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Construction and validation of an educational video for nursing students about obstetric cardiopulmonary arrest

Construção e validação de vídeo educativo para estudantes de enfermagem sobre a parada cardiorrespiratória obstétrica

Construcción y validación de un video educativo para estudiantes de enfermería sobre parada cardiorrespiratoria obstétrica

Marcela Lourene Correia Muniz[1]
Nelson Miguel Galindo Neto[2]
Guilherme Guarino de Moura Sá[3]
Juliana de Castro Nunes Pereira[3]
Marilene Cordeiro do Nascimento[3]
Carmina Silva dos Santos[1]

1. Faculdade Pernambucana de Saúde, Programa de Mestrado Profissional em Educação para o Ensino na Área de Saúde. Recife, PE, Brasil.

2. Instituto Federal de Educação, Ciência e Tecnologia de Pernambuco, Departamento de Enfermagem. Pesqueira, PE, Brasil.

3. Instituto Federal de Educação, Ciência e Tecnologia de Pernambuco, Departamento de Enfermagem. Belo Jardim, PE, Brasil.

Corresponding author:
Juliana de Castro Nunes Pereira.
E-mail: juli_decastro@hotmail.com

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ABSTRACT

Objective: to construct, validate and assess educational video for nursing students about obstetric cardiopulmonary arrest. **Method**: this is a methodological study consisting of video construction, content validation by 22 experts in obstetric cardiopulmonary arrest and assessment by 21 undergraduate nursing students. The Health Educational Content Validation Instrument was used for validation with experts, and a questionnaire adapted from the Suitability Assessment of Materials, for student assessment. In the validation with judges and the target audience, the item with a minimum agreement of 80% was considered valid, obtained from the Content Validation Index and the binomial test, was considered valid. **Results**: video, lasting 8 minutes and 53 seconds, contemplated nursing care stages in carrying out basic life support to pregnant women affected by cardiac arrest. In content validation, of the 18 items assessed, 16 had 100% agreement, one had 95% and the remaining item had 81%. In students' assessment, of the 13 items assessed, 12 had 100% agreement, and the remaining item had 95%. **Conclusion and implications for practice**: the video was considered valid by experts in obstetric cardiopulmonary arrest and understandable by nursing students, thus it is a viable educational resource to contribute to nursing education.

Keywords: Education, Nursing; Health Education; Pregnancy; Audiovisual Aids; Cardiopulmonary Resuscitation.

RESUMO

Objetivo: construir, validar e avaliar vídeo educativo para estudantes de enfermagem sobre a parada cardiorrespiratória obstétrica. **Método**: estudo metodológico, composto pela construção do vídeo, validação de conteúdo por 22 especialistas em parada cardiorrespiratória obstétrica e avaliação por 21 estudantes de graduação em enfermagem. Utilizou-se o Instrumento de Validação de Conteúdo Educacional em Saúde, para validação com os especialistas, e o questionário adaptado do *Suitability Assessment of Materials,* para avaliação dos estudantes. Na validação com juízes e com o público-alvo, foi considerado válido o item com concordância mínima de 80%, obtida a partir do Índice de Validação de Conteúdo e do Teste Binomial. **Resultados:** o vídeo, com duração de 8 minutos e 53 segundos, contemplou as etapas da assistência de enfermagem na realização do suporte básico de vida à gestante acometida por parada cardiorrespiratória. Na validação de conteúdo, dos 18 itens avaliados, 16 tiveram concordância de 100%, um obteve 95% e o item restante obteve 81%. Na avaliação dos estudantes, dos 13 itens avaliados, 12 possuíram concordância de 100% e o item restante possuiu 95%. **Conclusão e implicações para a prática:** o vídeo foi considerado válido pelos especialistas em parada cardiorrespiratória obstétrica e compreensível pelos estudantes de enfermagem, assim, trata-se de recurso educativo viável para contribuir com a formação da enfermagem.

Palavras-chave: Educação em Enfermagem; Educação em Saúde; Gravidez; Recursos Audiovisuais; Ressuscitação Cardiopulmonar.

RESUMEN

Objetivo: construir, validar y evaluar videos educativos para estudiantes de enfermería sobre parada cardiopulmonar obstétrica. **Método**: estudio metodológico, consistente en la construcción del video, validación de contenido por 22 expertos en parada cardiorrespiratoria obstétrica y evaluación por 21 estudiantes de enfermería. Se utilizó el Instrumento de Validación de Contenidos Educativos en Salud, para la validación con los expertos, y el cuestionario adaptado del Suitability Assessment of Materials, para la evaluación de los estudiantes. En la validación con jueces y público objetivo, se consideró válido el ítem con una concordancia mínima del 80%, obtenido del Índice de Validación de Contenido y la Prueba Binomial. **Resultados**: el video, de 8 minutos y 53 segundos, contempló los pasos del cuidado de enfermería en la realización de soporte vital básico a gestantes afectadas por paro cardíaco. En la validación de contenido, de los 18 ítems evaluados, 16 tuvieron un 100% de concordancia, uno tuvo un 95% y el restante un 81%. En la evaluación de los estudiantes, de los 13 ítems evaluados, 12 tuvieron un 100% de concordancia, y el ítem restante tuvo un 95%. **Conclusión e implicaciones para la práctica**: el video fue considerado válido por especialistas en parada cardiopulmonar obstétrica y comprensible por estudiantes de enfermería, por lo que es un recurso educativo viable para contribuir a la formación en enfermería.

Palabras clave: Educación en Enfermería; Educación en Salud; Embarazo; Recursos Audiovisuales; Reanimación Cardiopulmonar.

