ISSNe: 2182.2883
Available: https://doi.org/10.12707/RIV19064

RESEARCH PAPER (ORIGINAL)
ARTIGO DE INVESTIGAÇÃO (ORIGINAL)

Validation of a nursing protocol for the evaluation and diagnosis of urinary retention in adults

Validação de protocolo de enfermagem para avaliação e diagnóstico de retenção urinária no adulto

Validación del protocolo de enfermería para la evaluación y el diagnóstico de la retención urinaria en adultos

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Abstract

Background: In situations where the patient manifests urinary retention (UR), the physical examination is often inconclusive. Consequently, urinary catheterization is often the alternative procedure, leading to risks associated with this procedure for the patient, like urinary tract infection.
Objective: To validate the content of a nursing protocol for the evaluation and diagnosis of UR in adults, with the support of the bladder scan, for use by Portuguese nurses.
Methodology: Methodological study, with the opinion of experts through the Delphi technique and the Fehring Model, adapted to the cultural context.
Results: Validation of the protocol was achieved in the first round of the Delphi technique, with the participation of 42 experts (CVI ≥ 0.90). The second round of the Delphi technique, with 26 experts, aiming at improving the protocol, obtained a CVI ≥ 0.88.
Conclusion: The validation of this protocol represents an improvement in nursing knowledge. The instrument is considered a theoretical and practical means to support the promotion of nursing care quality.

Keywords: nursing protocols; ultrasonography; urinary retention; evaluation and/or validation studies; nursing diagnosis

Resumo

Enquadramento: Nas situações em que o doente tem manifestações de retenção urinária (RU), nem sempre o exame físico é conclusivo, recorrendo o enfermeiro frequentemente, a cateterismo urinário, incorrendo o doente a riscos associados a esta intervenção, como a infeção do trato urinário.
Objetivo: Validar o conteúdo de um protocolo de enfermagem de avaliação e diagnóstico de RU no adulto, com recurso à ultrassonografia vesical, para utilização pelos enfermeiros portugueses.
Metodologia: Estudo metodológico, com a opinião de peritos através da técnica Delphi e do Modelo de Fehring adaptado ao contexto cultural.
Resultados: Obteve-se a validação do protocolo na primeira ronda da técnica Delphi, com a participação de 42 peritos (IVC ≥ 0,90). Na segunda ronda da técnica Delphi, com 26 peritos, objetivou-se aperfeiçoar o protocolo (IVC ≥ 0,88).
Conclusão: A validação do presente protocolo representa um incremento no conhecimento em enfermagem. Considera-se que o instrumento é um suporte teórico e prático promotor da qualidade dos cuidados de enfermagem.

Palavras-chave: protocolos de enfermagem; ultrassonografia; retenção urinária; avaliação e/ou estudos de validação; diagnóstico de enfermagem

Resumen

Marco contextual: En situaciones en las que el paciente tiene episodios de retención urinaria (RU), el examen físico no siempre es concluyente. El enfermero utiliza a menudo el sondaje urinario, una intervención que conlleva riesgos asociados para el paciente, tales como infección del tracto urinario.
Objetivo: Validar el contenido de un protocolo de enfermería de evaluación y diagnóstico de la RU en el adulto, para lo cual se recurrió a la ecografía vesical, con el fin de que lo utilicen los enfermeros portugueses.
Metodología: Estudio metodológico, con la opinión de expertos a través de la técnica Delphi y del Modelo Fehring adaptado al contexto cultural.
Resultados: La validación del protocolo se obtuvo en la primera ronda de la técnica Delphi, con la participación de 42 expertos (IVC ≥ 0,90). La segunda ronda de la técnica Delphi, con 26 expertos, tuvo como objetivo perfeccionar el protocolo (IVC ≥ 0,88).
Conclusión: La validación del presente protocolo supone un aumento de los conocimientos de enfermería. Se considera que el instrumento es un apoyo teórico y práctico para promover la calidad de la atención de enfermería.

Palabras clave: protocolos de enfermería; ultrasonografía; retención urinaria; evaluación y/o estudios de validación; diagnóstico de enfermería

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Received for publication: 18.09.19
Accepted for publication: 29.11.19

Introduction

Urinary retention (UR) in adults is a nursing diagnosis that often occurs in several medical conditions. NANDA International taxonomy (NANDA-I) defines it as the inability to empty the bladder completely (NANDA International, 2018). On the other hand, the International Council of Nurses (ICN) describes it as the urinary status of incomplete bladder voiding due to loss of muscular function resulting from narcotics or bladder damage (Conselho Internacional de Enfermeiros, 2016).

