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Patient self-care with double catheter lumen for hemodialization: validation of instructional folder

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ABSTRACT. The use of venous catheters for hemodialysis is associated with high rates of morbidity and mortality in patients with chronic renal failure. The implant of the dual lumen catheter (DLC) assists the patient in a worsening situation but commonly the patient remains with the DLC back home and this requires a series of important measures. The use of printed educational materials becomes an important tool to assist this type of care. Thus, the objective was to create and validate an instructive folder for the self-care of the patient using a catheter for hemodialysis. It is a methodological study of creation and evaluation of technology, in three stages. For validation of the content and style the material was submitted to the evaluation by experts in the area. 92.3% of the participants stated that the folder demonstrates clarity in their language, 53.8% of the participants suggested change and addition of information, and the same percentage also states that the instrument is attractive. The main suggestions were to change some term/word used in the folder, suggest changes to the images used, and include some information in the content. It is presumed then that the use of educational materials results in benefits to the patients who will receive the guidelines for self-care. Thus, the importance of nurses to use these resources for chronic renal patient care is emphasized.

Keywords: self-care; catheters; hemodialysis at home; catheter-related infections, hemodialysis; infection.

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Introduction

Chronic renal failure (CKD) consists of slow, progressive and irreversible damage and loss of renal function. In its later stage the kidneys are no longer able to maintain the metabolic and hydroelectrolytic balance of the patient, and can affect the functioning of all other organs of the body. In this situation, one of the main alternatives for the treatment of the patient is hemodialysis (Peres et al., 2010).

Hemodialysis is a procedure performed by a machine in which blood cleansing and filtration occurs: the procedure removes waste products that are harmful to health and liquids in excess of the blood, thus maintaining control of blood pressure and the balance of substances such as sodium, potassium, urea and creatinine, and then returning the cleaned and treated blood to the body. This procedure is commonly performed three times a week for three to four hours in each session, depending on the need for each patient (Miranzi, Iwamoto & Souza, 2011; Freitas & Cosmo, 2010; Oh & Cho, 2019).

For hemodialysis, adequate venous access to treatment, such as the arteriovenous fistula or catheters implanted in central veins, is required, called a double lumen catheter (DLC). Commonly catheters are the first choice at the start of treatment as it can be used immediately after implantation, and may be in the patient for a period of a few days to months, while the patient waits manufacturing or maturation of a vascular access of long-term, such as the arteriovenous fistula or permcath. The latter is a long-term catheter (Morton & Fontaine, 2011).

Because of the possibility of complications, the use of venous catheters for hemodialysis is associated with high rates of morbidity and mortality in patients with chronic renal failure. One of the most frequent complications is infection, which has its incidence varying according to the type of catheter, length of time, technique, and insertion site, used solutions and care of handling and maintenance carried out by the nursing staff (Silva et al., 2018; Sousa et al., 2019). In Brazil, catheter-related infection for hemodialysis ranges from 3.2 to 40.4 events per thousand days of catheter and the related mortality ranges from 6.7 to 75.0%. These infections cause high costs for the hospital unit (Porto et al., 2018; Schwanke, Danski, Pontes, Kusma & Lind, 2018).

The double lumen catheter implant usually happens to the patient in an worsening situation of exacerbation of the chronic kidney disease, when the patient is usually hospitalized. Hospital discharge occurs as soon as the

patient's clinical condition is stable, but the need for hemodialysis persists, and the patient remains on DLC on the way home. Then there is a situation where the patients must take care of themselves to maintain DLC, as well as avoid complications. At this stage, guidance and self-care stimulation are essential for maintaining patient health (Valle, Andrade, Sousa, & Carvalho, 2016).

In this way, the orientation for the patient's self-care is seen as an important part of the maintenance of the DLC, which makes it essential that the individual be guided about the protective attitudes to have in his/her new routine.

In this regard, it is understood that the use of printed educational materials becomes an important tool to assist professionals in this type of care, in which the patient needs to memorize a large number of information. Thus, the use of folders, booklets or similar, with didactic and illustrated instructions can optimize the care provided by the nurse.

Printed educational material has been used to improve patient awareness, satisfaction, adherence to treatment and self-care. It is recommended the use of educational material written by health professionals as a tool to reinforce verbal orientations. The nurse can act in the educational interventions, communicating contents and evaluating educational resources produced for health education (Lima, Bezerra, Sousa, Rocha, & Oriá, 2017).

