

ORAL CARE OF ADULT PATIENTS INTUBATED ON MECHANICAL VENTILATION: DEVELOPMENT OF AN EDUCATIONAL VIDEO

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Abstract: The oral care of patients intubated on mechanical ventilation is essential, being the responsibility of nursing, to maintain the promotion and maintenance of oral health. This study proposes a learning object, an educational video, for the oral care of intubated patients on mechanical ventilation. It is about the development of a video, based on the model of Fleming, Reynolds and Wallace, comprising the phases: Pre-production, Production, Post-production sustained in the stages of the Nursing Process and in the classification systems of NANDA, NOC and NIC; it was approved by the Research Ethics Committee nº40144114.9.0000.5393. The construction of the screenplay/script and storyboard was based on scientific literature and integrative review, with content validation by three experts, who allowed the creation of scenes, filming and video editing. Educational resources through innovative technologies can ensure the best evidence-based care practices, promoting professional development and patient safety.

Keywords: educational technology; nursing education; oral hygiene; critical care; intratracheal intubation; nursing assistance.

INTRODUCTION

Patients intubated on mechanical ventilation (PEVM), most of the time, do not have adequate oral hygiene⁽¹⁾. This condition often triggers periodontitis, gingivitis, candidiasis⁽²⁾, otitis, chronic rhinopharyngitis, ventilator-associated pneumonia (VAP), infective endocarditis, bacteremia, sepsis and brain abscess⁽³⁾.

VAP, in addition to being related to an increase in morbidity and mortality rates, is also related to an increase in length of stay and, consequently, hospital costs, in patients in the Intensive Care Unit (UTI)⁽⁴⁾.

Oral care is the responsibility of the nursing team, however, limited time and lack of

knowledge about assessment, technique and appropriate products are factors that make this practice difficult⁽⁵⁻⁶⁾.

A teaching strategy using a Digital Versatile Disc (DVD) can improve the learning outcome in teaching skills and abilities, when compared to the traditional learning system, and provide the nursing team with scientific knowledge capable of modifying their behavior through critical and reflective education⁽⁷⁾.

The use of video as an educational strategy has been demonstrated in the literature as being able to stimulate and capture the attention of those involved (8). However, there are few studies available that detail the methodological development of educational video production, as well as the difficulties encountered⁽⁹⁾.

In this context, the objective of this study is to develop a learning object, an educational video, for the oral care of intubated patients on mechanical ventilation, for the nursing team.

METHOD

This is a descriptive study of learning object development. The methodology for constructing an educational health video was based on the Fleming, Reynolds and Wallace model⁽⁸⁾, structured on the Nursing Process and standardized nursing terminologies such as the *North American Nursing Diagnosis Association classifications* (NANDA-I)⁽¹⁰⁾, *Nursing Outcomes Classification* (NOC)⁽¹²⁾ and *Nursing Interventions Classification* (NIC)⁽¹²⁾.

The educational video was developed at the Nursing Practice Simulation Center (CSPE) of `` Escola de Enfermagem da Universidade de São Paulo `` (EERP-USP).

The construction of the educational video is based on the literature and consists of the following phases: Phase 1 pre-production, Phase II production and Phase III post-production, as shown in Chart 1.

| Phases | Phases | Description |
|---------------------|--------|--|
| I pre-production | Step 1 | construction of the script / <i>script</i> and <i>storyboard</i> |
| II production | Step 2 | validation of the script / <i>script</i> by experts |
| | Step 3 | <i>storyboard</i> validation by experts |
| | Step 4 | rehearsal with the actors |
| | Step 5 | shooting the scenes |
| | Step 6 | image development |
| | Step 7 | narration/audio recording |
| III post production | Step 8 | Edition |

Table 1. Presentation of the phases and stages of the development of an educational video⁽¹³⁾.

Pre-production is the initial phase for the construction of a video and consists of the construction of the script, an important step as a guide for the production phase⁽¹³⁾.

It is important to highlight at this stage the search in textbooks on the subject, to construct each item corresponding to the script and storyboard, which relate to the stages of the nursing process, as well as the use and application of classification systems. nursing in the context of clinical practice for the oral care of intubated adult patients on mechanical ventilation, focusing on NANDA-I®, NOC and NIC⁽¹⁰⁻¹²⁾.

In addition to the use of these textbooks, in order to ensure updated development based on scientific evidence, specifically for nursing intervention activities, an integrative review (IR) of the literature was carried out.

