CONSTRUCTION AND VALIDATION OF OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE) ON CARDIOPULMONARY RESUSCITATION

CONSTRUÇÃO E VALIDAÇÃO DE EXAME CLÍNICO OBJETIVO ESTRUTURADO (OSCE) SOBRE RESSUSCITAÇÃO CARDIOPULMONAR

CONSTRUCCIÓN Y VALIDACIÓN DE UN EXAMEN CLÍNICO OBJETIVO ESTRUCTURADO (OSCE) SOBRE REANIMACIÓN CARDIOPULMONAR

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ABSTRACT

Objective: to develop and validate an objective structured clinical examination instrument for a simulation scenario on cardiopulmonary resuscitation in adults in basic life support, using automatic external defibrillator in the hospital environment. **Method:** applied research of technological production, developed at the *Escola de Enfermagem* in *Ribeirão Preto* of *Universidade de São Paulo*, from January 2017 to March 2018 with 16 expert professionals in the area of urgency and emergency for validation the structured objective clinical examination. The instrument addressed 40 intervention items related to the link in the chain of survival of American Heart Association (2015) to perform clinical evaluation in the cardiopulmonary resuscitation simulation scenario. **Results:** of the experts, 62.5% obtained a score higher than or equal to 10 in Fehring criteria and it is noteworthy that 93.75% have clinical practice in adults' urgency and emergence. The objective structured clinical examination reached agreement of 97.34% in organization; 96.09% in objectivity; 93.75% in clarity, and in the categorization of the inter-evaluator agreement proposed by Landis and Kock showed "almost perfect agreement", with p<0.0001. **Conclusion:** in the validation process by the experts, opportunities for improvement were identified and accepted and the objective structured clinical examination is a contemporary object and adequate for application in the teaching-learning process on cardiopulmonary resuscitation in adults on basic life support with the use of automatic external defibrillator in the hospital environment.

Keywords: Cardiopulmonary Resuscitation; Teaching; Clinical Competence; Learning; Educational Measurement.

RESUMO

Objetivo: desenvolver e validar um instrumento de exame clínico objetivo estruturado para o cenário de simulação sobre ressuscitação cardiopulmonar no adulto em suporte básico de vida com o uso do desfibrilador externo automático no ambiente hospitalar. Método: pesquisa aplicada, de produção tecnológica, desenvolvida na Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo, no período de janeiro de 2017 a março de 2018 com 16 profissionais experts da área de urgência e emergência para validação do exame clínico objetivo estruturado. O instrumento abordou 40 itens de intervenção relacionados ao elo da cadeia da sobrevivência da American Heart Association (2015) para realizar a avaliação clínica no cenário de simulação em ressuscitação cardiopulmonar. Resultados: dos experts, 62,5% obtiveram pontuação superior ou igual a 10 nos critérios de Fehring e destaca-se que 93,75% possuem prática clínica em urgência e emergência no adulto. O exame clínico objetivo estruturado alcançou concordância de 97,34% em organização; 96,09% em objetividade; 93,75% em clareza, e na categorização da concordância interavaliador proposta por Landis e Kock evidenciou "concordância quase perfeita", com p<0,0001. Conclusão: no processo de validação pelos experts foram identificadas e acatadas as oportunidades de melhorias e o exame clínico objetivo estruturado apresentado demonstrou-se um objeto contemporâneo e adequado para aplicação no processo

de ensino-aprendizagem sobre ressuscitação cardiopulmonar no adulto em suporte básico de vida com o uso do desfibrilador externo automático no ambiente hospitalar.

Palavras-chave: *Reanimação Cardiopulmonar; Ensino; Competência Clínica; Aprendizagem; Avaliação Educacional.*

