating unsuccessful cases of self-catheterization learning by children and identifying educational failures is challenging for healthcare professionals (Benício et al., 2018). One multidisciplinary group training program with seven children (aged between 7 and 12 years) having difficulties learning CIC procedures had training aspects that favored learning. The training program included sharing difficulties and achievements with other children/parents, cognitive restructuring to improve comprehension and motivation, equipment handling and experimenting, relaxation as a response to physical stress, and parental orientation and support (Cobussen-Boekhorst et al., 2010).

To better understand what techniques work better than others, the website included a blog, so patients and caregivers could communicate with each other and their healthcare professional(s). The efficacy of this blog interface will be the subject of a follow-up study. The development of any blog for children is challenging for health professionals, because such blogs need to be carefully monitored to prevent inappropriate use. Although the

benefits of blogs for CIC education are still unknown, sharing experiences may be beneficial for the parents.

### Limitations

A few limitations should be noted in relation to this work. First, the website is completely in Portuguese, which restricts the access to Portuguese language users. Second, there have been few studies developing and validating websites for health education; thus, we had a limited framework for designing the website. Although the recommendations of Cook and Dupras (2004) were directed toward another target group (health professionals and students), the recommendations served the needs of the project. Third, only a single healthcare center was used for face validation and nonclinical evaluation of the website. Finally, it will be important for children to also validate the website and its effectiveness. In this study, children accompanied their mothers during the website validation and provided some opinions; however, the mothers responded to the questions. Future research could include an additional step involving children's validation. Therefore, caution should be exercised until the results can be generalized to different contexts.

### Conclusions

This study contributes to a discussion regarding healthcare professionals' roles in the rehabilitation of children, which goes beyond hospitals, clinics, and ambulatory environments. This age-appropriate website can support rehabilitation professionals attending to children

## Key Practice Points

- Age-appropriate website interventions can be useful for rehabilitation nurses as a complement to healthcare education for children requiring CIC.
- The use of age-appropriate educational materials by rehabilitation nurses could encourage children's participation in their own care and minimize dependency on their parents.
- The website can be used by rehabilitation nurses to develop similar resources for different needs.

with spinal cord injury and other neurological disorders needing CIC.

The website is freely available at [www.doutorbexiga.com.br](http://www.doutorbexiga.com.br). It is composed of different didactic resources, including educational videos, coloring games, a memory game, a comic book magazine, animations, and a blog for communication among patients, caregivers, and health professionals. The website developed in this study can potentially strengthen the bond between professionals and families, encourage children's participation in their own care, minimize children's dependence on their caregivers, and empower families. Although it is not believed that educational materials should replace direct health education provided by professionals, online portals can facilitate learning through repetition and home access, which promotes the understanding and sharing of information among family and friends. In the future, a study to assess the impact of this website on children's knowledge and CIC performance is planned. Finally, because rehabilitation nurses provide the majority of health education for families and children, it is recommended that this website serve as a model for developing similar material.

## Acknowledgments

The authors would like to acknowledge Fundação de Amparo à Pesquisa do Estado de São Paulo.

## Conflict of Interest

The authors declare there are no conflicts of interest.

## Funding

This work was supported by Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP; Grant 15/18722-8). T. R. was funded by FAPESP (Grant 16/22176-1). M. P. B. A. was funded by FAPESP (Grant 17/01665-7).

## References

Amaro, J. L., Alves, M. V. M. F. F., Avila, M. A. G., & Uezono, T. M. (2015). *Juca em uma viagem pelo sistema urinário*. Botucatu,

Brazil: Universidade Estadual Paulista Júlio de Mesquita Filho. Faculdade de Medicina de Botucatu. ISBN 978-85-65318-22-8. Retrieved from <http://www.doutorbexiga.com.br/gibi/>

Annaim, A., Lassiter, M., Viera, A. J., & Ferris, M. (2015). Interactive media for parental education on managing children chronic condition: A systematic review of the literature. *BMC Pediatrics*, 15, 201. doi:10.1186/s12887-015-0517-2

