

Educational animation about home care with premature newborn infants

Animação educativa sobre cuidados domiciliares com o prematuro
Animación educativa sobre cuidados domiciliarios con el prematuro

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ABSTRACT

Objective: to elaborate and validate animation on the care of premature newborn infants at home. **Method:** Methodological study in three stages: integrative review on home care; animation design based on Roper, Logan and Tierney's Model named "Activities of Living" (ALs), and validation of content and appearance by neonatology specialists. The steps to develop the animation were: creation of storyboard; definition of objects; specification of keyframes; and frame generation among key frameworks. **Results:** Of the 53 articles selected in the review, care was extracted and grouped into the twelve activities of living. Three storyboards were created to embrace all care and validated by 22 experts. Most of the care had matches above 80%. **Conclusion:** The validation of the storyboards made it possible to glimpse the changes in scenes and dialogues in a clearer and more detailed way. Animation is an innovative educational technology to support teaching and learning of parents and family. **Descriptors:** Premature Newborn; Educational Technology; Animation; Neonatal Nursing; Validation Studies.

RESUMO

Objetivo: elaborar e validar animação sobre os cuidados com o prematuro no domicílio. **Método:** Estudo metodológico em três etapas: revisão integrativa sobre cuidados domiciliares; elaboração da animação com base no "Modelo de Atividades de Vida" de Roper, Logan e Tierney, e validação de conteúdo e aparência por especialistas em neonatologia. Para desenvolver a animação seguiu-se: *storyboard*; definição de objetos; especificação de quadros-chave; e geração de quadros entre os quadros-chave. **Resultados:** Dos 53 artigos selecionados na revisão foram extraídos os cuidados e agrupados nas doze atividades de vida. Foram produzidos três *storyboards* no sentido de contemplar todos esses cuidados, e foram validados por 22 especialistas. A maioria dos cuidados obteve concordância acima de 80%. **Conclusão:** A validação dos *storyboards* possibilitou vislumbrar as modificações em cenas e diálogos de forma mais clara e minuciosa. A animação é uma tecnologia educacional inovadora no apoio ao ensino-aprendizagem de pais e familiares. **Descritores:** Recém-Nascido Prematuro; Tecnologia Educacional; Animação; Enfermagem Neonatal; Estudos de Validação.

RESUMEN

Objetivo: elaborar y validar una animación sobre los cuidados con el prematuro en el domicilio. **Método:** Estudio metodológico en tres etapas: revisión integrativa sobre los cuidados domiciliarios; la elaboración de la animación basada en el "Modelo de Actividades de Vida" de Roper, Logan y Tierney, y validación de contenido y apariencia por especialistas en neonatología. Para desarrollar la animación se hizo: *storyboard*; definición de objetos; especificación de cuadros clave; y generación de cuadros entre los cuadros clave. **Resultados:** De los 53 artículos seleccionados en la revisión fueron extraídos los cuidados y agrupados en las doce actividades de vida. Se produjeron tres *storyboards* para contemplar todos esos cuidados, y fueron validados por 22 especialistas. La mayoría de los cuidados obtuvieron concordancia por encima del 80%. **Conclusión:** La validación de los *storyboards* permitió vislumbrar las modificaciones en escenas y diálogos de forma más clara y minuciosa. La animación es una tecnología educativa innovadora en el apoyo a la enseñanza-aprendizaje de padres y familiares. **Descritores:** Recién Nacido Prematuro; Tecnología Educativa; Animación; Enfermería Neonatal; Estudios de Validación.

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INTRODUCTION

The main cause of hospitalizations in neonatal intensive care units (NICU) is prematurity, and the moment of hospital discharge requires orientations directed to the needs of this newborn infant at home. Discharge is a potentially stressful event for parents, marked by expectations and uncertainties, as it is at this time that parents and family members truly take care of the child and feel anguished when they must do it without the help of a health team⁽¹⁻²⁾.

The discharge planning should be individualized, and the health professional should provide clear, concise and simple guidelines for family members⁽³⁾. The application of educational support can contribute to this process of health education, since it simplifies the routine of the health team and benefits the family with instructions that can improve the strengthening of the affective bond and decrease the insecurity of those who take care of the premature infant⁽⁴⁻⁵⁾.

