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REVIEW ARTICLE

The role of lay rescuers in case of cardiopulmonary arrest in an extra-hospital environment

El papel de los socorristas legos en caso de parada cardiopulmonar en un entorno extrahospitalario

A atuação do socorrista leigo em caso de parada cardiorrespiratória em ambiente extra-hospitalar

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Abstract

The aim was to analyze the evidence on the role of laypersons in cases of out-of-hospital cardiopulmonary arrest. This is an integrative literature review, with a critical and retrospective characteristic, with complete primary data sources, published between 2015 and 2020, in the following databases: MEDLINE, LILACS, BDENF, SciELO and Google Scholar. The publications included in the study were 07 articles. The results found showed that the training of lay people can be done through a balance between self-learning and teaching given by instructors with practical classes. If there is no instructor-led course or training, so-called self-directed training is an accepted recommendation for lay rescuers, video classes can further drive learning. With more people trained, there is a greater chance that one of them will witness an out-of-hospital cardiopulmonary arrest case and perform quality cardiopulmonary resuscitation. When analyzing the layperson's performance in cases of out-of-hospital cardiopulmonary arrest, this action, when performed in accordance with international protocols, will provide early assistance to the victim and increase the survival rate, thus serving as a foundation for the assistance of the medical service of emergency when you get to the scene.

Descriptors: Electric Countershock; Teaching; Heart Arrest; Out-of-Hospital Cardiac Arrest; Mentoring.

Resumén

El objetivo fue analizar la evidencia sobre el papel de los profanos en los casos de parada cardiorrespiratoria extrahospitalaria. Se trata de una revisión de literatura integradora, de carácter crítico y retrospectivo, con fuentes primarias completas de datos, publicada entre 2015 y 2020, en las siguientes bases de datos: MEDLINE, LILACS, BDENF, SciELO y Google Scholar. Las publicaciones incluidas en el estudio fueron 07 artículos. Los resultados encontrados mostraron que la formación de los laicos se puede realizar a través de un equilibrio entre el autoaprendizaje y la docencia impartida por los instructores con clases prácticas. Si no hay un curso o capacitación dirigida por un instructor, la llamada capacitación autodirigida es una recomendación aceptada para los rescatistas legos, las clases de video pueden impulsar aún más el aprendizaje. Con más personas capacitadas, existe una mayor probabilidad de que una de ellas sea testigo de un caso de paro cardiopulmonar extrahospitalario y realice una reanimación cardiopulmonar de calidad. Al analizar el desempeño del laico en los casos de parada cardiopulmonar extrahospitalaria, esta acción, cuando se realiza de acuerdo con los protocolos internacionales, brindará atención temprana a la víctima y aumentará la tasa de supervivencia, sirviendo de base para la asistencia del médico. servicio de emergencia al llegar al lugar.

Descriptores: Cardioversión Eléctrica; Enseñanza; Paro Cardíaco; Paro Cardíaco Extrahospitalario; Tutoría.

Resumo

Objetivou-se analisar as evidências sobre a atuação do leigo em casos de parada cardiorrespiratória extra-hospitalar. Trata-se de revisão integrativa de literatura, de característica crítica e retrospectiva, com fontes de dados primários completos, publicados entre 2015 e 2020, nas seguintes bases de dados: MEDLINE, LILACS, BDENF, SciELO e o Google Scholar. As publicações incluídas no estudo foram 07 artigos. Os resultados encontrados evidenciaram que, o treinamento de leigos pode ser feito por uma conciliação entre autoaprendizagem e o ensino ministrado por instrutores com aulas práticas. Caso não haja um curso ou treinamento conduzido por instrutor, o chamado treinamento autodirigido é uma recomendação aceita para socorristas leigos, aulas por meio de vídeos podem direcionar ainda mais o aprendizado. Com mais pessoas treinadas, existe uma maior chance de uma delas presenciar um caso parada cardiorrespiratória extra-hospitalar e realizar a reanimação cardiopulmonar de qualidade. Ao analisar a atuação do leigo em casos de parada cardiorrespiratória extra-hospitalar, esta atuação quando realizada de acordo com os protocolos internacionais, proporcionará um atendimento precoce a vítima e aumentará a taxa de sobrevivência, servindo assim de alicerce para a assistência do serviço médico de emergência quando chegar ao local.

