Original Article

TEXTO & CONTEXTO ENFERMAGEM
TEXT & CONTEXT NURSING TEXTO & CONTEXTO ENFERMERÍA

DEVELOPMENT AND VALIDATION OF AN EDUCATIONAL VIDEO TO PREVENT FALLS IN HOSPITALIZED CHILDREN

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ABSTRACT

Objectives: to develop and validate an educational technology (educational video) oriented toward health professionals and addressing fall prevention in hospitalized children.
Methods: methodological study carried out between December 2017 and January 2019 in five steps: identification of themes based on a literature review and the examination of the Brazilian Ministry of Health Fall Prevention Protocol; development of an educational video; validation of the material by referees specialized in children's health, patient safety, or social communication; validation by the target audience, made up of health professionals at a pediatrics institute in Rio de Janeiro, Brazil; and material adjustment. A Likert-like scale was used to validate the video, with items showing agreement indexes equal to or higher than 70% considered validated.
Results: the video "Fall prevention in hospitalized children" was produced and validated with an average adequacy agreement index of 86% among the referees and 99.3% among the target audience. Only one item, related to adequate size of titles and topics, was not validated by the referees and was modified based on their suggestions.
Conclusion: the video was validated by the referees and the target audience and may have practical application in education and training of health professionals who work in the children's health field.

DESCRIPTORS: Validation study. Educational technology. Instructional film and video. Accidental falls. Hospitalized child.

HOW CITED: Campos DC, Silva LF, Reis AT, Góes FGB, Moraes JRMM, Aguiar RCB. Development and validation of an educational video to prevent falls in hospitalized children. Texto Contexto Enferm [Internet]. 2021 [cited YEAR MONTH DAY]; 30:e20190238. Available from: https://doi.org/10.1590/1980-265X-TCE-2019-0238

ELABORAÇÃO E VALIDAÇÃO DE VÍDEO EDUCATIVO PARA PREVENÇÃO DE QUEDA EM CRIANÇA HOSPITALIZADA

RESUMO

Objetivo: elaborar e validar tecnologia educacional (vídeo educativo) voltado para os profissionais de saúde sobre prevenção de queda em criança hospitalizada.
Método: pesquisa metodológica, realizada entre dezembro de 2017 e janeiro de 2019, em cinco etapas: identificação dos temas a partir da revisão de literatura e do Protocolo de prevenção de queda do Ministério da Saúde, elaboração do vídeo educativo e validação deste por juízes-especialistas em saúde da criança, segurança do paciente e comunicação social, validação pelo público-alvo, representado por profissionais de saúde de um Instituto de Pediatria do Rio de Janeiro e adequação do material. Para validação foi utilizada escala *Likert* sendo considerados validados os itens com índices de concordância maior ou igual a 70%.
Resultados: o vídeo "Prevenção de queda em criança hospitalizada" foi elaborado e validado com índice médio de concordância de adequação de 86% entre os juízes, e de 99, 3% entre o público-alvo. Apenas um item, referente ao tamanho adequado aos títulos e tópicos, não foi validado pelos juízes e foi modificado com base nas sugestões dos mesmos.
Conclusão: o vídeo foi validado pelos juízes e pelo público-alvo e poderá ter aplicação prática na educação/capacitação de profissionais de saúde na atenção **à** saúde da criança.

DESCRITORES: Estudo de validação. Tecnologia educacional. Filmes e vídeos educativos. Acidentes por quedas. Criança hospitalizada.

