ORIGINAL ARTICLE

MILITARY SKILLS OF FIREFIGHTERS IN CARDIOPULMONARY RESUSCITATION

HABILIDADES DE MILITARES DEL CUERPO DE BOMBEROS EN RESSUSCITACIÓN CARDIOPULMONAR

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ABSTRACT

Objective: to investigate the military’s abilities of the Fire Department in Cardiopulmonary Resuscitation, Basic Life Support, in the adult, and with the use of the Automatic External Defibrillator. Method: quantitative, cross-sectional and descriptive study, with operational military of the Fire Department of a company in the interior of Minas Gerais, totaling 23 participants. The military was invited to perform a Cardiopulmonary Resuscitation on a medium fidelity manikin, and for this data collection, the Systematic Observation Roadmap, based on the 2015 guidelines of the American Heart Association, was applied. Data were analyzed using descriptive statistics. Results: Gaps in skills were shown in the stages of Cardiopulmonary Resuscitation in External Thoracic Compressions, ventilation, defibrillation and activation of the Advanced Service. Conclusion: it is recommended the re-evaluation and continuous training to adapt the skills of the Fire Brigade’s military, contributing to minimize morbidity and mortality in cases of Cardiorespiratory Arrest. Descriptors: Cardiopulmonary Resuscitation; Basic life support; Firefighter.

RESUMO


RESUMEN

Objetivo: investigar las habilidades de militares del Cuerpo de Bomberos en la Resucitación Cardiopulmonar, en Soporte Básico de Vida, en el adulto, y con el uso del Desfibrilador Externo Automático. Método: estudio cuantitativo, transversal y descriptivo, con militares operacionales del Cuerpo de Bomberos de una compañía en el interior de Minas Gerais, totalizando 23 participantes. Los militares fueron invitados a ejecutar una Resucitación Cardiopulmonar en un maniquí de media fidelidad, siendo en este momento, para la recolección de datos, aplicado la Hoja de Observación Sistemática, basado en las directrices de 2015 de la American Heart Association. Los datos fueron analizados por medio de estadística descriptiva. Resultados: se evidenció lagunas en las habilidades acerca de las etapas de la Resucitación Cardiopulmonar en Compresiones Torácicas Externas, ventilación, desfibrilación y acionamiento del Servicio Avanzado. Conclusión: se recomienda la reevaluación y la capacitación continuas para la adecuación de las habilidades de los militares del Cuerpo de Bomberos, contribuyendo a minimizar la morbimortalidad en casos de Parada Cardiorrespiratoria. Descritores: Resucitación Cardiopulmonar; Soporte Vital Básico; Bombero.

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INTRODUCTION

For the Military Fire Brigade (MFB), the performance, based on scientific criteria, of Cardiopulmonary Resuscitation (CPR) in Basic Life Support (BLS) in adults and with the use of Automatic External Defibrillator (AED) is an event of great importance inside care and assistance given to the victim of Cardiorespiratory Arrest (CRA), a situation in which it requires knowledge and skills to provide excellent care, increasing the possibility of reversal of CRA with minimization of morbidity and mortality.

There are few publications on this subject and, with the questioning whether the MFB is performing the maneuvers according to the latest international guidelines published in 2015 by the American Heart Association (AHA), the interest arose in carrying out this study.

It is worth noting that the relevance of this study is to investigate the MFB’s abilities on CPR, seeking to elucidate the questioning raised, making it possible to identify gaps and favoring the possibility of improvements in the actions performed in the CPR by this group of professionals.

CRA is defined as sudden absence of spontaneous ventilation and pulse in large arteries, accompanied by loss of consciousness in the same individual at the same time.1

CPR can be considered the set of maneuvers performed soon after a CRA, with the objective of artificially maintaining the arterial flow to the brain and other vital organs until the return of the spontaneous circulation occurs.2

BLS is to perform CRA recognition and implementation of immediate and effective measures for reversion of respiratory and cardiovascular collapse.3

Brazil has as a challenge to optimize the learning about CPR, aiming at effective actions in the first minute of the CRA.4

To be successful in the care of victims, MFB professionals must be trained both to identify a CRA and to adequately perform, based on the current protocols, the CPR maneuvers, ensuring successful delivery.5 Since the effectiveness of CPR depends training and constant updates.2

In this context, the objective of this study was to investigate the military abilities of the Fire Department in Cardiopulmonary Resuscitation, in Basic Life Support, in the adult and with the use of the Automatic External Defibrillator.