Benício, C. D. A. V., Rocha, D. M., Dourado, G. O. L., Bezerra, S. M. G., Andrade, E. M. L. R., & Nogueira, L. T. (2018). Factors associated with the knowledge of patients and caregivers about clean intermittent urethral catheterization: An integrative review. *Revista da Escola de Enfermagem da USP*, 52, e03362. doi:10.1590/S1980-220X2017033703362

Braga, L. H., Rickard, M., Farrokhyar, F., Jegatheeswaran, K., Brownrigg, N., Li, C., ... Lorenzo, A. J. (2017). Bladder training video versus standard urotherapy for bladder and bowel dysfunction: A noninferiority randomized, controlled trial. *The Journal of Urology*, 197(3 Pt. 2), 877–884. doi:10.1016/j.juro.2016.08.089

Castillo, J., Ostermaier, K. K., Fremion, E., Collier, T., Zhu, H., Huang, G. O., ... Castillo, H. (2017). Urologic self-management through intermittent self-catheterization among individuals with spina bifida: A journey to self-efficacy and autonomy. *Journal of Pediatric Rehabilitation Medicine*, 10(3–4), 219–226. doi:10.3233/PRM-170447

Cobussen-Boekhorst, H. J., Kuppenveld Van, J. H., Verheij, P. P., Jong De, L. L., Gier De, R. R., Kortmann, B. B., & Feitz, W. W. (2010). Teaching children clean intermittent self-catheterization (CISC) in a group setting. *Journal of Pediatric Urology*, 6(3), 288–293. doi:10.1016/j.jpuro.2009.09.002

Cook, D. A., & Dupras, D. M. (2004). A practical guide to developing effective web-based learning. *Journal of General Internal Medicine*, 19(6), 698–707. doi:10.1111/j.1525-1497.2004.30029.x

Faleiros, F., Pelosi, G., Warschausky, S., Tate, D., Käßpler, C., & Thomas, E. (2018). Factors influencing the use of intermittent bladder catheterization by individuals with spina bifida in Brazil and Germany. *Rehabilitation Nursing*, 43(1), 46–51. doi:10.1002/rnj.302

Faure, A., Peycelon, M., Lallemand, P., Audry, G., & Forin, V. (2016). Pro and cons of transurethral self-catheterization in boys: A long-term teaching experience in a pediatric rehabilitation centre. *Urology Journal*, 13(2), 2622–2628.

Fumincelli, L., Mazzo, A., Martins, J. C. A., Henriques, F. M. D., & Orlandin, L. (2017). Quality of life of patients using intermittent urinary catheterization. *Revista Latino-Americana de Enfermagem*, 25, e2906. doi:10.1590/1518-8345.1816.2906

Grant, J. S., & Davis, L. L. (1997). Selection and use of content experts for instrument development. *Research in Nursing & Health*, 20(3), 269–274.

Holland, J. E., DeMaso, D. R., Rosoklija, I., Johnson, K. L., Manning, D., Bellows, A. L., & Bauer, S. B. (2015). Self-catheter experience journal: Enhancing the patient and family experience in clean intermittent catheterization. *Journal of Pediatric Urology*, 11(4), 187–187.e6. doi:10.1016/j.jpuro.2015.03.011

Lima, M. B., Rebouças, C. B. A., Castro, R. C. M. B., Cipriano, M. A. B., Cardoso, M. V. L. M. L., & Almeida, P. C. (2017). Construction and validation of educational video for the guidance of parents of children regarding clean intermittent catheterization. *Revista da Escola de Enfermagem da USP*, 51, e03273. doi:10.1590/s1980-220x2016005603273

Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, 33(6), 382–385.

