

Tracheostomy care in the home environment: development of educational videos



Cuidados com a traqueostomia no ambiente domiciliar: desenvolvimento de vídeos educativos

Cuidados de la traqueotomía en el entorno: desarrollo de vídeos educativos

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ABSTRACT

Objective: To develop educational videos on tracheostomy care for adults and the elderly in the home environment.

Method: Applied and methodological research, with technological production of educational videos, developed in a public educational institution in Minas Gerais, Brazil. To validate the content of the scripts/storyboards, the population consisted of nurses and physiotherapists. To evaluate the videos, the population consisted of caregivers and adults/elderly people with tracheostomy. Data collection took place in February and July 2024. The following instruments were used: *Validação de Conteúdo Educacional em Saúde* and *Suitability Assessment of Materials*. For analysis, the Content Validity Index and the Adequacy Score were calculated.

Results: Two educational videos were developed: Tracheostomy Hygiene and Fixation and Tracheostomy Aspiration, lasting 5 minutes and 2 seconds and 6 minutes and 31 seconds, respectively. Fifteen specialist professionals and 9 caregivers/patients participated in the study. The scripts/storyboards obtained a Content Validity Index of 0.90, Content Validity Ratio of 0.81, with a Kappa coefficient of 0.71. The videos obtained a total adequacy score of 95 points.

Conclusion: The videos showed scientific reliability, high suitability and acceptability. They were considered clear, informative and relevant for the daily care of tracheostomized patients in the home environment.

Descriptors: Tracheostomy; Patient discharge; Instructional film and video; Nursing care; Home nursing.

RESUMO

Objetivo: Desenvolver vídeos educativos sobre os cuidados com a traqueostomia de adultos e idosos no ambiente domiciliar.

Método: Pesquisa aplicada e metodológica, com produção tecnológica de vídeos educativos, desenvolvida em uma instituição pública de ensino de Minas Gerais, Brasil. Para a validação de conteúdo dos roteiros/storyboards, a população foi constituída de enfermeiros e fisioterapeutas. Para a avaliação dos vídeos, a população foi constituída de cuidadores e adultos/idosos com traqueostomia. A coleta de dados aconteceu em fevereiro e julho de 2024. Foram utilizados os instrumentos *Validação de Conteúdo Educacional em Saúde* e *Suitability Assessment of Materials*. Para análise, foram calculados o Índice de Validade do Conteúdo e o Escore de Adequação.

Resultados: Foram desenvolvidos dois vídeos educativos: Higiene e Fixação da Traqueostomia e Aspiração da Traqueostomia, com durações de 5 minutos e 2 segundos e de 6 minutos e 31 segundos, respectivamente. Participaram do estudo 15 profissionais especialistas e nove cuidadores/pacientes. Os roteiros/storyboards obtiveram Índice de Validade do Conteúdo de 0,90, *Content Validity Ratio* de 0,81, com coeficiente Kappa de 0,71. Os vídeos obtiveram o escore de adequação total de 95 pontos.

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Conclusão: Os vídeos apresentaram confiabilidade científica, alta adequação e aceitabilidade. Foram considerados claros, informativos e pertinentes para o cuidado cotidiano do paciente traqueostomizado no ambiente domiciliar.

Descritores: Traqueostomia; Alta do paciente; Filme e vídeo educativo; Cuidados de enfermagem; Assistência domiciliar.

RESUMEN

Objetivo: Desarrollar vídeos educativos sobre el cuidado de la traqueotomía para adultos y ancianos en el entorno del hogar.

Método: Investigación aplicada y metodológica, con producción tecnológica de videos educativos, desarrollada en una institución educativa pública de Minas Gerais, Brasil. Para validar el contenido de los guiones/storyboards, la población estuvo formada por enfermeras y fisioterapeutas. Para evaluar los videos, la población estuvo conformada por cuidadores y adultos/ancianos con traqueotomía. La recopilación de datos se realizó en febrero y julio de 2024. Se utilizaron los siguientes instrumentos: *Validação de Conteúdo Educacional em Saúde* y *Suitability Assessment of Materials*. Para el análisis se calculó el Índice de Validez de Contenido y el Puntaje de Adecuación.