It is difficult to carry out a nursing diagnosis of UR with only the patient's clinical background and physical examination, so bladder catheterization (BC) is often used but does not always lead to confirmation. Therefore, technological means should support diagnosis, such as ultrasonography (US), which allows assessing the bladder volume (BV) or postvoid residual volume (RV) correctly. Unnecessary BC are thus avoided, and consequently, so is the risk of catheter-associated urinary tract infection (CAUTI; Mendes, 2012).

Nursing protocols constitute theoretical support of care standardization, which, when based on scientific evidence, are a valuable tool for safe practices (Pimenta, Pastana, Sichieri, Solha, & Souza, 2015).

This study aims to validate the content of a nursing protocol for the evaluation and diagnosis of UR in adults, using bladder US, for use by Portuguese nurses.

Background

Nurses play a fundamental role in UR prevention through the identification of patients' risk factors for developing this status. The most relevant risk factors are a prostatic condition, acute myocardial infarction, and stroke; bladder voiding problems; urinary tract infection; cognitive changes/confusional state; diabetes; alcoholic neuropathy; constipation; severe pain; long-term immobility; emotional stress; and use of opioids or anticholinergic drugs. Other situations should also be considered, such as acute disease (trauma and poisoning), RV ≥ 200ml, administration of large volumes of fluids, BV removal, pre- and postoperative period, and epidural anesthesia (Johansson et al., 2012). Consequently, the authors of this study created an action protocol for BV or RV measurement, arguing that patients with RV >499ml and <999ml should be submitted to an intermittent catheterization.

Buchko, Robinson, and Bell (2013) conducted a pilot study in women undergoing gynecological surgery to understand if the application of an evidence-based protocol, combined with training of nurses in UR and use of portable US, would decrease postoperative UR. The results showed that the implementation of the protocol and the training of nurses did reduce the incidence of UR, bladder distension, and the number of intermittent catheterizations, by increasing the number of BV measurements.

According to Widdall (2015), it is essential to implement protocols using portable US in rehabilitation practice because many patients manifest neurological changes and functional deficits that can lead to bladder dysfunction.

Mendes (2012) carried out a systematic review to confirm if the use of US in measuring BV in people with acute UR was an evidence-based technique and if it impacted professional practice. The results suggested that there was evidence that the US was the ideal technique for BV measurement over bladder palpation and application of intermittent BC. The same review described the US as a sensitive method for bladder dysfunction diagnosis and noted the correlation between BV measurements with intermittent BC and supported by portable US.

This evidence-based protocol was developed by Jorge (2017) and aimed to standardize the evaluation and diagnosis of UR in adults using bladder US. Jorge (2017) validated the content of the protocol for use by Brazilian nurses but stressed the need for other studies on the application of the protocol in clinical practice. In this sense, Portuguese researchers conducted this study to validate the content of the protocol for use by Portuguese nurses.

This tool consists of two parts, an introductory part on evaluation and diagnosis of UR, and the protocol itself. The protocol is composed of three phases: 1) training of nurses in data collection for the confirmation of suspected UR; 2) guidance for bladder US use; 3) presentation of clinical parameters that support UR diagnosis in the area of obstetrics, rehabilitation, and post-surgery. The protocol also includes a schematic picture for each step of US use.

Research Question

Is there empirical data supporting the validation of the nursing protocol for US-supported evaluation and diagnosis of UR in adults for use by Portuguese nurses?

Methodology

This methodological study with a quantitative approach aims to validate the content of a nursing protocol for US-supported evaluation and diagnosis of UR in adults for use by Portuguese nurses. The non-probabilistic network sampling method facilitated the inclusion of professionals with the desired characteristics. Data were collected for 30 days, between September and October 2016. The 180 individuals initially contacted were acquaintances suggested by researchers as professionals likely willing to participate in the study. The sample comprised clinical nurse specialists and medical specialists or doing their specialty residency, with ≥ 2 years' professional experience in rehabilitation orthopedics, post-anesthesia care (PACU), gynecology, obstetrics, neurology, internal medicine, and surgery units of private and public hospitals; and teachers of nursing and medicine bachelor's degrees with experience as clinical supervisors of these same units. One inclusion criterion was having professional experience in the units mentioned above because patients develop a higher risk of developing UR in these units.