INTRODUCTION

Cardiopulmonary arrest (CRA), classified as obstetric, which affects one in every 20,000 pregnant women, has a survival rate of 7%, and, according to the Brazilian Society of Cardiology, it has particularities inherent to pregnancy that interfere with its epidemiology and treatment.[1,2] Factors that can increase the chance of a pregnant woman evolving to CRA are the administration of magnesium sulfate, preeclampsia, amniotic embolism, stroke, heart disease and trauma.[3]

Nursing is part of a multidisciplinary team working in cardiopulmonary resuscitation (CPR) maneuvers, so it needs to develop knowledge and skills compatible with the preparation to offer the most effective care for the mother-fetus binomial. Such preparation is relevant, as the correct execution of CPR doubles the chance of obtaining maternal return of spontaneous circulation (ROSC).[4]

In accordance with the Brazilian National Curriculum Guidelines for the nursing course, training must culminate in the profile of graduates able to act in the resolution of real existing demands. Thus, professional training on basic life support (BLS) needs to occur since training,[5] so that it corroborates with greater chances of preparing professionals to work and multiply information about obstetric CRA.

Pedagogical strategies for teaching nursing include the use of various technologies. Among these, the audiovisual resource such as video stands out in health education that enables the use of images to demonstrate procedures, attract attention and contribute to learning in a way that, according to a study carried out in the United Kingdom, has increasing use for teaching BLS.[6,7]

The construction of audiovisual resources for teaching CPR is found in Brazilian research that aimed at validating video aimed at teaching deaf people, as well as videos for teaching health professionals about CRA care in the adult and pediatric context.[8-10] In this context, it is pointed out the relevance of using videos to be preceded not only by their construction, but also for its submission to the scientific process of content validation and assessment of its target audience, in order to increase the chances of the technological resource being understandable and effective for the teaching-learning process.[8]

Given the specificity of obstetric CRA, which involves care for the pregnant abdomen and maternal anatomical changes, the need for nursing training since training and the use of video as a didactic resource, which has increasing use in health education and has shown valid for teaching CPR to non-pregnant adults, the relevance of video construction and validation for nursing teaching about CRA in pregnant women is pointed out. Such a study will result in the availability of educational technology built from scientific rigor, valid in terms of content and understandable by the target audience representatives, so that it can be used in nursing education.

Thus, the present study aimed to build, validate and assess an educational video for nursing students about obstetric CAR.

METHOD

This is a methodological study composed of three stages: the first comprises the video construction; the second comprises content validation by experts in cardiorespiratory arrest in pregnant women; and the third comprises the video assessment by undergraduate nursing students. The research was carried out by virtual means, with students from the *Instituto Federal de Educação, Ciência e Tecnologia de Pernambuco* (IFPE), Pesqueira campus.

The stages that make up the study took place from February to June 2020. The first stage had no participants, as it was the video construction, which was carried out in pre-production, production and post-production. In pre-production, the storyboard was built, which is a visual representation of images and text and describes the scenes.

Production consisted of animation and synchronization of images and sounds, and post-production, in content completion and storage.

The content to compose the video was extracted from the Brazilian Society of Cardiology, American Heart Association, Asian Resuscitation Council and Advanced Life Support Obstetric (ALSO) guidelines. Scene planning and organization, from the storyboard, showed their presentation divided into five chunks. The first refers to questions about spectators' prior knowledge and physiological changes of pregnancy. The second refers to the correct identification of CRA in pregnant women. The third refers to chest compression and ventilation with the appropriate adaptations for the pregnancy situation. The fourth is about defibrillation and the fifth about perimortem cesarean section.

We opted for the visual form of animation, to the detriment of recording actors on stage. This decision was based on the possibility of the video becoming more attractive, being subject to corrections and alterations, being able to arouse more curiosity among nursing students.[11] Thus, the storyboard and images were built and vectorized in Illustrator and After Effects software by a professional designer, under the researcher's guidance and supervision.

For the video content to be in line with pedagogical principles, its construction took place from the Multimedia Learning Theory theoretical framework, which includes 12 characteristics/aspects, named by the author as principles, necessary for the exposure of multimedia content to culminate in effective learning.[12] The first principle, multimedia principle, advocates that learning is improved by exposing words and images. The second, image principle, points out that illustrations can be used without the narrator being visualized. The third, voice principle, establishes that audio must be associated with image. The fourth principle, modality, refers to the use of narration together with image animation. The fifth principle, signaling, expresses that the learner's attention is maintained if content is presented prominently.

The sixth and seventh principles, temporal and spatial contiguity, establish the simultaneous presentation of items with proximity in the layout. The eighth principle, segmenting, recommends that the content should be presented in fragments, to facilitate

understanding. The ninth principle, pretraining, establishes that there must be a prior and summarized explanation of what will be covered throughout content exposure. The tenth principle, coherence, recommends that the guidelines be objective and simple, to optimize memory storage. The eleventh principle, redundancy, states that excessive repetitions must not exist. The twelfth principle, personalization, states that learning is most effective when content is presented in conversational language.

The video for teaching nursing about obstetric CRA contemplated the 12 principles of the Multimedia Learning Theory, as exemplified in Figure 1.

In the second stage, content validation with experts, the population consisted of nurses nominated, in snowball sampling, by professors of bachelor's degree in nursing at IFPE, Pesqueira campus. For the selection of nurses who participated in the video content validation, the inclusion criteria adopted were having taught curricular components related to emergency and/or women's health, having a minimum of one year experience in clinical nursing practice in the area of emergency and/or obstetrics. The exclusion criterion adopted was the form submission with unanswered questions.