This pre-production phase also consisted of defining the educational video production team, human, technological and physical resources involved.

After the construction of the script, the *storyboard* was elaborated, a table with columns, which aims to guide the creative process in the other stages of production and can be defined as the result of transforming a script into a video project⁽¹³⁾. The *storyboard* was adapted from research on the development

of an educational video on central access dressings⁽⁹⁾.

The PEVM oral care *storyboard* contains three columns. The first column presents a detailed description of the narration of the video by the performing nurse; the content of the script/script was distributed and numbered, to facilitate the identification and location of the lines during the recording of the scenes.

The second column of the *storyboard* comprised the description of the recorded scenes and images, as well as the descriptive slides, such as title and references. The third column consisted of the description of the photos and animations.

In phase II Production, steps 2 and 3, script/script and storyboard validations were performed. To carry out this stage, the email was forwarded to three specialist nurses/experts, who were identified in Brazilian literature regarding the use of the video construction method for nursing, as well as those related to the topic of care, oral health and the nursing process.

The script/script validation instrument of the educational video, in its original format, was applied in a research related to the development of an educational video about central access dressing⁽⁹⁾, which considers the following aspects: objective, content, relevance, environment, verbal language and inclusion of topics.

However, considering the object of study of this research, which is the oral care of PEVM, changes were made to the presented contents, for due adjustments. Each of the criteria was evaluated by the experts as, strongly agree, agree, disagree, strongly disagree and don't know.

After validation, the test was carried out with the video production team, composed of the researcher (executive nurse), two research assistant nurses with experience in critical

care and an audiovisual technician.

This step aimed to establish the necessary *storyboard* corrections with those involved, perform scene rehearsals, photos, equipment positioning, choice of dummy, actors and camera position on the day of recording.

The next stage consisted of recording the scenes and audio. During this phase, the performance of an experienced production team is important, since lighting, microphone location, camera positioning and shooting angles are essential to obtain accurate images in the post-production phase^(8,13).

The video recording started with the scenes described in the *storyboard* and took place in the CSPE laboratory at EERP-USP, with the participation of the production team, composed of the researcher, two research auxiliary nurses and the audiovisual technician, with experience in the construction of videos educational institutions, belonging to the same institution, which was responsible for filming the scenes.

The equipment used for recording was: Canon EOS 7D Camera, Lapel Microphone and 1 Fan Ciev camera tripod model FT 663S.

A scenario similar to an ICU unit was created in the laboratory, containing the following materials and equipment: multiparameter monitor, low-fidelity Laerdal® Nursing Anne simulation mannequin, capable of being intubated, effective and efficient for clinical training, as well as in the comprehensive patient analysis and care; electric bed, bedside table, IV stand, infusion and syringe pumps, gas ruler with compressed air, oxygen and vacuum output, in addition to a table with a computer and a chair for recording nursing records.

Materials such as an orotracheal tube, disposable aspiration bottle, aspiration probe, pulse oximeter, disposable surgical-type protection mask, disposable apron, protective glasses, procedure gloves, sterile gauze,

flashlight and disposable spatula were also used. All these materials and equipment are resources made available by EERP-USP. The toothbrush, chlorhexidine 0.12% oral solution and lip balm were financed by the researcher herself.

In addition to the recorded scenes, animations created by the audiovisual technician from the Multimedia Creation and Production Service (SVCPM) at EERP-USP and photos captured of the oral cavity of adult patients intubated with an orotracheal cannula, admitted to the ICU of the "Hospital Estadual Américo Brasiliense" (HEAB) were used.), public hospital, in the State of São Paulo, belonging to the Hospital das Clínicas Complex of the Faculty of Medicine of Ribeirão Preto – Universidade de São Paulo / Foundation for Support to Teaching, Research and Assistance.

The narration of the educational video was performed by the performing nurse, in the same location where the scenes were recorded, using the *script* to guide him.

The post-production phase is described as the editing process of assembling all the elements of the *storyboard*, in an uninterrupted sequence of scenes which also includes the inclusion of texts, photos, drawings and audio ⁽⁸⁾. In this step, the following software was used: Adobe® Premiere, Adobe® Flash software, Photoshop and Audacity software. This phase was carried out by the researcher and by the audiovisual technician from the SVCPM at EERP-USP.

The research followed the legal procedures that determine Resolution 466/2012 of the National Health Council, being approved by the Research Ethics Committee of the EERP-USP, according to Process n° 40144114.9.0000.5393. The Informed Consent Form was applied to the research participants, expert nurses and family members of patients admitted to the HEAB ICU.

