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Original Article

AMERICAN HEART ASSOCIATION GUIDELINES FOR CARDIOPULMONARY RESUSCITATION: KNOWLEDGE OF RESCUERS

DIRETRIZES DA *AMERICAN HEART ASSOCIATION* PARA RESSUSCITAÇÃO CARDIOPULMONAR: CONHECIMENTO DE SOCORRISTAS

DIRECTRICES DE LA AMERICAN HEART ASSOCIATION PARA RESUCITACIÓN CARDIOPULMONAR: CONOCIMIENTO DE SOCORRISTAS

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Objective: to describe the knowledge of rescuers about the American Heart Association protocol for cardiopulmonary resuscitation. Method: designed as a descriptive study with quantitative approach conducted with 40 rescuers from a Mobile Emergency Care Service. Data collection took place through a structured interview using a form designed based on the American Heart Association guidelines for cardiopulmonary resuscitation. Results: 70% of the participants know the sequence of cardiac resuscitation steps, 40% do not know the frequency and depth of chest compressions, 55% do not know the cardiorespiratory arrest identification technique, and 52.5% do not know the number of breaths to be given during the care to advanced cardiac arrest patients. Conclusion: the knowledge of rescuers, despite the new guidelines of the American Heart Association for cardiopulmonary resuscitation, is not updated as the entity recommends; thus, demonstrating that these guidelines have not yet been implemented in practice.

Descriptors: American Heart Association. Heart Arrest. Cardiopulmonary Resuscitation. Knowledge.

Objetivo: descrever o conhecimento dos profissionais socorristas sobre o protocolo da American Heart Association para ressuscitação cardiopulmonar. Método: estudo descritivo, com abordagem quantitativa, realizado com 40 socorristas de um Serviço de Atendimento Móvel de Urgência. Os dados foram coletados por meio de entrevista estruturada, utilizando-se um formulário construído com base nas recomendações da American Heart Association para ressuscitação cardiopulmonar. Resultados: 70% dos entrevistados conhecem a sequência das manobras de ressuscitação cardíaca, 40% não conhecem a frequência e profundidade das compressões torácicas, 55% não sabem a técnica de identificação de parada cardiorrespiratória e 52,5% não sabem o número de ventilações a serem aplicadas durante um atendimento ao paciente em parada cardíaca com via aérea avançada. Conclusão: o conhecimento dos socorristas, a despeito das novas diretrizes da American Heart Association para ressuscitação

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cardiopulmonar, não está atualizado conforme preconiza a entidade, demonstrando, assim, que essas diretrizes ainda não foram implantadas na prática.

Descritores: American Heart Association. Parada cardíaca. Reanimação cardiopulmonar. Conhecimento.

Objetivo: describir el conocimiento de socorristas sobre el protocolo de la American Heart Association para resucitación cardiopulmonar. Método: estudio descriptivo, con enfoque cuantitativo, realizado con 40 socorristas de un Servicio de Atención Móvil de Urgencia. Datos recolectados a través de entrevista estructurada, utilizándose formulario basado en las recomendaciones de la American Heart Association para resucitación cardiopulmonar. Resultados: 70% de los entrevistados conocen la secuencia de las maniobras de resucitación cardíaca, 40% no conocen la frecuencia y profundidad de las compresiones torácicas, 55% no saben la técnica de identificación de parada cardiorrespiratoria y 52,5% no saben el número de ventilaciones a aplicarse durante la atención al paciente en paro cardíaco con vía aérea avanzada. Conclusión: el conocimiento de los socorristas, mismo con las nuevas directrices de la American Heart Association para resucitación cardiopulmonar, no está actualizado según la preconiza, señalando, así, que esas directrices aún no fueron implantadas en la práctica.

Descriptores: American Heart Association. Paro Cardíaco. Reanimación Cardiopulmonar. Conocimiento.