Based on the above, the objective was to create and validate an instructive folder for the self-care of the patient using a hemodialysis catheter.

Methods

It is a methodological study, of creation and evaluation of technology based on the constructivist paradigm, divided into three stages.

First stage

A folder has been created (Dias et al., 2017) which is configured in an instrument to guide the chronic renal patient using a dual lumen catheter for hemodialysis, regarding self-care and the risks inherent in the use of the device. This first phase of the research aims to improve the folder created for content, language and visual presentation. The material provides information regarding the definition/conceptualization of the catheter and its purpose, time of use, inherent risks and complications, and informs the reader about catheter maintenance care to avoid complications. The folder (Dias et al., 2017) was built in the Microsoft Office Word 2016 Program and, for graphic improvement, in this research was used the program Microsoft Office Publisher 2016, in order to make it more attractive visually. The thematic content addressed has been improved, based on the bibliographical references that deal with the theme.

Second stage

To validate the content and style the material was submitted to the evaluation by experts in the area, selected based on the criteria:

- 1 – Higher education in medicine or nursing, and specialty in the area of nephrology and;
- 2 – Professional experience of at least 2 years working in hemodialysis area;

For that, a survey of professionals working in this area was carried out in two large cities, Teresina, Piauí and Timon, Maranhão. Next, the chosen professionals were approached in the services, until reaching the desired previous number of thirteen judges, based on a previous study (Echer, 2005).

The analysis material consisted of the following questions:

- 1) Did you think that the language used in the folder is clear enough for patients to understand? Do you suggest the change of any term?
- 2) Did you think the folder is visually appealing? Do you suggest any improvement?
- 3) Do you think the information in the folder is complete? Do you suggest adding any information in the content?

After the judges' assessment, the suggestions were discussed, and the material was improved.

It was built a database in a Microsoft Office Excel 2016 spreadsheet with the information obtained from the evaluation of the folder held by the judges, and the results were presented in tables and figures, with simple percentages and absolute numbers frequencies. Then, it was discussed and compared to the relevant literature.

The project was sent to the Research Ethics Committee (CEP) of the Paulista University (UNIP) on 02.10.17 under the number of the Certificate of Ethical Assessment (CAAE) number 79594217.8.0000.5512, and approved.

Results

The material presented to the experts is in the Figure 1.

<p>WHAT CARE SHOULD I TAKE CARE WITH DLC:</p> <ul style="list-style-type: none"> • Take bath daily, at least 1x a day, protecting the dressing. • Do not wet the dressing, if this occurs, look for the dialysis unit and ask to redo your dressing. Wet dressing can cause infection; • Wear clean clothes and towels. • Always wash your hands and avoid touching the catheter. • Do not sleep on the side of the catheter; • Do not draw or bend the catheter; • If the catheter is bleeding, seek the dialysis unit immediately; • Do not use the catheter outside the unit, only trained professionals can access the catheter pathways. • Be careful with clothes and accessories not to pull the catheter. 	<p>REMEMBER:</p> <p>Collaborate with your treatment, so that no complications come up with the use of the double lumen catheter.</p> <p>Observe the puncture path of the catheter, preventing it from doubling and preventing the passage of blood for dialysis</p>  <p>ELABORATION:</p> <ul style="list-style-type: none"> - Daniely Matias Facundes - Amanda Lorena Lima Carneiro <p>ADVISOR: Mstª Sayonara Maia</p> <p>REFERENCES: https://www.portaldodialise.com/portal/o-que-e-hemodialise</p>	<h3>DOUBLE LUMEN CATHETER</h3> 
<p>WHAT IS THE DOUBLE LUMEN CATHETER (DLC)?</p> <p>It is a temporary access device used for hemodialysis. The catheter is implanted under local anesthesia in the large caliber veins (jugular (neck), subclavian (shoulder) and femoral (groin)), with aseptic technique by nephrologist, and trained staff, and is fixed by surgical wires.</p> <p>HOW LONG WILL I STAY WITH CATHETER?</p> <p>Its length of stay with the CDL is very variable, it can be from days to months, until the implantation and/or maturation of the fistula is waiting, or until another vascular access for hemodialysis</p> 	<p>IS THERE A RISK OF INFECTION?</p> <p>Yes, its incidence is high and severe, even with catheter handling and proper care there are the risks of infections.</p> <p>SIGNS AND SYMPTOMS OF INFECTION:</p> <ul style="list-style-type: none"> • Secretion in the catheter orifice; • Fever; • Chills (during or between hemodialysis sessions).  <p>ATTENTION:</p> <p>The signs and symptoms should be closely observed by the team with the help of the patient. If there is an infection, there are two indications; the use of antibiotics or in more severe cases withdrawal of the catheter for implantation of another</p>	<p>WHAT ARE THE RISKS OF CATHETER USE:</p> <ul style="list-style-type: none"> • Obstruction: The catheter may clog with clotted blood. In these cases, the catheter should be replaced by another. • Thrombosis: In the catheter implanted in the femoral vein in the groin, the catheter-side leg may become swollen with poor circulation. • Infection: when there is pus at the catheter site, secretion with a strong odor, and when there is fever in the patient. <p>WHEN YOU SHOULD REMOVE THE CATHETER:</p> <p>In case of obstruction, infection that does not heal or when it has another access, with the fistula or a long-stay catheter.</p> 

