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Cardiopulmonary Arrest: characterization of the assistance in the mobile emergency medical service

ABSTRACT | Objective: to describe the characteristics of assistance for victims of cardiopulmonary arrest in the prehospital setting. Methods: this is a quantitative, epidemiological and retrospective study made from data present in the medical files of the assistance provided by the Mobile Emergency Medical Service, occurred in 2014 regarding the victims of cardiopulmonary arrest. The information was collected through a structured form using the Utstein language and the descriptive analysis was obtained after processing the data in the STATA 12.0 statistical package. Results: 946 medical files for cardiopulmonary arrest were investigated. Among the victims, there was a predominance of males (56.3%), aged 61-80 years (32.5%), events of a clinical nature (80%), the prevalent cardiac rhythm was asystole (42, 2%) and death was the main outcome (84.5%). Conclusions: it was found a need for training aimed at the population, with the aim of recognizing and intervening early in cardiopulmonary arrest and in parallel, improving anamnesis during telemedicine.
Keywords: Heart arrest; Cardiopulmonary resuscitation; Emergency medical services; nurses.

RESUMEN | Objective: to describe the characteristics of assistance for victims of cardiopulmonary arrest in the prehospital setting. Methods: this is a quantitative, epidemiological and retrospective study made from data present in the medical files of the assistance provided by the Mobile Emergency Medical Service, occurred in 2014 regarding the victims of cardiopulmonary arrest. The information was collected through a structured form using the Utstein language and the descriptive analysis was obtained after processing the data in the STATA 12.0 statistical package. Results: 946 medical files for cardiopulmonary arrest were investigated. Among the victims, there was a predominance of males (56.3%), aged 61-80 years (32.5%), events of a clinical nature (80%), the prevalent cardiac rhythm was asystole (42, 2%) and death was the main outcome (84.5%). Conclusions: it was found a need for training aimed at the population, with the aim of recognizing and intervening early in cardiopulmonary arrest and in parallel, improving anamnesis during telemedicine.
Palavras claves: Heart arrest; Cardiopulmonary resuscitation; Emergency medical services; nurses.

RESUMO | Objetivo: descrever as características do atendimento às vítimas de parada cardiorrespiratória no ambiente pré-hospitalar. Métodos: estudo quantitativo, epidemiológico e retrospectivo elaborado a partir de dados presentes nas fichas de atendimento realizado pelo Serviço de Atendimento Móvel de Urgência, ocorridas no ano de 2014 referentes às vítimas de parada cardiorrespiratória. As informações foram coletadas através de formulário estruturado utilizando a linguagem Utstein e análise descritiva foi obtida após processamento dos dados no pacote estatístico STATA 12.0. Resultados: foram investigadas 946 fichas de atendimento por parada cardiorrespiratória. Entre as vítimas, houve predomínio do sexo masculino (56,3%), com faixa etária de 61-80 anos (32,5%), eventos de natureza clínica (80%), o ritmo cardíaco prevalente foi a assistolia (42,2%) e o óbito foi o principal desfecho (84,5%). Conclusões: constatou-se a necessidade de treinamento direcionado à população, com o objetivo de reconhecer e intervir precocemente na parada cardiorrespiratória e em paralelo, aprimorar a anamnese durante telemedicina.
Palavras-chaves: Parada Cardíaca; Reanimação Cardiopulmonar; Serviços médicos de Emergência; Enfermeiras e Enfermeiros.

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INTRODUCTION

Cardiorespiratory arrest is a major cause of death in adults in the modern world. [1] The keys to the treatment are early recognition, the activation of the emergency medical service, the beginning of chest compressions and early defibrillation. [2,3,4]

The four steps described above are considered to be low complexity procedures, however, the Brazilian population does not receive periodic training to recognize and conduct chest compressions until the emergency team arrives. The consequences generate low survival rates ranging from 1% to 6% [3] related to the pathophysiology of the event, which has one of the most critical times to be attended. If the resuscitation maneuvers do

not occur soon, after 3 to 5 minutes, the probability of neurological impairment increases significantly. [1]

In this way, the assistance to Cardiorespiratory Arrest is periodically reviewed by accredited institutions in order to improve the outcomes. Recent updates improve the telephone service provided by a regulatory attendant of the Emergency Medical Service, in Brazil called Mobile Emergency Service (Serviço de Atendimento Móvel às Urgências - SAMU). Such updates include increasing the effectiveness of telephone instructions, thus focusing on the quality of chest compressions for the lay public. [2] proper instructions by the dispatcher, on the phone, and assisted cardiac arrest demonstrate promising results in public places. [4]

The continuity of assistance takes place, strategically, with the arrival of the SAMU team, which begins the service with Basic and Advanced Life Support. The goal is to increase patient survival, with early interventions such as maintaining effective chest compressions, using an advanced airway, specific medications for each case, and, with successful resuscitation, referral to a hospital that can continue treatment. [5]

The importance of describing the characteristics of care for victims of CPA (Cardiopulmonary arrest) in the prehospital environment in the fourth most populous capital of the country is based on the high occurrence of cardiovascular events, the need to obtain information about this phenomenon and subsidies to increase the chances of survival of CPA victims in this medium.