Nursing, as well as other health professions, uses educational technologies to teach health care, which are used in health education as facilitating and auxiliary means for the autonomy and independence of its clients. There are several educational technologies such as: scrapbooks, booklets, educational manuals, software, games, among others. They have been produced by Nursing to apply them in different scenarios with diverse populations⁽⁶⁾.

However, there are few studies using cartoons as a tool for health education. The graphic animation feature as an information support, which uses text, sound, image and an interactive dialogue, provides virtual assistants with multi-sensory experiences and easier and more effective learning for the people they attend⁽⁷⁻⁸⁾. We performed this research because of the scarcity of studies aimed at the development of cartoons and the innumerable advantages produced by this tool.

OBJECTIVE

To create and validate the educational animation on home care to the premature newborn infant.

METHOD

Ethical aspects

The Research was approved by the Ethics and Research Committee of the Federal University of Espírito Santo, under the Certificate of Presentation for Ethical Consideration (CAAE).

Theoretical reference

To make the cartoons, we used the Nursing Theory of Roper, Logan and Tierney as a reference. This theory has five concepts, which are interrelated and cover: activities of living; the duration of life; continuous dependency/independence; factors that influence the activities of living; and the individuality of life⁽⁹⁾.

Type of Study

Methodological study developed in three stages: identifying home care to the premature infant; creating the cartoons; and validating the educational technology.

Data collection and organization

In the first stage, to identify care, an integrative literature review was conducted, directed to the following guiding question: What are the care guidelines for premature newborn infants at hospital discharge?

This review used as inclusion criteria: scientific articles extracted from the Latin American and Caribbean Literature in Health Sciences (LILACS) and Medical Literature Analysis and Retrieval System Online (MEDLINE) databases with the descriptors: "nursing care, patient discharge, neonatal nursing, premature infant", published from January 2011 to December 2015, in the Portuguese, English and Spanish languages, dealing with the topic of care for premature newborns at the discharge from hospital. We selected studies developed within these five years due to the need to seek and use articles that show the current knowledge produced about this theme. The following exclusion criteria were established: papers presented at conferences; dissertations; monographs; theses; letters to the editor; reflection studies; and articles with abstracts unavailable.

Seeking and selecting the studies were carried out independently by two researchers. The selection of the studies was made from the analysis of the titles, abstracts and full texts of the publications. In situations of disagreement, after discussions, consensus was sought. The included articles that were not available were obtained in the full-text format on the website of the Coordination for Higher Education Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES*).

We found 96 articles in LILACS and 329 in MEDLINE. We excluded 02 articles (abstracts unavailable) out of 425. Of the 423 abstracts, 84 articles were repeated and 201 were excluded because they did not meet the inclusion criteria, and 138 articles were eligible. After reading the complete articles, 85 were excluded, which did not deal with the topic of care for preterm newborns at discharge from hospital. We included 30 qualitative articles and 23 quantitative articles in the study, totalling 53 articles. These articles were read exhaustively in order to highlight the care of premature newborns. The data were organized in spreadsheets, categorizing care according to the activities of living of Roper, Logan and Tierney⁽⁹⁾ which are: to maintain a safe environment; communicate with people; breathe; eat and drink; eliminate; take care of personal hygiene and dress; control body temperature; mobilize; work and get distracted; express sexuality; to sleep and die.

In the second stage we created the cartoon which was composed of four phases: 1) storyboard 2) definition of objects 3) specification of keyframes and 4) generation of frames between keyframes⁽¹⁰⁾. The first two phases correspond to planning the animation, while the last two to producing. We used the programs Adobe Illustrator, Adobe Photoshop and Adobe After Effects.

To prepare the script, the 53 articles and textbooks on nursing, neonatology, neonatal intensive care and guides of the Ministry of Health on neonatology area were used. The script was adapted and corrected by a professor of the Department of Languages and the Postgraduate Program in Linguistics of the Federal University of Espírito Santo. The educational technology was produced by the design team of the Laboratory and Observatory of Projective Ontologies (*LOOP*) of the Undergraduate Career in Design of the Federal University of Espírito Santo.