Figure 1. Educational material on self-care of patients with dual lumen catheter for hemodialysis.

Source: elaborated by the authors

Table 1 provides the information of the professionals participating in the study. It is verified that 61.5% of them are part of the nursing area, 84.6% of them are specialists in nephrology and 61.6% have been working for more than 05 years in the area.

92.3% of the participants affirm that the folder demonstrates clarity in their language, 53.8% of the participants suggested change and increase of information, and the same percentage also affirms that the instrument is attractive (Table 2).

Table 1. Profiles of the study participants (N=13), 2017.

Variables	n	%
Professional category		
Physician	03	23.1
Nurse	08	61.5
Pedagogue	02	15.4
Postgraduate*		
Specialization in nephrology	11	84.6
Residency in nephrology	02	15.4
Masters	01	7.6
Does not apply	02	15.3
Experience time		
5-10 years	04	30.8
11-20 years	04	30.8
21-30 years	02	15.4
31-40 years	01	7.6
Does not apply	02	15.4
Mean (min. – max.)	27.4 (5 – 36)	
Age		
30-40 years	02	15.4
41-50 years	09	69.2
51-60 years	01	7.7
61-70 years	01	7.7
Mean (min. – max.)	38.4 (40 – 61)	
Total	13	100

*Multiple answer

Source: elaborated by the authors

Table 2. Participants' responses to the characteristics of the folder (N=13). Teresina, 2017.

Variables	n	%
Clarity in language		
Yes	12	92.3
No	-	-
Partially	01	7.7
Suggestion of change		
Yes	07	53.8
No	06	46.2
It is visually attractive		
Yes	07	53.8
No	01	7.7
Partially	05	38.5
Suggests to add information		
Yes	07	53.8
No	06	46.2
Total	13	100

Source: elaborated by the authors

The evaluators were enumerated from 1 to 13, and the suggestions of each participant, when present, were described in Table 3. The main suggestions were to change some term/word used in the folder, suggest changes on the images used, and add some information in the content.

Table 3. Description of the suggestions of the evaluators regarding the folder, 2017.

Evaluator	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Modify the image on the location of the catheter, put image of the three access places.	X	-	X	-	-	-	-	-	-	-	-	-	-
2. Modify the word 'removal' by 'withdrawal' from the DLC.	-	X	-	-	-	-	-	-	-	-	-	-	-
3. Add images about catheter care, information about clothing and accessories care so that they do not pull the catheter, and respect the path of the punction.	-	-	-	X	X	-	-	-	-	-	X	-	-
4. Add image showing the arterial and venous flow to understand the reference "double lumen".	-	-	-	-	X	-	-	-	-	-	-	-	-
5. Modify the image in a way that makes the signs of infection more visible and noticeable.	-	-	-	-	X	X	-	-	X	-	-	-	-
6. Modify the image from the permanent catheter to the image of the temporary catheter.	-	-	-	-	-	X	X	-	-	-	X	-	-
7. Modify the item 'when should I withdraw' to 'the catheter will be removed by the health team'.	-	-	-	-	-	-	-	-	X	-	-	-	-

Source: elaborated by the authors

Discussion

Researches with chronic kidney patients on a hemodialysis program show that they commonly have low educational level or no schooling. Dias et al. (2017) observed that 63.6% of chronic kidney patients participating in their study were not literate. For these authors, the level of education can influence the understanding of catheter care. Torres (2010) believe that the higher the education level, the greater the understanding of the disease and the treatment, which significantly improves the patient's ability to promote self-care, mainly improving their hygienic habits, helping to prevent the occurrence of DLC-related infection.