Resultados: Se desarrollaron dos videos educativos: Higiene y Fijación de Traqueostomía y Aspiración de Traqueostomía, con duración de 5 minutos y 2 segundos y 6 minutos y 31 segundos, respectivamente. Participaron del estudio 15 profesionales especialistas y 9 cuidadores/pacientes. Los guiones/storyboards obtuvieron un Índice de Validez de Contenido de 0,90; Content Validity Ratio de 0,81; con un coeficiente Kappa de 0,71. Los vídeos obtuvieron una puntuación total de adecuación de 95 puntos.

Conclusión: Los vídeos demostraron confiabilidad científica, alta idoneidad y aceptabilidad. Se consideraron claros, informativos y relevantes para el cuidado diario del paciente traqueostomizado en el entorno domiciliario.

Descriptores: Traqueostomía; Alta del paciente; Película y video educativos; Atención de enfermería; Atención domiciliar de salud.

■ INTRODUCTION

Tracheostomized patients are cared for by a team of specialized professionals in a hospital setting, both in intensive care units and in clinical and surgical inpatient centers⁽¹⁾. However, home care for these patients is becoming increasingly common. Research shows that, on average, 20% of patients undergoing tracheostomy are discharged home with the tracheostomy tube still in the insertion site⁽²⁾.

Rising hospital expenses and the depletion of available therapeutic resources in health services are two reasons for this trend toward dehospitalization⁽³⁾. This is caused by the prolonged hospital stay due to the chronicity of the clinical condition of tracheostomized patients⁽²⁾. Furthermore, this reality can make individuals more susceptible to nosocomial infections and accentuate the discomfort caused by separation from family⁽²⁾, factors that also motivate the transition of care to the home environment.

Hospital discharge and transfer of care to home can be challenging and often frightening for tracheostomy patients and their families. In this context, nurses play a fundamental role, guiding and training them for home care. This process favors improved self-care and promotes autonomy and quality of life for patients⁽⁴⁾.

In health education, nurses use various strategies and materials to ensure the effectiveness of pedagogical

interventions, aiming for continuous improvement in care for patients and their families. Information and Communication Technologies, in particular, stand out as fundamental resources for teaching and learning self-care⁽⁵⁾. Among these technologies, educational videos are effective teaching tools, as they combine audio, text, and image elements, promoting knowledge and fostering patient autonomy⁽⁵⁾.

An integrative literature review that analyzed preventive measures for complications in tracheostomized patients indicated health education aimed at the nursing team, the patient and the caregiver/family member as one of the main strategies to prevent the worsening of the clinical condition of these patients⁽⁶⁾.

A qualitative study with 12 tracheostomized patients and their caregivers revealed that the hospital-home transition presents a deficit in the quantity and quality of the guidance provided, identifying the video as an effective educational resource as it allows a visual and inclusive approach, adapted to different target audiences⁽⁷⁾.

The importance of studies on the development and evaluation of health education technologies is emphasized, aiming at their use in nursing interventions during the transition from hospital to home care. Therefore, this study aimed to develop educational videos on tracheostomy care for adults and older adults in the home environment.

METHOD

Type and location of study

Applied and methodological research that involved the technological production of educational videos, developed in three stages: pre-production, production and post-production, according to the adopted methodological framework⁽⁸⁾. The research was developed in a public higher education institution and in a large, public hospital certified as a teaching hospital, located in the Brazilian state of Minas Gerais.

Study protocol

In phase I, pre-production, scripts and storyboards were developed based on a scoping review⁽⁹⁾. The scoping review provided a basis for tracheostomy care and its adaptations to the home environment. In this phase, images were selected, scenes were described, and narration was developed using language appropriate to the target audience⁽⁸⁾. Storyboards were developed from the following elements: audio/narration; scenes and images; texts/captions; and references.

In phase II, the scripts and storyboards were validated by experts and, subsequently, the scenes and audio were recorded in a practice laboratory at a nursing education institution, which had the appropriate infrastructure.

The material resources used were provided by the institution where the study was conducted. Permanent materials included a digital video camera, an adult mannequin, a hospital bed, and a portable secretion

aspirator. Consumable materials included a tray, a tracheostomy tie/fixator, adult-sized metal and plastic tracheostomy tubes, gauze packets, cotton swabs, a box of procedure gloves, sterile gloves, 10- and 12- French suction catheters, a kidney basin and a 70% alcohol canister, a suction extension, an oxygen extension, a humidifier bottle, tracheostomy masks, a 1-mL syringe, a 20-mL syringe, 10-mL vials of distilled water, 10-mL vials of saline solution, 250-mL saline solution, and compresses.

