

USE OF URINARY CATHETERS FOR CLEAN INTERMITTENT CATHETERIZATION: SATISFACTION OF PATIENTS WITH BONE MARROW INJURY*

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ABSTRACT: The objective in this study was to assess the use of the conventional catheter, hydrophilic catheter and pre-lubricated catheter with bag for clean intermittent catheterization. Exploratory-descriptive cross-sectional research involving 59 bone marrow injury patients attended at rehabilitation centers of three Brazilian states between January and April 2012. The questionnaire to assess the perceived catheter attributes and the adapted consumption experience satisfaction questionnaire were used. The conventional catheter was not statistically superior in any aspect assessed. The hydrophilic catheter was considered superior to the conventional for package opening and sliding during insertion. The pre-lubricated catheter with bag was superior to the conventional for package opening, introduction, sliding and removal. The indication of the ideal catheter depends on the individual assessment of the patients, their difficulties, potentials and preferences.

DESCRIPTORS: Intermittent urethral catheterization; Paraplegia; Patient satisfaction.

USO DE CATETERES VESICAIS PARA CATETERISMO INTERMITENTE LIMPO: SATISFAÇÃO DA PESSOA COM LESÃO MEDULAR

RESUMO: Objetivou-se com este estudo avaliar a satisfação de pessoas com lesão medular com a utilização de cateter convencional, hidrofílico e pré-lubrificado com bolsa na realização de cateterismo intermitente limpo. Pesquisa exploratório-descritiva, de corte transversal com 59 pessoas que tiveram lesão medular, atendidas em centros de reabilitação de três estados brasileiros no período de janeiro a abril de 2012. Foi utilizado o questionário de avaliação de percepção de atributos do cateter e o questionário adaptado de satisfação em experiência de consumo. O cateter convencional não foi estatisticamente superior em nenhum aspecto avaliado. O cateter hidrofílico foi considerado superior ao convencional para abertura da embalagem e deslizamento na inserção. O cateter pré-lubrificado com bolsa foi superior ao convencional em abertura da embalagem, introdução, deslizamento e retirada. A indicação do cateter ideal depende da avaliação individualizada com lesão medular, suas dificuldades, potencialidades e preferências.

DESCRIPTORES: Cateterismo uretral intermitente; Paraplegia; Satisfação do paciente.

USO DE CATÉTERES VESICALES PARA CATETERISMO INTERMITENTE LIMPIO: SATISFACCIÓN DE LA PERSONA CON LESIÓN MEDULAR

RESUMEN: Estudio cuya finalidad fue evaluar la satisfacción de personas con lesión medular con la utilización de catéter convencional, hidrofílico y prelubricado con bolsa en la realización de cateterismo intermitente limpio. Investigación exploratoria descriptiva, transversal con 59 personas que tuvieron lesión medular, atendidas en centros de rehabilitación de tres estados brasileños en el periodo de enero a abril de 2012. Fue utilizado el cuestionario de evaluación de percepción de atributos de catéter y el cuestionario adaptado de satisfacción en experiencia de consumo. El catéter convencional no fue estadísticamente superior en ningún aspecto evaluado. El catéter hidrofílico fue considerado superior al convencional para abertura del embalaje y deslizamiento en la inserción. El catéter prelubricado con bolsa fue superior al convencional en abertura del embalaje, introducción, deslizamiento y retirada. La indicación del catéter ideal depende de la evaluación individualizada con lesión medular, sus dificultades, potencialidades y preferencias.

DESCRIPTORES: Cateterismo uretral intermitente; Paraplegia; Satisfacción del paciente.

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INTRODUCTION

One of the consequences of bone marrow injury is the neurological of the lower urinary tract dysfunction (NLUTD). This results in the incomplete voiding of the bladder and entails urinary tract infections (UTI), vesicoureteral reflux, hydronephrosis and kidney function loss. Intermittent catheterization is the preferred treatment to prevent the complications of NLUTD, and refers to periodical bladder voiding through the introduction of a catheter through the urethra or catheterizable channel⁽¹⁾.

Clean intermittent catheterization (CIC), which Lapides proposed in 1970, involves the use of a non-sterile technique and material, simply cleaning the hands and genital region⁽²⁾. It was observed that bladder distension and urinary stasis caused the UTI, instead of the asepsis of the technique⁽³⁾.