METHOD

A quantitative, cross-sectional and descriptive study carried out at the MFB Company, composed of 41 soldiers, in a city in the Interior of Minas Gerais (MG). Twenty-three military personnel participated in the study, since they were included in the operational level and excluded from activities due to vacations and medical leave.

The instrument for data collection consisted of two parts: Systematic Observation Roadmap, indicated for controlled conditions with the purpose of answering pre-established purposes, 6 based on the AHA CRA algorithm in adults for BLS Health professionals - Update of 2015, 7, considering: CRA recognition, frequency / depth / location of External Thoracic Compression (CTE), bag-mask ventilation, AED defibrillation and Advanced Support (SAV) activation; and form for characterization of participants.

Before conducting the training with the MFB, a pre-test for validation of the instruments was carried out, applied to students of the first period of the Nursing course of the University of the State of Minas Gerais (UEMG) - Passos Unit, since these are considered laymen within the topic addressed and, theoretically, at the same level as the population studied. Possibility of adjustments were identified and realized, guaranteeing improvements and optimization of the applied instruments.

The equipment used was: Full-body, full-length, full-length mannequin (176 cm), with airway opening (VVAA), chest compression, artificial respiration, accompanied by a display that provides procedural parameters with report issuance at the end of the maneuver, natural resistance during the CTE, electronic pulse of the carotid artery and anatomical orientation points; AED simulator for training, a model indicated for Medical and Nursing schools and characterized as an ideal tool for students to be familiar with the BLS process and with the use of AED; Bag-valve-mask for adult; Torpedo of Oxygen and Equipment of Individual Protection (EPI): masks, gloves and goggles.

The researchers were trained by the professor responsible for the Emergency and First Aid disciplines of the UEMG - Passos Unit, prior to the data collection.

After the approval of the Ethics Committee in Research (CEP), the Foundation for Higher Education of Steps (FESP), Opinion number 1,789,118 (CAAE: 56326416.0.0000.5112), data were collected. Participants were
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divided into four groups, according to the scale of work, as requested by the Lieutenant in charge.

The scheduled dates were May 10th to 13th, 2016. At which time the military were received in a room of the Company of the MFB. Exposed the objective of the research, an invitation was made to participate in it. Those who accepted it were asked to sign the Informed Consent Form (TCLE) and applied the questionnaire to characterize the participant.

The soldiers were individually invited in an isolated room to demonstrate in a simulated manner the attendance to a CRA using the manikin and other equipment when, the Skeptical Observation Roadmap was applied.

The obtained data were organized and inserted in spreadsheets in Microsoft Excel, being analyzed through descriptive statistics, focusing on absolute and relative frequency. Subsequently, they were exposed in tables to show the results.

**RESULTS**

According to the data collected, the characteristics of the participants, stand out (Table 1):

<table>
<thead>
<tr>
<th>Variables</th>
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<th>%</th>
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<tr>
<td>Office</td>
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<td></td>
</tr>
<tr>
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</tr>
<tr>
<td>Corporal</td>
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<td>21.7</td>
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<td>39.15</td>
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<tr>
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<td></td>
</tr>
<tr>
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<td>6</td>
<td>26.1</td>
</tr>
<tr>
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<td>5</td>
<td>21.7</td>
</tr>
<tr>
<td>13 - 20 years</td>
<td>5</td>
<td>21.7</td>
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<td>17.4</td>
</tr>
<tr>
<td>&gt; 25 years</td>
<td>3</td>
<td>13.1</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>100</td>
</tr>
<tr>
<td>Education</td>
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<td></td>
</tr>
<tr>
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<td>73.9</td>
</tr>
<tr>
<td>Higher education</td>
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<td>26.1</td>
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<tr>
<td>Total</td>
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<td>100</td>
</tr>
<tr>
<td>Age</td>
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<td></td>
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<tr>
<td>18 - 29 years old</td>
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<td>30 - 39 years</td>
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<tr>
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<tr>
<td>Total</td>
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<td>100</td>
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</table>

It was found that nine (39.15%) participants of the MFB sample was a sergeant; six (26.1%) with a duration of less than or equal to five years; 17 (73.9%) had a high school education; nine (39.15%) aged 18-29 years and, in the same proportion, of 40-49 years.

Regarding the completion of courses in CPR, 15 (65.2%) reported not having received an update after initial training, but, 20 (86.9%) considered it safe to perform CPR maneuvers.