Human resources involved students and teachers linked to the extension project Safe Hospital Discharge for Adults/Elderly: Production and Availability of Learning Objects, in addition to support from the institution's audiovisual team.

The first edition of the videos was carried out in the final post-production phase, and was preceded by evaluation of the educational videos by the target audience (caregivers and tracheostomized patients). The last stage consisted of the final editing of the videos and the insertion of Brazilian Sign Language (Libras). The software used for the edits was Filmora Video Editor, version 13.4. Figure 1 below shows the study protocol.

Population and sample

To validate the content of the scripts and storyboards of the educational videos (phase II), the population consisted of nurses (with expertise in adult/elderly health, clinical and surgical nursing) and physiotherapists (with expertise in respiratory physiotherapy).

Figure 1 – Study protocol. Minas Gerais, Brazil, 2024.



Source: The author

The selection of nurses and physical therapists to validate the content of the scripts and storyboards for educational videos on tracheostomy care is based on the complementary expertise of these professionals, which is essential for addressing this topic.

Nurses with expertise in adult and elderly health, as well as clinical and surgical nursing, possess fundamental skills for the comprehensive care of tracheostomized patients. Their responsibilities range from assessing clinical status to managing complications associated with the device, as well as providing direct care such as hygiene, suctioning, and tracheostomy management.

Physiotherapists specializing in respiratory therapy play a crucial role in optimizing ventilation and bronchial hygiene. They use techniques that maintain clear airways and teach respiratory rehabilitation exercises, promoting patient recovery and comfort.

The participation of these professionals in validating the educational material ensures the quality and accuracy of the information presented.

(Adapted) criteria suggested by the literature⁽¹⁰⁾ were used, which propose, for the selection of these professionals, a score calculation considering clinical experience of at least 4 years in the specific area (mandatory) = 4 points, experience of at least 1 year in clinical teaching in the specific area = 1 point, experience in research with articles published in the specific area in reference journals = 1 point, participation of at least 2 years in a specific research group in the area = 1 point, Doctorate in the specific area = 1 point, Master's degree in the specific area = 1 point, residency or specialization in the specific area = 1 point.

Professionals who obtained a minimum score of five points were included. The exclusion criterion was failure to return the validation instrument within the established 20-day deadline.

The experts for script and *storyboard validation* were selected using the textual search tool on the Lattes Platform of the National Council for Scientific and Technological Development (CNPq) (<https://buscatextual.cnpq.br/buscatextual>). Two search criteria were used to identify the professionals: the "Subject" field (title or keyword of the work) and the "Area of Expertise" filter. In the "Subject" field, the terms "tracheostomy," "health

education," "home care," "educational technology," and "self-care" were entered to locate *résumés* with declared scientific work on these topics. The "Area of Expertise" filter was then used to restrict the search to the fields of "Nursing" and "Physiotherapy." The combination of these criteria generated a list of *résumés* compatible with the study's objective.

The *résumés* returned by the search were manually reviewed based on the following inclusion criteria: minimum specialized training, active professional or academic affiliation, declared experience in clinical, educational, or scientific contexts related to tracheostomy, and relevant bibliographic production in the last five years. Sixty-three professionals were selected, including 35 nurses and 28 physical therapists. Of those invited, 20 experts agreed to participate in the study. However, five did not complete the validation instrument within the established timeframe (20 days) and were excluded according to the previously defined criteria. The final sample of the validation phase consisted of 15 experts, who fully completed the proposed instruments and comprised the group evaluating the scripts and storyboards.

In phase III of the study, participants were selected from among patients admitted to the clinical and surgical units of the hospital where the research was conducted, as well as their respective caregivers. The selection was conducted prospectively and intentionally, characterizing a non-probabilistic sample, during weekly visits conducted from June to July 2024.

The initial screening identified 13 potential participants: four tracheostomy patients expected to be discharged from the hospital and nine caregivers accompanying patients with the same clinical conditions. Inclusion criteria were: adult or elderly patients with tracheostomies who were conscious, oriented, and able to communicate, or accompanied by a caregiver; and caregivers of tracheostomy patients expected to be discharged from the hospital while still using the device. Exclusion criteria were: patients with suspected or confirmed COVID-19; patients colonized or infected with multidrug-resistant microorganisms, under contact, droplet, or aerosol precautions; and caregivers absent from the unit at the time of the interview. Among the

screened patients, three were excluded because they were under contact precautions due to colonization by multidrug-resistant microorganisms, which precluded participation. Of the nine caregivers, one refused to participate in the study after reading the Informed Consent Form (ICF). Thus, the final sample consisted of nine participants, eight caregivers (88.9%) and one tracheostomized patient (11.1%).