Introduction

The struggle to preserve life takes place in various urgency and emergency situations and constitutes a basic and fundamental principle that guides technical-scientific development in the healthcare area. Among the life-threatening emergencies, cardiorespiratory arrest (CA) is the most feared, since the chance of survival is directly related to a quick, safe, and effective care. CA is defined as a sudden and unexpected condition of absolute tissue oxygenation deficiency, being potentially reversible[1]. It represents a highly complex intercurrence, a worldwide public health problem, constituting the leading cause of death in adults[2].

The American Heart Association (AHA) is a non-profit organization committed to producing knowledge about Cardiovascular Emergency Care (CEC), training professionals and laypeople, and developing globally accepted protocols[3], such as the Cardiopulmonary Resuscitation (CPR) that aims to reverse the CA and minimize its consequences on the affected individual[4]. Much of the success of resuscitation is due to a quick identification of CA, communication to the emergency department, and immediate initiation of cardiopulmonary resuscitation maneuvers[5-6]. In this context, rescuers must have training and knowledge about resuscitation maneuvers, inasmuch as lacking knowledge results in inadequate actions, thus compromising care and survival[7].

The guiding question of this study was: What is the knowledge level of rescuers on the current AHA guidelines for CPR? As a primary hypothesis, the knowledge of rescuers is insufficient and outdated regarding the current AHA protocol for the care of patients undergoing CA.

This study aimed to describe the knowledge of rescuers on the AHA guidelines for cardiopulmonary resuscitation, characterize the professionals who act as rescuers, and verify the conformity between the knowledge and the AHA guidelines.

Method

This is a descriptive cross-sectional study with quantitative approach of the field study type. This kind of research aims to deepen a specific reality in which the investigations will occur through the data collection with people.

The study took place at the Mobile Emergency Care Service (SAMU) in Caxias, a municipality located in the eastern region of the state of Maranhão, Brazil, with an area of 5,196,771 km^2[8].

The selection of participants that comprised the study population occurred through means of a probabilistic sample of the simple random

type, using the following inclusion criteria: health professionals of technical or higher education level that compose the nursing areas or are under nursing supervision and act as rescuers in the pre-hospital care of cardiac arrest patients. For this purpose, professionals who met the described criteria, but were on vacation and/or leave during the research development period, were excluded. Though the application of these criteria, 50 professionals who act as rescuers in SAMU were identified. Among these, 6 were excluded because they were on vacation/leave, resulting in 44 suitable workers among ambulance drivers, nursing technicians, and nurses. Therefore, the sample size was calculated based on 44 professionals who worked in the care of patients in cardiac arrest situation. The sample calculation estimated the mean of 40 samples required for the study. For this calculation, the confidence level of 95% and tolerable sampling error of 5% were used.

For data collection, a form developed by the researchers based on the 2015 AHA guidelines for Cardiopulmonary Resuscitation was used to identify the knowledge of rescuers. This form, composed of 23 multiple choice questions, was evaluated by a group of experts in the area to obtain a desirable degree of reliability and was subsequently applied in a test survey to evaluate its applicability and perform the necessary adaptations.

Data obtained were processed by the Statistical Package for the Social Sciences (SPSS) software. Simple descriptive statistical analysis was used. To analyze the statistical significance, the One-Sample Chi-Square Test and One-Sample Binomial Test were used, as well as the Kolmogorov-Smirnov test, to verify the normality of collected data.

In compliance with ethical aspects, the research project was submitted to the Plataforma Brasil for appraisal by the Research Ethics Committee of the Faculdade de Ciências e Tecnologia do Maranhão (Facema) and approved under protocol No. 1,464,125, CAAE No. 53855215.9.0000.8007. The research began after clarification of doubts and signing of the Free and Informed Consent Term (TCLE) by the participants.

