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Validation of an instructional video for nurses about hot tub bath for preterm newborns

Validação de vídeo instrucional sobre banho de ofurô em recém-nascido pré-termo para enfermeiros

Validación de video instructivo sobre baño de ofuro en recién nacido prematuro para enfermeros

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Abstract

Objective: To produce an instructional video for nurses about hot tub bath for preterm newborns and to validate its content. **Method:** Methodological study of technological development with emphasis on content validation, conducted in three stages: exploratory literature review, production of an instructional video educational technology and expert validation. The data were systematized and organized in spreadsheets and the analyses were carried out in the statistical package R. For content validation, the Kappa Index was calculated to measure response agreement and the Content Validity Index was employed to estimate item representativeness. **Results:** Publications about the technique (n=3) identified in the literature review were used for video production. The video simulates care in a neonatal unit and lasts 13 minutes. In the validation process, the video was considered, in general, to have an adequate content representation and had an almost perfect response agreement index. Two items were assessed as "adequate after revision" and modified. **Conclusion and implication for the practice:** The produced material was considered by the experts as suitable for use in training nurses on the technique and sharing information, contributing to a humanized and safe nursing care in neonatal units.

Keywords: Educational technology; Infant, premature; Nursing care; Humanization of Assistance; Bath.

Resumo

Objetivo: Produzir um vídeo instrucional para enfermeiros sobre o banho de ofurô em recém-nascidos pré-termo e validar seu conteúdo. **Método:** Estudo metodológico de desenvolvimento tecnológico com ênfase na validação de conteúdo, conduzido em três etapas: revisão exploratória da literatura, produção da tecnologia educacional do tipo vídeo instrucional e validação por especialistas. Os dados foram sistematizados e organizados em planilhas e as análises foram conduzidas no pacote estatístico R. Para validar o conteúdo, aplicaram-se o Índice Kappa, para medir a concordância entre as respostas, e o Índice de Validade de Conteúdo, para estimar a representatividade do item. **Resultados:** As publicações sobre a técnica (n=3) identificadas na revisão de literatura foram utilizadas para a produção do vídeo. O vídeo simula o cuidado em unidade neonatal e tem duração de 13 minutos. No processo de validação, o vídeo foi considerado, no geral, com representatividade de conteúdo adequada e obteve índice de concordância entre as respostas quase perfeito. Dois itens foram avaliados como "adequados com alterações" e modificados. **Conclusão e implicações para a prática:** O material produzido foi considerado adequado para ser utilizado na capacitação de enfermeiros sobre a técnica e compartilhamento de informações, contribuindo para o cuidado de enfermagem humanizado e seguro em unidades neonatais.

Palavras-chave: Tecnologia educacional; Recém-nascido prematuro; Cuidados de enfermagem; Humanização da assistência; Banhos.

Resumen

Objetivo: Producir un video instructivo para enfermeros sobre el baño de ofuro en recién nacidos prematuros y validar su contenido. **Método:** Estudio metodológico de desarrollo de tecnología con énfasis en la validación de contenido, realizado en tres etapas: revisión exploratoria de la literatura, producción de tecnología educativa de tipo video instructivo y validación por expertos. Los datos fueron sistematizados y organizados en hojas de cálculo y los análisis se realizaron en el paquete estadístico R. Para validar el contenido se aplicó el Índice Kappa para medir la concordancia entre las respuestas y el Índice de Validez del Contenido para estimar la representatividad del ítem. **Resultados:** Para la producción del video se utilizaron publicaciones sobre la técnica (n = 3) identificadas en la revisión de la literatura. El video simula la atención en una unidad neonatal y tiene una duración de 13 minutos. En el proceso de validación, el video se consideró, en general, con adecuada representación de contenido y con un índice de concordancia casi perfecto entre las respuestas. Dos ítems se evaluaron como "adecuados con cambios" y se modificaron. **Conclusión e implicaciones para la práctica:** El material producido fue considerado por los especialistas como adecuado para uso en la formación de enfermeros sobre la técnica y el intercambio de información, contribuyendo para la atención de enfermería humanizada y segura en las unidades neonatales.