Data collection

For Phase II participants, invitations were sent via email in February 2024, containing a presentation of the study objectives and a link to access the electronic form. Upon accessing the link, experts were initially directed to read the informed consent form and, upon selecting the "I agree to participate in the research" option, were automatically redirected to the participant characterization and script and storyboard validation tools.

To characterize the participants, the following variables were considered: gender, age, academic qualifications, and years of professional experience. The Health Educational Content Validation Instrument (IVCES) ⁽¹¹⁾ was used, which consists of an instrument with 18 items, divided into three domains (objectives, structure/presentation, and relevance), in which each item is evaluated according to agreement and relevance, using a Likert-type scale with options agree, partially agree, and disagree.

In phase III, the patient/caregiver approach was carried out in the inpatient units of the hospital where the study was conducted, with the research being explained and the informed consent obtained in July 2024. The educational videos were presented to the patients/caregivers via tablet, at the bedside. Participants were then interviewed to complete the adapted version of the Suitability Assessment of Materials (SAM) instrument, translated into Portuguese ⁽¹²⁾.

The SAM is an instrument of North American origin ⁽¹³⁾, useful for evaluating the adequacy of content and appearance of educational materials, which can be adapted to videos. It has six factors: content, literacy requirements, illustrations, and layout and presentation (organization), and stimulation/motivation for learning. These factors have items that are assessed using

a Likert-type scale with options adequate, partially adequate, and not adequate.

Data processing and analysis

To ensure the quality and adequacy of the tests used, data analysis was assisted by a statistician.

The data were coded, categorized, and entered using double entry into Microsoft Excel® spreadsheets. They were then transferred and processed using the Statistical Package for the Social Sciences (SPSS®), version 20.0.

The variables for characterizing the participants were analyzed according to descriptive statistics, through the distribution of absolute and relative frequency, measures of centrality (mean) and dispersion (standard deviation, minimum and maximum values).

In phase II, the Content Validity Index (CVI) was calculated for each criterion and the total CVI of the instrument. The CVI considered acceptable was at least 0.80 ⁽¹⁴⁾. As a complement and to minimize the risk of analytical bias, the Content Validity Ratio (CVR) was also calculated ⁽¹⁵⁾. To verify the reliability of the agreement between the experts, the Kappa coefficient was verified.

In phase III, each SAM item was assigned a score based on the participant's response, with adequate = 2 points; partially adequate = 1 point; and inadequate = 0. A simple mean was obtained for each item, a mean for each factor, and a mean for the total instrument, according to the instructions of the instrument's authors ⁽¹¹⁾. The means obtained were transformed into scores from zero to one hundred; the higher the score obtained, the better the evaluation of the educational video.

Ethical aspects and financing

The project observed the legal procedures established by resolution 466/2012 of the National Health Council (CNS) regarding research involving human beings. It was submitted to the Human Research Ethics Committee for review under Ethical Appreciation Submission Certificate (CAAE) number 64598822.0.0000.5149 and approved under protocol number 5,868,678 on January 30, 2023.

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■ RESULTS

Two educational videos were developed on tracheostomy care in adults/elderly individuals in the home environment: hygiene care, tube fixation, and tracheostomy suctioning, lasting 5 minutes and 2 seconds and 6 minutes and 31 seconds, respectively. The total sample for this validation consisted of 24 participants. Fifteen specialist professionals participated in phase II, and nine patients/caregivers in phase III.

Phase I: pre-production

At this stage, tracheostomy care and its adaptations for the home environment were adopted. The care provided was categorized, resulting in the development of two scripts/ storyboards: one covering stoma hygiene, dressing changes, cleaning of the endocannula, and tracheostomy fixation; and the other related to the tracheostomy suctioning procedure.

The vignette and soundtrack used were the property of the extension project linked to this study, entitled *Safe Hospital Discharge for Adults/Elderly People: Production and Availability of Learning Objects*. The figures and images used in the storyboards were obtained from the internet, respecting copyright and usage licenses.