ELABORACIÓN Y VALIDACIÓN DE VIDEO EDUCATIVO SOBRE PREVENCIÓN DE CAÍDAS EN NIÑOS HOSPITALIZADOS

RESUMEN

Objetivo: elaborar y validar tecnología educacional (video educativo) orientado a profesionales de salud sobre prevención de caídas en niños hospitalizados.
Método: investigación metodológica realizada entre diciembre de 2017 y enero de 2019, en cinco etapas: identificación de temas a partir de revisión de literatura y del Protocolo de prevención de caídas del Ministerio de Salud; elaboración del video educativo y validación por jurados-especialistas en salud infantil; seguridad del paciente y comunicación social; validación del público objetivo, representado por profesionales de salud de un instituto pediátrico de Rio de Janeiro; y adecuación del material. Para validación fue utilizada la escala *Likert*, considerándose validados aquellos ítems con índice de concordancia mayor o igual al 70%.
Resultados: el video "Prevención de caídas en niños hospitalizados" fue elaborado y validado con índice promedio de concordancia en su adecuación del 86% entre los jurados, y del 99,3% entre el publico objetivo. Solo un ítem referente al tamaño adecuado de títulos y tópicos no fue validado por los jurados, habiendo sido modificado conforme sus sugerencias.
Conclusión: El video fue validado por los jurados y por el público objetivo, y podrá ser aplicado en la práctica de educación/capacitación de profesionales de salud abocados a la salud infantil.

DESCRIPTORES: Estudio de validación. Tecnología educacional. Película y videos educativos. Accidentes por caídas. Niño hospitalizado.

INTRODUCTION

Falls are one of the most common adverse events in the hospital setting, although, in many cases, they are preventable. In Brazil, this type of incident is the third most reported adverse event via the Notivisa System, which belongs to the Brazilian Health Regulatory Agency[1]. In hospitalized children, falls can cause injuries and increase hospital stay and hospitalization costs[2].

Hospitalized children are doubly subject to fall occurrence. First, because falls are more common in people at age extremes[2]. Children are under cognitive and motor development, do not have a proper perception of risks, and often show defiant behaviors[2–3]. Additionally, hospitalized children are even more likely to fall because of the use of medications that alter sensory and cognitive abilities, the presence of devices and equipment attached to the patients, and the hospital environment itself, with which they are not familiar[3].

Although the subject patient safety frequently refers to drug safety or healthcare-associated infections, fall prevention should not be ignored, given that it is a common and serious incident. The issue is even one of the patient safety international targets established by Joint Commission International in a partnership with the World Health Organization[4]. Additionally, in Brazil, the Reference Document for the National Patient Safety Program[4] determined that falls are a relevant aspect and one of the indicators of quality of care delivered to patients.

Fall prevention involves management of patients' risk factors, optimization of the hospital physical space, and attention of the multiprofessional team,[5] which must be the target of constant training strategies. By carrying out educational interventions oriented toward professionals, it is possible that they develop a better understanding about the fall phenomenon and become capable of contributing to the development of better health practices[5–6] in prevention and management of this event. Taking into account that guiding patients and their relatives through falls in the hospital setting is a responsibility of health professionals, it is indispensable that there are educational technologies (ET) that provide them with resources to fulfill this task[7].

Regarding ET oriented toward fall prevention in hospitalized children, there are predominantly multifaceted educational programs aiming to prevent falls in the hospital setting[8–9] and risk factor identification scales[10]. These programs include education with posters, guidance of relatives by health professionals, and regular checking of the environmental conditions, among other measures. Scales, in turn, in addition to helping identify children at risk of fall (which characterizes them as a care technology), are also a training and teaching strategy for professionals who use them[10].

The development of digital ET oriented toward fall prevention continues to be an important demand. Educational videos, for instance, can be very useful because of their appealing, modern, and dynamic nature[11]. Information and communications technologies, in general, are already present in people's routines, in both personal and professional activities. In the health area, videos have been made to train students, instruct professionals, and/or inform the wider public. However, the content of this type of material is not always aligned to what the literature advocates because of issues such as cutbacks in audiovisual productions and the ease to make this type of material and reproduce it in smartphones[12]. For this reason, educational videos oriented toward training of professionals and/or guidance of patients have been developed and validated regarding both their content and their face, similarly to what is done with ET such as games, educational manuals, etc[12].

The objectives of the present study were developing and validating an ET (more specifically, an educational video) oriented toward health professionals and addressing fall prevention in hospitalized children.

METHODS

This was a methodological study carried out between December 2017 and January 2019 in five steps. The first step focused on theme searching, that is, defining the themes that would be addressed in the ET. The emphases of the subsequent steps were: video making, validation of the video by expert referees, validation of the video by the target audience, and implementation of adjustments in the produced ET.

