COMPLICATIONS OF INTRAVENOUS THERAPY FOR RELATIVES OF HOSPITALIZED CHILDREN: HANDBOOK VALIDATION

COMPLICAÇÕES DA TERAPIA INTRAVENOSA PARA FAMILIARES DE CRIANÇAS HOSPITALIZADAS: VALIDAÇÃO DE MANUAL

COMPLICACIONES DE LA TERAPIA INTRAVENOSA PARA LOS FAMILIARES DE LOS NIÑOS HOSPITALIZADOS: VALIDACIÓN DEL MANUAL

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Objective: to validate the content and layout of the educational technology "Complications of Intravenous Therapy in Children: Family's Guideline Handbook" in the perspective of companions of hospitalized children. Method: methodological study, the technological production type. The validation was performed by 65 relatives of hospitalized children through reading and application of a questionnaire on all items that were part of the technology. Results: the distribution of the concordance index of all variables reached more than 90% according to the companions of hospitalized children. Conclusion: the handbook proved to be suitable for use in daily clinical practice in pediatric hospitals, because the family companions considered the content appropriate, clear language used and layout, highlighting the motivation during the reading of the information available.

Descriptors: Pediatric Nursing. Infusions, Intravenous. Adverse Effects. Educational Technology.

Objetivo: validar o conteúdo e a aparência da tecnologia educacional "Complicações da Terapia Intravenosa em Crianças: Manual de Orientações para Familiares" na perspectiva de acompanhantes de crianças hospitalizadas. Método: estudo metodológico, do tipo produção tecnológica. A validação foi realizada por 65 familiares de crianças hospitalizadas, mediante leitura e aplicação de questionário sobre todos os itens que faziam parte da tecnologia. Resultados: a distribuição do índice de concordância de todas as variáveis alcançou mais de 90% segundo os acompanhantes das crianças hospitalizadas. Conclusão: o manual demonstrou estar apto para utilização na prática

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clínica diária nos hospitais pediátricos, pois os familiares acompanhantes consideraram o conteúdo apropriado, clareza da linguagem utilizada e sua aparência, destacando a motivação durante a leitura das informações disponíveis.

Descritores: Enfermagem Pediátrica. Infusões Intravenosas. Efeitos Adversos. Tecnologia Educacional.

Objetivo: validar el contenido y el aspecto de la tecnología educacional "Complicaciones de la Terapia Intravenosa en Niños: Manual de Directrices para la Familia" en la perspectiva de los compañeros de los niños hospitalizados. Método: un estudio metodológico, del tipo de la producción tecnológica. La validación fue realizada por 65 familiares de los niños hospitalizados a través de la lectura y la aplicación de un cuestionario sobre todos los elementos que eran parte de la tecnología. Resultados: la distribución del índice de concordancia de todas las variables alcanzó más del 90% de acuerdo a los acompañantes de los niños hospitalizados. Conclusión: el manual demostró ser adecuado para el uso en la práctica clínica diaria en los hospitales pediátricos, porque los cuidadores familiares consideran el contenido apropiado, la claridad del lenguaje utilizado y su apariencia, resaltando la motivación durante la lectura de la información disponible.

Descriptores: Enfermería Pediátrica. Infusiones Intravenosas. Efectos Adversos. Tecnología Educacional.

Introduction

For the infusion of intravenous therapy, the most commonly performed procedure in pediatric units is the peripheral intravenous catheterization, due to its low cost and intravascular device easily handled. However, the daily use of this device exposes the child to the occurrence of adverse events associated with this type of therapy (1-2). Among the adverse events, there stand out local complications, such as phlebitis, infiltration, extravasation, obstruction, accidental removal, local infection, among others. Many of those complications result from the invasive nature of the catheter, the location of insertion of the device, its time of permanence and the nature of the medicinal products/solutions infused (3).

The family that accompanies the hospitalized child and is present at the bedside, when identifying early clinical signs and symptoms suggestive of complications associated with intravenous therapy, such as absence of dripping or alarm of electronic systems of infusion, local pain, edema and hyperemia, communicates them to the nursing team. For this reason, it is essential to provide them with knowledge about the correct identification of these events and the implementation of basic care for their prevention.