Phase II: production

Among the 15 specialist professionals who participated in the study, most (93.3%) were nurses, and one (6.7%) was a physical therapist. The average age was 41.3 years, with a standard deviation of 7.7 years, minimum age of 35 and maximum age of 61 years. The average professional experience of the participants was 18.6 years, with a standard deviation of 8.6 years, minimum experience of 10 years and maximum of 39 years. Regarding the highest qualification, all professionals had at least a specialization. The characterization of the participants in phase I is described in Table 1. Table 2 presents the validations

of the content of the scripts/ storyboards according to the IVCES⁽¹¹⁾.

The scripts/storyboards obtained a total CVI of 0.90, which is considered acceptable⁽¹⁴⁾. The total CVR was 0.81, which is considered adequate for the number of experts participating in this study⁽¹⁵⁾. The total Kappa coefficient value was 0.71, indicating strong agreement among the experts.

Regarding the experts' recommendations, suggestions were made regarding the language and its suitability for the target audience; the inclusion of questions to increase interaction; and the number of illustrations and images to complement the footage. All suggestions were incorporated into the final product.

After validation, the videos were recorded and the first edition was made.

Phase III: Post-production

Nine participants participated in phase III, one (11.1%) patient and eight (88.9%) caregivers, with an average age of 39.7 years, standard deviation of 11.9 years, minimum age of 18 years and maximum of 63 years. The characterization of the participants in phase III is described in Table 3.

Table 4 presents the evaluations regarding the content and appearance of the videos, based on SAM⁽¹²⁾ adapted for tracheostomy care.

The videos received a total adequacy score of 95 points, and were considered adequate by the participants. Suggestions from patients/caregivers, such as increasing the audio and adding specific subtitles, were taken into account in the final editing of the video. The videos were duly registered with the National Cinema Agency (ANCINE) under registration numbers B24-004558-00000 and B24-004677-00000, and made available on the linked institution's YouTube® channel (<https://www.youtube.com/watch?v=udF-SeTahdC0&t=144s> and <https://www.youtube.com/watch?v=YBoGMo1XgPk&t=182s>)

Figure 2 shows some scenes from the videos after final editing.

Table 1. Characterization of the phase II sample (n=15). Minas Gerais, Brazil, 2024.

Variables	
Professional occupation	
Nurse	14 (93.3)
Physiotherapist	1 (6.7)
Gender	
Female	12 (80)
Male	3 (20)
Highest academic qualification	
Master's degree	5 (33.3)
Doctorate	10 (66.7)

Source: prepared by the author.
Results expressed as n (%).

Table 2. Content validation by specialist professionals (n=15). Minas Gerais, Brazil, 2024.

Agreement Criterion	I disagree	I partially agree	I agree	IVC*	CVR**
Objectives: purposes, goals or aims					
Includes proposed theme	-	-	15 (100)	1.00	1.00
Suitable for the teaching-learning process	-	3 (20)	12 (80)	0.80	0.60
Clarifies doubts about the topic discussed	1 (6.7)	1 (6.7)	13 (83.6)	0.86	0.73
Provides reflection on the topic	-	1 (6.7)	14 (93.3)	0.93	0.86
Encourages behavior change	-	2 (13.4)	13 (86.6)	0.86	0.73
Average CVI* and CVR**				0.89	0.78
Structure/presentation: organization, structure, strategy, coherence and sufficiency					
Language appropriate to the target audience	-	5 (33.3)	10 (66.7)	0.67	0.33

Table 2. Cont.

Agreement Criterion	I disagree	I partially agree	I agree	IVC*	CVR**
Language appropriate to educational material	-	2(13.4)	13 (86.6)	0.86	0.73
Interactive language, allowing active involvement in the educational process	1 (6.7)	2 (13.4)	12 (80)	0.80	0.60
Correct information	-	1 (6.7)	14 (93.3)	0.93	0.86
Objective information	-	2 (13.4)	13 (86.6)	0.86	0.73
Clarifying information	-	2 (13.4)	13 (86.6)	0.86	0.73
Necessary information	-	-	15 (100)	1.00	1.00
Logical sequence of ideas	-	1 (6.7)	14 (93.3)	0.93	0.86
Current theme	-	-	15 (100)	1.00	1.00
Appropriate text size	-	2 (13.4)	13 (86.6)	0.86	0.73
Average CVI* and CVR**				0.88	0.75
Relevance: significance, impact, motivation and interest					
Stimulates learning	-	1 (6.7)	14 (93.3)	0.93	0.86
Contributes to knowledge in the area	-	-	15 (100)	1.00	1.00
Awakens interest in the topic	-	1 (6.7)	14 (93.3)	0.93	0.86
Average CVI* and CVR**				0.95	0.90

Source: prepared by the author.