In the first step, the Brazilian Ministry of Health Fall Prevention Protocol[13] and an integrative literature review were used to define the essential topics to be addressed in the video and support the produced material with a scientific basis. The review was carried out in December 2017 in the Latin America and Caribbean Center on Health Sciences Information, Medical Literature Analysis and Retrieval System Online, Nursing Bibliographic Database via Virtual Health Library, and PubMed databases by using the descriptors "*acidentes por quedas*" ("accidental falls") and "*crianças hospitalizadas*" ("hospitalized child"). In this step, the authors sought to answer three questions: what do publications show about falls in hospitalized children? What are the fall risk factors in hospitalized children and their most common consequences described in the literature? What are the strategies described to prevent falls in hospitalized children?

Articles or theses that mentioned the subject "fall during hospitalization" in their titles or abstracts published in English, Spanish, or Portuguese were included. Articles that addressed the subject "fall during hospitalization" exclusively in adults or elderly people, those that examined falls in children in environments other than hospitals, and duplicates were excluded. A publication period was not delimited.

The second step, dedicated to the making of the video, occurred by means of the interaction between the researcher who is the first author of the study and a videomaker, having the script written in the previous step as a starting point. First, an adaptation of the five-column script, an instrument available for free on the internet, was used. It aims to guide the formulation of scripts of simple videos[14].

The script contained the text to be said (based on the results of the literature review), the text to be shown on the screen (lettering), and scene suggestions. These three items were aligned when the proposal was that they happened simultaneously in the video. The objective was producing a video in which a health professional (represented by a cartoon character) presented an exposition to their work colleagues about fall prevention in hospitalized children, encompassing different areas of the hospital and all childhood age groups. It was established that the hospital facility would be shown to exemplify the content that would be discussed and that short sentences would be used to reinforce the most important topics.

By using the script as a starting point, the videomaker, still in the video preproduction, made a storyboard, in which scenes are shown in the graphic novel format to allow the scenes to be visualized and planned. This resource brings together the imagination of the audiovisual producer and the objective of the writer of the script.

Subsequently, the video voice-over was recorded, at a speed considered ideal for audiobook narration (between 150 and 160 words per minute)[14]. Last, video creation and animation were carried out by using the following software: Illustrator®, to create some characters and drawings; Adobe After Effects®, to animate characters and effects; and Adobe Premiere®, to edit the video.

The third step consisted of validation of the material by expert referees regarding objectives, structure, presentation, and relevance. The referees were found by consulting the Coordination for the Improvement of Higher Education Personnel Lattes Platform and by applying snowball nonprobability sampling with names indicated by some of the chosen referees. The inclusion criteria were: working in the children's health, or patient safety, or social communication area and scoring at least five

points in the adapted classification system of Fehring's criteria[15]. This system seeks to guarantee the expertise of the referee in the subject of the study (or ET) at hand and assigns a score according to the professional's qualification. The items are: PhD title (4 points), master's title (3 points), publication of material about the study subject in an indexed journal (2 points), specialization in the study subject (2 points), clinical practice experience of at least five years in the area addressed in the study (2 points), and participation in scientific events about the subject addressed in the study over the previous two years (1 point)[15]. Participants who did not send the completed instrument back until the stipulated deadline were excluded. The experts were invited to participate in the study by e-mail. Those who accepted the invitation received, also by e-mail, a link that directed them to the educational video and the evaluation instrument. The latter was designed as a Likert-like scale with 22 items organized into three blocks intended to evaluate the ET regarding its objectives, structure, presentation, and relevance. Additionally, it contained blank spaces for the experts to write remarks and suggestions. Thirty-one experts were invited to participate in the study, which is between two and three times the desired number of experts (four from each area). Thirteen concluded their participation, of whom four were specialized in social communication, four in patient safety, and five in children's health.

In the fourth step, validation by the target audience was carried out regarding clarity, understanding, face, and motivation at an inpatient unit at a teaching hospital in Rio de Janeiro, Brazil, with capacity to receive 46 children, which encompassed wards for breast-fed children, preschoolers and school-age children, surgical inpatients, and inpatients under hemato-oncologic treatment.