RESUMEN

Objetivo: *desarrollar y validar un instrumento de examen clínico objetivo estructurado para el escenario simulado de reanimación cardiopulmonar en adultos con soporte vital básico mediante desfibrilador externo automático en el entorno hospitalario.* ***Método:*** *investigación aplicada de producción tecnológica, desarrollada en la Facultad de Enfermería de Ribeirão Preto de la Universidad de São Paulo, entre enero de 2017 y marzo de 2018 con 16 expertos de urgencias y emergencias para validar el examen clínico objetivo estructurado. El instrumento enfocó 40 aspectos de intervención relacionados con el eslabón de la cadena de supervivencia del American Heart Association (2015) para realizar una evaluación clínica en el escenario de reanimación cardiopulmonar simulada.* ***Resultados:*** *el 62.5% de los expertos obtuvo puntuación mayor o igual a 10 en los criterios de Fehring; se realza que el 93,75% tiene práctica clínica en urgencias y emergencias de adultos. El examen clínico objetivo estructurado alcanzó acuerdo de 97,34% en organización; 96,09% en objetividad; 93.75% en claridad, y la categorización acuerdo entre evaluadores propuesta por Landis y Kock mostró un "acuerdo casi perfecto", con p <0.0001.* ***Conclusión:*** *en el proceso de validación por parte de los expertos, se identificaron y aceptaron las oportunidades de mejora. El examen clínico objetivo estructurado resultó ser un objeto contemporáneo y apropiado para su aplicación en el proceso de enseñanza-aprendizaje de la reanimación cardiopulmonar adulta en soporte vital básico con el uso de desfibrilador externo automático en el entorno hospitalario.*

Palabras clave*: Reanimación Cardiopulmonar; Enseñanza; Competencia Clínica; Aprendizaje; Evaluación Educacional.*

INTRODUCTION

With technological advances, the way to deal with information and contributing for adequate pedagogical practice in nursing has become a constant concern, in order to ensure new possibilities to teach and learn in contemporaneity, especially for the peculiar profile of digital natives.[1]

Digital natives is the term that has been widely used about the favorable use of technology, not only conditioned to age, but also related to social, economic and cultural groups.[2]

In the intention of obtaining a contemporary and technological education in nursing, there was a requirement to construct methods that would enable the understanding of the relationship between theory and practice, linked in a teaching process aimed at training qualified, creative, critical and reflective individuals.[3]

When considering the learning objective in the theme of cardiopulmonary resuscitation (CPR), the construction of knowledge and skills acquisition also require a pattern of excellence and innovation.[4]

In this context, highlighting its legal competencies, it is up to nursing to provide care to patients in cardiorespiratory arrest and make immediate decisions regarding the execution of basic life support with the use of automatic external defibrillator (AED). And, also, promoting permanent education in the hospital environment on this theme, aiming at the development of clinical competence in the healthcare team.[5]

The International Liaison Committee on Resuscitation (ILCOR), representative of the American Heart Association (AHA), specifies the importance of CPR training adapted to the target audience in different modalities, offering alternative means of teaching that ensure acquisition and retention of knowledge and skills.[6]

For this purpose, it is recommended the use of the Objective Structured Clinical Examination (OSCE), considered a tool for measuring clinical competencies, through the adoption of standardized stations, which allows the complete integration between clinical evaluation indicators within cognitive, effective and psychomotor domains and quantifies the performance of students in simulated environments.[7]

During an OSCE, candidates are expected to perform a variety of tasks (clinic, diagnostic and/or related to communication, among others) in a simulated environment while specialized professionals using a standardized evaluation instrument evaluate them.[8]

It is successful only when there is significant planning, multi-resource coordination, commitment for large-scale testing and careful use of data for evaluation, and it evaluates the development of competence on CPR science, little explored and often misused for this purpose.[9]

The implementation of the OSCE, as a tool for measuring and evaluating competence fills an important gap, both in the process of teaching and learning in nursing on CPR, as well as in clinical practice. It is characterized by the incipience of standardized formats of excellence evaluation that articulate the cognitive knowledge and psychomotor skills of students and professionals.[10] This fragility does not prevent teaching CPR, but makes it vulnerable regarding its efficiency for the teaching process and learning in health schools and institutions.[11,12]

This problem reinforces the need to develop tools that improve and qualify the teaching of CPR in adults in BLS with the use of AED in the hospital environment, also added to the change in the population profile, characterized by the massive presence of digital native, with a close relationship with technological resources who long for an innovative teaching-learning process.

We understand, therefore, that teaching and health evaluation are still permeated by traditional methods and that providing differentiated evaluation resources such as OSCE, which addresses the development of competence in CPR, can

be an incentive to change the current teaching practices. Based on this, this study aimed to develop and validate an OSCE instrument for a simulation scenario on CPR in adults on basic life support (BLS), using automatic external defibrillator (AED) in the hospital environment.