Three storyboards were created. The first deals with everyday activities: keeping the environment safe, mobilizing, communicating, sleeping, working and having fun. The second presents the activities: eating and drinking, breathing and dying. And the third, the activities: eliminating, performing personal hygiene and clothing, and controlling body temperature. These activities were organized in a way to bring meaning to the script, paying attention to the number of themes that would be addressed in each activity of daily living, and to the duration of the storyboards, since a long animation does not keep the attention of the receiver.

In the third step, to validate the cartoon, judges evaluated its content and appearance. They were selected according to the inclusion criteria: health professionals (physicians, nurses, physiotherapists, phono audiologists, social service professionals) of Neonatal Intensive Therapy with clinical experience of at least two years, in neonatology or with specialization, residency, master's or doctorate course with emphasis in neonatology.

After selecting the judges based on the mentioned criteria, a letter of invitation was sent in person which provided information on the purpose of the study and on the form of participation. After acceptance, a meeting was scheduled to carry out the validation. At this meeting all the procedures and instruments to be filled out were explained, as well as the signing of the Free and Informed Consent Form. The duration of the meeting was of, at most, two hours to avoid fatigue. It is important to emphasize that the researcher was the mediator of the group.

Two instruments of data collection were elaborated. The first was to characterize the judges and the second to evaluate the content and appearance of the storyboard of the animation. The second instrument for content evaluation was organized using the Rodrigues Junior form with adaptations according to Comparato⁽¹¹⁾. The screenplay of Comparato⁽¹¹⁾ is used to assess videos in contests and is available for free use. The instrument consisted of 9 items: Idea concept; Dramatic Creation; Pace; Characters; Dramatic Potential; Dialogues; Visual Style; Target Audience; and Relevance.

In the instrument aimed at validating the content and appearance of the storyboard, the judges issued agreement on the statements by filling in with an "x" YES or NO. In cases of disagreement, the experts filled in a space for observations and suggestions for modifications. The items that obtained agreement above 80% were considered validated. The items that had lower than expected averages were modified. The suggestions of judges were answered and corrected in the storyboards.

RESULTS

The storyboard of the first cartoon about activities of living: keeping the environment safe, mobilizing, communicating, sleeping, working and having fun has 94 pictures. The second storyboard deals with feeding, breathing and dying, and it has 70 frames. The third addresses physiological needs, personal hygiene, clothing, and body temperature control with 90 frames.

The first storyboard presents a definition of premature newborn infants and addresses the importance of hand hygiene. People should not touch the infant in case of some infectious disease as well as number of visits and vaccination must be controlled. Moreover, it presents the need to keep the environment clean, airy,

and without humidity, exposing the need to wash the curtains frequently and not leave stuffed animals close to the newborn infant. It advises parents to avoid loud noises and brightness, to not smoke near the neonate and take care of the risk of sudden infant death.

As for sleeping and mobilizing it points out the need for a quiet environment, with dim light, so that the baby can sleep. It mentions the proper position to sleep in supine position to avoid sudden infant death syndrome and advises not to put them to sleep in bed together with other people as it may cause accidents. Recognition of nonverbal communication of newborns by family members assists in caring for the baby, so it is extremely important for relatives to be aware about different types of crying. About work and leisure activities, it is important to highlight the responsibility of the family members to follow-up visits to see the development and growth of neonates, as well as the early identification of their deviations, verifying the particularities of each case. It also reveals the need for leisure: you must go for a walk, take them to sunbath and play with newborns, which contributes to neuropsychomotor development.

The storyboard of the second cartoon approaches feeding, guides breastfeeding and reinforces the benefits of human milk. The dialogues expose the question of premature infants as drowsier, which is why they must be awake during breastfeed; this can be done by removing the clothes or touching the infant's face. It emphasizes the importance of correct holding and the alternation of various types of positions to breastfeed premature infants. Nevertheless, it addresses massaging, milking the breasts and taking care with the storage of human milk. In relation to breathing and dying aspects, parents should be aware in case of choking, observe skin coloration like the presence of cyanosis, and which technique can be used to clear the upper airways. When this occurs, parents should position the infant's head laterally to drain the food into the mouth, preventing food from returning to the lung. This shows the fear of death of family members about premature death.