Representatives of the target audience of the video (health professionals) were purposefully selected from the group of professionals who worked at the setting described above and individually approached by the researcher, who applied the inclusion criterion being a health professional who worked at the inpatient unit. The target audience group should have from nine to 12 members, show a profile similar to that of the actual target audience of the ET, and, preferably, have a variety of levels of education[16]. Consequently, the authors opted to invite at least three professionals with complete high school level, three with a college degree who were not nurses, and three nurses. This strategy was applied to guarantee participation of professionals from different categories and levels of education, since there was a predominance of nursing professionals in the sector.

At that point of the study execution, the researcher briefly explained the study objectives and data collection method and invited the professionals to be part of the sample. After they accepted the invitation, links for the video and the evaluation instrument designed for the target audience were sent to the professionals. The latter had 26 items grouped into five blocks and aimed to assess the produced ET regarding objectives, organization, media style, face, and motivation[16].

The evaluation instruments used in the third and fourth steps had been previously validated for assessment of printed ET, such as booklets, manuals, guides, and protocols[16]. Additionally, they were already used in a video validation study, in which the authors made slight adjustments in the wording of the instrument such as using the expression "audiovisual media" to increase the applicability of the tool[17].

Quantitative analysis of the answers was carried out based on the following grading: total number of answers named totally adequate (TA), adequate (A), partially adequate (PA), and inadequate (I). It consisted of calculating the percentage of positive answers (the sum of the number of TA and A answers) in relation to the maximum possible score, which would be reached if all referees chose a positive answer in all items. The maximum score was obtained by multiplying the number of items in the evaluation instrument by the number of referees. Items that reached agreement indexes equal to or higher than 70% were considered validated[16–17].

The fifth step, adjustment of the educational video, was planned to occur in two occasions: after validation by expert referees and after validation by representatives of the target audience. The goal was changing or correcting items that did not reach the minimum agreement index[16].

The present study was approved in accordance with the principles listed in the Research Ethics Brazilian National Council Resolution 466/12.

RESULTS

The results of each step that culminated in the development and validation of the video "Fall prevention in hospitalized children" are shown as follows.

Step 1

Twelve articles emerged from reviewing the literature. These publications, together with the Brazilian Ministry of Health Fall Prevention Protocol, provided resources for the development of the video. The themes brought up by these materials originated the content addressed in the video. These themes were: characterization of fall incidents in hospitalized children, which occur predominantly at night, at hospitalization units of the ward type, mainly involving the height of the patient or of the hospital bed, even in the presence of accompanying adults, culminating in contusions, cuts, bruises, and excoriations; associated risk factors, including age lower than 3 years, male gender, neurologic diagnosis at admission, cognitive alteration, use of medications such as sedatives, laxatives, and diuretics, low level of education or adequacy of the accompanying adults regarding fall prevention, and application of fall prevention strategies. These strategies include knowing and identifying risk factors, creating a safe environment, guaranteeing safe moving of the patients and use of appropriate clothing and footwear, and providing the accompanying adults with guidance.

Step 2

The video was made as a 2D animation, with illustrative images (Figure 1) and written text and without exposure of human beings. It lasted 6 minutes and 15 seconds and addressed the characterization of fall incidents in hospitalized children, associated risk factors, and prevention strategies, as well as the most common outcomes and the expected actions by health professionals in face of the incident. This content was presented by a health professional (represented in the 2D animation as a cartoon character, as intended) at a hospital setting. Two versions of the video were produced. The first was evaluated by the expert referees. The second, which included the alterations requested by the referees, was submitted to evaluation by the target audience representatives. It did not need further adjustment, so it became the final version. It can be found by clicking on the link http://educapes.capes.gov.br/handle/capes/573128. or https://www.youtube.com/watch?v=PhVAkUIAOA8 .

Figure 1 – Images extracted from the video “Fall prevention in hospitalized children”. Designed by the authors. Niterói, RJ, Brazil. 2019.

Step 3

In the group of 13 expert referees, 70% were women, 77% were 40 years old or older, 85% lived in Rio de Janeiro, 15% lived in São Paulo, 30% were from the social communication area, and 70% were from the health area. The equitable participation of experts from the three areas of interest of the study (children’s health, patient safety, and social communication) was essential to obtain an evaluation with different and complementary views. All health professionals were nurses, although other health professionals from the field of children’s health were invited to participate.