Palabras clave: Tecnología educacional; Recien nacido prematuro; Atención de enfermería; Humanización de la atención; Baños.

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INTRODUCTION

Prematurity is one of the leading causes of neonatal death, which, according to estimates of international health agencies, victimizes around one million newborns (NB) every year. In Brazil, one in every ten live births are preterm, which corresponds to 279 thousand births every year, making Brazil the tenth country worldwide in premature deliveries.[1] Prematurity results from pregnancy interruption before the 37th week and poses variable risks to the life and health of NB on their adaptation to extrauterine life due to their biological immaturity.[2] The adoption of humanized practices to promote the well-being of preterm NB (PTNB), such as hot tub bath (HTB), contributes to the reduction of complications and the neonatal mortality rate.

As a signatory country of the worldwide 2030 Sustainable Development Goals (SDG), proposed by the United Nations (UN) in 2015, Brazil has been intensifying political and structural actions for the organization of mother and child health services to reduce neonatal mortality. Noteworthy actions include the expansion of bed availability in neonatal units and professional qualification for their implementation in institutional routines and humanized practices, aiming at the well-being of PTNB.[3]

Among the neonatal care techniques targeted at PTNB well-being, HTB is emphasized; this was introduced to intermediary and complex neonatal care units.[4] The HTB may be summarized as the immersion of PTNB into water warmed up for five minutes, simulating the intrauterine environment and promoting a sensation of safety and relaxation, favoring extrauterine adaptation.[5,6]

In the routines of neonatal care units, PTNB are constantly exposed to unpleasant and painful situations. In this context, HTB must be incorporated as a care technology to contribute to reduce stress and pain, alleviating respiratory, cardiovascular, immunological, and hormonal alterations while favoring neuropsychomotor and affective development.[7,8]

Although there is no irrefutable scientific evidence on the therapeutic properties of warm water, studies have observed the reduction of irritability and crying, as well as an improved sleep pattern in NB, after HTB sessions, reinforcing the hypothesis that this intervention promotes their well-being.[5,9,10] This is so due to immersion into warm water promoting peripheral vasodilation; favoring strengthening respiratory muscles, since hydrostatic pressure increases resistance to thorax expansion; improving gas exchange; reducing pain by blocking nociceptors through increased temperature and hydrostatic pressure; and reducing muscle tonus and plasma cortisol levels.[5,7,8]

However, the HTB technique should be performed in neonatal units only by professionals who are qualified to provide care, with technical and scientific knowledge for assessment and follow-up of the NB health status, and trained to perform this technique, as nurses are. Nurses in neonatal units combine scientific knowledge and technical skill to provide humanized care to PTNB and, when trained to perform HTB, may perform this technique as a strategy to promote the NB's well-being and shorten hospitalization.

Health professional training is set forth by the Brazilian National Policy of Permanent Health Education (*Política Nacional de Educação Permanente em Saúde* – PNEPS), which aims to implement strategies for human resource qualification, increasing the quality of care provided to the population. From this perspective, health education processes are understood as the bases of practices and professional skills to respond to identified problems,[11] possibly mediated by technology.

Technology is a concrete result of daily experience and scientific research applied to the construction of material or immaterial products to enable interventions over a given practical situation.[12] The term technology is broad and may be applied to educational processes. Educational Technologies (ET) are techniques, processes, and devices which, upon application, can generate knowledge and collaborate with teaching and learning. Employing ET in professional training enables improving the care technique, favoring safety and facilitating the application of scientific knowledge to daily practice.[13]

The application of an audiovisual ET about the HTB technique in PTNB is a tool to optimize training for nurses who provide care in neonatal units, safely contributing to broadening directives of humanized care to the NB. The objective of this study was to produce an instructional video for nurses about HTB for PTNB and validation of its content by experts.

METHOD

This is a methodological study on the production and content validation of an instructional video about the technique of hot tub bath for PTNB directed at nurse training. The production of the video "Hot Tub Bath Technique for Newborns Hospitalized in Neonatal Units" was motivated by the need to provide an ET for supporting nurse training on this technique in a kangaroo intermediate neonatal care unit (KINCU) of a reference maternity ward in the city of Manaus, Brazil, identified during a university extension project. An audiovisual ET of the type instructional video was opted for due to the facilitated content access by the public, its adaptability to several digital platforms, and message objectivity.