In this sense, the health education becomes an instrument of socialization of knowledge and health promotion. Therefore, inserting the figure of the family companion in the care with the hospitalized child is an important strategy in the promotion of patient safety and in collaboration with health workers, which does not exclude their responsibility for the periodic clinical evaluation of sites of insertion of peripheral vascular catheters⁽⁴⁾.

Involving patients and families in actions of patient safety and expanding the society's access to information relating to this practice are some of the objectives of the National Program for Patient Safety. These goals can be achieved if patients are placed in the center of care and included as partners⁽⁵⁾. Nevertheless, there were no national or international publications related to educational technologies on complications of intravenous therapy for use of family members of hospitalized children.

Thus, the printed educational technology entitled "Complications of Intravenous Therapy in Children: Family's Guideline Handbook" can be used by healthcare workers, because it has already been validated, regarding the content and the layout, by specialists in the field of pediatric nursing (6), with experience in family care in hospital environment, in the elaboration and validation of instructional materials and textbooks.

This handbook contains 12 pages and includes cover, back cover, general presentation,

and explanation about the intravenous therapy, signs and symptoms of phlebitis, infiltration, extravasation and obstruction, as well as information on how the family can collaborate to prevent and early detect these complications, in addition to references used.

Nonetheless, to ensure that this manual can be used in clinical practice, its target users need to evaluate it, which is essential to verify, among other things, the understanding of information by the persons to whom it is intended ⁽⁷⁻⁸⁾.

In this context, the following question emerged: Does a handbook about complications of intravenous therapy in children hospitalized have valid psychometric properties in relation to the content and layout in the family's perspective? Thus, the objective of this study is to validate the content and layout of the educational technology "Complications of Intravenous Therapy in Children: Family's Guideline Handbook" in the perspective of companions of hospitalized children.

Method

This is a methodological research, carried out in surgical, medical and oncological clinical units of a pediatric state hospital located in the city of Feira de Santana, Bahia, between July and August 2016.

The sample was of the convenience type and calculated considering the following formula:

$$n = Z\alpha^2 P \cdot (1-P)/d^{2(9)}$$

in which $Z\alpha$ refers to the level of confidence adopted, which was 95%, P is the minimum proportion of individuals who agree with the relevance of components in the handbook, considering 80%, and d is the difference in the proportion deemed acceptable, which was 20.0%. Thus, the final calculation was determined by $n=1,96^2.0,80.0,2/0,2^2$, which resulted in approximately 18 family members, considering 20.0% for probable losses.

However, in order to give greater robustness to the data, 65 relatives were interviewed, because this was the number of companions who met the eligibility criteria during the data collection period.

These criteria were thus defined: experience in monitoring children in a hospital environment; companion of children with a history of local complications resulting from intravenous therapy in the current hospitalization; having observed at least two withdrawals of peripheral intravenous catheters of children hospitalized due to the occurrence of complications; and being able to read and write.

The study did not include the companions who witnessed the withdrawal of peripheral intravenous catheters by accident, during the manipulation of the child or the child him/herself and/or termination of intravenous therapy; and the family companions who initially agreed to participate in the study and gave up due to personal reasons throughout the research development.

For the validation of content and layout of the handbook by family members, there was the creation of a questionnaire containing data to characterize the participants and items related to the content, language, layout and motivation. The responses for each evaluated item could be: I disagree, I agree and I do not know. The instrument also contained a space for the family include suggestions for improvements of the handbook. The questionnaire was adapted from a national survey⁽¹⁰⁾ and validated by professor belonging to the matrix research project.

The data collection was carried out by nursing graduate students, duly trained for the implementation of the instrument, and through the recruitment of family companions to participate in the research.

The collectors initially consulted the list of children hospitalized in the clinics in study to identify those that were in use of peripheral intravenous therapy. Then, the parents of eligible children received information about the research, in relation to the purpose, benefits, risks and strategy for the collection of information.

The participants were informed that they should read the instructional technology and, after 24 hours, information about their judgment would be collected in relation to the content,

language, layout, motivation and suggestions for improvement of this resource. The interviews occurred at the child's bedside and at time scheduled by the study participants.