The third storyboard addresses personal hygiene and clothing care, teaches how to change the diaper of newborn infants, and perform the humanized bath. Moreover, it discusses care with cleaning clothes, objects and toys. And, finally, it explains how to control body temperature and perform the kangaroo position.

To produce the animation we defined the objects for the creation of the family characters: Nina - the premature infant; Ana - her mother; Zeca (José Carlos) - her father; Rafa (Rafael) - her older brother (7 years); Lena - Ana's mother, Tetê (Tereza) - Zia and Flora's great-aunt, also the nurse (Figure 1).

Regarding the characterization of the judges who participated in the validation process, we verified that 90.9% were female, around 32; the youngest professional was 24 and the oldest 54. As for the profession, 63.64% were nurses, 22.72% doctors, 9.1% physiotherapists and 5.54% phonoaudiologists; they had an average of 11.27 years of training (ranging from 2 to 30 years); time of clinical practice in the average of 7.7 years (2 to 26 years); 100% had specialization in the neonatal area, and of these, 27.28% also had a master's degree.

The instrument to evaluate content and appearance consisted of 9 items: Idea concept; Dramatic creation; Pace; Characters; Dramatic potential; Dialogues; Visual style (aesthetics); Target Audience and Relevance, presented in the following tables.



Figure 1 - A characterized family

As for the general evaluation of the idea, we found that 54.54% considered it outstanding, 40.9% great and 4.54% good. The judges said the proposal was innovative, creative, easy to understand and simple.

As for the general evaluation of the dramatic creation, we observed that 36.36% considered it outstanding, 45.45% great and 18.18% good. Several judges pointed out that the script contributes to the learning of family members, because it raises doubts and clarifies them.

In the general evaluation of the pace we observed that 31.82% considered it outstanding, 54.54% great and 13.64% good. According to the judges the pace is adequate, with a good scene-sequence.

Regarding the general evaluation of the characters we verified that 45.45% considered it outstanding, 45.45% great and 9.10% good. One judge signalled the importance of adding several family members, whereas another judge stated that the grandmother character was not well portrayed. In the general evaluation of the

dramatic potential we observed that 45.45% considered it outstanding, 40.9% great and 13.64% good. According to a judge, the cartoons represented care in risk scenarios for the newborn infant.

Regarding the general evaluation of the dialogues, we observed that 36.36% considered it outstanding, 54.54% great and 9.10% good. Judges pointed out that the vocabulary was appropriate for family members (there was always someone helping and explaining). On the other hand, some judges said that they missed a link between dialogues.

In the general evaluation of the visual style we noticed that 40.9% considered it outstanding, 50.0% great and 9.10% good. According to one judge, the drawings facilitate the understanding of the viewer, while another judge pointed out that some drawings did not correspond to the action described.

As for the general evaluation of the target audience we found that 54.54% considered it outstanding, 36.36% great and 9.10% good. One judge highlighted that the language was easy, simple and reached audiences like children, adults and elderly people. Regarding relevance, we saw that that 50.0% considered it outstanding, 40.9% great and 9.10% good.

In the general comments and suggestions, the judges reported that the texts of the storyboards are interesting and illuminating, giving a better understanding about the care of premature infants at home. In addition, the judges supported the use of animations in hospital discharge guidelines since they constitute a practical strategy for understanding and resolving doubts about the care of premature infants.

Table 1 – Description of the evaluation of the content and appearance of the storyboards according to the idea concept