This study was conducted in three phases: exploratory literature review, production of the initial version of the video, and content validation by the expert judges.[14] To put together the theoretical references for video production, an exploratory literature review was conducted, identifying publications which described the HTB technique. In addition, audiovisual productions about this theme were identified on the internet.

The process of video production followed the stages of preproduction, production, and postproduction.[15] In the first stage, the idea was defined and the script, the narration and subtitle texts were structured; these were assessed by two professionals with experience in performing HTB. The scenarios were created in CorelDRAW® by a designer and the Storyboard was extracted from them, helping with previous visualization of the video and scene planning.

In the production stage, the scenes were recorded in a simulated teaching environment, with a cast composed of one nurse with expertise in neonatal nursing and performing the technique and three nursing researchers who had concluded a course on child health. The narration audio was recorded in a place with adequate acoustics and added to previously edited images. In the postproduction stage, the video was edited using *Filmora 9*. The initial version was converted to mp4 format (*MPEG-4 Part 14*) and assessed by three nurses with expertise on this area. The suggested adjustments led to the validation version of the video.

To validate the content of the ET, an assessment instrument was elaborated with Google Forms*;* it comprised 34 items grouped into three domains: content, presentation, and relevance. The items to be assessed in each domain were subdivided into topics, facilitating score attribution.[16,17]

The assessment form offered the judges the following response options: "completely adequate", "adequate", "partially adequate", and "inadequate". When an item was considered by the judge to be "partially adequate" or "inadequate", suggestions were requested for item improvement.

The judges were selected from the Lattes Platform and the inclusion criteria were being a registered professional and/or having academic experience with the performance of HTB. Invitations for participation were sent by email to eight (8) nurses, six (6) of which accepted participation. A new email was forwarded to the latter; it contained a link to access the Informed Consent Form, the instructional video, and a link to access the video assessment instrument. The responses of the expert judges registered in the assessment instrument were systematized and organized into an Excel spreadsheet. The quantitative analyses were conducted with R statistical package version 4.2.2.

For content validation of the instructional video, Kappa Index (K) was applied to measure agreement between the judges' responses for each assessed item. The following intervals of K were considered: < 0.00 – no agreement, 0.00 to 0.19 – poor agreement, 0.20 to 0.39 – slight agreement, 0.40 to 0.59 – moderate agreement, 0.60 to 0.79 – substantial agreement, and 0.80 to 1.00 – almost perfect agreement.[18] This study included only items with K > 0.61.

Item representativeness regarding content was defined with Content Validity Index (CVI), which is the proportion of judges who considered the item valid, obtained by the division of the number of judges who assessed the item as "adequate" or "adequate after revision" by the total of judges who assessed the item.[19] The overall CVI of the ET was obtained by dividing the sum of each CVI by the total of items. A minimum CVI of 0.75 was considered acceptable for both item assessment and overall assessment. The instructional video was reformulated in view of the judges' suggestions.

This study is part of a broader study, which meets all ethical criteria put forth by current legislation (opinion 3.456.197, CAAE 12466119.3.0000.5016).

RESULTS

In the exploratory literature review, publications on the theme were found to be scarce (n = 3) and only one described the technique. On the other hand, many audiovisual productions were found to be available on the internet; they were mostly videos produced by mothers of full-term NB or older children based on their own experiences with HTB.

The results of the review enabled the elaboration of a reliable script and a text for scene narration. The application of the storyboard facilitated the actors' performance, enabling video production. Video review by expert professionals with experience on the technique enabled the production of the validation version; few adjustments were required.

All judges participating in the validation process were female (n = 6), with a mean age of 34 years, mean education of 10 years, and a mean of 9.5 years of work in neonatal units. Half of the participants (50%) had the title of neonatal nursing specialist, 16.7% held a Master's in Nursing, and 33.3% held a PhD in Nursing (data not presented in tables).