Descritores: Cardioversão Elétrica; Ensino; Parada Cardíaca; Parada Cardíaca Extra-Hospitalar; Tutoria.

Introduction

Cardiorespiratory arrest (CPA) is considered one of the main clinical emergencies in the world, its basic definition is the cessation of heartbeat and loss of respiratory function, consequently generating a sudden loss of consciousness. In this context, irreparable physiological damage can be generated in a short time if there is no quick service, since right after the first five minutes of CPA the patient may have irreversible brain damage[1].

According to the update of the Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Guideline of the Brazilian Society of Cardiology (SBC)[2], data published in the literature on the incidence of CRA in the country are scarce. However, SBC's Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care[3] mentions that around 200,000 CRAs take place per year in Brazil, half of which in a non-hospital environment.

Out-of-hospital cardiopulmonary arrest (HRCP) is considered a public health problem. In the United States, approximately 155,000 people a year are treated by the emergency service outside hospitals, only 8% of these people survive. Regarding the European continent, around 128,000 to 275,000 people are victims of a HRCP, about 10% survive[4]. Even with progressive development, several less than 40% of adults in a situation of CA receive Cardiopulmonary Resuscitation (CPR) performed by laypersons, even lower (about 12%) is the chance of a victim receiving defibrillation by the Automatic External Defibrillator (DEA) before specialist care arrives[5].

The layperson can provide the first assistance in this emergency if they are properly trained and informed. A study on the knowledge of lay people about basic life support (BLS), carried out in the city of Juiz de Fora in the State of Minas Gerais and corroborated by national and international literature, found that the performance of research participants was low, even the performance of those who reported having had contact with the topic previously[6].

Despite numerous studies reflecting the importance of knowledge of first aid, it is still a subject that is not widespread in Brazil. In a scene in which a person has a sudden illness in a public place, help is provided through the feeling of solidarity and often, without the technique or knowledge for such a situation. This is an action that can aggravate the victim's health condition[7].

Based on the facts presented, the following guiding question emerged: How should the layperson act in cases of out-of-hospital cardiopulmonary arrest? Which aims to analyze the evidence in the scientific literature on the role of laypersons in cases of out-of-hospital cardiopulmonary arrest.

Methodology

This is an Integrative Literature Review (RIL) as it enables the systematization of scientific knowledge, bringing those who research the problem they want to assess closer together, tracing the evolution of the topic over time and, therefore, visualizing possible research opportunities[8].

The six steps intrinsic to this method were followed: Identification of the theme and selection of the guiding question, Establishment of inclusion and exclusion criteria, Identification of pre-selected and selected studies, Categorization of selected studies, Analysis and interpretation of results and Presentation of the synthesis of knowledge[8].

The integrative review was previously developed with the identification of the research theme, which is “layman's role in out-of-hospital cardiopulmonary arrest”. Subsequently, the research problems were defined, these being the impact of the performance in relation to the best prognosis in relation to the CPA event and the initial performance of this individual in an emergency. Based on this definition, the guiding question of the study was elaborated, based on the PICo strategy, which presents as a question for its formulation the prognosis or prediction, in which the "P" indicates the population, patient (age, race, status, of health) or problem, the "I" demonstrates the interest and the "Co" context

Given the above, the guiding question of this study was based on the PICo strategy, which is: How should the layperson act in cases of out-of-hospital cardiopulmonary arrest?

Figure 1. Illustrative diagram of the elaboration process of the guiding question. Rio de Janeiro, RJ, Brazil, 2021