Idea concept	Storyboard 1		Storyboard 2				Storyboard 3					
	Yes		No		Yes		No		Yes		No	
	n	%	n	%	n	%	n	%	n	%	n	%
Is the thematic content relevant and current?	22	100	0	0	22	100	0	0	22	100	0	0
Is the content consistent to guide family members about home care at premature birth?	22	100	0	0	22	100	0	0	22	100	0	0
Is the objective of the animation consistent with the reality of nursing practice?	22	100	0	0	22	100	0	0	22	100	0	0
Is the context in which the animation takes place clear from the very beginning?	21	95.45	1	4.54	21	95.45	1	4.54	22	100	0	0
Are the premises/information displayed correct?	22	100	0	0	18	81.82	4	18.18	19	86.36	3	13.64
Is information comprehensive?	22	100	0	0	22	100	0	0	22	100	0	0
Is there enough information?	15	68.18	7	31.82	14	63.64	8	36.36	18	81.82	4	18.18
Does information meet the objectives of institutions which work with premature infants?	20	90.90	2	9.10	21	95.45	1	4.54	22	100	0	0
Is it proper to be used by a health professional?	21	95.45	1	4.54	21	95.45	1	4.54	21	95.45	1	4.54
Does the content address behaviors?	21	95.45	1	4.54	21	95.45	1	4.54	22	100	0	0
Does it suggest to the target audience a change of behavior?	20	90.90	2	9.10	21	95.45	1	4.54	21	95.45	1	4.54
Does it support family members to feel more confident to care for premature infants?	22	100	0	0	22	100	0	0	22	100	0	0
Is it able to improve knowledge about care with premature infants?	22	100	0	0	22	100	0	0	22	100	0	0

Table 2 – Description of the evaluation of the content and appearance of the storyboard according to the dramatic creation, pace, characters and dramatic potential

Dramatic creation	Storyboard 1				Storyboard 2				Storyboard 3			
	Yes		No		Yes		No		Yes		No	
	n	%	n	%	n	%	n	%	n	%	n	%
Does the starting point of the script have impact?	20	90.90	2	9.10	19	86.36	3	13.64	20	90.90	2	9.10
Is the script presentation enjoyable?	22	100	0	0	21	95.45	1	4.54	21	95.45	1	4.54
Do the scenes reflect stereotypes or discrimination?	4	18.18	18	81.82	5	22.72	17	77.27	4	18.18	18	81.82
Does interest grow with the development of the script?	20	90.90	2	9.10	20	90.90	2	9.10	21	95.45	1	4.54
Does the video motivate family members to learn?	22	100	0	0	22	100	0	0	21	95.45	1	4.54
Pace												
Does each scene motivate the next one?	22	100	0	0	21	95.45	1	4.54	21	95.45	1	4.54
Characters												
Is there rapport with the characters?	22	100	0	0	22	100	0	0	21	95.45	1	4.54
Is the presentation of characters adequate?	21	95.45	1	4.54	21	95.45	1	4.54	22	100	0	0
Do characters resemble real family members as the video proposes?	20	90.90	2	9.10	22	100	0	0	22	100	0	0
Dramatic potential												
Is there emotion?	22	100	0	0	22	100	0	0	22	100	0	0
Are there surprises?	19	86.36	3	13.64	21	95.45	1	4.54	20	90.90	2	9.10

Table 3 – Description of the evaluation of the content and appearance of the storyboard according to the dialogues, visual style, target audience and relevance

Dialogues	Storyboard 1				Storyboard 2				Storyboard 3			
	Yes		No		Yes		No		Yes		No	
	n	%	n	%	n	%	n	%	n	%	n	%
Are dialogues natural?	21	95.45	1	4.54	22	100	0	0	22	100	0	0
Do characters speak with a proper vocabulary?	22	100	0	0	22	100	0	0	22	100	0	0
Is the active voice style used?	20	90.90	2	9.10	21	95.45	1	4.54	21	95.45	1	4.54
Is there conclusion in the dialogues?	22	100	0	0	20	90.90	2	9.10	20	90.90	2	9.10
Visual style												
Do scenes reflect important aspects of home care for premature infants?	22	100	0	0	22	100	0	0	22	100	0	0
Target audience												
Is the content directed related with the target audience?	22	100	0	0	22	100	0	0	22	100	0	0
Is there identification of the target audience with the exposed problem?	22	100	0	0	22	100	0	0	22	100	0	0
Is the language compatible with the level of knowledge of the target audience?	20	90.90	2	9.10	21	95.45	1	4.54	21	95.45	1	4.54
Relevance												
Does the animation script illustrate important aspects of the theme under study?	22	100	0	0	22	100	0	0	22	100	0	0
Are scenes relevant for parents and family members to know about home care for premature newborns?	22	100	0	0	22	100	0	0	22	100	0	0
Does the script have a summary or review?	17	77.27	5	22.72	20	90.90	2	9.10	19	86.36	3	13.64

DISCUSSION

Despite technological advance, adequate care for premature infants has been one of the challenges to reduce infant mortality

rates in the country, given that neonatal mortality accounts for almost 70% of deaths in the first year of life⁽³⁾. Thus, health teams need to be sensitized about the importance of basic care guidelines to premature infants during discharge from hospital,

avoiding several respiratory and infectious diseases that account for high mortality rates in the first year of life. For this to be achieved, it is fundamental that health professionals have well organized and documented language so that parents become confident to take care of the baby at home⁽⁵⁾.