Data were collected via email. The link to Google Docs was provided, containing the researchers' identification and contact information and explaining the study in order to obtain the informed consent of participants. Afterward, the participants were forwarded to the protocol access links. The first-round questionnaire was developed by Jorge (2017) and adapted to the European Portuguese culture and language by the Portuguese researchers, aiming at a single protocol to be used both in Brazil and Portugal. The questionnaire consisted of 42 questions and was organized into two parts: 1) sociodemographic and professional characterization of participants; 2) evaluation of the protocol with questions about its objectives, content, language, relevance, functionality, and usability. The evaluation was carried out following a Likert scale: *strongly agree* (CF), *agree* (C), *disagree* (D), *strongly disagree* (DF), and *do not know* (NS), according to the recommendations of the Fehring model and the Delphi technique (Egaña, Araya, Núnez, & Camus, 2014; Rozados, 2015).

Of the 180 questionnaires sent, only 47 were returned. Five of them were eliminated because the participants did not meet the inclusion criteria. The suggestions of the experts were analyzed individually as to their relevance and pertinence.

In the second round of the Delphi technique, a new email was sent to the 42 experts who responded to the first, with the same procedures as referred to in the previous round but including the changes made in the protocol according to the suggestions. Each change included five optional answers (Likert scale) for each participant to validate the change. After examining the answers, no changes were needed in the second version of the protocol.

Google Docs allows the responses to be registered in the database automatically, then exported to an Excel file, and finally transferred to IBM SPSS Statistics, version 22.0, for analysis.

Following the Fehring model, the responses were analyzed using the Content Validity Index (CVI), which measured the degree of agreement among the experts on each item, through the ratio between the number of positive respondents (*strongly agree* + a*gree*) and the total number of experts (Egaña et al., 2014). Because the literature does not show consensus regarding CVI values for content validation, the researcher was then responsible for defining it, and so a CVI ≥ 0.80 was considered the cutoff level. In this sense, Egaña et al. (2014) reported that all items evaluated with a CVI < 0.80 should be discarded and deemed critical.

This study preserved all the ethical-legal principles of scientific research. Favorable opinion (P354-07/2016) was obtained from the Ethics Committee of the Health Sciences Research Unit: Nursing of the Nursing School of Coimbra.

Results

In the first round, 57.1% of the 42 experts were female, and 54.8% were between 30 and 40 years old, with a mean age of 40.5. The sample was composed of 41 nurses and 1 physician, specialists and/or masters. The majority (88.1%) cared for patients with a nursing di-

agnosis of UR. Also, only 28.6% stated that they had experience in using portable US for UR diagnosis.

In the second round, only 26 experts responded, 65.4% were female, and 61.5% were between 30 and 40 years old, with a mean age of 39. The sample consisted of specialist nurses and/or masters, and the majority (88.5%) cared for patients with a nursing diagnosis of UR. Only 38.5% claimed to have experience in using portable US for UR diagnosis.

Protocol validation

The protocol objectives were considered adequate and achievable by most experts. The CVI was 0.97 (Table 1).

Table 1
Validation of the protocol objectives (n = 42)

Statements/items	Degrees of agreement					CVI
	CF *n*(%)	C *n*(%)	D *n*(%)	DF *n*(%)	NS *n*(%)	
The objectives can be achieved	19 (45.2%)	22 (52.4%)	-	-	1 (2.4%)	0.97
The objectives are consistent with clinical practice	20 (47.6%)	21 (50%)	-	-	1 (2.4%)	0.97

Note. CF= strongly agree; C= agree; D= disagree; DF= strongly disagree; NS: do nor know; CVI= content validity index.

The protocol content was validated with a CVI ≥ 0.92 (Table 2).