Results expressed as n (%).

*CVI: Content Validity Index; **CVR: Content Validity Ratio.

Table 3. Characterization of the phase III sample (n=9). Minas Gerais, Brazil, 2024.

Variables	
Gender	
Female	7 (77.8)
Male	2 (22.2)

Table 3. Cont.

Variables	
Length of experience with tracheostomy care	
< 6 months	5 (55.6)
6 months - 2 years	3 (33.3)
> 2 years	1 (11.1)
Type of tracheostomy targeted for care	
Metallic	1 (11.1)
Plastic	8 (88.9)
Preferred media for learning about tracheostomy care	
Videos	8 (88.9)
Booklets/ written and illustrated manuals	0
Videos and booklets/written and illustrated manuals	1 (6.7)

Source: prepared by the author.
Results expressed as n (%).

Table 4. Evaluation of video content and appearance by patients and caregivers (n=9). Minas Gerais, Brazil, 2024.

Agreement Criterion	Not suitable	Partially adequate	Adequate	Adequacy score
Content				
The purpose is clear about tracheostomy care	-	-	9 (100)	1 00
The content addresses behaviors for tracheostomy care	-	-	9 (100)	100
The content is focused on the purpose: tracheostomy care	-	-	9 (100)	100
The content highlights the main points of tracheostomy care	-	-	9 (100)	100
Adequacy score				100

Table 4. Cont.

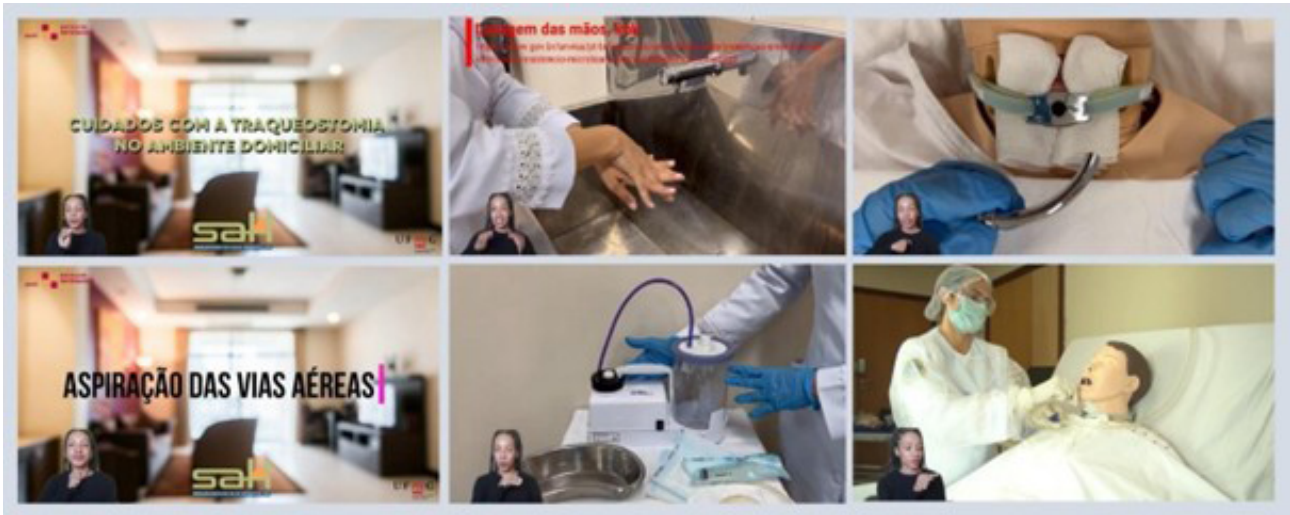
Agreement Criterion	Not suitable	Partially adequate	Adequate	Adequacy score
Literacy requirement				
Reading level	-	-	9 (100)	100
Uses writing in the active voice	-	2 (22.2)	7 (77.8)	89
Use vocabulary with common words in the video	-	-	9 (100)	100
Context comes before new information	-	-	9 (100)	100
Learning is facilitated by topics	-	-	9 (100)	100
Adequacy score				98
Illustrations				
The purpose of the illustration in the video is clear.	-	1 (11.1)	8 (88.9)	94
Types of illustrations for tracheostomy care	-	1 (11.1)	8 (88.9)	94
The figures/illustrations are relevant to tracheostomy care	-	-	9 (100)	100
The illustrations have captions	-	2 (22.2)	7 (77.8)	89
Adequacy score				94
Layout and presentation				
Layout feature (video presentation)	-	1 (11.1)	8 (88.9)	94
Font size and type	-	3 (33.3)	6 (66.7)	83
Adequacy score				88
Stimulation, motivation of learning				

Table 4. Cont.