Mazzo, V. A., Lima, V. F., Carvalho, A. K. D. S., Weissheimer, G., & Soares, L. G. (2017). Online information as support to the families of children and adolescents with chronic disease. *Revista*

- Gaúcha de Enfermagem*, 38(1), e63475. doi:10.1590/1983-1447.2017.01.63475
- Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). New York, NY: Cambridge University Press.
- Nardi, A. C., Nardozza, A. Jr., Fonseca, C. E. C., Bretas, F. F. H., Truzzi, J. C. C. I., & Bernardo, W. M. (2014). *Bexiga Neurogênica na infância: Diagnóstico e tratamento conservador. Diretrizes das Sociedade Brasileira de Urologia*. Rio de Janeiro, Brazil: Sociedade Brasileira de Urologia.
- Polit, D. F., & Beck, C. T. (2011). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing and Health*, 29(5), 489-497.
- Silva, D. R. A., Mazzo, A., Jorge, B. M., Souza Júnior, V. D., Fumincelli, L., & Almeida, R. G. S. (2015). Intermittent urinary catheterization: The impact of training on a low-fidelity simulator on the self-confidence of patients and caregivers. *Rehabilitation Nursing*, 42(2), 97-103. doi:10.1002/rnj.226
- Sturm, R. M., & Cheng, E. Y. (2016). The management of the pediatric neurogenic bladder. *Current Bladder Dysfunction Reports*, 11, 225-233. doi:10.1007/s11884-016-0371-6
- Tavares, P. A. J., Hamamoto Filho, P. T., Ferreira, A. S. S. B. S., & Avila, M. A. G. (2018). Construction and validation of educational material for children with hydrocephalus and their informal caregivers. *World Neurosurgery*, 114, 381-390. doi:10.1016/j.wneu.2018.03.082
- Zanollo, L. G., Stensrod, G. C., Kerdraon, J., Lund, K. G., Halvorsen, A. H., Losavio, E., & Soler, J. M. (2015). Standardized intermittent catheterization education improves catheterization compliance in individuals with spinal cord injury. *International Journal of Urological Nursing*, 9(3), 165-172. doi:10.1111/ijun.12084

For more than 170 additional continuing professional development articles related to Pediatrics topics, go to [www.NursingCenter.com/ce](http://www.NursingCenter.com/ce).

Lippincott®  
NursingCenter®

#### TEST INSTRUCTIONS

- Read the article. The test for this nursing continuing professional development (NCPD) activity is to be taken online at [www.nursingcenter.com/CE/RNJ](http://www.nursingcenter.com/CE/RNJ). Tests can no longer be mailed or faxed.
- You'll need to create an account (it's free!) and log in to access My Planner before taking online tests. Your planner will keep track of all your Lippincott Professional Development online NCPD activities for you.
- There's only one correct answer for each question. A passing score for this test is 7 correct answers. If you pass, you can print your certificate of earned contact hours and access the answer key. If you fail, you have the option of taking the test again at no additional cost.
- For questions, contact Lippincott Professional Development: 1-800-787-8985.
- Registration deadline is March 3, 2023

#### PROVIDER ACCREDITATION

Lippincott Professional Development will award 2.0 contact hours for this nursing continuing professional development activity.

Lippincott Professional Development is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

**NCPD** Nursing Continuing Professional Development

This activity is also provider approved by the California Board of Registered Nursing, Provider Number CEP 11749 for 2.0 contact hours. Lippincott Professional Development is also an approved provider of continuing nursing education by the District of Columbia, Georgia, and Florida, CE Broker #50-1223. Your certificate is valid in all states.

**Payment:** The registration fee for this test is \$10.00 for members and \$12.50 for nonmembers.

1. ARN members can access the discount by logging into the secure "Members Only" area of <http://www.rehabnurse.org>.
2. Select the Education tab on the navigation menu.
3. Select Continuing Education.
4. Select the Rehabilitation Nursing Journal article of your choice.
5. You will appear at [nursing.CEConnection.com](http://nursing.CEConnection.com).
6. Log in using your Association of Rehabilitation Nursing username and password. The first time you log in, you will have to complete your user profile.
7. Confirm the title of the CE activity you would like to purchase.
8. Click start to view the article or select take test (if you have previously read the article.)
9. After passing the posttest, select + Cart to add the CE activity to your cart.
10. Select check out and pay for your CE activity. A copy of the receipt will be emailed.