The sample quantity of experts who validated the content was determined from the formula for sample calculation of the

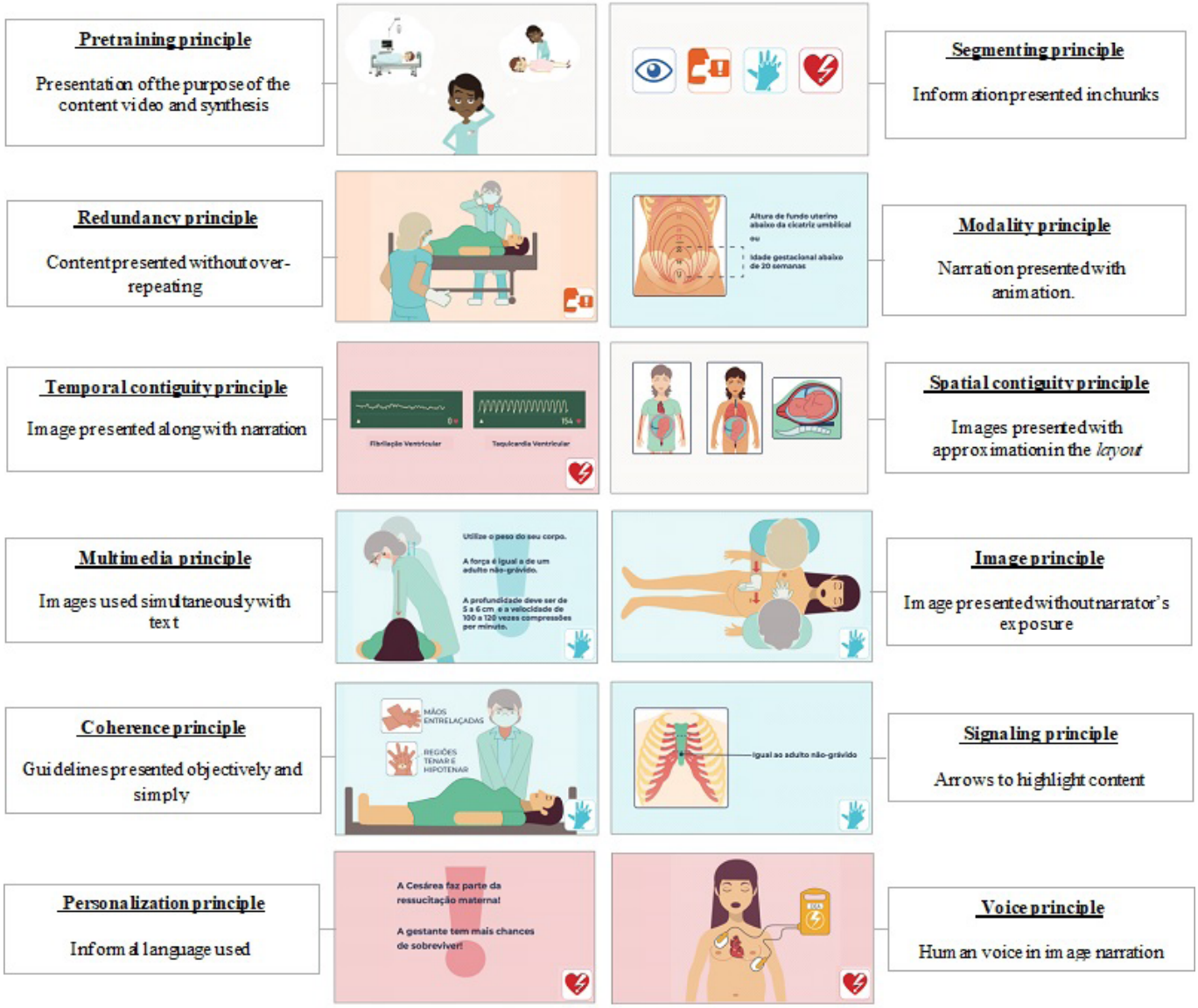

Figure 1. Compliance of the video for teaching nursing about obstetric cardiopulmonary arrest with the Multimedia Learning Theory. Recife, PE, Brazil, 2020.
Source: prepared by the authors.

finite population n=Za2.P(1-P)/e2. By adopting the parameters: Za (confidence level)=95%, P (proportion of expert agreement)=85%, "e" (accepted difference)=5%, a total of 22 participants were obtained to compose the sample, so that, when considering the constructs involved in the theme, 11 were experts in obstetrics and 11 in emergency.

In data collection, experts filled out two instruments: the first consisted of 10 questions for socioeconomic and professional characterization; and the second was the Health Educational Content Validation Instrument (HECVI), built and validated in Brazil,[13] which has 18 questions on a Likert scale: five referring to objectives, 10 to structure and layout and three to relevance.

Based on nomination of professors of bachelor's degree in nursing at IFPE, 12 professionals were recruited and contacted via e-mail. In that contact, the Informed Consent Form (ICF), the video storyboard and the HECVI were sent to be completed by professionals, in addition to being asked to nominate other professionals with an eligible profile to integrate the study sample. Through the response of eight of these first professionals, using a snowball strategy, the name and contact information of another 30, belonging to the northeast, south and southeast regions, to whom the same e-mail content was sent, was obtained. Of the 42 invited professionals, 22 sent a response.

Experts suggested adjustments that were duly carried out regarding the replacement of some words, for which professionals sent the corrected text, and about images, to reposition a character and highlight the place where the first responder's hands overlapped pregnant women's chest.

After adjustments, the video animation was operationalized by a designer using the Vyond software. Subsequently, in the third stage, the video was assessed by nursing students. At this stage, the population consisted of bachelor nursing students at IFPE, the inclusion criteria were regular enrollment and attendance at the course and the exclusion criterion adopted was the form submission with unanswered questions.