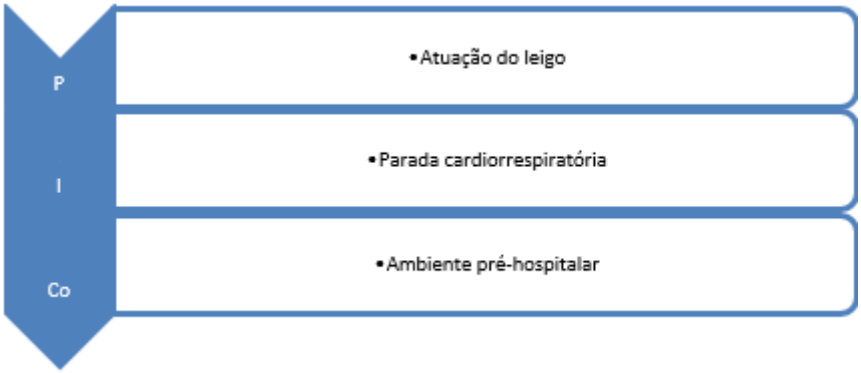


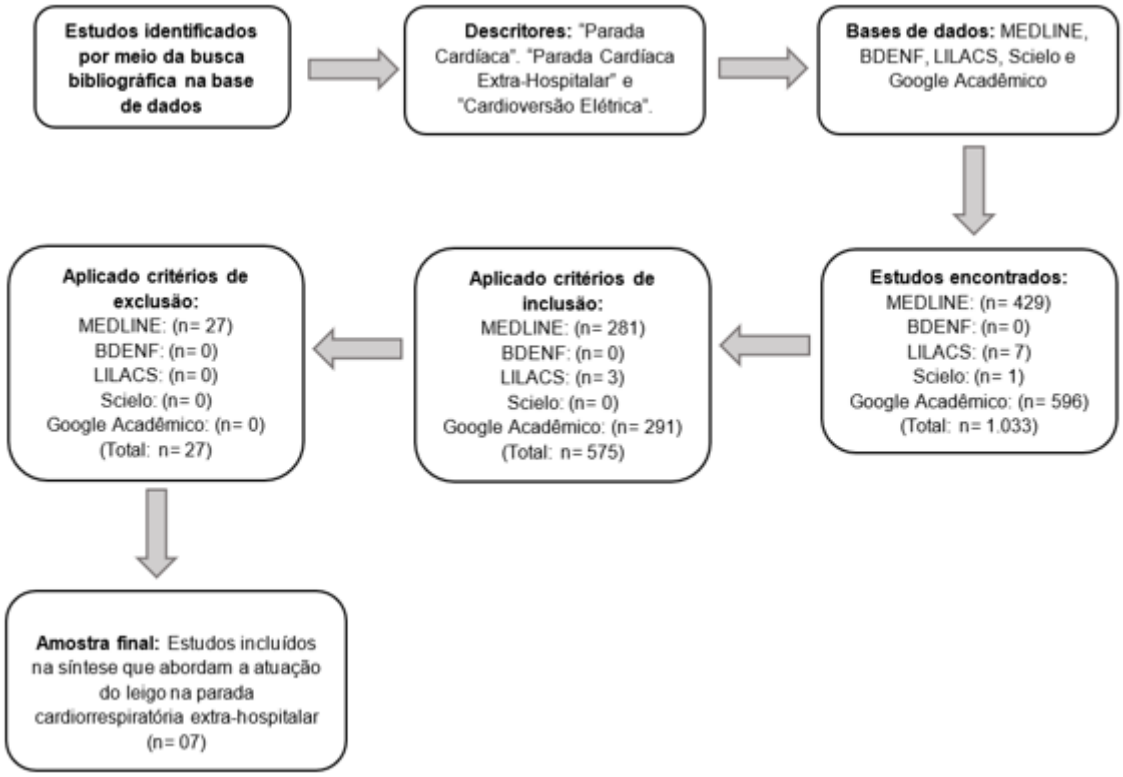
Figure 1 above shows the entire process of elaborating the research's guiding question.

To carry out the research, the Virtual Health Library and its respective databases were used: Medical Literature Analysis and Retrieval System Online (MEDLINE), Nursing

Databases (BDENF) and the Latin American and Caribbean Literature in Sciences of the Health (LILACS), the Scientific Electronic Library Online (SciELO) was also consulted, and to locate the largest number of publications, Gray Literature was also used with a search on Academic Google. The search period took place from January to the end of August 2021.