Regarding academic training, 23% of the group had been or were postdoctoral fellows, 54% had a PhD degree, 23% had a master’s degree, and 8% were specialists. Thirty percent stated that they had been working in their area of specialization for over 20 years, 30.8%, from 10 to 20 years, and no participants had been working in the area for less than five years, because this was a criterion established to determine expertise. Eighty-five percent of the referees had articles about one or more areas of interest of the present study, 100% stated that they participated in scientific events about the subjects of the present study over the past two years, and 77% mentioned that training or permanent education of professionals was their main function or position when data were collected.

The instrument used by the 13 referees to evaluate the ET had 22 items, which means that the maximum possible score in the validation process was 286 points. Of the 286 answers (100%), 247 (86%) were “totally adequate” or “adequate” (Table 1).

Table 1 – Answers of expert referees regarding objectives, structure, presentation, and relevance of the produced educational video. Niterói, RJ, 2018.

	Scores (n=13)				
Items	**TA***	**A†**	**PA‡**	**I§**	**Agreement index per item**
1. Objectives	Number of answers	Number of answers	Number of answers	Number of answers	
1.1 The information/contents are aligned to the everyday needs of the target audience of the ET	9	3	1	0	92.3%
1.2 The information/contents are important for the quality of the work of the target audience of the ET	10	3	0	0	100%
1.3 The ET stimulates and/or encourages changes in behavior and attitude	7	4	2	0	84.6%
1.4 The ET can circulate in the scientific circles of the area	8	3	2	0	84.6%
1.5 The ET meets the objectives of institutions where its target audience works	8	3	2	0	84.6%
Block 1 total	42	16	7	0	89.2%
2. Structure and presentation	Number of answers	Number of answers	Number of answers	Number of answers	
2.1 The educational media is suitable for its target audience	9	2	2	0	84.6%
2.2 The messages are shown with clarity and objectivity	7	3	3	0	84.6%
2.3 The presented information is scientifically correct	8	4	0	1	92.3%
2.4 The material is fitting to the sociocultural level of the target audience of the ET	9	3	0	1	92.3%
2.5 There is a logical sequence in the proposed content	9	3	1	0	92.3%
2.6 The text is correct regarding concordance and orthography	8	5	0	0	100%
2.7 The style of the writing and the presentation matches the level of knowledge of the target audience	5	5	2	1	76.9%
2.8 The information shown in the summary, acknowledgments, and/or introduction are coherent	9	3	0	1‖	100%
2.9 Title and topic sizes are adequate	8	1	4	0	69.2%
2.10 The illustrations are expressive and sufficient	8	2	3	0	76.9%
2.11 The material (audiovisual media) is appropriate	7	3	3	0	76.9%
2.12 The duration of the ET is adequate	7	4	2	0	84.6%
Block 2 total	94	38	20	4	91.6%

Table 1 – Cont.

Items	Scores (n=13)				
	TA*	A†	PA‡	I§	Agreement index per item
3. Relevance	Number of answers	Number of answers	Number of answers	Number of answers	
3.1 The themes address key aspects that must be reinforced	10	2	1	0	92.3%
3.2 The material allows to extend and generalize the contents to different contexts (different hospital settings)	7	5	0	1	92.3%
3.3 The ET proposes knowledge construction	6	5	2	0	84.6%
3.4 The material addresses the subjects that are necessary for the knowledge of the target audience of the ET	9	3	1	0	92.3%
3.5 The ET is suitable to be used by any professional included in the target audience of the ET	8	2	2	1	76.9%
Block 3 total	40	17	6	2	87.6%
Total	176	71	33	6	86%

*Totally adequate. †Adequate. ‡Partially adequate. §Inadequate. ‖The referee considered that this evaluation item did not apply. Consequently, this answer was not classified as “inadequate”, so the item received 100% of “totally adequate” or “adequate” answers.

By observing the answers block by block, it is possible to better detail the evaluation of the developed ET.

Block 1: regarding the objectives of the educational video, the agreement index among the referees was 89.2%. Therefore, all items were validated. In the blank spaces for suggestions, the referees stressed that the video was very informative and useful for the intended target audience, being comprehensive enough to provide information to both multiprofessional health teams and accompanying adults, having the potential of leading to positive effects and adherence to preventive measures.