Results

The study population comprised 40 rescuers who had an employment relationship with SAMU. Among them, there was prevalence of males (75%), aged between 25 and 35 years (42.5%), and ambulance drivers (50%). Regarding the participation of professionals in training, 92.5% stated that they had participated in Basic Life Support (BLS) courses and 55% had not taken Advanced Life Support (ALS) courses. Regarding CA care, the majority (77.5%) denied difficulty, self-assessed them as able to perform CPR maneuvers (90%), and stated that they were aware of the 2015 AHA guidelines for CPR (57.5%) according to Table 1.

Table 1 – Sample characterization according to the demographic and professional variables. Caxias, Maranhão, Brazil – 2016. (n=40) (to be continued)

Variables	n	%	Standard Deviation	p-value
Gender				0.003*
Male	30	75.0	5.4	
Female	10	25.0	5.4	
Age				0.001**
25-35 years	17	42.5	8.9	
36-45 years	16	40.0	7.9	
46-55 years	03	7.5	4.2	
56-65 years	04	10.0	5.6	
Professional function				0.025**

Table 1 – Sample characterization according to the demographic and professional variables. Caxias, Maranhão, Brazil – 2016. (n=40)

(conclusion)

Variables	n	%	Standard Deviation	p-value
Nurse	06	15.0	4.9	
Nursing technician	14	35.0	7.8	
Ambulance driver	20	50.0	7.1	
Participated in Basic Life Support training				<0.0001*
Yes	37	92.5	3.9	
No	03	7.5	3.9	
Participated in Advanced Life Support training				0.635*
Yes	18	45.0	8.0	
No	22	55.0	8.0	
Presents difficulty in Cardiac Arrest care				0.001*
Yes	09	22.5	6.5	
No	31	77.5	6.5	
Self-assessment of cardiopulmonary resuscitation ability				<0.0001**
Unable	01	2.5	2.8	
Trained	36	90.0	5.3	
Poorly trained	03	7.5	4.1	
Knowledge about the 2015 American Heart Association Guidelines for Cardiopulmonary Resuscitation				0.429*
Yes	23	57.5	7.5	
No	17	42.5	7.5	
Total	40	100.0		

Source: Created by the authors.

* One-Sample Binomial Test. ** One-Sample Chi-Square Test.

Questions related to the current AHA protocol for CPR, 2015, were asked to the rescuers. These questions, listed in Table 2, indicated that most of them were wrong about the CA identification technique (55%), but were right about the CPR (70%). Regarding the frequency and depth of chest compressions according to the 2015 AHA guidelines, it was noticed that the percentages of right and wrong answers were close, 45% and 40%, respectively.

Table 2 – Knowledge of rescuers about the American Heart Association Guidelines for Cardiopulmonary Resuscitation. Caxias, Maranhão, Brazil – 2016. (n=40)

(to be continued)

Question	Right answers		Wrong answers		Unable to answer		Does not apply		p-value
	n	%	n	%	n	%	n	%	
How should the cardiorespiratory arrest be diagnosed?	13	32.5	22	55.0	5	12.5	-	-	0.004**
What is the correct sequence of care for victims of Cardiopulmonary Arrest?	28	70.0	10	25.0	2	5.0	-	-	<0.0001**
What is the frequency and depth of chest compressions according to the 2015 American Heart Association guidelines?	18	45.0	16	40.0	6	15.0	-	-	0.022**
What is the compression/breathing ratio on adults?	32	80.0	06	15.0	2	5.0	-	-	<0.0001**

Table 2 – Knowledge of rescuers about the American Heart Association Guidelines for Cardiopulmonary Resuscitation. Caxias, Maranhão, Brazil – 2016. (n=40) (conclusion)

Question	Right answers		Wrong answers		Unable to answer		Does not apply		p-value
	n	%	n	%	n	%	n	%	
What is the compression/breathing ratio on children?	12	30.0	25	62.5	3	7.5	-	-	<0.0001**
What should be done right after the shock with the defibrillator?	36	90.0	-	-	4	10.0	-	-	<0.0001**
How many breaths per minute should be given during cardiopulmonary resuscitation with advanced airway?	10	25.0	21	52.5	9	22.5	-	-	0.035**
Total	n=40		(%)=100.0						

Source: Created by the authors.
Note: Conventional sign used:
* Numeric data equals to zero not resulting from rounding.
** One-Sample Chi-Square Test.