The data obtained were doubly entered on the software Statistical Package for the Social Sciences version 22.0. Descriptive data analysis was conducted; the quantitative variables were described as means and qualitative variables, as absolute frequency (n) and relative frequency (%).

To analyze the validity of content and layout of the handbook, the Content Validity Index (CVI) was used, calculated based on two mathematical equations: the I-CVI (item-level content validity index) and the S-CVI/Ave (scale-level content validity index)⁽¹¹⁾.

The I-CVI, called content validity index, was calculated for each item related to the content, language, layout and motivation individually and through the division of the number of "I agree" responses of the validated item by the number of responses to the index. The S-CVI/Ave, called average of content validation indexes for each validation criteria, was calculated by the sum of all the CVI calculated individually, divided by the number of items considered for the criterion (11).

The Global S-CVI was calculated, called global content validity index, through the sum of all the CVI calculated separately for each item, divided by the number of items considered in the evaluation. For all of the CVI calculated,

I-CVI, S-CVI/Ave and Global S-CVI, there was the estimate of 0.80 as a parameter to consider each evaluated item as validated⁽¹¹⁾.

Those who agreed to participate signed the Informed Consent Form (ICF), as ethical recommendations for researches involving human beings, Resolution n. 466/12 of the National Health Council, and received a copy of the handbook. This research was approved by the Research Ethics Committee of the State University of Feira de Santana, by Opinion n. 841612 and CAEE n. 34172014.7.0000.0053.

Results

The validation of the handbook was performed by female participants (90.8%), mostly mothers (75.4%) of children hospitalized in the surgical clinic (64.6%), aged 26 through 34 years (43.1%), mean of 32.9 years (±8) and who studied until the complete secondary education (46.6%).

The peripheral intravenous catheterizations accompanied by family members ranged from 0 to 50 punctures, with a median of 3. The children remained hospitalized for a minimum period of 1 day and maximum time of 240 days, with a median of 4.5 days.

Regarding the content (Table 1), the participants agreed with the clarity of the concept, signs and symptoms of each complication described in the handbook. All items assessed in the content criterion obtained I-CVI exceeding 0.80 and S-CVI/Ave of 0.96.

Table 1 – Distribution of agreement, content validity index of individual items and average of content validation indexes for the handbook content criterion, according to companions of hospitalized children. Feira de Santana, Bahia, Brazil – 2016 (continued)

Variables	I agree n (%)	I disagree n (%)	I do not know n (%)	I-CVI*
Content			-	
The concept of phlebitis is clear	62 (95.4)	-	3 (4.6)	0.95
Phlebitis signs and symptoms are clear	64 (98.5)	-	1 (1.5)	0.98
The concept of infiltration is clear	65 (100)	-	-	1
Infiltration signs and symptoms are clear	63 (96.9)	-	2 (3.1)	0.97
The concept of extravasation is clear	60 (92.3)	3 (4.6)	2(3.1)	0.92
The signs and symptoms of extravasation are clear	61 (93.8)	2 (3.1)	2 (3.1)	0.94

Table 1 – Distribution of agreement, content validity index of individual items and average of content validation indexes for the handbook content criterion, according to companions of hospitalized children. Feira de Santana, Bahia, Brazil – 2016 (conclusion)

Variables	I agree n (%)	I disagree n (%)	I do not know n (%)	I-CVI*
The concept of catheter obstruction is clear	62 (95.4)	-	3 (4.6)	0.95
Obstruction signs are clear	64 (98.5)	-	1 (1.5)	0.98
The topic "How can you collaborate" is clear	63(96.9)	-	2 (3.1)	0.97
S-CVI/Ave** for the content				0.96

Source: Created by the authors.

Note: Conventional signal used:

The handbook, concerning the language and layout (Table 2), contains phrases of easy understanding, cover that draws the reader's attention and makes the subject to which it refers

clear. In the language and layout criteria, the evaluated items obtained I-CVI exceeding 0.80 and S-CVI/Ave of 0.96 and 0.94, respectively.