Block 2: regarding structure and presentation of the educational video, item 2.9 was the only one that was not validated because it showed an agreement index of 69.2%. It was adjusted to become more suitable. The negative evaluation it received was justified by the fact that there was not enough time to read some texts in the first version of the video. This problem was fixed in the second version, which ended up being the final version. Taking into account that the referees’ request regarding this item was fulfilled, the second version of the material was not sent to them and proceeded to the next step of the study execution (validation by the target audience).

Block 3: regarding relevance, 87.6% of the answers were positive, which rendered the block approved. According to the referees, to obtain an improvement in this block, it was suggested that other hospital unit sectors be indicated, in addition to adjusting the observations related to its content.

Step 4

The group of representatives of the target audience was three high-school level professionals, three professionals with a college degree who were not nurses, and three nurses. Eighty-three percent of the sample were women, 83% were between 31 and 50 years old; 25% were high-school level professionals, 33% were specialists, and 17% had a master's degree. Time working in the children's health area varied: 17% stated that it ranged from 1 to 5 years, 33% reported that it was from 6 to 10 years, 25% mentioned the interval 11 to 15 years, and 25% had been working in this field for over 15 years. When asked about previous access to educational material on fall prevention in hospitalized children, 50% answered that they had already had contact with this kind of material and cited mainly lectures and training programs that occurred at the service.

The instrument designed for the target audience had five blocks that totaled 26 items, which accounted for 312 answer options (100%). Of these, 310 (99.3%) were positive, that is, were the "totally adequate" or "adequate" option (Table 2).

Table 2 – Answers of target audience representatives regarding objectives, organization, audiovisual media style, face, and motivation of the produced educational video. Niterói, RJ, 2019.

	Scores (n=12)				
Items	**TA***	**A†**	**PA‡**	**I§**	**Agreement index per item**
1.Objectives	Number of answers	Number of answers	Number of answers	Number of answers	
1.1 The video meets the objectives of the target audience of the ET	11	1	0	0	100%
1.2 The video helps during the execution of the work of the target audience of the ET	10	2	0	0	100%
1.3 The video is appropriate to be used by any professional who works in the area of the target audience of the ET	11	1	0	0	100%
Block 1 total	32	4	0	0	100%
2. Organization	Number of answers	Number of answers	Number of answers	Number of answers	
2.1 The media is appealing and indicates the content to be addressed	9	2	1	0	91.6%
2.2 The title and content size in the topics is adequate	10	2	0	0	100%
2.3 The topics are ordered in a logical sequence	11	1	0	0	100%
2.4 There is coherence between the information shown in the summary, acknowledgments, and introduction sections	12	0	0	0	100%
2.5 The material (audiovisual media) is appropriate	8	4	0	0	100%
2.6 The duration of the video is appropriate	5	6	1	0	91.6%
2.7 The themes deal with important aspects	12	0	0	0	100%
Block 2 total	67	15	2	0	97.6%

Table 2 – Cont.

Items	Scores (n=12)				
	TA*	A†	PA‡	I§	Agreement index per item
3. Audiovisual media style	Number of answers	Number of answers	Number of answers	Number of answers	
3.1 The audiovisual media has an adequate style	10	2	0	0	100%
3.2 The text is interesting and the tone is friendly	10	2	0	0	100%
3.3 The vocabulary is accessible	9	3	0	0	100%
3.4 There is an association between the theme of each section and the section's text or speech	11	1	0	0	100%
3.5 The text or speech is clear	10	2	0	0	100%
3.6 The writing style is compatible with the level of knowledge of the target audience	10	2	0	0	100%
Block 3 total	60	12	0	0	100%
4. Face	Number of answers	Number of answers	Number of answers	Number of answers	
4.1 The sections seem organized	11	1	0	0	100%
4.2 The illustrations are simple	12	0	0	0	100%
4.3 The illustrations serve as a complement to the texts	11	1	0	0	100%
4.4 The illustrations are expressive and sufficient	11	1	0	0	100%
Block 4 total	45	3	0	0	100%
5. Motivation	Number of answers	Number of answers	Number of answers	Number of answers	
5.1 The material is suitable for the profile of the target audience of the ET	11	1	0	0	100%
5.2 The contents of the ET are presented in a logical sequence	12	0	0	0	100%
5.3 Interaction is encouraged by the script, which suggests actions	11	1	0	0	100%
5.4 The ET addresses the subjects that are necessary for the everyday routine of its target audience	12	0	0	0	100%
5.5 The ET stimulates and/or incites changes in behavior and attitude	9	3	0	0	100%
5.6 The ET offers knowledge to its target audience	11	1	0	0	100%
Block 5 total	66	6	0	0	100%
Total	270	40	2	0	99.3%