Considering the relevance of the theme for qualifying care in the scope of urgency and emergency, it was designed as an objective: to describe the characteristics of care for victims of CPA in the pre-hospital environment.

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METHODS

This is a quantitative, epidemiological and retrospective study carried out based on the extraction of data from the care records and CPA of sessions carried out by basic life support units (BLS) and advanced life support (ALS) of SAMU, from the municipality of Salvador-BA, Brazil.

Said service started its activities on July 18, 2005, under the auspices of the Municipal Health Department, which provides assistance to an estimated population of 2.872.347 inhabitants.[6] Its structure has an emergency regulation center, 33 BLS units, 08 ALS units, 01 river mobile unit and 08 motorcycles [7].

As an inclusion criterion for data collection, patient files attended by SAMU were used, generated from January 1st to December 31th 2014, with a call or nickname of the occurrence, entitled by the following terms: 'stopped', 'no responds', 'unconscious' or' CPA '. All the forms for the year 2014 were checked and all those related to services described by the inclusion criteria were manually separated.

Data collection took place in the period from February to March 2015 by nurses from that service, using a structured form. The structured collection form was prepared based on the Utstein Out-of-hospital hospital language, [8] instrument that directs the collection of data related to CPA, validated in Brazil. In addition, it was adjusted according to the data available in the SAMU attendance files, which were filled out by nursing technicians, nurses and doctors. The instrument used for data collection was initially tested with the 2013 service records.

The form consisted of five blocks: characterization of the population served (sex, age and etiology of the CPA), clinical data (first detected heart rhythm), procedures performed (if there was cardiovascular resuscitation-CPR), survey on immediate survival and deaths and the time taken to perform CPA invested by the BLS or ALS teams. The data related to the activation, with regard to the recommendations of the regulator to the applicant, were not available in the attendance form. The consolidated data

formed a bank in the Microsoft Excel program, being exported to the statistical package STATA, version 12.0, in which the analyzes were processed in relative and absolute frequencies.

The development of the research took place upon approval of the project by the Research Ethics Committee of the Faculty of Medicine of Bahia (FMB), of the Federal University of Bahia, under CAAE nº 55279216.1.0000.5577. This study was funded by the researchers.

Table 1 - Characterization of victims of CPA at SAMU. Salvador- BA, 2014, (n= 946).

Variável	N	%
Sexo		
Masculino	533	56,3
Feminino	374	39,6
Sem informação	39	4,1
Idade		
0-1	5	0,5
2-20	24	2,5
21-40	93	9,8
41-60	240	25,4
61-80	308	32,6
81-100	197	20,8
Sem informação	79	8,4
Etiologia da PCR		
Clínica	757	80,0
Traumática	168	17,8
Psiquiátrica	01	0,1
Sem informação	20	2,1

Source: own elaboration, 2015.

Table 2- CPR performed by SAMU. Salvador-BA, 2014 (n=946).

Variável	N	%
Realização de RCP		
Sim	369	39,0
Não	562	59,4
Sem informação na ficha	15	1,6

Source: own elaboration, 2015.

Tabela 3 - First rhythm detected in the care of victims of CPA by SAMU. Salvador-BA, 2014 (n= 369).

Variável	N	%
Primeiro ritmo detectado		
Assistolia	156	42,3
Atividade Elétrica sem Pulso	25	6,8
Fibrilação ventricular	44	11,9
Taquicardia ventricular sem pulso	16	4,3
Sem informação	128	34,7

Source: own elaboration, 2015.

RESULTS

From 14,400 records corresponding to the consultations carried out in 2014, 946 records were selected referring to all consultations of patients victims of CPA by SAMU, in the city of Salvador-BA. Among the victims of CPA, there was a predominance of males (56.3%), from 61-80 years old (32.6%), the etiology of CPA, predominantly those of a clinical nature (80%) (Table 1).

As for the procedures, shown in table 2, CPR was performed in 39% of cases. In 59.4%, CPR was not performed and in 1.6% of the forms, the professionals recorded death without mentioning whether or not CPR was performed.

According to table 3, the clinical data of the visits in which CPR was performed (n = 369), the first heart rate detected was asystole (42,3%), followed by ventricular fibrillation (11,9%). In 34,7% of the records, there was no record of the first rhythm detected.

Regarding the outcomes of the visits, death was the main result, even after the intervention of the BLS (45,3%) and ALS (39,3%). In 48 (13%) visits in which CPR was performed, patients had immediate survival with return to spontaneous circulation (table 4).

The time spent performing CPR in the BLS was less than 20 minutes (32,2%), whereas in the ALS, the time spent in CPR assistance was greater than 20 minutes in (32,2%), as shown in (Table 5).