METHOD

The applied research, of technological production, was addressed in this study for the development and validation of an instrument called OSCE, which aimed to evaluate the care of CPR in adults in BLS using AED in the hospital environment, aimed at students and health professionals' teaching-learning process.

The research was carried out at the *Escola de Enfermagem in Ribeirão Preto* of *Universidade de São Paulo* (EERP/USP), with a population of 16 expert professionals in the area of urgency and emergency (UE), for evaluation and validation of the OSCE, selected through Fehring criteria[13]. They consider a certain score, according to the professional description, as follows: four points for the degree of master in Nursing; a point for titration of master in Nursing with dissertation in the area of interest of the study; two points for doctoral thesis in the area of the study; one point for clinical practice of at least one year in the area of interest; two points for clinical practice certificate (specialization) in the area of interest; two points for publication of relevant research for the area of interest and two points for publication of article on the topic in reference journal.

The inclusion criteria of the professionals used in this study were: a minimum score of five points, minimum value to be considered an expert according to Fehring criteria[13] and performance/training/teaching in UE field. Exclusion criteria considered vacation or leave in the period defined by the researcher to evaluate the instruments and not performing the evaluation within the given period.

To select them, we conducted a survey in the research groups related to UE areas, searching for authors of studies related to cardiorespiratory arrest (CRA) and CPR and teachers in the UE area in institutions of various regions. An invitation was sent via e-mail, explaining the objectives of this study, to 26 expert professionals; 18 answered accepting to participate and 16 completed the evaluation and validation process. Those who agreed to participate received via e-mail or printed, according to the expert's preference, the following items: Free and Informed Consent Form; general guidelines related to the evaluation/validation process, explanatory guide for validation, instrument for validation; and the OSCE.

To constitute the OSCE, 40 intervention items were elaborated in order to perform the clinical evaluation of CPR simulation scenario in adults in BLS using AED in the hospital environment, according to the guidelines of AHA[14] and registration of CRA/PCA, according to the In-hospital Utstein Style report.[15] The items covered were: the security of the scene for the victim's care; use of personal protective equipment; confirmation of the patient's irresponsiveness; request for help with care; request for medical professional; request for an emergency cart and AED; exposure of the victim's chest; evaluation of the carotid pulse; breath evaluation; simultaneous evaluation of pulse and breathing; positioning the patient in bed with tablet for compressions; position of the rescuer in relation to the victim's chest; correct place to perform chest compressions; correct depth for chest compressions; optimum speed for chest compressions; permission for chest return after each compression; interruption every two minutes for pulse checking; relay of the rescuer for compression every two minutes; elevation of the head for maintaining airway permeability; connection of the bag-valve-mask to the oxygen humidifier; ensure oxygen flow from 12 to 15 liters per minute; correct coupling of the mask on the victim's face for ventilation; offering two ventilations of one second each; inspection of thoracic expandability at each ventilation; performing 30 compressions every two ventilations; connecting the AED immediately and bring it closer to the victim; fitting the paddles to the AED; correct fixation of the paddles in the victim's chest; ensuring the quality of compressions during the paddles adhesion; removing everyone during the AED request; interruption of oxygen flow during the use of AED; button pressure indicated by the AED for shock at the right time; restarting immediate cardiopulmonary resuscitation after shock application; evaluation of the patient's response when shock was not indicated; ensuring airway permeability; oxygen supply by high flow non-reinhalant mask or positive pressure ventilation; blood pressure verification, oximetry and continuous electrocardiographic monitoring; maintenance of the AED paddles adhered to the victim's chest; referral of the victim to the post-CPR intensive care unit; follow-up of the In-Hospital Utstein Style model.[15]

The items of OSCE were organized by distributing them in a table with four columns, and presenting, respectively, the items related to the link in the chain of survival of AHA[14] (the items were distributed according to each link), detailed description of the action expected in the execution of the simulated scenario, answer option and quantification of the score). In each item, actions were described in detail and defined as "correct" and "incorrect" with quantification of each item/response, totaling a value from zero to 10 points.

OSCE is based on the guidelines published by the Medical Council of Canada[8], namely: candidates are expected to perform a variety of tasks (clinic, diagnostic and/or communication-related, among others) in a simulated environment. Specialized professionals evaluate them, using a standardized evaluation instrument, which allows direct

observation of the student in a relatively short period, with a standardized approach to a specific evaluation, minimizing bias by the characteristics of the examiners.