*Totally adequate. †Adequate. ‡Partially adequate. §Inadequate.

In the blank spaces intended for remarks, many representatives of the target audience pointed out the strengths of the ET. They emphasized its informative and didactic nature, its accessible language, and its richness of information. Some participants reinforced its utility to different settings with hospitalized children and its importance to predict adverse events. More than one participant suggested that the video be applied to instruct people accompanying hospitalized children or relatives of children who are at home, although these populations have not been included in the target audience of the ET in a first moment. Instead, the goal was producing a material oriented toward health professionals, since they are the disseminators of fall prevention measures.

Step 5

Regarding adequacy of the educational video, considering the expertise of the referees and the objective of achieving the greatest possible suitability of the material, the authors opted to make the suggested adjustments even in items that reached 70% of positive agreement, as long as the changes did not go against the video objectives neither modified its duration too much.

As a result, some alterations implemented in the video were: 1) Regarding objectives: adding the advocated distance between the grids and the evaluation of the scene in fall occurrence; emphasizing the exception that children with growth deficit must be put in their crib; stressing the need to install protective devices in staircases, windows, and objects that may be used as steps by children; enlightening the person responsible for carrying out physical tests after occurrence of falls; and delimiting the clinical observation time after occurrence of falls. 2) Regarding structure and presentation: reading the World Health Organization definition of fall; using more warm colors, such as red and orange; changing the color of dark fonts when the background is dark too; decreasing the number of transition effects; synchronizing scenes with text; and rerecording the audio. 3) Regarding relevance: using more hospital objects in the scenes and mentioning more hospital sectors.

After the changes suggested by the referees, the video was in its second version, which was submitted to evaluation by representatives of the target audience. It was not necessary to make adjustments in the material after this validation step, so the second version came to be the final one.

DISCUSSION

Nursing has engaged in producing educational videos by using the methodology applied to develop and validate ETs. This has happened because nursing professionals noticed the possibilities that audiovisual materials offer to instrumentalize permanent education and training of professionals and make feasible and strengthen the education of patients, with the ultimate goals of promoting health and self-care and preventing worsening of diseases[18].

It is important that the development of these educational videos really be oriented toward the reality they are intended to show, so as to be the most assertive possible regarding content and the most appealing possible regarding face. It is equally important that these materials be submitted to a validation process to verify whether researchers have reached their educational goals at the end of the development of the videos. Validation confers legitimacy and realiability to a practice that offers qualified care, given that a well-produced and validated educational material can contribute to changing the reality of people[18].

Evaluation studies require considerable methodological and theoretical expertise, and the task must be entrusted to researchers external to the intervention. It seems that there is not a consensus regarding adequate selection of expert referees, so it becomes necessary to choose a classification/scoring system that demonstrates their expertise and takes into account their training and experience as well as their adherence to the study interest area[15].

It is relatively common that some experts do not carry through their participation in validation studies. They decline the invitation either because of personal reasons or because they consider that the ET does not show substantial intersection with their area, and sometimes they do not send the material back within the stipulated deadline[19].

However, it is important to seek the participation of a number of evaluators that make analysis of the material according to the proposed methodology feasible[16]. Heterogeneity in the group fo experts is also advised to ensure validity of results, given that multidisciplinarity allows to obtain more valid predictive consensuses[20].

Yet, it is necessary to keep in mind that information extracted from evaluations has to be considered a tool of negotiation between multiple interests rather than the truth. In other words, researchers must consider mostly referees' concurring evaluations and opinions, whereas individual opinions can be questioned and complied with (or not) depending on the objectives and methods of the main researcher[16,20–21].