In the Systematic Observation Roadmap, constructed according to the AHA of CRA algorithm in adults for BLS Health professionals - 2015 Update with the objective of evaluating the participants’ abilities regarding recognition of CRA, frequency / depth / location of the CTE, bag-valve-mask ventilation, AED defibrillation and SAV activation, the results obtained are highlighted in table 2 below.
Regarding the recognition of CRA, the majority proceeded correctly in the evaluation of this item; 22 (95.65%) in the evaluation of responsiveness and 21 (91.3%) in the evaluation of breathing and pulse.

In the CTEs, 22 (95.65%) participants correctly demonstrated the depth; 21 (91.3%), the site, but in contrast, only four (17.4%) correctly, demonstrated the frequency.

The skills regarding venting with bag-valve-mask, ten (43.5%) performed it inadequately.

In the assessment of skills regarding defibrillation with the AED, the evaluation was performed on arrival, installation and, after evaluation by the equipment, and 14 (61.85%) acted correctly upon arrival and action after evaluation of the equipment. Only nine (38.15%) did not interrupt the compressions to install the AED blades.

Regarding the activation of the SAV, 13 (56.5%) performed incorrectly, the demonstration of the attendance to a CRA by MFB.

### DISCUSSION

The Adult CRA Algorithm for Health Professionals of BLS - AHA 2015 Update states that the identification of CRA is to evaluate responsiveness and, immediately thereafter, to evaluate the heart rate and respiration simultaneously, not exceeding 10 seconds. In the CTE a minimum frequency of 100 and maximum of 120 / min, minimum depth of five and maximum of six centimeters and in the lower third of the sternum should be maintained; ventilation with bag-valve-mask should be two insufflations every 30 CTEs; AED defibrillation is indicated immediately upon arrival of equipment; install blades, without interrupting compressions, and resume CPR after shock and / or heart rate assessment by the equipment; and the VAS should be triggered immediately after CRA identification.7

The International Liaison Committee on Resuscitation (ILCOR), an AHA representative, cites the importance of training in CPR and emphasizes that it should be tailored to the target audience in different modalities, offering alternative means of teaching, in order to guarantee the acquisition and retention of knowledge and skills in the CRA care.8

The characteristics of the MFB that participated in this research, compared to the existing literature, show: study reveals equality of proportion in the function of sergeant; divergences in time working at the corporation; predominance of function between 10-14 years; schooling in complete higher education adn age between 20-30 years. 9 The study showed a predominance of up to five years of activity in the MBC (26.1%), and the prevalence in the university was 10% (73.9%) and age between 18-29 and 40-49 (39.1% in each group).

Table 1 shows that 65.2% (n = 15) did not receive refresher course in CPR after initial training. Given this, we emphasize that MFB must provide a quality service, being linked to the constant updating of procedures and the training of the teams, seeking the scientific basis necessary to guide the daily actions. It is always necessary to verify if the theoretical teachings are in line with the practice.6 Updating in BLS is inextricable, since knowing and knowing how to perform the CPR maneuvers by adopting the CRA service protocol, based on the AHA guidelines, bases the excellence of the performed.

CPR training is indicated at least every three to six months to avoid deterioration of skills and knowledge5 and encouragement for studies examining CPR skills with the aim of identifying variables and improving quality and skills.13

The training strategy on CPR is considered relevant for the achievement of better results.
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**CONCLUSION**

When analyzing the data obtained, it was possible to analyze the characteristics and skills in CPR in BLS in adults with the use of AED by the MBC of a city in the interior of Minas Gerais.

It was identified that the majority was a sergeant, with military time of less than or equal to five years, age between 18-29 and 40-49 years old, high school education, no CPR update course and referring to having security to act in the CRA.

Skills show deficiency at all stages, except for recognition of CRA. We emphasize that only 17.4% demonstrated abilities in the frequency of CTEs; 38.15%, in the AED installation and 43.5%, in the activation of the VAS.

We emphasize that there are few MFB versus CPR publications according to international guidelines, a limiting fact that assumes that there is inference in the data discussion. In this context, it is necessary to promote studies and publications on this subject.

Through this study, we verified that it is indispensable to invest training in MFB teams, allowing better results in the care of the victim in CRA, since the skills identified in this study are deficient and can certainly determine the result of CPR, contributing to minimize morbidity and mortality in the victims of CRA.

**REFERÊNCIAS**


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