To carry out the searches, the descriptors registered in the Health Sciences Descriptors Portal (DeCS) were used: “cardiac arrest”, “out-of-hospital cardiac arrest”, “electrical cardioversion” and their equivalents in English and Spanish. The word "layman" was used separately, as a keyword, as it was not registered in DeCS until the work was carried out and crossed with the terms "cardiorespiratory arrest" and "defibrillator" to adapt the productions found to the theme of the search using the Boolean operator “AND”. Based on the search strategy, the number of productions associated with the theme can be highlighted as described in the flowchart below:

Figure 2. Illustrative flowchart of the methodological approach for identifying pre-selected studies and selecting studies to be included in the adapted PRISMA review. Rio de Janeiro, RJ, Brazil, 2021



As inclusion criteria: articles made available in full, in the selected databases, which present adherence to the theme in Portuguese, Spanish and English, published between the years 2015 and 2020 to identify evidence of the theme in question published in the last 05 (five) years, as the Guideline referring to the CPR guidelines was revised in 2015 and 2020.

Studies without availability of the full text and which are not compatible in the context of the topic to be addressed were excluded, as well as studies whose access link at the time of collection is unavailable. To include the studies, the titles and abstracts of each publication were read to verify harmony with the guiding question. If there was any kind of doubt regarding the inclusion or exclusion of the study, the full reading was carried out to reduce the risk of harm by losing publications relevant to the study.

Figure 2 shown above illustrates the methodological approach to identifying pre-selected studies and selecting studies to be included in the review.

Data analysis took place judiciously, through the list of themes addressed by the selected articles, since the objective of this study is to analyze the role of lay rescuers in case of cardiac arrest in an extra-hospital environment. Given the above, the extracted data were described and organized in a table with information referring to: Publication number; Title of the article; Authors of publications; The journal name and date; Data base; Country and Language and Key Research Findings, as described in the Chart 1.

Chart 1. List of articles selected from the databases. Rio de Janeiro, RJ, Brazil, 2021

Title	Authors	Journal/Date	Data base	Country/Language	Main Findings
Motivation, challenges and realities of	BARRY, T.; GUERIN, S.; BURY, G.[9]	The BMJ, Jun, 2019	MEDLINE	Ireland/ English	The implementation of an assistance service performed by local lay

volunteer community cardiac arrest response: a qualitative study of 'lay' community first responders					attendants in a community is a foundation for performing CPR and early, quality defibrillation before the arrival of the emergency service, which can generate higher survival rates.
Out-of-hospital cardiac arrest survival in international airports	MASTERSON, S.; McNALLY, B.; CULLINAN, J. et al.[10]	Resuscitation, Mar, 2018	MEDLINE	Sweden/ English	The occurrence of HRCP at international airports is relatively high and the chance of a positive outcome is greater than in most places where this event takes place. The study showed that in 59% of the cases the bystander performed the shock, with 42% of the patients being at a shocking pace at the time and a third of the victims survived. Suggesting the importance of providing publicly accessible AEDs in strategically appropriate locations such as an international airport.
Out-of-hospital cardiac arrest: Probability of bystander defibrillation relative to distance to nearest automated external defibrillator	SONDERGAARD, K. B.; HANSEN, S.M.; PALLISGAARD, J.L. et al.[11]	Resuscitation, Nov, 2017	MEDLINE	Denmark/ English	Despite the recommendations of the American Heart Association and the European Resuscittation about the importance of making AEDs available in places of public access, and the great adherence of these recommendations by countries, only 2-4% of victims were defibrillated by a bystander. The work cites some of these obstacles such as the great distance between an AED and the victim, the difference between a HRCP in a home and on a public street, places that provide closed AEDs and the population's lack of knowledge about using the device.
Minnesota Heart Safe Communities: Are community-based initiatives increasing pre-ambulance CPR and AED use?	BOLAND, L. L; FORMANEK, M.B.; HARKINS, K.K. et al.[12]	Resuscitation, Jul, 2017	MEDLINE	USA/ English	The Minnesota Heart Safe Communities program was created to encourage and educate the population about caring for a HRCP. Prior to the creation of the program, 83% of victims received CPR and 63% use of the AED was prior to arrival at the EMS.
Cardiopulmonary resuscitation by trained responders versus lay persons and outcomes of out-of-hospital cardiac arrest:	PARK, Y. M.; SHIN, S.D.; LEE, Y. J. et al.[13]	Resuscitation, Jun, 2017	MEDLINE	South Korea/ English	The study was characterized by dividing into a specific group of the population that has the greatest chance of witnessing a HRCP such as firefighters, police, public transport drivers, teachers, sports instructors and lifeguards, the other group is formed by the lay community in general. . A