Table 2
Validation of the protocol content (n = 42)

Statements/items	Degrees of agreement					CVI
	CF *n*(%)	C *n*(%)	D *n*(%)	DF *n*(%)	NS *n*(%)	
The content agrees with the objectives proposed in the study	20 (47.6%)	21 (50%)	1 (2.4%)	-	-	0.97
The content facilitates the process of UR nursing diagnosis	20 (47.6%)	22 (52.4%)	-	-	-	1
The content allows understanding the topic	24 (57.1%)	18 (42.9%)	-	-	-	1
The content follows a logical order	23 (54.8%)	18 (42.9%)	1 (2.4%)	-	-	0.97
The content incorporates all the necessary steps for UR nursing diagnosis evenly	21(50%)	19 (45.2%)	2 (4.8%)	-	-	0.95
The content includes all the necessary items for UR nursing diagnosis	17 (40.5%)	22 (52.4%)	2 (4.8%)	-	1 (2.4%)	0.92
The information presented by the protocol is correct	18 (42.9%)	22 (52.4%)	1 (2.4%)	-	1 (2.4%)	0.95
The information presented by the protocol is clear	19 (45.2%)	22 (52.4%)	-	1 (2.4%)	-	0.97

The information presented by the protocol is straightforward	21 (50%)	20 (47.6%)	1 (2.4%)	-	-	0.97
The schematic picture shows the content clearly	20 (47.6%)	21 (50%)	1 (2.4%)	-	-	0.97
The schematic picture presents important aspects	20 (47.6%)	22 (52.4%)	-	-	-	1
The schematic picture has the required clarity for visualization	19 (45.2%)	21 (50%)	2 (4.8%)	-	-	0.95

Note. CF= strongly agree; C= agree; D= disagree; DF= strongly disagree; NS: do nor know; CVI= content validity index.

The protocol language was validated with total agreement (Table 3).

Table 3
Validation of the protocol language (n = 42)

Statements/items	**Degrees of agreement**					
	CF ***n*(%)**	**C** ***n*(%)**	**D** ***n*(%)**	**DF** ***n*(%)**	**NS** ***n*(%)**	**CVI**
The protocol language is clear	22 (52.4%)	20 (47.6%)	-	-	-	1
The protocol language is straightforward	23 (54.8%)	19 (45.2%)	-	-	-	1
The protocol language is understandable for users	22 (52.4%)	20 (47.6%)	-	-	-	1

Note. CF= strongly agree; C= agree; D= disagree; DF= strongly disagree; NS: do nor know; CVI= content validity index.

The relevance of the protocol was validated with a CVI ≥ 0.97 (Table 4).

Table 4
Validation of the relevance of the protocol (n = 42)

Statements/items	**Degrees of agreement**					
	CF ***n*(%)**	**C** ***n*(%)**	**D** ***n*(%)**	**DF** ***n*(%)**	**NS** ***n*(%)**	**CVI**
The protocol presents important aspects for UR nursing diagnosis	22 (52.4%)	20 (47.6%)	-	-	-	1
The protocol is applicable in establishing the UR nursing diagnosis	21 (50%)	20 (47.6%)	1 (2.4%)	-	-	0.97
Protocol lets transfer learned content to practice	17 (40.5%)	25 (59.5%)	-	-	-	1

Note. CF= strongly agree; C= agree; D= disagree; DF= strongly disagree; NS: do nor know; CVI= content validity index.

The functionality of the protocol was validated with a CVI ≥ 0.95, and total agreement was obtained in two items (Table 5).

Table 5
Validation of the functionality of the protocol (n = 42)

Statements/items	Degrees of agreement					CVI
	CF *n*(%)	C *n*(%)	D *n*(%)	DF *n*(%)	NS *n*(%)	
The protocol constitutes an adequate tool for the proposed objective	17 (40.5%)	24 (57.1%)	1 (2.4%)	-	-	0.97
The protocol allows producing positive outcomes in UR nursing diagnosis	20 (47.6%)	22 (52.4%)	-	-	-	1
The protocol allows reducing the number of unnecessary urinary catheterizations	29 (69.0%)	13 (31.0%)	-	-	-	1
The protocol allows reducing the urinary tract infection rates	26 (61.9%)	14 (33.3%)	2 (4.8%)	-	-	0.95
The protocol allows obtaining positive outcomes in clinical practice to patients with UR	24 (57.1%)	17 (40.5%)	1 (2.4%)	-	-	0.97

Note. CF= strongly agree; C= agree; D= disagree; DF= strongly disagree; NS: do nor know; CVI= content validity index.

Lastly, the usability of the protocol was validated with a CVI ≥ 0.92 (Table 6).