Discussion

To discuss the AHA guidelines, it is necessary to explain that they are reviewed every five years to standardize and improve the CEC[3]. Currently, the guidelines issued in October 2015 are in force, which will be the reference until the year 2020.

Among the 40 participants, there were prevalence of males and the age group of 25 to 35 years. Regarding the professional function, ambulance drivers prevailed, followed by nursing technicians, and nurses. Similar data can be found in a study[9] developed in a SAMU, with the participation of 14 drivers, 13 nursing technicians, and 4 nurses. Among the possible explanations for the predominance of males among SAMU rescuers, the following stand out: it is a work that requires logical rationality and dynamism, traditional requirements of men, and demand physical strength, necessary in most of the attendances, given the constant removals performed.

The sample characterization regarding the self-assessment of the ability to perform CPR expressed that 90% of the respondents evaluated themselves as trained. Similar data have been reported both at the international and national levels and indicate that, although most health professionals claim to be trained, only the minority performs CPR maneuvers correctly[10-11]. This is a disturbing fact, since the perception of the limitations regarding the competence for the care practice drives the search for knowledge and updating. Lack of knowledge results in inappropriate actions. In the case of cardiac arrest, whose main objective is to preserve life, care should be developed by a competent and qualified team able to perform such task[12].

When asked if they knew the new AHA guidelines for cardiopulmonary resuscitation, 57.5% of the participants answered affirmatively and 42.5% negatively. A research[13] developed in a teaching hospital in Curitiba (PR), Brazil, corroborates this finding, highlighting that only 62.3% of the participants who reported knowing the protocol correctly matched the correct sequence of cardiac resuscitation steps. In this regard, it should be noted that the percentage of interviewees who reported not knowing the current protocol is relatively high; hence, generating losses in the care provided and consequently affecting the survival rates of CA victims, since an effective care requires training from professionals as much as knowledge about the current protocol.

There was a high percentage of errors in some technical aspects, such as the identification of CA, in which 55% were wrong. This finding

differs from that found in some studies, in which the percentage of right answers was high[14-15]. It is worth mentioning that the survival rate after cardiac arrest is closely related to the early onset of cardiopulmonary resuscitation; however, these can only be initiated after diagnosing the CA[16]. This high incidence of errors registered in the CA identification can be explained by the subtle difference in the current protocol, since the 2010 guidelines[17] recommended sequential steps in the identification of cardiac arrest, while, in the 2015 protocol, the AHA recommends performing simultaneous steps, to reduce the onset time of chest compressions[3].

Regarding the sequence of the CPR steps, 70% of the sample matched the sequence C-A-B-D (chest compressions – airway opening – breaths – defibrillation). Other studies[14,18] presented similar data. Nevertheless, other findings[10] revealed divergent results. It is important to highlight that this sequence of care for victims of cardiac arrest did not change in the 2015 AHA guidelines, which might explain the high percentage of correct answers. It is also emphasized that the chance of survival of people affected by cardiac arrest can double or triple when the resuscitation steps are performed correctly and with quality[7].

Knowledge should be highlighted as a starting point for decision-making in an attempt to ensure the quality of the procedures performed with the victim at the site of occurrence. Thus, the importance of acquiring the skills that sustain scientific knowledge is undeniable, ensuring a greater effectiveness in a situation in which is paramount the appropriate use of time.