Judgement of the items for assessment of the instructional video "Hot Tub Bath Technique for Newborns Hospitalized in Neonatal Units" indicated the ET as an overall valid instrument (overall CVI = 0.99) for application when training nurses at the KINCU, enabling them to perform the HTB technique during PTNB care. The level of agreement of the judges' responses was almost perfect (Kappa = 0.98) (data not presented in tables).

In the assessment grouped by domains, the content of the ET was judged to be adequate (CVI = 1), with an almost perfect level of agreement among judges (K = 1). In this domain, the assessed items comprised scientific coherence of the conveyed information, meeting the needs of the target public, the contribution of the video to the quality of the provided care, fostering changes in care practices, encouraging humanized care, and the step-by-step description of the HTB technique, considered to be adequate (CVI = 1; K = 1) (Table 1).

In the assessment of the items in the presentation domain, the ET presented an overall CVI = 0.98 and K = 0.99 and was considered valid. In this group, the assessed items referred to format, logical sequence of the scenes, image quality, sound quality, subtitle size and font, video duration, and objectivity of the conveyed message, all of which had CVI = 1 and K = 1. The items performance expressiveness and synchronization between image, sound, and subtitles were considered adequate after revisions (CVI = 0.94; K=0.93) (Table 1).

In the domain referring to ET relevance, the assessed items enabled judgement of the educational material in its articulation with health policies, its potential for sharing knowledge, its approach of fundamental issues in nursing practice and its usefulness for nurse qualification. As a set, the items were considered by the expert judges as valid (CVI = 1; K = 1) to be incorporated into training for the performance of HTB (Table 1).

The items assessed by the judges as "adequate after revision" in the presentation domain were adjusted considering the registered suggestions. For the item "performance expressiveness", the

need for adjustments in two scenes was pointed out. The first adjustment suggested by the judges was to highlight the scene showing the position of the performer's hands when occluding the external acoustic meatus with the ring finger and the thumb by zooming and pausing.

The second adjustment suggested by the judges for this item was on the scene in which the baby is put inside the bathtub: there should be more emphasis on how the professional changes hands to turn the baby, positioning him adequately in the bathtub (Chart 1).

Table 1. Judgement by expert judges of the items comprising the instructional video Hot Tub Bath Technique for Newborns Hospitalized in Neonatal Units according to domain and adequacy. Manaus, Amazonas, Brazil, 2021. (N = 6)

Judged items	Adequate		Adequate after revision		CVI	K
	n	%	n	%		
Content						
Scientific coherence of the information	6	100	0	0	1	1
Meets the needs of the target public	6	100	0	0	1	1
Contributes to quality of care	6	100	0	0	1	1
Fosters practice changes	6	100	0	0	1	1
Encourages humanized care	6	100	0	0	1	1
Describes the technique step-by-step	6	100	0	0	1	1
Presentation						
Format	6	100	0	0	1	1
Image quality	6	100	0	0	1	1
Audio quality	6	100	0	0	1	1
Subtitle size and font	6	100	0	0	1	1
Language	6	100	0	0	1	1
Video duration	6	100	0	0	1	1
Message objectivity	6	100	0	0	1	1
Logical sequence of scenes	6	100	0	0	1	1
Performance expressiveness	5	83.4	1	16.7	0.94	0.93
Synchronization among image, sound, and subtitle	5	83.4	1	16.7	0.94	0.93
Relevance						
Articulation with health policies	6	100	0	0	1	1
Knowledge sharing	6	100	0	0	1	1
Approaches necessary issues for the practice	6	100	0	0	1	1
Usefulness for team training	6	100	0	0	1	1

Source: Elaborated by the authors.

Chart 1. Judges' suggestions for items considered adequate after review in the instructional video Hot Tub Bath Technique for Newborns Hospitalized in Neonatal Units. Manaus, Amazonas, Brazil, 2021. (N = 6)

Items requiring changes	Judges' adjustment suggestions
Performance expressiveness	- Zoom in and pause the scene showing the performer's hand position for occlusion of the baby's acoustic meatus.
	- Slow down the scene in which the baby is put in the bathtub, highlighting how the professional changes hands to turn the baby in the water.
Synchronization among image, sound, and subtitle	- Slow down the scene showing the procedure of occlusion of the baby's acoustic meatus, synchronizing movement and narration.