Table 6
Validation of the usability of the protocol (n = 42)

Statements/items	Degrees of agreement					CVI
	CF *n*(%)	C *n*(%)	D *n*(%)	DF *n*(%)	NS *n*(%)	
The protocol is easy to use	21 (50%)	19 (45.2%)	1 (2.4%)	1 (2.4%)	-	0.95
The theoretical concepts used in the protocol are easy to understand and absorb	23 (54.8%)	19 (45.2%)	-	-	-	1
The protocol allows its easy application in clinical practice by the professional	20 (47.6%)	19 (45.2%)	2 (4.8%)	-	1 (2.4%)	0.92

Note. CF= strongly agree; C= agree; D= disagree; DF= strongly disagree; NS: do nor know; CVI= content validity index.

Although all the protocol items were validated in the first round with a CVI > 0.90, specific changes suggested by the experts were made to the protocol. There was a second round of the Delphi technique to validate the changes. All the suggestions made by the experts were validated with a CVI ≥ 0.88 (Table 7).

Table 7
Validation of changes made to the protocol (n = 26)

Changes	Degrees of agreement					CVI
	CF *n*(%)	C *n*(%)	D *n*(%)	DF *n*(%)	NS *n*(%)	
On page 1 of the protocol, references to the authors who defined UR were included in "Introduction".	14 (53.8%)	12 (46.2%)	-	-	-	1
On page 2 of the protocol, the last item in "Risk factors for UR" was changed: "use of some drugs, such as anticholinergics, antispasmodic, tricyclic antidepressants, antiparkinsonian, opioids, and anesthetics."	15 (57.7%)	11 (42.3%)	-	-	-	1
On page 3 of the protocol, the objective was changed in the first paragraph: "This document aims primarily to establish, step by step, a clinical evaluation evidence-based protocol for UR nursing diagnosis in adults."	13 (50%)	13 (50%)	-	-	-	1
On page 4 of the protocol, the item "F) To wash and disinfect hands. (Level A)" was added in "Phase 1. Data Collection"	16 (61.5%)	10 (38.5%)	-	-	-	1
On page 4 of the protocol, the following components were included in item "1) Anamnesis": "B) If the patient is communication-impaired, note if the patient manifests agitation for no apparent reason. (Level B)"	15 (57.7%)	10 (38.5%)	1 (3.8%)	-	-	0.96
On page 4 of the protocol, the following components were included in item: "1) Anamnesis": "E) Inquire if the patient has urinary loss. (Level B)"	13 (50%)	13 (50%)	-	-	-	1
On page 5 of the protocol, "B) To wash and disinfect hands. (Level A)" was included in item: "4) Palpation"	17 (65.4%)	9 (34.6%)	-	-	-	1
On page 5 of the protocol during phase 2 and in the schematic picture, the following item was rephrased in item "1) Use of Portable Bladder Scanner": "At bedside, prepare the portable bladder scanner with the necessary equipment: 1) conductive gel; 2) procedure gloves; 3) paper or fabric compress for gel removal. (Level B)"	11 (42.3%)	14 (53.8%)	1 (3.8%)	-	-	0.96
On page 6 of the protocol during phase 2 and in the schematic picture, the following item was rephrased in item "1) Use of Portable Bladder Scanner": "O) For female patients undergoing total hysterectomy, press male gender button. (Level B)"	15 (57.7%)	8 (30.8%)	2 (7.7%)	-	1 (3.8%)	0.88

On page 7 of the protocol during phase 2 and in the schematic picture, the following item was rephrased in item "1) Use of Portable Bladder Scanner": A.E.) Wash and disinfect hands, and perform nursing record. (Level A)"	17 (65.4%)	9 (34.6%)	-	-	-	1
On page 7 of the protocol during phase 3, "Clinical and urine volume parameters assessed as UR," the following item was changed: "D) In rehabilitation practice: ≥100ml of urine volume retained in the bladder, after voluntary voiding. (Level A)"	16 (61.5%)	10 (38.5%)	-	-	-	1
The schematic picture title was rephrased: "Clinical evaluation protocol for urinary retention nursing diagnosis in adults-Use of Portable Bladder Scanner"	14 (53.8%)	11 (42.3%)	1 (3.8%)	-	-	0.96
The following footnote was included in the schematic picture: "This protocol is directed at clinical evaluation and nursing diagnosis of urinary retention in adults with the use of portable bladder scanner, model Verathon Bladderscan BVI 3000®"	14 (53.8%)	10 (38.5%)	1 (3.8%)	-	1 (3.8%)	0.92
The following label was included in the schematic picture: "Item R"	11 (42.3%)	12 (46.2%)	1 (3.8%)	-	2 (7.7%)	0.88
The following label was included in the schematic picture: "Item V"	11 (42.3%)	12 (46.2%)	1 (3.8%)	-	2 (7.7%)	0.88

Note. CF= strongly agree; C= agree; D= disagree; DF= strongly disagree; NS: do nor know; CVI= content validity index.