The sample of nursing students who assessed the video was selected for convenience and consisted of 21 academics, nominated by the course coordination as available to participate in this stage. Of these, 10 were enrolled in the second semester and 11 in the fourth semester of an undergraduate nursing course. It is worth noting the relevance of students enrolled in such semesters, since those belonging to the second semester had already attended the Pre-Hospital Care (PHC) curricular component, in which the content about BLS in non-pregnant adults is addressed and those enrolled in the fourth semester were studying the curricular component related to women's health. Thus, the video content assessed had a transversal theme to the profile of students of both semesters, as it deals with an aspect inherent to the PHC, CRA, and another inherent to the context of women's health, the fact that it is a specific CRA in pregnant women. In the assessment of nursing students, a questionnaire adapted Suitability Assessment of Materials (SAM) was used,[14] with 13 items on a Likert scale with options of disagree, partially agree and totally agree, which allowed the assessment of content, language, images, motivation and cultural suitability, in addition to five questions regarding socioeconomic and academic characterization.

Students were contacted through the multimedia messaging platform, WhatsApp, in which a meeting was scheduled via Google Meet.

At the scheduled meeting, the researcher explained the study, projected the video through screen sharing and, later, sent the collection instrument and the informed consent to the academics individually, via Google Forms. It was clarified that participants could respond calmly and without a time limit for sending the answers. Everyone submitted the answers, with no suggestions for adjustments to the video content.

Both in judges' validation and in nursing students' assessment, the item that obtained a minimum agreement of 80% was considered valid, measured from the Content Validation Index (CVI), calculated in two ways: Item-Level Content Validity Index (I-CVI), for each item, referring to the proportion of agreement of experts to the item, and Scale-level Content Validity Index (S-CVI), which corresponds to the average of I-CVI, so that it consists of the global view of agreement of all items assessed.[15]

Furthermore, to verify whether the proportion of experts' agreement was statistically equal to or greater than 0.8, R software, version 3.3.3, was used to calculate the binomial test, with a significance level of 5%.

The research was carried out in accordance with Resolution 466/12, with approval by the Research Ethics Committee of the *Faculdade Pernambucana de Saúde*, according to Opinion 3,851,786 and CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 25801819.0.0000.5569.

RESULTS

The video was 8 minutes and 52 seconds long, consisting of information on how BLS should be offered by nursing, aimed at pregnant women in CRA and is available on YouTube, so that it can be accessed through the link https://youtu.be/fc-nan19GFg. The initial content presents questions to the viewer, which aim to lead them to reflect on their prior knowledge and importance of the theme. Subsequently, the video content presents the physiological changes of pregnancy that must be considered in order to understand the particularities in the care of pregnant women. Then, the video exposes BLS stages, the correct way to recognize CRA, to perform chest compressions and ventilation, so that all the information is presented with emphasis on the particularities inherent to the pregnancy context. Finally, the video describes nursing care in defibrillation of pregnant woman and in perimortem cesarean section.

The content that makes up the video for teaching nursing about obstetric CRA is summarized and with examples of illustrations used in Figure 2.

In the validation of the video content, the experts came from the Northeast, South and Southeast regions. Moreover, 40.9% had a PhD, 40.9% had a master's degree and 18.2% were experts. A

total of 86.4% had professional experience in hospital care and 72.7% had teaching experience. With regard to experience and production on the subject, 90.9% had already performed CRA in a non-pregnant adult, and 40.9% in pregnant women affected by CPR. 77.3% had published an article on CPR in a scientific journal, and the remaining 27.3% had abstracts published in annals of events on the theme. Regarding the experience in assessing technologies, 63.6% had already participated in the