Source: Elaborated by the authors.

The item "synchronization among image, sound, and subtitles" required changes in the scene showing the procedure of occlusion of the baby's internal acoustic meatus. The judges considered the scene to be out of sync with the narration and suggested reducing its speed to match it (Chart 1).

After the validation process was finished, the recommendations by the expert judges were incorporated into the ET, making the instructional video an adequate teaching and learning tool to be applied when training nurses for performing HTB in PTNB hospitalized in KINCU.

DISCUSSION

This study's findings reinforce the importance of the availability of audiovisual ET, such as the instructional video "Hot Tub Bath Technique for Newborns Hospitalized in Neonatal Units", to broaden humanized practices centered on the well-being of PTNB.

The process of content validation of the instructional video "Hot Tub Bath Technique for Newborns Hospitalized in Neonatal Units" by expert judges has shown that the elaborated educational material is adequate to be applied into nurse training, given that it has achieved an overall CVI over the cut point established as acceptable by the scientific literature.[20] The validation of educational technologies by expert judges is a phase of product development which guarantees their coherence with the scientific literature, providing them with credibility and broadening their coverage of application, since it minimizes inconsistencies.[21-23]

The elaboration of ET starts with the search for scientific evidence in the available literature. The production of the instructional video had as its first step the elaboration of a theoretical basis for the HTB technique, its benefits for the PTNB, the clinical conditions which indicate and contraindicate its application, and the main practical difficulties to its performance. This step of the process of elaboration of the ET guaranteed the scientific coherence of the information it conveys, as well as the identification of the necessities of those who perform the technique.

The adequacy of the items composing the presentation domain of the instructional video "Hot Tub Bath Technique for Newborns Hospitalized in Neonatal Units" reinforces that image-based ET are useful tools in the teaching and learning process. This is due to the fact that the identification of viewer with the actor and the scenes presented in the educational material aim at stimulating the adoption of the procedures portrayed in the images with the intention that the viewer may respond similarly to the characters.[24]

The relevance domain of the instructional video "Hot Tub Bath Technique for Newborns Hospitalized in Neonatal Units" was positively assessed by the expert judges, showing that the material's message is articulated with newborn health policies and humanized care directives,[5] capable of sharing knowledge of necessary issues for nursing practice, and useful for nurse training.

The reproduction of scenes adopting familiar language and environment enable the identification of the needs of the target public. The involvement between character and target public enables expression and communication in pedagogical actions. The characters become thus more captivating for approaching daily life themes, creating motivation for changes of attitude and behavior in each situation after knowledge apprehension.[25]

A thorough detailing of this technique is crucial for the development of this skill by professionals, avoiding uncertainties related to hand position and movements which may lead to insecurity when performing the technique.[25] A study about HTB in nursing care routines of high-risk neonatal units identified that the more knowledge of the benefits and details of the technique, the higher is adherence to it and that access to protocols, updates, and acquisition of equipment favor its implementation.[26]

CONCLUSION AND IMPLICATIONS FOR THE PRACTICE

The production of the instructional video "Hot Tub Bath Technique for Newborns Hospitalized in Neonatal Units" and its content validation by expert judges ensure its value as a scientific product. In the final opinion, there is evident agreement among the judges on the potential of the educational material for sharing knowledge of this practice with nurses working with PTNB care in neonatal units.

The process of ET validation has shown that the content, the presentation, and the relevance are adequate for use in nurse training for performing this procedure. Although adjustments were indicated in the expressiveness and synchronization among images, narration, and subtitles in certain scenes, the assessments were satisfactory, suggesting that the material is qualified to be made available and is useful for the area.

The instructional video will help developing skills for technical performance of HTB in the routines of neonatal units, broadening the offer of humanized care and minimizing the damages of premature birth throughout life.

The fact that the instructional video was validated only by expert judges was identified as a study limitation. Although expert judges have practical experience in performing the procedure, validation by the target public is an important phase for complete validation of ET.

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