Discussion

The lack of responses in both rounds and the short period of data collection were considered limitations of this study. However, the samples are representative. There was a low response rate of approximately 26.1%, agreeing with the disadvantages of online data collection established by Apostolico and Egry (2013). These authors consider that digital media are still seldom used for primary data collection and specially used in validation studies, like this research.

Also, another possible limitation of this study is that the protocol presents clinical parameters, which support UR diagnosis, only in the area of obstetrics, rehabilitation, and post-surgery. Patients hospitalized in orthopedics, gynecology, neurology, and internal medicine units also have an increased risk of developing UR as a result of their clinical diagnosis. Chronic UR is usually associated with neurological dysfunctions, such as multiple sclerosis, spinal cord injuries, and stroke (Seth, Haslam, & Panicker, 2014). Mendes (2012) stresses the high incidence of UR in stroke victims, leading to numerous procedures, such as intermittent catheterization, surveillance of UR signs, and use of equipment for BV measurement. The systematic review by the same author highlights that the use of bladder scan is associated with the lower number of unnecessary catheterizations because it adds to the results obtained by other noninvasive techniques, such as bladder palpation and observation of signs like sweating and agitation, as described in the various stages of the protocol. However, because neurology units feature a relevant component of rehabilitation activities, the application of this protocol in these units is recommended, in compliance with the clinical parameters of UR in rehabilitation.

The samples of experts in both rounds had academic qualifications, as all participants possessed the required clinical expertise. Nurses were specialists or masters, and the only first-round

physician was a specialist and had completed a postgraduate degree. Moreover, more than half of the experts of both samples had a master's degree. In the first round, most participants had between 10 and 30 years of professional experience, while in the second round, the majority had between 10 and 20 years of professional experience, indicating a higher and suitable degree of expertise for the validation of the protocol. In the two samples, the majority of experts worked in direct care delivery to patients with UR and had participated in scientific events related to their area of expertise. Rozados (2015) pointed out the participants' expertise criteria in the Delphi technique: time dedicated as a researcher to the topic; teacher in public or private schools; publications related to the research topic; and participation in scientific events related to the subject of the Delphi study. Although the participants manifested experience in UR evaluation and diagnosis, it was found that the majority did not use US to perform it, reflecting the lack of services and the need for training on the use of this technology in patient care.

Validation of the protocol

This study found that all the items under analysis were validated, resulting from a full consensus between experts (CVI = 1) in items related to the protocol content: "The content facilitates the process of UR nursing diagnosis"; "The content allows understanding the topic," and "The schematic picture presents important aspects." Full consensus between the experts remained regarding the protocol's clarity, objectivity, and accessibility. They also fully agreed on the relevance of the protocol, stating that "The protocol presents important aspects for the nursing diagnosis" and "Protocol lets transfer learned content to practice." Thus, it is understood that this protocol meets the recommendations by Pimenta et al. (2015), who claim that protocols should have good formal quality and evidence-based content and be easy to read, reliable, and valid. There was also full consensus on the functionality of the protocol, as shown by the following statements: "The protocol allows producing positive outcomes in UR nursing diagnosis" and "The protocol allows reducing the number of unnecessary urinary catheterizations." The item "The protocol allows reducing the urinary tract infection rates" obtained a CVI = 0.95, and the item "The protocol allows obtaining positive outcomes in clinical practice with patients with UR" obtained a CVI = 0.97. These findings agree with Johansson et al. (2012), who claim that UR is a rather frequent complication in hospitalized patients and that permanent catheterization is the most common treatment, responsible for 80% of CAUTI. These authors also argue that the appropriate use of bladder scan reduces bladder damage caused by UR and the need for permanent catheterization, leading to lower rates of urinary tract infection and associated costs.

Concerning the protocol's usability, there was total agreement in the understanding and assimilation of the theoretical concepts used. The remaining items obtained consensus levels of 0.95 to 0.97, which indicates a high degree of agreement among experts, thus reinforcing the validation of the protocol.

Considering the acknowledged expertise of the participants, and for protocol improvement purposes, the second phase of the Delphi technique was initiated. Approximately 54% of the changes obtained total agreement (CVI = 1), and the remaining achieved agreement values of 0,88-0,96, thus maintaining the validation.