The simulation scenario for OSCE execution addressed a 50-year-old patient who was admitted to an emergency room of a hospital in the morning, admitted by the nursing team, complaining of vomiting, epigastric and precordial pain with irradiation to the posterior thoracic region, who had later cardiorespiratory arrest and implementation of basic life support using AED.

For OSCE validation, the evaluation requested, according to the items highlighted by the Medical Council of Canada[8] was a table format instrument, adapted from Bellan[16], evaluating the aspects related to organization, clarity and objectivity, with options of dichotomous responses (Yes/No).

When necessary and/or unnecessary information was absent and in case of disagreement in a specific area of the instrument, experts should identify suggestions and comments. It is important to emphasize that, through the after the validation, the instrument was adjusted and corrected in line with AHA guidelines.[14]

The content of OSCE was considered validated if 80% of the experts attributed a positive assessment (signaling the "yes" option) in validation instruments.

Data analysis related to the characterization of the experts was performed through descriptive statistics, frequency, percentage and position measurement (mean). To evaluate the inter-evaluators agreement among the 16 experts, we used the AC1 statistic, developed by Gwet.[17] The data was organized in spreadsheets of Microsoft Excel 2010 program®, with double typing, performed by two people, with subsequent validation to obtain reliable data. The statistical analysis was performed with the support of a statistical professional linked to EERP/USP. The program used for the concordance analyses was the R version 3.4.1, which can be free downloaded from <www.r-project.org>website. In all analyses, the significance level adopted was 5% (p < 0.05). To categorize the inter-evaluator agreement, we considered the values defined by Landis and Kock18, as described in Table 1.

Table 1 - Categorization of inter-evaluator agreement classification

Agreement classification	Coefficient AC1
Poor	< 0.00
Mild	0.00 – 0.20
Acceptable	0.21 – 0.40
Moderate	0.41 – 0.60
Significant	0.61 – 0.80
Almost perfect	0.81 – 1.00

Source:: Landis and Kock.[14]

Agreement is considered satisfactory for indexes with values greater than 0.60, when they offer useful benchmarks for the discussion of results.[17]

Fulfilling ethical precepts, we used Resolution N° 466/2012 of the *Conselho Nacional de Saúde*/National Health Council (CNS) as a legal parameter for the research. The research was submitted to the evaluation of the Research Ethics Committee (CEP) of EERP-USP. After issuing the CAAE assent: 65387417.4.0000.5393, the validation of the instruments began. We requested Bellan's[16] authorization to use the validation instrument, which was adapted to this study.

RESULT

The sample of the experts who participated in OSCE validation was formed 100% of nurses. Regarding sex, 13/16 (81.25%) were women and 03/16 (18.75) men. Age ranged from 29 to 55 years old (mean of 36.56 ±7.33) and training time between four and 32 years (mean of 12.93 ±7.51).

Regarding academic titration, 13/16 (81.25) have specialization, 15/16 (93.75%) master's degree, 10/16 (62.50%) doctorate and 03/16 (18.75%) post-doctorate. It is noteworthy that 08/16 (50%) are teachers in higher education.

When asked about their participation in events in the last two years, 13/16 (81.25%) reported having participated in events related to the area of interest in this study, i.e. UE.

We highlight the geographical distribution of the experts, from different states of Brazil, namely: 07/16 (43.75%) from *São Paulo*, 04/16 (25.00%) from *Minas Gerais*, 02/16 (12.50%) from *Rio Grande do Norte*, 01/16 (6.25%) from *Pernambuco*, 01/16 (6.25%) from *Alagoas* and 01/16 (6.25%) from *Mato Grosso do Sul*, covering the Southeast, Midwest and Northeast regions of Brazil. They are working in HEI such as *Universidade Federal do Rio Grande do Norte*, *Universidade do Estado de Minas Gerais*, *Universidade Federal de Mato Grosso do Sul*, EERP/USP, *Instituto Federal de Pernambuco*, *Instituto Federal do Sul de Minas Gerais* and private institutions in the interior of *Minas Gerais* and *São Paulo*.

Table 2 shows the criteria and classification of experts who participated in validation according to Fehring.[13]

According to Fehring criteria[13] we observed an excellent classification, highlighting that the majority of the experts who participated in the validation process obtained a score equal to or greater than 10 (62.5%) and 04/16 (25%) obtained maximum score, 14 points. It is noteworthy that the minimum score defined for inclusion was five points.