Most judges rated that the language of the folder was clear, but little more than half considered it visually appealing. The suggestion to insert figures and/or to change some images of the folder was mentioned in 12 nominations, by more than half of the judges. This fact leads us to rethink the presentation of the folder, which had many written guidelines and few images.

The health education material should be written in a simple way, with a lower level of reading and that allows to transmit accurate information. The illustrations should be attractive with clear communication of the purpose of the educational material. In addition, the images should reach a high level of attention and interest in the reading of material with acceptance of the population at different levels of schooling (Lima et al., 2017).

Regarding the suggestions for changes related to the images, the evaluators 1 and 3 indicated to modify the figure on the location of the catheter, and to put images of the three possible places of venous access. Three judges also suggested modifying the image of the permanent catheter into the image of the temporary catheter.

The double lumen catheter for hemodialysis can be implanted in the jugular, femoral or subclavian veins, and the criterion of choice of location depends mainly on characteristics inherent to the patient. Given that the folder had figures with DLC deployed only in the jugular vein, are considered relevant indications of judges (Riella, 2010).

Regarding the type of catheter that appeared in the figure on page 1 of the folder, it was a long-stay catheter, called permcath, which is longer than the double lumen catheter and has a cuff in its length, an accessory that objective to maintain catheter fixation and to make a barrier against migration of microorganisms in the implantation tunnel. Permcath is used in specific situations in which the chronic renal patient is no longer able to make arteriovenous fistula (Daugirdas, Blake & Todd, 2016).

Since permcath is less widely used, and DLC is the first choice of venous access for the patient initiating hemodialysis, it is considered relevant to carry out the suggested change.

It was suggested by one of the judges to put image showing the arterial and venous flow to understand the reference "double lumen". The common catheter for hemodialysis is called a double lumen because it has two lumens: an arterial pathway where the patient's blood is aspirated to pass through the hemodialysis machine and filtered; and the venous route, in which the patient's blood is reinfused to the organism after filtration (Barros, Manfro, Thomé & Gonçalves, 2006).

It is believed that the indications of the evaluators are relevant, since an understanding of the principles of CDL is necessary to optimize the memorization of care. Steering to repeat tasks in an unthought-of manner will be less effective for the patient to memorize and perform self-care. In a different way, teaching the physiological mechanism of treatment will bring greater opportunity for patient understanding and autonomy, and consequently a greater chance of self-care execution (Inoue et al., 2018).

We ratify the above reasoning when we consider the thoughts of some authors about empowerment, a term added to discussions on health promotion in recent years. The theory of empowerment education seeks to contribute to the emancipation of the individual through the development of critical thinking and the encouragement of actions that aim to promote health. To develop empowerment is to develop people's autonomy so that they have more control over decisions and actions that affect their quality of life (Reberte, Hoga & Gomes, 2012; Carvalho, 2004).

Another suggestion referred to by the evaluators is to add images that exemplify catheter care, such as care for clothing and accessories (judges 4, 5 and 11). One more illustrative suggestion was to insert an image that would make the signs of infection more visible and noticeable.

Infection is one of the complications that can occur in the renal patient using CDL, and is the most important cause of catheter loss, increases morbidity and mortality. The infection usually appears by migration of the patient's own skin flora through the puncture site and the external surface of the catheter. Gram-positive bacteria (commonly *Staphylococcus*) are the most frequent. The signs of infection of the catheter exit orifice are: erythema and/or crust and purulent secretion outlet. Systemically the patient may experience chills and fever (Daugirdas et al., 2016).

Conclusion

The stimulation to self-care with the catheter minimizes the indices, avoids the morbidity and mortality related to infections of the patient using a double lumen catheter, decreases health costs and improves patients' quality of life. It is presumed then that the use of educational materials results in benefits to the patients who will receive the guidelines for self-care. Thus, stresses the importance of the nurse to use these resources for chronic renal patient care.

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