One of the changes with a CVI = 1 is related to the definition of UR as RV ≥ 100ml in rehabilitation practice. Kim et al. (2012) conducted a study to correlate the RV and the incidence of urinary tract infection in stroke victims in rehabilitation units. It was concluded that intermittent catheterization constitutes, in situations of RV ≥ 100ml, a preventive measure of post-stroke urinary tract infection. Likewise, Widdall (2015) suggests the use of intermittent catheterization in cases of BV ≥ 400ml and adds that BC should be performed continuously in situations of recurrent UR, as suggested in this protocol.

During data collection, the introduction of more hand hygiene moments before starting anamnesis, at the end of palpation, and after using the US represents three changes of the protocol, which obtained a CVI = 1. It is understood that this measure, presented in this protocol, is a crucial step for its validation, in compliance with the recommendations of the standard precautions for healthcare-associated infection (HAI) control and prevention (Direção-Geral de Saúde, 2017). Nusee, Ibrahim, Mohd, and Ismail (2014) con-

ducted a cross-sectional study with mothers in a Malaysian hospital. They aimed to measure bladder volumes using the US accurately, compare these measurements with those obtained through urinary catheterization, and identify the factors that may affect BV measurements using US. The results point out the use of US in measuring BV after childbirth as a technique equivalent to urethral catheterization. It should be stressed that it is a non-invasive, easy-to-use, well accepted by patients and health professionals. Also, it constitutes no risk of infection or trauma.

Balderi, Mistraletti, D'Angelo, and Carli (2011) conducted an observational study, whose objective was to assess the incidence of postoperative UR in patients submitted to a knee or hip replacement surgery and evaluate the effectiveness of the use of a UR nursing evaluation and diagnosis protocol supported by the US. It was found that the incidence of UR with a need for BC for more than 48h was 17% and that the use of an UR nursing evaluation and diagnosis protocol supported by US was effective, thus reducing BC.

Pimenta et al. (2015) also pointed out as advantages of the use of nursing protocols the increase in patient and professional safety, care standardization, promotion of decision-making supported by nurses, facilitation of new technology inclusion, more sensible use of available resources, and development of process and outcome indicators. This study stresses the importance of evidence-based nursing protocols to support decision-making in nursing, thus ensuring safe care delivery.

This study has validated the content of the protocol of nursing evaluation and diagnosis of UR in adults. The protocol allows nurses to evaluate UR in adults safely and based on scientific evidence, for the promotion of HAI prevention. The knowledge of nurses on UR evaluation and their actions in the case of this diagnosis can now be supported with the use of this protocol.

Conclusion

The Fehring model and the Delphi technique were used for protocol validation, obtaining a CVI ≥ 0.88 for each item in the final version of the protocol. Empirical evidence supports its validity. Therefore, the objective of this study was achieved.

Considering the validation of this protocol, nurses can use an instrument that facilitates healthcare delivery to patients at risk of developing UR. Nurse can use nursing protocols for the evaluation and diagnosis of UR for a standardized, evidence-based practice, avoiding diagnosis errors and preserving the patients' right to be cared for according to the most up-to-date knowledge.

This study highlights the importance of using protocols in nursing care delivery and also emphasizes the relevance of technological resources for the evaluation of BV, such as bladder scan. Using this non-invasive device to measure BV is an HAI prevention strategy, particularly CAUTI, because it avoids unnecessary urinary catheterizations. It also contributes to reducing the number of intermittent catheterizations, leading to a reduction in expenses and time spent by nurses and higher patient satisfaction.

This protocol is developed for the area of obstetrics, rehabilitation, and post-surgery and may be applicable also in orthopedics, gynecology, neurology, internal medicine, and surgery units, adopting the parameters used for the contexts of rehabilitation and post-surgery, according to the specific situation of each patient. Lastly, the protocol provides standardized clinical parameters without discriminating the bladder capacity of each patient. However, it is known that urodynamic studies on patients' bladder capacity evaluation are predominantly conducted in rehabilitation units, even though nurses can use this instrument along with other strategies. Following the validation of its content, the authors suggest the implementation of the protocol in rehabilitation, orthopedics, PACU, gynecology, obstetrics, neurology, internal medicine, and surgery services.

Acknowledgments

The authors would like to thank Professor José Carlos Martins for his contribution to data collection and statistical treatment and assessment.

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