Regarding to the frequency and depth of chest compressions, the percentages of right and wrong answers were close, 45% and 40%, respectively. Several studies indicate conflicting results, presenting high percentage of correct answers on this question[7,10,14]. It is evidenced that all the studies mentioned were based on the 2010-2015 AHA guidelines. This expressive percentage of errors can be explained by the change in the current protocol, since the 2010 guidelines recommended that chest compressions should be performed with a minimum frequency of 100 compressions per minute and a minimum depth of 5 cm; while the current guidelines recommend that compressions should be performed at a rate of 100-120 per minute to a depth of at least 5 cm but not greater than 6 cm[3].

Regarding the compression/breathing ratio on adults, 80% of the sample matched the ratio of 30 compressions followed by 2 breaths. Studies corroborate this finding[12-14]. As to the compression/breathing ratio on children, there was a significant difference ($p<0.0001$), since 62.5% of the participants gave wrong answers to this question.

An identical situation was observed in research developed with professionals from a pediatric emergency unit. When questioned about the compression/breathing ratio on children with two rescuers, 51.11% of respondents correctly answered 15:2, while 48.89% said 30:2. The referred study[19] demonstrated that professionals are very confused when it comes to CPR for children.

The compression/breathing ratio on adults and children remains unchanged by the 2015 AHA guidelines for CPR. The entity recommends 2 breaths after 30 compressions on adults, regardless of the number of rescuers, and on children and infants when there is only one rescuer; and 2 breaths after 15 compressions, when there are two or more rescuers[3].

When asked what to do after the shock with the defibrillator, there was a significant difference ($p<0.0001$), since 90% of rescuers correctly answered that they should resume chest compressions (1 cycle of 2 minutes), exactly as recommended by AHA[3]. A study[12] presented divergent results, since 87.5% of its sample got this question wrong, thus showing the unpreparedness of the nurses participating in the work developed. In this perspective, the authors recommended reassessment and continuous training of subjects for adequate performance in CA care.

Regarding the number of breaths to be given per minute during CPR with advanced airway, 52.5% of the participants were wrong, and 22.5%

did not know how to respond. There were no studies found in the databases to address this aspect of CA care.

The abovementioned findings are worrying, since they represent important aspects of care, as both hypoventilation and hyperventilation cause inefficiency of CPR or complications in the clinical condition of the victim after cardiac arrest. In this regard, the AHA guidelines[3] recommend that the rescuer should give 1 breath every 6 seconds (10 breaths per minute).

Among the limitations of this study, which prevent the generalization of the findings, should be highlighted the single field where this research was carried out, the difficult adherence of rescuers in filling out the form, the interruptions of the interviews motivated by occurrences, and the reduced sample size.

Conclusion

This research enabled to characterize rescuer professionals, describe their knowledge about the 2015 AHA guidelines for CPR, and verify the conformity of their knowledge with the recommendations of that entity.

The knowledge of the rescuers about CPR is not yet in consonance with the new AHA guidelines, since the questions related to the changes made in the protocol were those that obtained the highest percentage of errors, demonstrating that these guidelines have not yet been implemented in practice.

Therefore, in this context is recommended to improve the already existing continuing education program in the studied healthcare service, aiming to adhere to the AHA recommendations; as well as afford innovative strategies such as a realistic simulator to evaluate the quality of CPR and programs that facilitate self-learning.

In sum, this work can possibly contribute to the discussion regarding the importance of periodic evaluation concerning healthcare professionals' knowledge related to the guidelines for CPR; thereby enabling the emphasis on training focusing on deficient points, the encouragement to seek the knowledge about the theme in question, as well as act as a driving force for the institutional support of the qualification of these professionals.

Collaborations:

1. conception, design, analysis and interpretation of data: Érica Rayanne da Silva Salazar and Emanuella dos Santos Lima Gaspar;

2. writing of the article and relevant critical review of the intellectual content: Érica Rayanne da Silva Salazar and Emanuella dos Santos Lima Gaspar;

3. final approval of the version to be published: Érica Rayanne da Silva Salazar, Emanuella dos Santos Lima Gaspar and Márcia Sousa Santos.

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