An increasing number of publications, comparing different urinary catheters for CIC, demonstrates the importance of the theme, in line with authors who affirm that the indication of the most appropriate catheter for the clients' need and preferences is a determining factor for their compliance with the technique⁽⁴⁾.

Comparative studies using different catheters found no difference between conventional and pre-lubricated catheters in terms of bleeding and UTI⁽⁵⁻⁶⁾, although differences were mentioned for urethral microtrauma, leukocyturia and, more importantly, for user satisfaction⁽⁷⁾.

The limited access to different catheters in the Brazilian context entails the need to elaborate public policies that favor the users' right to choose. Authors mention that knowledge on the extent to which the users' expectations are attended to supports the elaboration of such policies.

Therefore, the objective was to assess the satisfaction of bone marrow injury patients with the use of three urinary catheters that come with different technologies, comparing and analyzing different attributes in the use of conventional, hydrophilic and pre-lubricated catheters.

METHOD

Exploratory and descriptive cross-sectional study with a quantitative approach. The study was developed at three rehabilitation centers in three large cities in the states of São Paulo, Paraná and Santa Catarina. The data were collected between

January and April 2012.

The convenience sample consisted of 59 individuals. The inclusion criteria were: being over 18 years of age, bone marrow injured, CIC as the form of bladder voiding for at least three months, being literate, affiliated with the places where the data were collected and without self-catheterization difficulties.

To collect the data, three tools were used. The first served to characterize the sample, which the researcher completed upon the first contact with the participant. The participant completed the other two tools (questionnaires) at the end of the catheter assessment period.

Stomal therapy nurses developed the client perception questionnaire with urinary catheters. It contained specific items related to the catheters, such as: opening of the package, handling, sliding in the urethra, removal, length of procedure, among others. The questions were answered on a five-point Likert scale, and the answers ranged from "very bad" to "very good" or from "very difficult" to "very easy". Subjects who marked the answers: "good" and "very good" and "easy" and "very easy" were considered satisfied, with "reasonable" or grade 3 serving as the cut-off point between satisfaction and dissatisfaction.

The other assessment tool was an adaptation of the Client Enchantment tool⁽⁸⁾, which contained general items, related to the consumption experience of a product, such as: response to expectations and desires, perceived product quality and performance and trend towards positive comments on the product. The answers were marked on a scale from one to seven, ranging from "I complete disagree" to "I completely agree". Considering enchantment to be the highest satisfaction level, or agreement level seven, individuals who marked grade five or higher on the item were considered satisfied.

Each subject assessed three urinary catheters. The conventional catheter, made of Polyvinyl Chloride (PVC) without lubrication, which all participants had been using for more than three months, was assessed retrospectively. A sufficient number of hydrophilic catheters and pre-lubricated catheters with bag were supplied to each subject for 24 hours of use, according to the interval observed among the catheterizations.

The new catheters assessed were: polyurethane catheter with second-generation hydrophilic lubrication of polyvinylpyrrolidone (PVP) and isotonic saline solution (ISS), and the PVC catheter

lubricated using a solution of glycerine and water, coated with a flexible polyethylene film, which permits a technique without any touch, linked to a disposable and drainable 2000 ml urine collection bag.

The individuals received orientations as to the use of each catheter and the completion of each tool and took home the two assessment tools for each catheter to be assessed, as well as a sufficient number of hydrophilic catheters and pre-lubricated catheters with bag to use each type for 24 hours. After the use and completion, the participants returned to the place of study to hand in the completed questionnaires.

Statistical analysis was developed in the software *Statística* version 8.0. To compare the catheters in pairs, the binomial test and group comparison were used, defined according to the female and male sex and injury level. For this purpose, Mann-Whitney's non-parametric test was applied. For qualitative variables, the Chi-square test or Fisher's exact test was considered. P-values < 0.05 indicated statistical significance.

Approval for the research project was obtained from the CEP-PUC/PR (opinion 5359/11). The subjects received proper ethical and technical information on all aspects of the study.