RESULTS

In order to ensure that the contents described in the script/script and *storyboard* are updated with the scientific evidence produced on the topic "oral care of the intubated adult patient on mechanical ventilation", an IR was carried out in the literature in the PUBMED database and the search in textbooks on the subject, for the construction of each item corresponding to the script / script and *storyboard*, which relate to the stages of the nursing process.

The validation of the script/script and *storyboard* of the educational video was carried out by three experts, critical care nurses with experience in the oral care of intubated patients on mechanical ventilation (PEMV), based on the nursing process and taxonomies NANDA-I®, NOC and NIC (10-12). The results of the aspects evaluated by the experts, regarding the objective, content, relevance, environment, verbal language and inclusion of topics, were:

- Objective: positively evaluated by the experts who marked with the option I strongly agree in 100% of the items.
- Content: this aspect was also evaluated positively, with the strongly agree option marked in 90.4% of the items, while the agree option appeared in 9.5% of the items. The suggestion of one of the experts was to include the factor related to the side effects of drug treatment in the nursing diagnosis.
- Relevance: strongly agree marked in 55.5% of the items, and the option agree marked in 44.5% of the items, therefore, evaluated positively by the experts. The suggestions included an articulated mouth mannequin, in an enlarged size, to demonstrate details of the oral hygiene intervention, such as brush angulation; and also, the inclusion of images from the NANDA-I®, NOC and NIC books.
- Environment: aspect evaluated positively by the experts, with 83.3% of the items

marked as strongly agree and 16.7% as agree.

- Verbal language: evaluated positively, with the option strongly agree appearing in 33.3% and the option agree in 66.7% of the items. There were suggestions from the three experts regarding the standardization of tense throughout the text.

- Inclusion of topics: evaluated positively by the experts, with 95.23% of the items being marked with strongly agree and 4.77% with strongly disagree. The experts' suggestions were the exclusion of item Scene 1 – Scenario, as there was repetition of content with the clinical case; and the inclusion of the related factor “oral fasting for more than 24 hours” for the Nursing Diagnosis phase. All considerations made were promptly attended by the researcher.

In the production phase of the educational video, prior to the date of filming the scenes, the video production team, composed of the researcher (executive nurse), two research auxiliary nurses with experience in critical care and the audiovisual technician, carried out the test for video recording.

After the rehearsal with the necessary adaptations, the video production team started filming the scenes. The researcher, based on the *storyboard*, performed the procedure and the research auxiliary nurse acted as a nursing technician. The audiovisual technician filmed the scenes, lasting five hours.

The following topics were addressed: Introduction, Clinical case, Evaluation and Data Collection, Establishment of the nursing diagnosis, Expected results and Intervention: restoration of oral health.

In the Image Development stage, in order to demonstrate the most common alterations, photos of the oral cavity of three intubated adult patients on mechanical ventilation, hospitalized in the HEAB ICU, were included.

The narration of the video was distributed

in two stages, being the recording of the first and second scenes on the day of filming and the rest at later dates, totaling four hours of work.

The post-production phase, video editing, was carried out by the audiovisual technician in collaboration with the researcher. Still in this phase, the narration was introduced in the video segment, sound adjustments and content editing.

DISCUSSION

The creation of a virtual learning environment, through an educational video, makes it possible to turn the content of this learning into a stimulating factor, which attracts attention through moving images and sound (audio and visual)⁽¹⁴⁾.

Researchers claim that this new generation of students is living in times of rapid technological transition, changing the nature of social practice; and yet, that the traditional model of higher education is changing with these students becoming consumers of interesting and interactive education models, to engage and stimulate learning⁽¹⁵⁾.

The first step in developing this educational video consisted of building/modeling a fictitious clinical case of a PEVM, in a simulated scenario. This phase consisted of carefully and judiciously listing the clinical variables that could be found in a real case, in a critical care environment.

An IR of the literature was carried out in search of the best evidence, as well as semiology and semiotics textbooks to support the pre-production phase, with a critical eye of the experts in the validation phase of the script/script and *storyboard*.

The construction of the script and the *storyboard* of the educational video was based on the particularities of a set of systematized knowledge based on the sciences of basic human needs, meeting the Conceptual Model

of Wanda Aguiar Horta⁽¹⁶⁾.