A community observational study					total of 6,475 HRCP events were analyzed and the group with the most likely people to witness this event witnessed a low incidence of HRHP. However, when compared to the lay group, they had higher rates of CPR and defibrillation, which resulted in better results.
Bystander Defibrillation for Out-of-Hospital Cardiac Arrest in Public vs Residential Locations	HANSEN, S. M.; HANSEN, C.M.; FOLKE, F. et al.[14]	JAMA Cardiology, Mar, 2017	MEDLINE	Denmark/ English	The American Heart Association and the European Resuscitation Council recommend wide distribution of the AED in many countries. The study included 18,688 patients who had a sudden illness between 2001 and 2012, of which 67.8% were men and 32.2% were women, 4,783 cases of HRCP occurred in public environments and 13,905 in residential areas. In residential locations it increased from 0.0% to 25% over the years. Making the device available, educating laypeople about CPR and an increase in defibrillation were indicative of a better survival prognosis for the victims.
The role of bystanders, first responders, and emergency medical service providers in timely defibrillation and related outcomes after out-of-hospital cardiac arrest: Results from a statewide registry	HANSEN, C. M.; KRAGHOLM, K.; GRANGER, C.B. et al.[15]	Resuscitation, Sep, 2015	MEDLINE	USA/ English	The work makes a comparison between the attendance of a HRCP by spectators, first responders and health service professionals. Overall, bystanders-initiated CPR in more than half of the cases.

Next, it was possible to analyze the distributions of the articles chosen according to the year of publication. They were: (n=1; 14.28%) in 2015; (n=3; 42.85%) in the year 2017; (n=2; 28.57%) in the year 2018; (n=1; 14.28%) in the year 2019.

Regarding the selected journals, (n=5; 71.42%) are from Jornal Resuscitation; (n=1; 14.28%) from The BMJ and (n=1; 14.28%) from JAMA Cardiology. Regarding the language of publications, (n=07; 100%) of the selected articles were published in English. It was possible to observe the countries of origin of the surveys carried out, (n=2; 28.58%) from Denmark; (n=2; 28.58%) from the United States; (n=1; 14.28%) from South Korea; (n=1; 14.28%) from Ireland and (n=1; 14.28%) from Sweden.

Through the data analyzed by Bardin's content analysis, it was possible to point out a thematic category which will be analyzed and discussed below[16].

Results

Role of lay rescuers in cardiorespiratory arrest in an extra-hospital environment

The average person is expected to experience more frequent episodes of cardiorespiratory arrest in non-hospital settings than a healthcare professional. In settings where trained lay rescuers can quickly reach a victim, post-event survival rates are higher. What can motivate a layperson to help another person is some type of previous experience, such as feeling prepared, some illness in the family or even a way of giving back this learned knowledge to the community where they live[9,11,13].

In the study by Hansen et al.[15], few patients had early defibrillation after the recognition of cardiorespiratory arrest, which is the moment of greatest benefit from shock. Even with passersby starting cardiopulmonary resuscitation, only 10% of the time did they perform defibrillation. In other studies, it is mentioned that in the United States, most people who suffer a sudden illness on public roads have a small probability of receiving CPR, in relation to the use of AED, its use concomitantly with CPR occurs in only 10 % of care provided by lay people[12].

In places where there is usually a quantity greater than 1,500 passers-by per day, for example: airports; football stadiums; shopping malls; beaches. In which there are people with various types of backgrounds and customs, it is expected in a society where lay people use first aid to shorten the time between cardiac arrest and first assistance to a victim. Corroborating these assumptions, studies indicate in a survey that in 70 international airports located in 9 countries and found that 32% of all treated patients survived and were discharged from the hospital. In addition, he cites that there is a small probabilistic difference in survival in victims witnessed by bystanders or by the emergency medical service, what really matters is the rapid defibrillation, regardless of who performs it[10].