RESULTS

Concerning the characteristics of the study sample, the subjects age ranged between 18 and 65 years, with a mean age of 34.6 years (± 11.8). The male sex was predominant with 76.3% (n=45). The education level was distributed among different levels. As for the level of education, finished secondary education predominated with 37.3% (n=22), followed by unfinished primary education with 30.5% (n=18). What the injury level is concerned, 67.8% (n=40) were paraplegic. The most frequent injury cause was wound by firearm, followed by car accident and fall from height. The time since the bone marrow injury ranged between 0.6 and 28 years, with a mean 7.1 years (± 6.2). The self-referred urethral sensitivity was intact in 44.1% (n=26).

For the item package opening, 54.2% of the users were satisfied with the conventional catheter, 74.6% with the hydrophilic catheter and 71.2% with the CIC set. The hydrophilic catheter showed the lowest percentage of dissatisfied users (1.7%). Considering the mean scores for each catheter, a statistically significant difference was found between the hydrophilic catheter

and the pre-lubricated catheter with bag and the conventional catheter, as displayed in Figure 1.

In the assessment of the catheter manipulation, no statistically significant difference was found when comparing pair by pair. The satisfaction percentage for this item corresponded to 59.3% for the conventional catheter, 61% for the hydrophilic and 67.8% for the pre-lubricated catheter with bag.

For the introduction of the catheter in the urethra, a statistically significant difference was only found for the comparison between the conventional catheter and the pre-lubricated catheter with bag, with a higher average for the second, as demonstrated in Figure 01. The satisfaction percentage for the pre-lubricated catheter with bag amounted to 72.9%, for the hydrophilic catheter 61% and for the conventional catheter 45.8%. The hydrophilic catheter obtained the largest percentage of dissatisfied patients with this item (23.7%).

The hydrophilic catheter showed the highest percentage of satisfaction with the sliding of the catheter in the urethra, with 89.8% of the participants and a dissatisfaction percentage of 3.4%. The percentage of users satisfied with the sliding of the pre-lubricated catheter with bag was 83% and of the conventional catheter 37.3%, with 33.9% of dissatisfied users. When comparing the mean scores of the catheters, a statistically significant difference ($p < 0.001$) was found for the hydrophilic and pre-lubricated catheters over the conventional type (Figure 1).

When assessing the catheter removal, 64.4% indicated they were satisfied with the conventional catheter; 81.4% with the hydrophilic catheter and 88.1% with the pre-lubricated catheter with bag. The comparison of means resulted in a statistically significant difference between the conventional catheter and the pre-lubricated catheter with bag, as shown in Figure 1.

Concerning the feeling of security when using the catheter, the patients satisfaction corresponded to 64.4% with the conventional catheter; 72.1% with the hydrophilic catheter and 88.1% were satisfied with the pre-lubricated catheter with bag. When comparing the means, as shown in Figure 1, the set for CIC was statistically superior to the conventional catheter and to the hydrophilic catheter.

For the item discomfort during catheter introduction, 56% mentioned this for the conventional catheter, 32% for the hydrophilic

Figure 1 – Mean satisfaction of bone marrow injury patients with the use of urinary catheters with different technologies – Sorocaba (SP), Curitiba (PR), Joinville (SC), Brazil, 2012

Attribute assessed	C1	C2	C3	P* value for difference	P* value for difference	P* value for difference
(mean scores)				C1xC2	C1xC3	C2xC3
Assessment scale of client perception of catheter in CIC						
Opening (01 to 05)	3.5	4.1	3.9	0.003	0.046	0.309
Manipulation (01 to 05)	3.6	3.6	3.9	0.760	0.085	0.124
Introduction (01 to 05)	3.3	3.6	3.9	0.157	0.004	0.114
Sliding (01 to 05)	3.0	4.3	4.2	<0.001	<0.001	0.612
Removal (01 to 05)	3.7	4	4.2	0.103	0.001	0.150
Security (01 to 04)	2.8	2.8	3.3	0.809	<0.001	0.001
Grade/concept (01 to 05)	3.4	3.8	4.3	0.063	<0.001	0.007
Score (07 to 34)	23.3	26.2	27.9	0.004	<0.001	0.066
Adaptation of assessment scale of enchantment/satisfaction – Adapted from Almeida and Nique (2007)						
Expectations (01 to 07)	4.1	4.8	5.5	0.072	<0.001	0.039
Satisfaction (01 to 07)	3.9	5	5.6	0.001	<0.001	0.046
Quality (01 to 07)	4.0	5.4	5.8	<0.001	<0.001	0.176
Performance (01 to 07)	3.9	5.1	5.5	0.001	<0.001	0.109
Desires (01 to 07)	4.2	4.9	5.4	0.050	0.001	0.138
Positive comments (01 to 07)	4.4	4.9	5.5	0.184	0.001	0.093
Recommendation to friend (01 to 07)	4.5	4.9	5.5	0.302	0.004	0.041

*Wilcoxon's non-parametric test, $p < 0.05$.