At this stage, the PEVM oral care standards included the design of environments, equipment, materials (audio and visual) and actions (scenes), in which nursing professionals' attitudes are implemented, in view of their knowledge of the stages of the nursing process. nursing (Data collection, Nursing Diagnosis, Planning, Implementation, Evaluation/Evolution).

When building the script/script and *storyboard*, the researcher searched the IR for evidence that supported the selection of materials and actions to carry out oral care, such as oral hygiene solution, mechanical brushing, tongue cleaning, lip hydration, care for the orotracheal tube, aspiration of secretions, time spent, frequency of oral care, saliva and personal protective equipment.

The validation of the script/script and *storyboard* is considered a fundamental phase for the development of the video, since the considerations made by the experts contributed to determine a scientific, understandable and uniform language, as well as to add factors related to the nursing diagnosis, approaching pertinent themes in the oral care of the PEVM.

Testing the scenes and photos allowed the production team to detect situations that required adjustments and adaptations, both in the text of the script and storyboard, and in relation to materials and equipment in the simulated scenario.

The video recording for the oral care of PEVM occurred with the application of a teaching strategy through simulation, with the objective of simulating real aspects of the practice, in a safe and controlled environment. The simulated environment allows repeating content, information and procedures safely, avoiding exposing patients to errors⁽⁹⁾.

The low-fidelity robotic simulation using the Laerdal® Nursing Anne manikin was a

strategy in the simulated clinical scenario that represented the fictitious patient, ensuring safety and control of the situations during the demonstration of the data collection stages (systematized clinical examination focused in the oral cavity) and, of the actions that were carried out for the nursing intervention "Oral Hygiene", in a critical care environment.

The use of equipment, materials and an environment similar to that of practice, reproducing a structure similar to that of an ICU, will allow professionals and students to identify with the scenario and facilitate learning.

In the image development stage, the researcher included photos captured from only three PEVM, since it was possible to identify the most common alterations in the oral cavity of these patients.

The post-production phase consisted of video editing. At this stage, the audiovisual technician and the researcher developed animations, opening slides and definition of the photo sequence.

After the first edition of the video, the need for adjustments was identified, for a better understanding of the content; the narration presented interferences in the sound, generated by ambient noises, being necessary to repeat this step twice. It is important to consider that the audio recording was not carried out in an acoustically isolated environment.

Approximately 50 min of footage was edited down to 18 min of video. The researcher and the audiovisual technician used 23 hours spread over nine days to edit the video, which represented a significant amount of time for the team involved.

The editing process proved to be the most meticulous and time-consuming process in video production, demanding hours of work and detailing from professionals in order to ensure its quality.

Health institutions need to adapt to the

demands related to the quality of care, as well as favor the application of new educational technologies to update knowledge ⁽⁹⁾.

The use of educational video is an excellent tool capable of transmitting knowledge and motivating viewers, in addition to improving performance when compared to the traditional teaching method ⁽⁷⁾.

The construction of this educational video for the oral care of intubated patients on mechanical ventilation in digital format was designed to enable its insertion in a virtual environment, such as the internet and the Moodle Platform, based on a social constructivist approach to teaching.

The educational video of oral care for patients in critical condition, based on the Nursing Process, was approached in this study, with the objective of contributing to the training of nursing professionals, technicians and nurses, as well as during their work in clinical practice, in a way that to guarantee the quality of care and safety for patients.

Considering the objective of this study, which is the development of a learning object for the oral care of the PEVM, for the nursing team, the construction of the proposed educational video can be used as an educational strategy, of active, innovative and motivational technology, capable of to facilitate knowledge and change the practice of nurses in oral care for critical patients ^(7,9).

FINAL CONSIDERATIONS

In view of the above, it is concluded that the objective of the present study was achieved, that is, the development of a learning object, an educational video, for the oral care of intubated patients on mechanical ventilation, for the nursing team.

Regarding the methodological trajectory of video construction, it allowed the researcher maturity and development, regarding the necessary steps to create educational videos and consisted of the following phases: Phase I Pre-production: Step 1 – construction of the script / script and storyboard. Phase II Production: Stage 2 and 3 – validation of the script/script and storyboard by experts; Step 4 – essay with the authors, Step 5 – filming the scenes, Step 6 – image development, Step 7 – narration / audio recording; Phase III Post-production: Step 8 – Editing.

As for the possibility of using this educational video, the importance of the content in the training of professionals, during clinical practice in the services, as a health education resource, as well as contributing to the development of future studies on the subject, is highlighted.

INTEREST CONFLICTS

The authors declare that there are no conflicts of interest in this study.

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