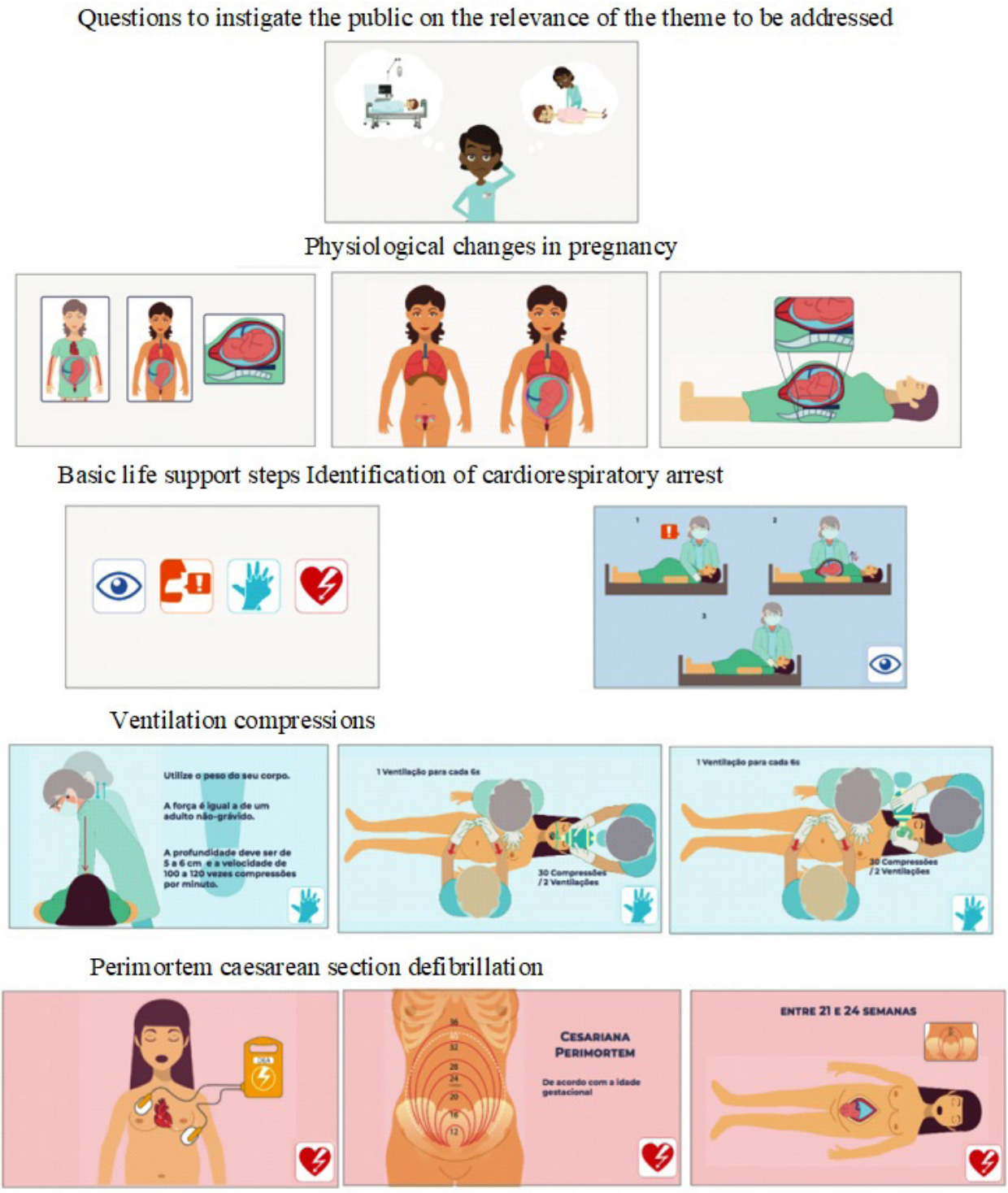

Figure 2. Sequence of content in educational video for nursing students about obstetric cardiopulmonary resuscitation. Recife, PE, Brazil, 2020.
Source: prepared by the authors.

assessment of educational videos and 40.9% had experience in construction and validation.

Regarding agreement, there was an assessment of 18 items in each of the five information chunks of the video, which totaled 90 assessments, of which 88 (97.8%) had agreement from all the judges (proportion of agreement of 100%). Of the two remaining items, one had an agreement proportion of 81% and the other of 95%. Thus, the general agreement proportion in the validation of video content was 99% (S-CVI=0.99), so that the video proved to be valid in terms of content.

Table 1 highlights the validation of the 18 items in chunks 1 and 2. These chunks had content related to prior knowledge and physiological changes of pregnancy, and about BLS stages and identification of CRA, respectively.

The items of the three remaining chunks, about compressions and ventilation, defibrillation and perimortem cesarean section, obtained agreement from all judges, so that the I-CVI and p of the 18 items, in the three chunks, were all equal to 1.

Nursing students who assessed the video were mostly women (76.2%), enrolled in the fourth semester (52.4%), none of them had a disapproval in their history, all were single, without children, reported having already resorted to educational video as a source of academic information and considered this type of technology successful for teaching-learning.

Of the 13 items assessed, all students agreed with 12 (92.3%), in the assessment of content, language, images, motivation and cultural suitability, so that the I-CVI of these was equal to 1. The students' overall assessment resulted in agreement of 99% (S-CVI=0.99), since the remaining item, about the visual resources being important and understandable, obtained agreement of 95% from students (Table 2).

DISCUSSION

The use of theoretical references to build and validate these technologies has been a reality in health education promotion and its application from strategies aimed at teaching-learning.

Table 1. Judges agree on objectives, structure, layout and relevance of educational video for nursing students about obstetric cardiopulmonary resuscitation. Recife, PE, Brazil, 2020.

Item	Chunk 1*		Chunk 2**	
	I-CVI***	p****	I-CVI***	p****
Objectives				
1. Addresses theme	1	1	1	1
2. Suitable for teaching	1	1	1	1
3. Clarifies doubts	1	1	1	1
4. Enables reflection	1	1	1	1
5. Encourages changing behavior	0.81	0.424	1	1
Structure and layout				
6. Language appropriate to audience	1	1	1	1
7. Language appropriate to material	1	1	1	1
8. Language allows engagement	1	1	1	1
9. Correct information	1	1	1	1
10. Objective information	1	1	1	1
11. Clear information	1	1	1	1
12. Necessary information	1	1	0.95	0.972
13. Logical sequence of ideas	1	1	1	1
14. Current theme	1	1	1	1
15. Appropriate text size	1	1	1	1
Relevance				
16. Encourages learning	1	1	1	1
17. Contributes to knowledge	1	1	1	1
18. Arouses interest by theme	1	1	1	1

Source: prepared by the authors.
* Chunk with questions about previous knowledge and physiological changes of pregnancy; ** Chunk with questions about BLS stages and CRA identification; *** Item-level Content Validity Index; **** Binomial test.

Table 2. Agreement of nursing students regarding the content, language, images motivation and cultural suitability of educational video on obstetric cardiopulmonary resuscitation. Recife, PE, Brazil, 2020.