C1: conventional PVC catheter without preliminary lubrication.

C2: polyurethane catheter with hydrophilic lubrication.

C3: pre-lubricated catheter with bag.

catheter and 20% for the pre-lubricated catheter with bag, resulting in a statistically significant difference between the conventional catheter and the set for CIC ($p=0.022$). Only individuals with intact urethral sensitivity answered this question.

As for the score/concept attributed to each catheter; 50.8% assessed the conventional catheter as "good" or "very good". This percentage corresponded to 69.5% for the hydrophilic catheter and 78% for the pre-lubricated catheter with bag. Only 1.7% classified the latter as "bad" or "very bad". The mean score was statistically superior for the pre-lubricated catheter with bag over the conventional catheter and the hydrophilic catheter.

The catheter score, corresponding to the sum of the items scored on questionnaire one, resulted in an average of 23.3 for the conventional catheter; 26.2 for the hydrophilic catheter and 27.9 for the pre-lubricated catheter with bag. Thus, according to the tool, none of the catheters assessed was classified as "very good" (scores from 28 to 34),

but all were classified as "good" (21 to 27 points). The scores showed significant superiority for the pre-lubricated catheters (hydrophilic and pre-lubricated with bag) over the conventional catheter.

Concerning the length of the procedure, no statistically significant difference was found when comparing the catheters. The mean length of time spent on the conventional catheter was 5.6 minutes, for the hydrophilic catheter 4.9 and for the pre-lubricated catheter with bag 4.5 minutes.

The data based on the analysis of the Client enchantment questionnaire behaved similarly, showing a smaller percentage of patients satisfied with the conventional catheter, a higher percentage for the hydrophilic catheter and an even higher percentage for the pre-lubricated catheter with bag. The mean scores for each catheter and their comparison with 0-values are displayed in Figure 1.

When assessing the compliance with pre-consumption expectations, the pre-lubricated catheter with bag obtained a higher average and

percentage of satisfaction with the participants, resulting in significant superiority over the other catheters. The same happened when post-consumption satisfaction was assessed. On this item, however, the hydrophilic catheter was also statistically superior to the conventional type. Concerning the quality and performance of the catheters in response to the users' desires, the hydrophilic catheter and the pre-lubricated catheter with bag were superior to the conventional type. No statistically significant difference was found when the pre-lubricated catheters were found.

As for the item related to the individual's trend to give positive comments, statistical significance was only found for the pre-lubricated catheter with bag in relation to the conventional catheter. The same difference was observed for the trend to recommend the product to a friend. For this item, the pre-lubricated catheter with bag was also superior to the hydrophilic catheter.

For all questions, the answers were compared between men and women and between people with injuries up to T4 and as from T5. None of these crossings of variables resulted in a considerable difference. In response to the guiding questions, it can be affirmed that there exists a difference in the satisfaction of bone marrow injury patients with the use of conventional catheters and of pre-lubricated catheters. A difference also exists in this population's satisfaction with the use of different pre-lubricated catheters. Nevertheless, the user does not prefer one type of catheter, but specific characteristics found in each.

The conventional catheter was not statistically superior on any of the items assessed. The hydrophilic catheter was superior to the convention with statistical significance for the opening of the package, sliding in the urethra, general score, satisfaction, quality and performance. The pre-lubricated catheter with bag was superior to the conventional bag for the items: opening, introducing, sliding, removal, general score, expectations, satisfaction, quality, performance, compliance with pre-consumption desires and trend towards positive comments and recommendation of the product. On the items security, expectation, satisfaction and trend to recommend the product, it was also superior to the hydrophilic catheter.