Agreement Criterion	Not suitable	Partially adequate	Adequate	Adequacy score
Uses interaction (exemplifying tracheostomy care)	-	-	9 (100)	100
The guidelines are specific and give examples	-	-	9 (100)	100
Motivation and self-efficacy for tracheostomy care	-	3 (33.3)	6 (66.7)	83
Adequacy score				94
Cultural suitability				
It is similar to its logic, language and experience	-	-	9 (100)	100
Image and examples are assimilated, according to the culture	-	2 (22.2)	7 (77.8)	89
Adequacy score				94

Source: prepared by the author.
Results expressed as n (%) or just %.

Figure 2. Scenes from educational videos. Minas Gerais, Brazil, 2024.



Source: prepared by the author.

DISCUSSION

The relevance of this approach is reflected in the need to provide educational materials that are accessible and understandable to patients and caregivers, promoting appropriate and safe self-care outside the hospital setting. There are still knowledge gaps regarding various aspects of tracheostomy care and management, both among professionals^(1,9) and among patients and family members⁽²⁾. The use of audiovisual resources in this context appears to be a promising strategy that can contribute to increasing caregiver autonomy and patient safety at home. In the context of health education, nursing has been dedicated to creating educational videos based on methodologies for the development, validation, and application of technologies, recognizing them as effective tools for patient education, promoting health and self-care, ensuring autonomy, and preventing complications⁽¹⁶⁾.

With the increasing use of videos as educational tools, it is essential that their production be closely aligned with the objectives and context represented, ensuring that the technology is as assertive as possible in terms of its content and appearance⁽¹⁶⁾. Likewise, it is imperative that videos be subjected to validation by experts to ensure that their educational purposes are achieved and to ensure their scientific reliability⁽¹⁶⁾.

In this study, video validation was performed with the assistance of nursing specialists and professionals experienced in tracheostomy care. Therefore, the evaluators' critical analysis and technical-scientific judgment were essential to ensure the quality and relevance of the content presented, allowing for the identification of elements that required adjustment to ensure clarity and applicability. As a result, the video content was considered appropriate for the target audience and sufficiently educational to guide the practice of caregivers and patients at home.

The validation process confers legitimacy and reliability to the material, directly contributing to the practice of qualified and evidence-based care, since a well-developed and validated resource can change the reality of the individuals for whom it is intended⁽¹⁷⁾. This aspect is even more relevant when considering the popularity of free video platforms, such as YouTube®, where the quality and credibility of the available videos may vary⁽¹⁸⁾.

Experts must be qualified to critically evaluate the content of educational materials, adopting a reflective and up-to-date perspective, to ensure their relevance to the target audience, as well as the quality and suitability of educational videos for health education⁽¹⁹⁾. The selection of these professionals should consider a classification system that demonstrates their expertise, taking into account qualifications, experience, and proximity to the topic of interest of the study.

For this study, criteria based on scientific literature were adapted⁽¹⁰⁾. Analysis of the experts' profiles revealed a highly qualified panel, with more than half of the participants holding a PhD and at least 10 years of experience in the research area.

The experts conducted their assessment based on measurable indicators defined in the validation instrument and contributed suggestions for improving the material. Research indicates that it is advantageous to allow evaluators a space for open comments on the forms, which allows for detailed criticism and clarification of assigned scores^(16-17,20). Therefore, the instrument sent to the experts included "Suggestions and/or comments" fields after each item.

The experts' evaluation of the videos in the present study primarily indicated the need to adapt the material's language to the target audience's reality. Of the 18 categories in the script validation instrument, only the item "Language appropriate for the target audience" had a CVI below the minimum acceptable.