Item	CT*	CP**	I-CVI***	p****
Content				
1. Facilitates theme learning	21	0	1	1
2. Presents attractive and engaging information	21	0	1	1
3. Encourages theme understanding	21	0	1	1
Language				
4. Vocabulary is composed of easy words	21	0	1	1
5. Narration favors understanding	21	0	1	1
6. Appropriate and understandable	21	0	1	1
Images and motivation				
7. Visual aids are important and understandable	19	2	0.95	0.952
8. Attractive and coherent to material purpose	21	0	1	1
9. Figures enable skill demonstration	21	0	1	1
Cultural suitability				
10. Patterns of behavior are well demonstrated	21	0	1	1
11. Motivates behavior change	20	1	1	1
12. Content appropriate to audience culture	20	1	1	1
13. Compatible with audience logic and experience	21	0	1	1

Source: prepared by the authors.
* Totally agree; ** Agree partially; *** Item-level Content Validity Index; **** Binomial test.

This research used Richard Mayer's theoretical framework in order to contribute to the promotion of multimedia learning of educational video. The same framework was used in a Brazilian study on the construction and validation of educational video aimed at older adults, which portrayed fall risk and was also considered valid by expert judges.[16] Thus, the importance of constructing studies based on theoretical frameworks is pointed out, so that their contents are presented in a way that can effectively contribute to care promotion.

For the video construction, the animation feature was used, since it is possible to dynamically present the theme addressed. This video option was also used in a study conducted in Jordan, where this type of video animation increased the knowledge of patients undergoing orthodontic treatment.[17] This is relevant to the use of this video option and the need for research on its use for health education of various themes is highlighted.

In the video composition, contents were arranged in logical order, according to the survival chain established at the moment the cardiorespiratory arrest occurs in pregnant women. This order refers to the knowledge of physiological transformations in pregnancy, BLS stages and perimortem cesarean section. Thus, in order to increase chances of favorable outcome, both for the mother and fetus, one should consider professionals' expertise, time and ability to coordinate procedures that take place during obstetric CRA.[18]

The video begins from the presentation of physiological transformations that take place in the gestational period. This information is relevant to be understood by nursing because,[3] due to these types of changes, pregnant women's cardiac output reduces. This reduction causes a decrease in uterine blood flow and, consequently, placental perfusion, implying a risk to the fetus.[19] It is important to highlight that the entire team that provides care to pregnant women should have the proper preparation and extensive knowledge of all changes that occur in this period, so that they have the full capacity to offer effective obstetric care for both the mother and the baby, in addition to being able to perform procedures and decision-making that culminate in the survival of mothers and babies.

In the order of the events presented in the video, content continues with the identification and prior recognition of CRA. These stages are relevant because the triggering of interventions to reverse the picture depends on the rapid and correct identification.[1] Such information corroborates a study conducted in Turkey that advocates the rapid activation of a multidisciplinary team to care for pregnant women affected by CRA,[18] since, in this way, chances of survival increase and chances of neurological damage decrease.

The entire sequence presented in the video construction pointed to the performance of high-quality CPR, consisting of the correct positioning of the first responder to perform compressions,

as well as the correct position of the hands on the pregnant woman's chest, in addition to ventilation and defibrillation.[1] Despite these stages being widely disseminated in standard CPR, performed on non-pregnant adults, the relevance of the video to have addressed the particularities inherent to obstetric CPR can generate doubts at the time of care for pregnant women in CRA. Such particularities include the fact that the first responder's hand is positioned over the middle third of the sternum, if a pregnant woman has it from 20 weeks of gestation, and on the lower half of the sternum, if the gestational age is less than 20 weeks.[3]

The existing stages in BLS rescue chain for pregnant women, when performed correctly and with quality, become decisive for the success of CPR with quality, since this, when performed with correct compressions, frequency and depth, with minimal pauses between compressions, increases the chances of spontaneous circulation happening again.[1,3] It should be noted that these actions ratify the effectiveness of CPR in accordance with a Brazilian research, which showed that the depth and correct speed of this procedure contributed greatly to the reduction in the mortality rate in patients hospitalized in the emergency sector.[20]

CPR maneuvers that were presented in the video aimed to contribute to learning, clarify doubts and point out specificities of the obstetric context. Therefore, it is important to recognize that pregnancy is considered a special CRA situation, which has particularities during the execution of CPR.

One of the main and important differences between CPR performed on non-pregnant adults and pregnant women is in the care of their abdomen, so that there is no vena cava compression, with consequent damage to venous return. Thus, if gestational age is from 20 weeks or fundal height (FH) is close to the umbilical scar, it is relevant to perform manual traction of the uterus of pregnant women, to the left, simultaneously with chest compressions, since such maneuver will relieve vena cava compression, resulting in greater effectiveness of maternal perfusion during CPR.[21]

In the video, it was possible to observe that ventilation in pregnant women follows the same pattern as that performed in non-pregnant adults. The speed and depth of compressions also follow the same parameter and defibrillation must also occur as soon as possible, for rhythms that are liable to shock, with the use of a defibrillator.[3] Both CPR and defibrillation, if performed responsibly and correctly, offer greater chances of survival and fewer sequel to patients who are affected by CRA. This information is duly presented in the video, since, in the face of an obstetric CRA, doubts may arise in the multidisciplinary team regarding about the way to perform ventilation, compression and defibrillation in pregnant women, compared to what occurs with non-pregnant adults.

The video completion occurred with the presentation of cases of perimortem cesarean section. This procedure is recommended to be performed when a pregnant woman is already five minutes away in CRA and the delay in performing this conduct will increase chances of maternal death. It is also emphasized that this process is effective and does not have the objective of trying to save only the baby's life, but is part of maternal resuscitation and, therefore, culminates in a greater chance of returning from maternal spontaneous circulation.[21]

According to judges' analysis, the five chunks of the storyboard demonstrated the importance of this theme and contribution to knowledge in the area. In a study conducted in Brazil, the educational video was also considered valid by professional judges and media professionals for vaccination against human papillomavirus.[22]

All judges' suggestions were relevant, contributed to make the video language more understanding and attractive, clear and objective to the audience to which it is intended. Thus, the relevance of educational technologies is highlighted not only to be empirically constructed, but to be submitted to the scientific process of content validation, to enable adjustments, suggested by professionals with expertise in the theme addressed in video, nursing education and the construction of educational technologies in health.