Although the tools used do not directly assess the catheter aspects that can influence the degree of satisfaction, these variables can be observed indirectly, by assessing the differential

of the catheter assessed as superior for each item. Hence, the following aspects are suggested: devices that facilitate the manipulation of the catheter, from the opening of the package until the removal, urine collection reservoir linked, homogeneous lubrication that permits smooth sliding and does not interfere in how steadfast the catheter is introduced.

DISCUSSION

The hydrophilic catheter, which obtained the best score for package opening, has the following differentials for this item: a sticker on the back of the package that permits sticking it to a smooth surface and opening it by using only one hand, and an opening ring to help manually less skilled people. The second best catheter was the pre-lubricated catheter with bag, which has one plastic and one paper side. At a central point of the opening, the paper is shorter, which makes it easier to separate both sides.

Authors have found no difference for the opening of the conventional and hydrophilic catheter packages. In this study, a hydrophilic catheter version for women was used with a different opening, which may have contributed to the difference found⁽⁹⁾.

As for the catheter manipulation, no statistically significant difference was found between the individuals' assessment of the three catheters. Some individuals mentioned difficulty to manipulate the hydrophilic catheter because they could not hold anywhere along the catheter. Others found the pre-lubricated catheter with bag very long.

Other studies did not find any difference either in the manipulation of pre-lubricated and hydrophilic catheters⁽¹⁰⁾, or conventional and hydrophilic catheters⁽⁶⁾. In a study that compared different brands of hydrophilic catheters⁽¹¹⁾, two participants out of 20 found the hydrophilic catheter used in this study slick and one found it was sticky.

Authors reported that the hydrophilic catheters can be very slick, making them difficult to manipulate without a protection in which they can be handled. The same authors report that catheters with a bag can be difficult to manipulate for people with limited manual skills⁽¹²⁾.

The lack of a significant difference in manipulation among the three catheters can be associated with the individuals' familiarity with

the conventional catheter, a fact that facilitates the manipulation even without facilitating devices.

The superiority in the assessment of the introduction of the pre-lubricated catheter with bag into the urethra may have been motivated by the possible accomplishment of the technique without any touch. The low-density polyethylene film that directly covers the catheter is not removed during the technique, serving as a protective coating through which the subject holds the catheter. On the other hand, the percentage of dissatisfaction for the hydrophilic catheter can be related to the impossibility to hold the catheter at any place along its length, not permitting any firm introduction.

In a study, it was demonstrated that children experience difficulty to introduce the hydrophilic catheter when compared to the conventional catheter. The main difficulty is related to the fact that it is very slick⁽⁹⁾, and the same difficulty may have motivated its worse assessment in relation to the pre-lubricated catheter with bag, considering that five subjects classified it as "bad" or "very bad" because it is very smooth.

In a study that only compared hydrophilic catheters⁽¹¹⁾, 85% of the users considered the introduction of the hydrophilic catheter good and 90% considered the introduction of the other compared brand good, with some references to it being very slick or sticky. Authors observed a statistically significant difference for comfort and facility in the introduction of the catheter, with the hydrophilic catheter showing superiority over the conventional type⁽¹³⁾. Others, using ostomized children as a sample, did not observe such a difference⁽⁶⁾. When comparing hydrophilic and non-hydrophilic pre-lubricated catheters with a urine container, authors observed that the hydrophilic type was assessed better⁽¹⁰⁾.

The hydrophilic catheter showed the higher satisfaction percentage for sliding in the urethra, possibly due to its lubrication technology. The catheter is coated with polyvinylpyrrolidone (PVP), a polymer that can absorb up to ten times its own weight. It comes immersed in Isotonic Saline Solution (ISS), which increases the osmolarity, resulting in an isotonic coating.

Randomized and controlled studies demonstrate favorable results of hydrophilic catheters in the prevention of hematuria and bacteriuria⁽¹⁾, indicating its capacity to slide through the urethra without causing any trauma, capable of avoiding micro-traumas along its

course.

The pre-lubricated catheter with a non-hydrophilic lubrication bag showed a statistically superior performance in relation to the conventional catheter. This demonstrates that not only second-generation lubrication, but preliminary and homogeneous lubrication contribute to good sliding. The conventional catheter obtained a low satisfaction percentage, considering that the subjects lubricate the catheter with lidocaine. It was observed that manual lubrication is insufficient to produce smooth sliding.