It is also worth mentioning that 15/16 (93.75%) have clinical practice of at least one year in UE in adults, 10/16 (62.50%) have published in a reference journal on UE subject and 08/16 (50%) have a PhD in UE area.

Table 2 - Characterization of experts (n=16) according to Fehring criteria[13] who participated in OSCE validation. *Ribeirão Preto*, SP, Brazil, 2018

Criteria	n	%
Master's degree in Nursing	15	(93.75)
Master's degree in Nursing with dissertation in the area of interest of the study*	09	(56.25)
Doctoral thesis in the area of interest of the study*	08	(50.00)
Clinical practice of at least one year on the topic of the study†	15	(93.75)
Specialization in the topic of interest of the study*	10	(62.50)
Research publication relevant to the study area of interest*	11	(68.75)
Publication of article about the study area* in a reference journal	10	(62.50)
Classification by Fehring criteria (1987)		
05	01	(6.25)
07	03	(18.75)
08	01	(6.25)
09	01	(6.25)
10	03	(18.75)
11	02	(12.5)
13	01	(6.25)
14	04	(25.00)

* Area of interest of the study: urgency and emergency.
† Theme: Urgency and emergency in adults.

The elaboration and validation of the instrument for practical evaluation – OSCE on CPR in adults in BLS using AED in the hospital environment – followed the guidelines of AHA.[14]

Table 3 shows the data collected in the experts evaluation for OSCE validation.

The evaluation of organization, objectivity and clarity of OSCE items was positive: organization 623/640 (97.34%), objectivity 615/640 (96.09%) and 600/640 (93.75%) clarity of items with "yes" answers by the experts.

Table 4 shows data related to inter-evaluator agreement evaluation of OSCE.

Validation according to the values defined by Landis and Kock[18], all items showed "almost perfect agreement", organization with AC1=0.94, objectivity with AC1=0.91 and clarity with AC1=0.87, all with p<0.0001. Suggestions, comments and review notes by the experts, evidenced opportunities for improving the OSCE, and changes were made reorganizing the information described in the item, including information, correcting spelling grammar and changing terms based on AHA guidelines.[14]

Table 3 - Distribution of expert responses (n = 16) related to the evaluation of OSCE items in relation to organization, objectivity and clarity. *Ribeirão Preto*, SP, Brazil, 2018

Item/ Action	Organization				Objectivity				Clarity			
	Yes		No		Yes		No		Yes		No	
	n	%	n	%	n	%	n	%	n	%	n	%
01	16	(100)			16	(100)			16	(100)		
02	16	(93.75)	01	(6.25)	16	(100)			15	(93.75)	01	(6.25)
03	16	(100)			16	(100)			14	(87.50)	02	(12.50)
04	16	(100)			16	(100)			16	(100)		
05	16	(100)			16	(100)			16	(100)		
06	16	(100)			16	(100)			16	(100)		
07	16	(100)			16	(100)			16	(100)		
08	16	(100)			15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)
09	15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)	14	(87.50)	02	(12.50)
10	15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)	14	(87.50)	02	(12.50)
11	15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)
12	16	(100)			15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)
13	16	(100)			16	(100)			15	(93.75)	01	(6.25)
14	16	(100)			16	(100)			15	(93.75)	01	(6.25)
15	15	(93.75)	01	(6.25)	16	(100)			15	(93.75)	01	(6.25)
16	16	(100)			15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)

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Table 3 - Distribution of expert responses (n = 16) related to the evaluation of OSCE items in relation to organization, objectivity and clarity. *Ribeirão Preto*, SP, Brazil, 2018