Studies show that the use of confusing language and excessive jargon is associated with fatigue, disinterest, and difficulties in understanding, potentially compromising patient safety⁽²¹⁾ in self-care learning materials. Therefore, achieving agreement among experts regarding the content, clarity, and language of videos is essential to ensure comprehension and attractiveness of the educational material to the target audience⁽²¹⁾. Material written in easy-to-understand language promotes user satisfaction, encourages the development of self-care attitudes and skills, promotes autonomy, and reinforces adherence to recommended care practices⁽²²⁾. Therefore, all the experts' comments regarding language were carefully analyzed, accepted, and incorporated into the final version of the videos.

Regarding the duration of the videos produced in this study, which were 5 minutes and 2 seconds and 6

minutes and 31 seconds, it complies with the recommendations in the literature. A maximum time range between 10 and 15 minutes is suggested for these resources, considering the impact of duration on the viewer's attention and assimilation of the content^(8,21,23-24).

Participants reported that the videos were highly appropriate in terms of content and encouragement/motivation for learning tracheostomy care. This may reflect increased confidence and safety in performing essential care, such as airway suctioning and stoma hygiene, skills that require practical guidance to minimize the risk of complications. These results corroborate findings from previous studies conducted nationally^(17,25) and internationally^(26,27), in which the use of visual educational materials facilitated understanding and retention of information by caregivers and family members^(4,17,25,26).

There is a lack of evidence in the current literature to address the unmet educational needs of patients and caregivers who need to perform tracheostomy care⁽⁴⁾. Thus, it can be inferred that the videos validated in this study not only fill informational gaps in home care^(27,28), but also constitute support tools for health education for caregivers and family members of tracheostomy patients.

The use of audiovisual materials in the home environment can favor adherence to nursing guidelines, promoting self-management of care and contributing to the prevention of unnecessary readmissions and adverse events, although it is still necessary to develop and test intervention programs to promote self-care for people with tracheostomies, based on available and robust evidence to guide practice⁽²⁸⁾.

The use of videos for discharge planning and care transfer, made available through mobile technology and free video platforms, when combined with the ability for users to pause, rewind, and fast-forward, is an element that makes the teaching-learning process efficient for patients^(3,29). Furthermore, it allows for the visualization of care in a dynamic and asynchronous manner, accessible whenever necessary in the home environment, which enhances the health promotion of individuals with tracheostomies.

It was also decided to include Brazilian Sign Language (LIBRAS) and specific subtitles in the videos, to increase accessibility and inclusion, ensuring that people with hearing impairments can fully understand

the educational content and participate in the teaching-learning process equitably.

It is becoming a challenge for researchers to promote health education using Information and Communication Technologies on a broader and more accessible scale. The importance of a favorable political environment, both within institutions (health and education) and within responsible government agencies, is emphasized to support and provide visibility to patients using tracheostomies in the home environment, as well as to support their families and caregivers. It is believed that this will enable guidelines and establish a consistent meaning for educational programs based on the use of these technologies, aimed at patient education. Furthermore, it is essential to develop and promote a public repository of educational videos that reflects and integrates local values and culture.

As a contribution to nursing practice, the videos in this study offer explanatory, scientifically based, inclusive, and illustrative content that sparks interest and fosters rapport between caregivers/patients and healthcare professionals. This resource can help prevent tracheostomy-related complications and preserve the patient's quality of life. Furthermore, the videos validated and evaluated here can be used in nurses' discharge planning, providing ongoing support for these patients' home care.

One limitation of this study is the lack of an assessment of the effectiveness of video use in this population. Future studies to assess the long-term impact of audiovisual educational materials on the quality of life of patients and caregivers are important, as is the need for ongoing research to adapt and update this content, reflecting the evolution of best practices and healthcare protocols.

■ CONCLUSION

Two educational videos were developed: Tracheostomy Hygiene and Fixation and Tracheostomy Suction, lasting 5 minutes and 2 seconds and 6 minutes and 31 seconds, respectively. Both were validated, achieving a total CVI of 0.90 and a total CVR of 0.81. The target audience's evaluation yielded a total score of 95 points, indicating high acceptance and adequacy.

The videos developed in this study were validated by experts and well-regarded by the target audience. They

are considered clear, informative, and appropriate resources for the learning of tracheostomized patients and their caregivers. They demonstrated scientific reliability, suitability, and acceptability. Furthermore, they are tools that can be used by healthcare professionals when planning the hospital discharge of tracheostomized patients. These videos have the potential to improve the autonomy of caregivers and patients, contributing to the promotion of safety in home care.

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■ Availability of data and material

Access to the dataset may be granted upon request to the corresponding author.

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