The high percentage of satisfaction while removing the pre-lubricated catheter with bag may have been motivated by the presence of a urine collector bag with antireflux valve, avoiding splashes. On the other hand, the hydrophilic catheter obtained the highest percentage of dissatisfied subjects, which the participants justified by the fact that the catheter cannot be bent for removal. Hence, when the collector bag is not connected, there is a risk of spilling the urine that was left in the catheter lumen.

Authors who compared hydrophilic and pre-lubricated catheters, both with bag, obtained the best assessment for the hydrophilic catheter⁽¹⁰⁾. In another comparative study of different hydrophilic catheters, 84% of the participants considered its removal was good and 5% of the sample considered it very sticky to remove. In the post-CIC removal in urinary stomas, there was no difference between the conventional and hydrophilic catheters⁽⁶⁾.

It is believed that the sum of some attributes positively influenced the assessment, as follows: the possibility to accomplish the technique without touching the catheter, producing a feeling of security regarding the risk of infection, the possibility of holding close to the urine drainage opening and the ease of having the urine collection bag linked to the system, avoiding disconnections or splashes.

Strengthening the ease of having a bag collected to the catheter for urine drainage, authors describe the barriers found to implement CIC for bone marrow injury patients⁽⁴⁾. These include access difficulties and adaptations of public washrooms, a problem some of the subjects solved by using catheters with collector bags.

Although the hydrophilic catheter obtained the best result in terms of sliding, the pre-

lubricated catheter with bag obtained better results for discomfort, even if both obtained satisfactory results. The conventional catheter, manufactured in the same material as the pre-lubricated catheter with bag, obtained a high incidence of discomfort. This result leads to the belief that its occurrence depends on individual sensitivity, besides the combination between lubrication and the flexibility of the catheter material. In a study involving children, 10% of the participants considered the pre-lubricated, hydrophilic catheter very hard⁽⁹⁾. In a study that compared different hydrophilic catheters, the same hydrophilic type used in this study received score 9.6 from the sample for its potential not to cause pain, against 8.7 for the compared catheter.

Authors compared two pre-lubricated hydrophilic catheters in terms of discomfort, one coated in isotonic saline solution like the hydrophilic catheter used in this study and another that needed added water before its introduction, in 196 women. In that group, 98 women indicated different types and intensities of discomfort, but without a difference for the two catheter types⁽¹⁴⁾.

Authors observed that the sample preferred the hydrophilic catheter in relation to the non-hydrophilic catheter⁽¹⁰⁾. Again, in the study cited, the hydrophilic catheter also contained a urine container, which may have contributed to the different results.

For the participants in two studies, one international and another Brazilian⁽⁵⁻⁶⁾, the time needed for the catheterization was similar for the conventional and hydrophilic catheter, like in this study, there was no statistically significant difference for the procedure length. In another study, the length of preparation for the CIC using the conventional catheter and the hydrophilic catheter was the same, with a difference for the introduction time, which was slightly shorter for the hydrophilic type⁽⁹⁾.

Some authors observed the superior results of the non-hydrophilic lubrication catheter when compared to the hydrophilic lubricated catheter. As the two pre-lubricated catheters had no collector bag, the superior result of the non-hydrophilic lubrication, because it allows for a coating and the execution of the technique without any touch, permits a firmer insertion⁽⁷⁾.

In this study, like in most other studies consulted, it was observed that the pre-lubricated catheters show higher scores, especially regarding user satisfaction. Nevertheless, the best material,

the best lubrication and complementary attributes depend on the users' needs, characteristics and preference.

FINAL CONSIDERATIONS

This study allowed the participants to get to know and assess the existing technologies for CIC. These benefits are expected to reach other users through the publication of the results and awareness-raising of the professionals and policy makers on the need for and benefits of the users' right to choose.

In additions, benefits are suggested for the manufacturers, whose products are assessed by the main stakeholder, the user, allowing them to improve their products based on the results with a view to responding to the actual consumption needs.

Besides the above, the research is important for professionals who work with bone marrow injury patients using CIC to consider the appropriate technological options for the users and appropriate usage orientations on the technology, so as to avoid complications and offer alternatives according to the user's preferences.