Table 2 – Distribution of agreement, content validity index of individual items and average of content validation indexes for the handbook language and layout criteria, according to companions of hospitalized children. Feira de Santana, Bahia, Brazil – 2016

Variables	I agree n (%)	I disagree n (%)	I do not know n (%)	I-CVI*
Language	•			
The phrases are easy to understand	60 (92.3)	-	5 (7.7)	0.92
The writing used is attractive	65 (100)	-	-	1
S-CVI/Ave for the language				0.96
Layout				
The cover draws attention	60 (92.3)	4 (6.2)	1 (1.5)	0.92
The cover shows what the subject is about	63 (96.9)	2 (3.1)	-	0.97
The sequence of topics is adequate	64(98.5)	1 (1.5)	-	0.98
The size of the content in each topic is adequate	60 (92.3)	5 (7.7)	-	0.92
The font size is adequate	61 (93.8)	4 (6.2)	-	0.94
Illustrations facilitate learning	63 (96.9)	2 (3.1)	-	0.97
The number of illustrations facilitates the understanding	59 (90.8)	5 (7.7)	1 (1.5)	0.91
S-CVI/Ave** for the layout				0.94

Source: Created by the authors.

Note: Conventional signal used:

In relation to the motivation (Table 3), after reading the handbook, participants judged that any companion who read it will be able to understand it, the text is interesting and motivating. Participants stated that they felt motivated to read until the end. They also evaluated that the handbook addressed subjects necessary to the family member about the

⁻ Numerical data equal to zero, not resulting from rounding.

^{*} I-CVI: content validity index; ** S-CVI/Ave: average of content validation indexes.

⁻ Numerical data equal to zero, not resulting from rounding.

^{*} I-CVI: content validity index; ** S-CVI/Ave: average of content validation indexes.

complications of intravenous therapy, which helped understand how to identify the signs and symptoms and prevent complications of intravenous therapy. All items assessed in the motivation criterion obtained I-CVI greater than 0.80 and S-CVI/Ave of 0.99.

Table 3 – Distribution of agreement, content validity index of individual items and average of content validation indexes for the handbook motivation criterion, according to companions of hospitalized children. Feira de Santana, Bahia, Brazil – 2016

Variables	I agree n (%)	I disagree n (%)	I do not know n (%)	I-CVI*
Motivation				
The text is interesting	65 (100)	-	-	1
Any companion who reads this manual will understand what it is about	62 (95.4)	2 (3.1)	1 (1.5)	0.95
You were motivated to read until the end	65 (100)	-	-	1
The handbook addresses the issues needed by the relative about the complications of intravenous therapy	65 (100)	-	-	1
The handbook helps understand how to identify the signs and symptoms of intravenous therapy complications	65 (100)	-	-	1
The handbook helps prevent complications from intravenous therapy	64 (98.5)	-	1 (1.5)	0.98
S-CVI/Ave** for motivation				0.99

Source: Created by the authors.

Note: Conventional signal used:

The Global S-CVI of the validated handbook was 0.96. Among the suggestions offered by the interviewed companions, there stood out increasing the number of illustrations and replacing the illustration that showed the infiltration, since they considered it confusing and difficult to understand. These suggestions were accepted.

Discussion

In Brazil and in the world, in recent decades, the family was inserted in hospital units through, among other factors, the increasingly frequent incorporation, by health professionals in this country⁽¹²⁻¹³⁾ and in others, of foundations of the philosophy of family-centered care.

Including the family in the hospital care with the child, more specifically in relation to intravenous therapy, enhances the promotion of his/her safety, in view of the increased

monitoring of the site of catheter insertion and the early identification of complications. For this purpose, families need information about the vascular access, so that they can contribute to the health of the vascular network of the child⁽¹⁴⁾.

Such prevention of adverse events is not translated into the family's full responsibility, but it is a strategy for their involvement as a protective agent of the child, once they deeply know his/her behavior and are at the bedside uninterruptedly.

In view of the effect of educational technologies in practice, as observed in an experimental study conducted with mothers, which found an increased self-efficacy and duration of breastfeeding when using an educational intervention of the flip chart type (15), printed educational technologies, as well as the material validated in the present study, are tools that facilitate the teaching-learning process.