Another factor that negatively influences first aid and consequently early defibrillation are events that happen at home. A national study carried out in Denmark found that there was an increase in the use of AEDs from 1.2% in 2001 to 15.3% in 2012 when CPA took place in a public environment, whereas in residential places, defibrillation by a bystander remained unchanged. The studies presented are about the very low rates of defibrillation in private areas, and they also point out that doormen are potential candidates to take courses and training to be the main first responders in private places[13,14].

Despite the great importance of the layperson providing first aid to a victim of CPA before the emergency medical service arrives, this service is often not provided. It is believed that the non-action of this lay person in a case of CPA is due to lack of qualification at first (first aid courses), secondly, one can think of psychological unpreparedness until they do not know what maneuvers should be performed. And, every minute without any correct care, the victim's survival prognosis dramatically decreases.

It is noteworthy that a maneuver performed without a technical-scientific apparatus, instead of helping the victim out of this CPA event, can contribute to other situations in which the prognosis may be unfavorable. Such situations here in Brazil can be evidenced during the 2016 Olympics where several videos were shared on social networks of unprepared people performing maneuvers that do not match what is recommended by emergency medical associations.

Discussion

According to Article 135 of the Brazilian Penal Code: "Fail to provide assistance, when possible, without personal risk, to an abandoned or lost child, or to an invalid or injured person, to helplessness or in grave and imminent danger; or not to ask, in these cases, for the help of the public authority", with a penalty of imprisonment from one to six months, or a fine. The penalty may be increased by half, if the omission results in bodily harm of a serious nature, and tripled, if it results in death[17].

A layperson is defined as one who has no knowledge of a particular subject; that expresses a certain ignorance about something; unknown. The works carried out on the knowledge of the lay population about the BLS are scarce in the Brazilian literature[6,18].

Even though the AHA guidelines recommend rapid initiation of CPR in presumed CPR, less than 40% of adult HRCP cases have some CPR maneuver performed by a layman, an even lower rate, 12% of victims have been defibrillated by an AED. Training can be a combination of self-learning and instructor-led teaching with hands-on training. Another way to teach a layman is through gamification and virtual reality[5].

The Red Cross was created by Henry Dunant in 1863, since its inception has had neutrality and humanitarian activities as its principle. In Brazil, it had as its starting point the year of 1908 and since 1910 it began the training of human resources in nursing and stands out with the teaching of first aid to lay people[19].

The training of lay people can be done through a balance between self-learning and teaching given by instructors with practical classes. If there is no instructor-led course or training, so-called self-directed training is an accepted recommendation for lay rescuers, video classes can further drive learning. With more people trained, there is a greater chance that one of them will witness a case of HRCP and perform quality CPR[5].

The term "in situ simulation" refers to training carried out in real locations that are more suitable for assisting a victim. It is recommended that whenever possible they have training on CPR under these conditions. Current literature proves that in situ work provides a different experience from conventional training and brings positive results for learning[5].

The use of technology is a relevant and current point for teaching and learning at the SBV. Studies demonstrate that gamification and virtual reality can generate advantages for participants such as improved knowledge acquisition, retention of prior knowledge and CPR aptitude[5].

Final Considerations

The research aimed to analyze the scientific production about the role of laypersons in cases of out-of-hospital cardiopulmonary arrest. evidence that this type of health education can save lives, which was mainly evidenced in developed countries.

Thus, it is necessary to include theoretical and practical classes focused on the theme of CPA and CPR in extra-hospital environments in basic education. It is important that children and adolescents sow knowledge in their homes and communities and are prepared to act if necessary.

Therefore, it is expected that this study can contribute to further research in this field of knowledge, as it was possible to identify that in several countries there is a lack of people with knowledge to act in this type of emergency. Furthermore, it is believed that educational measures on the topic addressed in this work will contribute to a circumstantial increase in resuscitation attempts carried out by lay people, consequently in an increase in the survival rate of HRCP victims and will reflect a decrease in the shortage of people qualified in society. In addition, it is possible to state that training new people is another field of action for professional nurses, mainly due to their comprehensive education and training.

The main limitation to develop the research was the incipient work related to the topic at the time of the search, mainly developed in the Brazilian scenario. Therefore, this research points to the need for study in this area of knowledge.

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