Through validation with the target audience, it is possible to make necessary adjustments for clarity and understanding proposed by the educational video. According to the assessment of students who participated in this assessment stage, the educational video was considered attractive, understandable, whose content favors knowledge, images make it possible to demonstrate the procedures, and which motivates behavior change. This assessment is similar to that obtained in a Brazilian study, in which an educational video on pediatric CPR was constructed and validated.[10] These findings confirm the relevance of consultation with the target audience for assessing educational technologies, so that the content is compatible with popular understanding.

CONCLUSION AND IMPLICATIONS FOR PRACTICE

The educational video for nursing students on obstetric cardiorespiratory arrest was constructed from animation, validated according to content by judges with expertise in the subject and assessed by nursing students.

As the educational video has the content validated by experts, and has been considered objective, clear and understandable by nursing students, it is inferable that its use is feasible to contribute to obstetric CRA teaching. Moreover, the technology constructed and validated in this study can be accessed by users as many times as necessary, in order to meet the specific learning demand of each student, without the need for mandatory help from a professor or instructor.

As nurses are present in all BLS stages to pregnant women, the constructed video can also be used as a pedagogical strategy for professors in various courses, such as undergraduate nursing, within the emergency and obstetrics curricula that address CRA in pregnant women, in addition to being a tool for multiplying

knowledge among professors, students and technical course professionals who are interested in the subject.

The study had as limitation the fact that it was carried out with representation of the target audience of only one Brazilian region, which may not be the reality obtained in other regions. It was also limited to only one federal public institution in higher education, which may not correspond to the reality of other educational institutions, including private institutions and technical courses. Still, this technology is evidence-based and has the potential to be adapted to other local, regional and international contexts when needed. As for the experts studied, all were from the nursing area, which may differ with the agreement found in other classes of health professionals.

Thus, the video was considered valid regarding the content by the experts and assessed as understandable, clear, motivating and relevant by nursing students, so that it is presented as a viable didactic resource to be used in nursing education.

AUTHOR'S CONTRIBUTIONS

Study design. Marcela Lourene Correia Muniz. Nelson Miguel Galindo Neto. Guilherme Guarino de Moura Sá. Carmina Silva dos Santos.

Data collect. Marcela Lourene Correia Muniz. Juliana de Castro Nunes Pereira. Marilene Cordeiro do Nascimento.

Data analysis. Marcela Lourene Correia Muniz. Nelson Miguel Galindo Neto. Guilherme Guarino de Moura Sá. Carmina Silva dos Santos.

Interpretation of results. Marcela Lourene Correia Muniz. Nelson Miguel Galindo Neto. Guilherme Guarino de Moura Sá. Carmina Silva dos Santos. Juliana de Castro Nunes Pereira. Marilene Cordeiro do Nascimento.

Article writing and critical review. Marcela Lourene Correia Muniz. Nelson Miguel Galindo Neto. Guilherme Guarino de Moura Sá. Juliana de Castro Nunes Pereira. Marilene Cordeiro do Nascimento. Carmina Silva dos Santos.

Approval of the final version of the article. Marcela Lourene Correia Muniz. Nelson Miguel Galindo Neto. Guilherme Guarino de Moura Sá. Juliana de Castro Nunes Pereira. Marilene Cordeiro do Nascimento. Carmina Silva dos Santos.

Responsibility for all aspects of the content and integrity of the published article. Marcela Lourene Correia Muniz. Nelson Miguel Galindo Neto. Guilherme Guarino de Moura Sá. Juliana de Castro Nunes Pereira. Marilene Cordeiro do Nascimento. Carmina Silva dos Santos.