Item/ Action	Organization				Objectivity				Clarity			
	Yes		No		Yes		No		Yes		No	
	n	%	n	%	n	%	n	%	n	%	n	%
17	16	(100)			16	(100)			15	(93.75)	01	(6.25)
18	16	(100)			16	(100)			15	(93.75)	01	(6.25)
19	14	(87.50)	02	(12.50)	13	(81.25)	03	(18.75)	13	(81.25)	03	(18.75)
20	16	(100)			16	(100)			16	(100)		
21	16	(100)			16	(100)			15	(93.75)	01	(6.25)
22	16	(100)			16	(100)			15	(93.75)	01	(6.25)
23	15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)
24	15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)	15	(93.75)	01	(6.25)
25	16	(100)			15	(93.75)	01	(6.25)	14	(87.50)	02	(12.50)
26	16	(100)			16	(100)			16	(100)		
27	16	(100)			16	(100)			16	(100)		
28	16	(100)			16	(100)			15	(93.75)	01	(6.25)
29	16	(100)			16	(100)			15	(93.75)	01	(6.25)
30	16	(100)			16	(100)			16	(100)		
31	16	(100)			16	(100)			16	(100)		
32	16	(100)			16	(100)			16	(100)		
33	16	(100)			16	(100)			16	(100)		
34	15	(93.75)	01	(6.25)	14	(87.50)	02	(12.50)	15	(93.75)	01	(6.25)
35	15	(93.75)	01	(6.25)	14	(87.50)	02	(12.50)	14	(87.50)	02	(12.50)
36	14	(87.50)	02	(12.50)	13	(81.25)	03	(18.75)	13	(81.25)	03	(18.75)
37	15	(93.75)	01	(6.25)	14	(87.50)	02	(12.50)	14	(87.50)	02	(12.50)
38	15	(93.75)	01	(6.25)	14	(87.50)	02	(12.50)	13	(81.25)	03	(18.75)
39	15	(93.75)	01	(6.25)0	14	(87.50)	01	(12.50)	15	(93.75)	01	(6.25)
40	15	(93.75)	01	(6.25)	14	(87.50)	01	(12.5)	15	(93.75)	01	(6.25)
Total	623	(97.34)	17	(2.66)	615	(96.09)	25	(3.91)	600	(93.75)	40	(6.25)

Table 4 - Inter-evaluator agreement measure (n=16) related to the validation of OSCE items in relation to organization, objectivity and clarity. *Ribeirão Preto*, SP, Brazil, 2018

Validation	AC1	EP_AC1	p-value*
Organization	0.94	0.0127	<0.0001
Objectivity	0.91	0.0195	<0.0001
Clarity	0.87	0.0199	<0.0001

*Significance level of 5% (p < 0,05).

DISCUSSION

The effects on the teaching-learning process arise when the evaluation itself requires learning, contributing with a point of view in which educators implement evaluations with the objective of adding pedagogical value.[19]

Evaluations have a strong influence on the way the learner studies, so they should be designed to foster desirable skills and reasoning, and identify whether learning objectives are being achieved exposing the results, highlighting strengths and weaknesses of the teaching-learning process for developing improvement.[20,21]

From this perspective, it is essential to evaluate learning through valid and reliable instruments such as OSCE, which covers appropriate methodological criteria, reliably corroborating the practice of evaluation, in order to achieve knowledge, skills and attitudes projection.[22]

This statement is also appropriate regarding CPR teaching, in which skill assessments are valuable opportunities to implement improvements in learning subsidized by OSCE.[16]

Evaluation of knowledge, skills and attitudes using OSCE has significant advantages, among them, the equivalence of

the evaluation process (in the same scenario), objectivity of the evaluator supported by the evaluation instrument and safety for real patients (replaced by mannequins and/or actors).[8]

OSCE is a standard performance-based evaluation for the identification of clinical competence, within a simulated scenario relevant to clinical practice.[23] Through OSCE it is possible to emphasize the measurement of observable behaviors necessary for patient care, becoming an instrument for the evaluation of skills.[24]

Learning, when measured by OSCE, reflects not only knowledge, but also complex behaviors in various situations.[25] In the current study, we structured an OSCE with 40 items addressing all links of the survival chain in CPR care of adults in BLS using AED in the hospital environment, given the magnitude, complexity and need to provide a practical evaluation tool, to improve learning this theme.

Using OSCE it is possible to involve, in CPR learning, a perception of preparation (or lack of it) for clinical practice, but for this, it is necessary to implement simulated scenarios compatible with the real environment, thus contributing to achieve confidence in the performance in clinical practice.[8]

In this sense, it is important to obtain reliable criteria to interpret the items of OSCE assessment and this should not happen in a subjective or "flexible" manner. Therefore, it is crucial to adopt strategies should that provide a fair and reliable evaluation, aiming at excellence of learning and the effective development of knowledge, skills and attitudes.[16]

The strategy adopted in the elaboration of this OSCE was the development of an explanatory script that clarifies about the actions that to consider correct or incorrect in each item, minimizing the possibility of the evaluator acting subjectively, because the action is described in detail to consider "correct" or "incorrect".