It has proven valid to allow evaluators, whether experts or representatives of the target audience, to freely write their opinions, without sticking to the obligation of answer numerically what the ET evaluation instrument requires. This can be justified by the fact that the remarks, going beyond what is included in the instrument, can be useful to obtain comments and suggestions, clarify the scores assigned to some items, and facilitate the understanding of researchers[16,18].

It is noteworthy that, by designing a digital ET, it is important to pay attention to aspects such as organization and visualization, as well as observe the quantity of information shown in each frame, font size and type, and color choice and contrast, among other aspects that culminate in the easy assimilation of the contents[22].

Clarity and smooth rhythm must be sought during the making of the video, since there are characteristics that make an instrument capable of changing people's attitudes and behaviors[12].

Some studies have addressed the ability of videos to promote changes of behaviors to prevent falls. Studies addressing the use of this technology to prevent falls in children were not found. In adults, however, application of multimedia strategies is already recommended as an intervention effective in improving preventive behaviors in face of fall threats. A study with elderly people who lived in a community in Detroit, United States, reported 94.3% of adherence to at least one new fall prevention behavior among adult participants submitted to multimedia technology-based education, such as videos[23].

Another randomized study carried out in Australia compared the efficacy of an educational material on fall prevention presented to the participants as a digital video disc (DVD) video or a booklet/manual[24]. The participants who received the DVD showed a higher self-perceived risk of fall and higher levels of confidence and motivation to engage in self-protection strategies in comparison with the participants who were given the manual. A higher proportion of participants who received any form of information provided "desired" answers compared to the control group, who received habitual education.

Creating a mental representation with multisensory experiences, that is, producing materials that involve use of more than one sense, increases the chances of remembering the informations and, consequently, adhering to the proposals, which supports the ideia of using multimedia in health education in general[12,25]. Regarding the potential an educational media has to incite attitude changes, a study involving nursing undergraduate students to evaluate an educational hypermedia on peripheral venous puncture considered the multimedia resource a facilitator of the teaching-learning process. Comparison of data before and after use of the hypermedia by applying pre and posttests indicated positive changes regarding acquisition and reinforcement of students' knowledge on the subject addressed by the hypermedia[22].

A Canadian study[26] concluded that educational videos are an important tool available to researchers that seek to translate evidence-based recommendations into fall prevention practices[26].

The authors hope that the educational video resulting from the present study is useful in permanent education of health professionals from various categories who develop their activities in the children's health field, since patient safety is a cross-cutting and multidisciplinary axis[6]. When the video is made available on the internet, it may be used in formal education classes for several health professional categories, training at service, and continuing education. Additional studies are necessary to determine the impact of this ET on nursing practice.

A study limitation that can be highlighted was the participation of only one category of health professionals as expert referees.

CONCLUSION

The produced educational video "Fall prevention in hospitalized children" proved valid regarding content and face according to the evaluation of both expert referees and representatives of the target audience. The material has potential to mediate educational practices in the hospital setting.

It is expected that the addressed content adds knowledge to professionals and that audiovisual media is useful to change behaviors related to risks, prevention, and management of falls. Health professionals are the people who can intervene in hospital environmental factors that contribute to falls, identify and minimize physiological risk factors, and provide relatives with guidance regarding the necessary cautions.

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NOTES

ORIGIN OF THE ARTICLE

Extracted from the dissertation - Elaboration and validation of educational video for prevention of falls in hospitalized children, presented to the professional master's program in nursing at the *Universidade Federal Fluminense*, in 2019.

CONTRIBUTION OF AUTHORITY

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APPROVAL OF ETHICS COMMITTEE IN RESEARCH

Approved by the Ethics Committee in Research with Human Beings of Instituto de Puericultura e Pediatria Martagão Gesteira, opinion n. 2.875.550/2018 and Certificate of Presentation for Ethical Evaluation n. 91363418.2.3001.5264.

CONFLICT OF INTEREST

There are no conflicts of interests.

EDITORS

HISTORICAL

Received: October 03, 2019.
Accepted: May 22, 2020.

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