Using educational materials can contribute to the process of health education, since it simplifies the routine of health professionals and benefits parents with instructions that may clarify doubts and reduce uncertainty to care for a premature infant^(2,4).

Given the results of the validation of the judges, it was evident that storyboards of the cartoons are relevant and valid content instruments. The validation process shows that the material intended to be used has relevance and credibility. For this, we consider that in the first phase an instrument should be created and in the second it should be assessed through the analysis by specialists⁽¹²⁾.

In the evaluation, judges pointed out that storyboards offer a range of information relevant to health education, and are presented in a simple, objective, and easily understood manner. The distribution of information provides learning from multiple potentialities, capacities, and interests of family members. Technology should be used in a way that favors the participation of the subjects in the educational process, contributing to construct citizenship and increase their autonomy. Therefore, we must explore resources that meet cultural meanings recognized and valued in the context of users and the community⁽¹³⁻¹⁴⁾.

It is essential to use a language accessible to all social realities, regardless of the target population' education level, considering that the material must be easy to understand. The use of images is fundamental to transform information into visual language, to raise interest and facilitate understanding of the guidelines given⁽¹⁵⁻¹⁶⁾.

The use of educational technology aims to help parents learn by developing a sense of responsibility during care of the newborn infant, teaching about the most appropriate way of providing care and responding to the needs of the child, reducing stress, avoiding readmissions and seeking resources available in the community for post-discharge care⁽¹⁷⁾.

We highlight that there is an increasing use of educational technologies in the process of health education, opening new possibilities for interaction between nurses, clients and their families. Notwithstanding, we emphasize that technologies do not replace guidelines provided by nurses, although they are important for reinforcing the recommendations given and mediating the teaching of care to the premature newborn.

Study limitations

We pointed out the need for validation along with parents and relatives of premature infants, considering that the validation

process seeks to verify the relevance and applicability with users of this technology.

Contributions to the nursing, health or public policy sectors

This animation is a technological innovation in health. It is the first cartoon produced in Brazil about home care for premature infants, which may bring benefits to the premature newborn, parents and relatives, nurses, attention to neonatal health and the Unified Health System to face the problem of prematurity.

Animation uses texts, sounds, images and interactive dialogues that can facilitate the understanding and learning of parents and their families about home care with premature infants.

This innovative educational technology to support teaching and learning about neonatal care can be applied in hospital environments, primary care and follow-up clinics as a motivating and proper alternative for health education approaches. It can also be used as a technique to trigger the dialogue between family members and professionals, instigating questions.

It also contributes to the nursing and health teams, since it standardizes care guidelines for preterm infants at home, thus alleviating parental anxiety, mainly related to controversial instructions.

CONCLUSION

This study described the construction and validation of three animations about preterm care related to activities of daily living guided by the Nursing Theory of Roper, Logan and Tierney. Thus, the cartoons deal with the care of premature infants in the maintenance of a safe environment, mobilization, communication, sleep, leisure, feeding, breathing, elimination, personal hygiene, clothing and control of body temperature.

The validation of storyboards made it possible to glimpse changes in scenes and dialogues in a clearer and more detailed way. Some specific details may not have been observed during the cartoon display.

We emphasize the contribution of the design team, considering that this technical knowledge was essential to produce animation, highlighting the importance of interdisciplinary production.

We pointed out the need to create new technologies by nursing professionals, mainly educational technologies to dynamize and innovate approaches of education in health and to call the attention of clients. We hope that this animation can contribute to create knowledge about care of premature newborns, facilitating the clarification of doubts and transforming learning with attractive situations, encouraging the ability of critical-reflexive analysis of the people who watch the cartoon.

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