The users' satisfaction with each catheter and in their comparison could be assessed and discussed, in response to the guiding questions. Nevertheless, the presentation and discussion of the results aroused questions that can guide future studies, including: does the pre-lubrication component alone influence the user satisfaction? Does the catheter material influence the satisfaction, ignoring other aspects? Do the users actually use complementary items like the opening ring of the package and the tearing section to dispose of the urine in the collector bag? In addition, the need for research with a longer follow-up is highlighted, allowing the users to get more familiar with the catheter being assessed.

In conclusion, the study sample showed higher satisfaction levels with the set for CIC and with the hydrophilic catheter in comparison with the conventional catheter. Based on the observation that each catheter offers satisfaction due to different aspects, however, one might say that the indication of an ideal catheter depends on the individual assessment of the subjects, their difficulties, potentials and preferences.

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REFERENCES

1. Nardi AM, Costa E, Nardi AC, Nardoza A, Facio Júnior FN, de Faria GE et al: Hipogonadismo masculino tardio ou DAEM: diagnóstico. In: Nardi AC et al (ed.), *Diretrizes urologia AMB*. Rio de Janeiro, SBU - Sociedade Brasileira de Urologia, 2014; 64-9.
2. Bezerra CA, Truzzi JC, Averbeck MA, Almeida SHM. *Uroneurologia: Recomendações SBU 2013*. SBU. 2013; 13-9.
3. Lapides J, Diokno AC, Silber SJ, Lowe BS. Clean Intermittent Self- catheterization in the treatment of urinary tract disease. *J Uro*. 1972; 167(2):458-461.
4. Vaidyanathan S, Soni BM, Singh G, Oo T, Hughes PL. Barriers to implementing intermittent catheterisation in spinal cord injury patients in Northwest Regional Spinal Injuries Centre, Southport, U.K. *Scientific World Journal*. 2011; (11):77-85.
5. de Ridder DJ, Evaraert K, Fernández LG, Valero JV, Durán AB, Abrisqueta ML, et al. Intermittent catheterisation with hydrophilic-coated catheters (SpeediCath) reduces the risk of clinical urinary tract infection in spinal cord injured patients: a prospective randomised parallel comparative trial. *Eur Urol*. 2005; 48(6):991-5.
6. Martins MS, Santos VLCCG, Secoli SR, Mata SM, Nogueira DS, Souza DM. Estudo comparativo sobre dois tipos de cateteres para cateterismo intermitente limpo em crianças estomizadas. *Rev. esc. enferm. USP*. 2009; 43(4):865-71.
7. Sarica S, Akkoc Y, Karapolat H, Aktug H. Comparison of the use of conventional, hydrophilic and gel-lubricated catheters with regard to urethral micro trauma, urinary system infection, and patient satisfaction in patients with spinal cord injury: a randomized controlled study. *Eur J Phys Rehab Med* 2010; 46(4):473-9.
8. Almeida SO, Nique WM. Encantamento do cliente: proposição de uma escala para avaliação do construto. *Rev. adm. contemp*. 2007; 11(4):109-30.
9. Boucher A, Cloutier J, Lebel S, Hamel M, Lamontagne P, Bolduc S. Hydrophilic-coated catheter appreciation study in a pediatric population. *Can Urol Assoc J*. 2010; 4(6):150-4.
10. Leriche A, Charvier K, Bonniaud V, Peyrat L, N'Guyen P, Soler JM, et al. Etude d'acceptabilité du set de sondage SpeediCath® Set comparativement à Actreen® Set chez des patients pratiquant l'autosondage. *Progrès en Urologie*. 2006; 16:347-51.
11. Taskinen S, Fagerholm R, Ruutu M. Patient experience with hydrophilic catheters used in clean intermittent catheterization. *J Pediatr Urol*. 2008; 4(5):367-71.
12. Newman DK, Willson MM. Review of intermittent catheterization and current best practices. *Urol Nurs* 2011; 31(1):12-28.
13. Wyndaele J, de Ridder D, Everaert K, Heilporn A, Congard-Chassol B. Evaluation of the use of Uroath-Gel catheters for intermittent self-catheterization by male patients using conventional catheters for a long time. *Spinal Cord*. 2000; 38(2):97-9.
14. Litherland AT, Schiotz HA. Patient-perceived discomfort with two coated urinary catheters. *Br J Nurs* 2007; 16(5):284-7.