ASSOCIATED EDITOR

Stela Maris de Melo Padoin

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Ivone Evangelista Cabral

REFERENCES

1. Bernoche C, Timerman S, Polastri TF, Giannetti NS, Siqueira AWS, Piscopo A et al. Atualização da diretriz de ressuscitação cardiopulmonar e cuidados cardiovasculares de emergência da sociedade brasileira de cardiologia - 2019. Arq Bras Cardiol. 2019;113(3):449-663. http://dx.doi.org/10.5935/abc.20190203. PMid:31621787.
2. Kleinman ME, Goldberger ZD, Rea T, Swor RA, Bobrow BJ, Brennan EE et al. 2017 American Heart Association Focused Update on Adult Basic Life Support and Cardiopulmonary Resuscitation Quality An Update to the American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2018;137(1):e7-13. http://dx.doi.org/10.1161/CIR.0000000000000539. PMid:29114008.
3. Panchal AR, Bartos JA, Cabañas JG, Donnino MW, Drennan IR, Hirsch KG et al. Part 3: adult basic and advanced life support: 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2020;142(16 suppl 2):S366-468. http://dx.doi.org/10.1161/CIR.0000000000000916. PMid:33081529.
4. Zelop CM, Einav S, Mhyre JM, Martin S. Cardiac arrest during pregnancy: ongoing clinical conundrum. Am J Obstet Gynecol. 2018;219(1):52-61. http://dx.doi.org/10.1016/j.ajog.2017.12.232. PMid:29305251.
5. Kochhan SI, Treviso P, Siqueira DS, Riegel F. Cardiac arrest and resuscitation in the view of nurses in the emergency room. Rev Enf UFPI. 2015;4(1):54-60. http://dx.doi.org/10.26694/reufpi.v4i1.2064.
6. Park JH, Moon S, Cho H, Ahn E, Kim TK, Bobrow BJ. Effect of team-based cardiopulmonary resuscitation training for emergency medical service providers on pre-hospital return of spontaneous circulation in out-of-hospital cardiac arrest patients. Resuscitation. 2019;144:60-6. http://dx.doi.org/10.1016/j.resuscitation.2019.09.014. PMid:31550494.
7. Carvalho SS, Costa JO, Santos SL, Rocha FS, Fonseca SSS, Silva NC. Knowledge of emergency intervention nurses in face of cardiopulmonary arrest. Research Society and Development. 2020;9(7):e80973721. http://dx.doi.org/10.33448/rsd-v9i7.3721.
8. Galindo-Neto NM, Lima MB, Barros LM, Santos SC, Caetano JA. Sign language instrument for assessing the knowledge of deaf people about Cardiopulmonary Resuscitation. Rev Lat Am Enfermagem. 2020;28:e3283. http://dx.doi.org/10.1590/1518-8345.3535.3283. PMid:32520239.
9. Alves MG, Batista DFG, Cordeiro ALPC, Silva MD, Canova JCM, Dalri MCB. Construção e validação de videoaula sobre ressuscitação cardiopulmonar. Rev Gaúcha Enferm. 2019;40:e20190012. http://dx.doi.org/10.1590/1983-1447.2019.20190012. PMid:31389480.
10. Sanguino GZ, Furtado MCC, Godoy S, Vicente JB, Silva JR. Management of cardiopulmonary arrest in an educational video: contributions to education in pediatric nursing. Rev Lat Am Enfermagem. 2021;29:e3410. http://dx.doi.org/10.1590/1518-8345.3680.3410.
11. Silveira MS, Cogo ALP. Contribuições das tecnologias educacionais digitais no ensino de habilidades de enfermagem: revisão integrativa. Rev Gaúcha Enferm. 2017;38(2):e66204. http://dx.doi.org/10.1590/1983-1447.2017.02.66204. PMid:28723986.
12. Sousa CS, Turrini RNT, Poveda VB. Translation and adaptation of the instrument "suitability assessment of materials" (SAM) in to portuguese. Rev Enferm UFPE. 2015;9(5):7854-61. http://dx.doi.org/10.5205/reuol.6121-57155-1-ED.0905201515.
13. Leite SS, Áfio ACE, Carvalho LV, Silva JM, Almeida PC, Pagliuca LMF. Construction and validation of an Educational Content Validation Instrument in Health. Rev Bras Enferm. 2018;71(Suppl 4):1635-41. http://dx.doi.org/10.1590/0034-7167-2017-0648. PMid:30088634.
14. Sousa CS, Turrini RNT, Poveda VB. Translation and adaptation of the instrument "suitability assessment of materials" (SAM) in to portuguese. Rev Enferm UFPE. 2015;9(5):7854-61. http://dx.doi.org/10.5205/reuol.6121-57155-1-ED.0905201515.
15. Abreu ACS, Marinho DF, Parente Cardoso IB. Tecnologia educativa para os cuidadores de pacientes submetidos a traqueostomia: estudo de validação. Rev Atenç Saúd. 2019;17(59). http://dx.doi.org/10.13037/ras.vol17n59.5730.
16. Sá GGM, Santos AMR, Galindo NM No, Carvalho KM, Feitosa CDA, Mendes PN. Building and validating an educational video for elderly individuals about fall risks. Rev Bras Enferm. 2020;73(Suppl 3):e20200010. http://dx.doi.org/10.1590/0034-7167-2020-0010. PMid:33111805.

17. Shqaidef AJ, Saleh MYN, Ismail FK, Abu-Awad M, Khambay BS. A comparative assessment of information recall and comprehension between conventional leaflets and an animated video in adolescent patients undergoing fixed orthodontic treatment: a single-center, randomized controlled trial. Am J Orthod Dentofacial Orthop. 2021;160(1):11-18.e1. http://dx.doi.org/10.1016/j.ajodo.2020.03.028. PMid:33902979.

18. Caglar H, Bibata BB, Karakuzu S, Cetinkol AE, Atasoy N. Successful management of perimortem cesarian section with two types of pelvic packing; a case report. J Clin Invest Surg. 2021;6(1):68-70. http://dx.doi.org/10.25083/2559.5555/6.1.13.

19. Soma-Pillay P, Nelson-Piercy C, Tolppanen H, Mebazaa A. Physiological changes in pregnancy. Cardiovasc J Afr. 2016;27(2):89-94. http://dx.doi.org/10.5830/CVJA-2016-021. PMid:27213856.

20. Moura JG, Brito MPS, Rocha GOS, Moura LTR. The knowledge and acting of a nursing team from a sector of cardiorespiratory arrest urgent care. Rev Pesqui Cuid Fundam (Online). 2019;11(3):634-640. http://dx.doi.org/10.9789/2175-5361.2019.v11i3.634-640.

21. Merchant RM, Topjian AA, Panchal AR, Cheng A, Aziz K, Berg KM et al. (2020). Part 1: Executive Summary: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2020;142(16 suppl 2), S337-57. https://doi.org/10.1161/CIR.0000000000000918.

22. Interaminense INCS, Oliveira SC, Linhares FMP, Guedes TG, Ramos VP, Pontes CM. Construction and validation of an educational video for human papillomavirus vaccination. Rev Bras Enferm. 2020;73(4):e20180900. http://dx.doi.org/10.1590/0034-7167-2018-0900.