⁻ Numerical data equal to zero, not resulting from rounding.

^{*} I-CVI: content validity index; ** S-CVI/Ave: average of content validation indexes.

Thus, through its use, the family may contribute to the identification of initial degrees of complications and to their immediate communication to healthcare professionals, who can implement some procedure to reduce further damage to the vascular network and the skin of the child, as well as prevent pain and stress associated with new attempts of catheterization.

In this sense, the technology validated may subsidize the health work reorganization, to the appreciation of the family as a promoter of safety actions for the hospitalized child and as the child's basic care unit.

The target audience of this research evaluated positively the educational technology. They considered it important for promotion of knowledge, with rich content, coupled with clarity, appropriate format and explanatory illustrations. This positive assessment was demonstrated by high values of I-CVI and S-CVI/Ave for each item validated and Global S-CVI of the technology by all of them, highlighting the motivation during their reading.

Handbooks with simple language and short phrases of easy comprehension improves the knowledge and become more interesting for the family. Therefore, the educational technology should present a language accessible to various social profiles⁽¹⁶⁾, which also corroborates the importance of their evaluation by the target audience as identified by previously published studies⁽⁷⁻⁸⁾.

The technology validated in this study contains information about concept, signs and symptoms of phlebitis, infiltration, extravasation and obstruction, clearly arranged, which will enable the early identification of these adverse events. Moreover, it includes suggestions for care that the family can adopt aiming to prevent such events. The family companion can perform all the types of care with safety, not being an exclusivity of health professionals. Nonetheless, they are important in the prevention of adverse events associated with the use of intravenous therapy.

Phlebitis, infiltration and extravasation were exemplified in the handbook with images of the authors' clinical practice. Using images as resources for the transmission of information is fundamental, because they transform it into visual language and are attractive, with a clear communication of the goal of the educational material. The images reach high level of attention and stimulate interest in reading, facilitating the understanding of the guidelines⁽¹⁶⁾.

As the results reached consensus in a single step, there was no need for changes in addition to those suggested by the relatives, because the handbook provides simple instructions to the target audience, guiding them on how to prevent and pay attention to the occurrence of complications of intravenous therapy. The consensus is an important tool for the validation of content and layout of educational materials with the target audience, because it ensures greater appropriateness to the participants' needs⁽¹⁷⁾.

This study is expected to encourage other researchers in the construction of instruments with aiming at health education, performed with scientific evidence and designed for the population and their needs and not just by experts of the scientific area.

This research has limitations such as the validation of content and layout of the handbook by family companions of children from a single hospital and in clinical units. Therefore, there should also be the validation by family members from other health institutions in the country and accompanying children in emergency units, in order to ensure the validities of construct and criterion of this technology. Another limitation is the inexistence, until the conclusion of the research, of scientific publications related to the preparation or use of technologies to involve the family in the prevention of complications resulting from the use of intravenous therapy in hospitalized children, limiting the discussion in relation to the comparison of the findings, which adds value to its disclosure and reducing this gap.

Conclusion

The educational technology has been validated with Content Validity Index higher than the stipulated parameter, demonstrating to

be suitable for use in pediatric hospitals, because the family companions considered the content and layout appropriate and the language clear, highlighting the motivation during the reading of the information available.

The content clarity may encourage its reading and motivate other family members/companions in the early identification of local complications arising out of the use of intravenous therapy, as well as may also promote their insertion in the patient safety, making them jointly responsible for the care.

Collaborations:

- 1 conception, design, analysis and interpretation of data: Chesney Mota Oliveira, Luciano Marques dos Santos and Evanilda de Souza Carvalho;
- 2 writing of the article and relevant critical review of the intellectual content: Chesney Mota Oliveira, Silvia da Silva Santos Passos, Erika Anny Costa Cerqueira and Cleonara Sousa Gomes e Silva;
- 3 final approval of the version to be published: Chesney Mota Oliveira, Luciano Marques dos Santos, Evanilda de Souza Carvalho and Silvia da Silva Santos Passos.

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