Thus, the literature suggests that answer options are generally binary, although non-binary checklists can be used, providing more possibilities for evaluators.[16]

We chose to use binary responses (correct or incorrect), because, in the context of CPR, there is no possibility of performing the maneuver other than correctly. Partially correct should be considered incorrect, since incorrectly or partially correct performance will lead to the possibility of non-reversal CPR or cause aftereffects to the victim.

For the reliability of OSCE, an important element in the evidence of validity, it is necessary to ensure standardization of evaluation items, conferring objectivity in relation to the examiners marking.[17]

It is noteworthy that valid and reliable instruments are necessary in the teaching-learning process when seeking a practice based on evidence and for identifying the effectiveness of different teaching strategies.[17]

In the construction of this OSCE, the experts validated in relation to organization, objectivity and clarity, reaching a positive evaluation of above 90% in most items. Given the challenge of finding human resources with sufficient workload for adequate planning, due to the economic crisis and restriction of financial resources to HEIs in Brazil, we implemented the application of low-cost OSCE. It is noteworthy that limited resources do not pose obstacles to the success of OSCE.[26]

In addition, even though other instruments for skill assessment, less costly and expensive for implementation, have been elaborated, their reliability and validity for the development of competence have been questioned.[27]

Specifically, teaching CPR of adults in BLS using AED should be proposed in a contemporary, attractive, relevant and convenient way, promoting changes in behavior through sustainable and up-to-date pedagogical strategies.

An example of promoting teaching and learning in a contemporary way is reported in a study[28] developed in the USA that evaluated nurses' self-confidence in CPR before and after training using simulation and evaluation through OSCE. This example proved that the use of this instrument is an effective method for evaluating self-confidence in CPR in simulated scenario, which corroborates this research.

Research conducted at an American university added the work and knowledge of several nursing professors to develop evaluative tools for the teaching and learning process in Nursing, emphasizing the theme of CPR in adults through OSCE. It concluded that the adoption of this instrument in the practice of simulation maximizes the development of participants' knowledge, skills and attitudes, which is similar to the objective intended in this research and it is possible by the elaboration and validation of this tool.[29]

Adopting OSCE for the process of teaching and learning CPR of adults in BLS using AED in the hospital environment has been recognized by nursing educators as a mechanism for changing the way students are taught and evaluated, improving the development of clinical competence in a safe and controlled learning environment, which generates more confidence and autonomy in nursing students and professionals.[30]

Thus, it is noted that the tool elaborated in this study facilitates learning CPR in adults in BLS using AED in the hospital environment and provides safety and reliability in the evaluation of the cognitive and psychomotor skills of students and nursing professionals. It resembles the main objective of OSCE, due to the presence of carefully developed variables, thus demonstrating a new pedagogical possibility for conducting teaching strategies on CPR, research and extension in a contemporary and updated way.

CONCLUSION

This study represents an important contribution to teaching and learning about CPR of adults in BLS using AED in the hospital environment, by developing and validating an OSCE. Methodological rigor was followed in the performance of this research, since it presents criteria based on the literature for the selection of experts, it performs the stages of validation process and preparation of OSCE, steps very much reviewed in order to ensure a safe script and risk-free for bias.

The instrument addressed 40 items related and validated in relation to issues of organization, objectivity and clarity, recording "almost perfect agreement". After analysis, the researcher promptly accepted the notes of the experts about opportunities for improving the instrument in consonance with the guidelines adopted.

Limitations found were in relation to the experts, due to the delay in obtaining the answers of acceptance or refusal to participate in the study, as well as for the time necessary for evaluation and validation of the instrument.

We noticed that the methodological trajectory adopted is adequate for the classification of experts and development of OSCE, but there is a need that further studies implement this tool in students and health professionals. In addition, it is important to identify the effectiveness and impact on the teaching and learning process in CPR in adults in BLS using AED in the hospital environment, which brings knowledge and skill aimed at this population, training active, creative, reflective and skilled individuals. The OSCE presented in this study is a contemporary object and suitable for application in the teaching and learning process on CPR in adults in BLS using AED in the hospital environment.

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