DISCUSSION

The predominance of male users, among victims of CPA in the pre-hospital environment, is in line with three similar studies carried out in Brazil (Belo Horizonte,

Londrina and Porto Alegre) and two in Spain.[9,10,11,12,13] When the analysis of this variable is carried out in the in-hospital environment specialized in highly complex cardiopneumology, the prevalence of males is observed among victims of CPA.[14]

The high frequency of clinical calls found converges with the data found in other units of the federation, referring to the age groups of 41-60 and 61-80 years. A study carried out in Londrina,[9] indicated an incidence of clinical cases in 77.3% of SAMU consultations, corroborating the similarities regarding the causes of the call and the predominant age groups in Salvador. This relationship is justified by the high prevalence of chronic non-communicable diseases of the circulatory system in the state of Bahia, which according to DATASUS, follows the national trend.[15]

The population coverage of 30.2% of primary care actions and 23.8% of the family health strategy in Salvador in the same year of the survey,[15] combined with the high prevalence of chronic non-communicable diseases, indicate the need for investment and strengthening in prevention and promotion actions in the first level of health care, in order to minimize events of worsening comorbidities, contributing to reduce the number of preventable deaths . SAMU, in this sense, acts as an observatory of the network, tracing a situational diagnosis of the deficiencies of the health system of the various regional territories.[16, 17]

Another data evidenced by the study on screen, concerns the non-performance of cardiac compressions by laypeople, revealing that there is misinformation / ignorance of the population in the identification of the signs of CPA, generating delays in attending to the victim and in the response time of the activation to the telephone call. This data reinforces the recommendation of the Brazilian Society of Cardiology, regarding the need for improvements in the structures and the health system, proposing the creation of programs that aim to train the population, supply materials and provide automatic external defibrillator (AED) in public places with high movement of people.[18,19]

On the other hand, such questions show the importance of the role played by the regulatory physician in primary telephone care, when determining the syndromic diagnosis. In the potential cases of CPA, this professional must act more effectively with the population, guiding the performance of CPR maneuvers with an emphasis on cardiac compressions, until the arrival of the mobile service. The updates to the guidelines[18,19] recommend these actions, as a possible improvement in the outcomes of the CPA.

Such guidelines[2,5,18] have been updated and recent studies,[19] reinforce the need to intensify educational activities aimed at the lay population. These aim to improve the likelihood that victims of CPA will receive the highest quality, evidence-based care, where CPR training uses educational principles backed by research that translates scientific knowledge into practice.[19,20]

The simplification of maneuvers, aimed at the lay population, was introduced in 2010, when the "see-hear-feel" stage was excluded in the initial assessment and, in the modification of the sequence of basic life support from ABC to CAB, emphasizing the importance of quality chest compressions as early as possible. Ventilation maneuvers for the layman have become irrelevant, as has the step of checking the pulse.[18,19]

Such recommendations are intended to facilitate learning and increase the contingent of trained laypeople, considering the population's risk of not absorbing

Table 4. Outcomes of assistance to victims CPA by SAMU. Salvador- BA, 2014 (n=369).

Variável	N	%
Desfecho dos atendimentos		
Óbito após manobras de SBV	167	45,3
Óbito após manobras de SAV	145	39,3
Sobrevida imediata	48	13
Óbito sinais evidentes incompatíveis com a vida	5	1,4
Sem informação	4	1

Source: own elaboration, 2015.

Table 5. Time spent performing CPR during visits to victims of CPA by SAMU. Salvador- BA, 2014 (n=369).

Variável	N	%
Tempo de SBV		
0-20 minutos	119	32,3
Mais de 20 minutos	104	28,2
Mais de 30 minutos	55	14,9
Sem informação	91	24,6
Tempo de SAV		
0-20 minutos	118	32
Mais de 20 minutos	119	32,3
Mais de 30 minutos	84	22,7
Sem informação	48	13

Source: own elaboration, 2015.

so many stages. The assistance offered by the lay population can be characterized as care without resources, because at that moment there are no active professionals, medical-hospital devices and medications involved.[18]

In the pre-hospital service, the request for help is made via telephone, the management of the call takes place through a regulation center composed of minimally telephonists and regulatory doctors, resulting in later guidance to the requester or activation of a mobile health team for the attendance. The unit sent can be either BLS or ALS, with the aim of reaching the victim early and providing qualified care. These normative aspects are well described in ordinances, but the urgency criteria tend to vary a lot from the communication between the regulating physician with whom he requests assistance.[16]

In relation to a request for assistance to the victim of PCR, the traffic conditions of the Bahian capital deserve to be highlighted. There was a marked increase in the motorization rate of the population, the urban bus fleet and alternative transport. All of these obstacles, combined with the lack of a mass transportation system (subway), disrupt traffic, causing interference in increasing SAMU's response time. In 2014, most of the city's main roads were undergoing structural works, in order to host a world sporting event and the subway works were not yet completed.

In this study, death predominated as the main outcome of visits to victims of CPA, even after isolated actions from the ALS and BLS, corroborating results found in three studies carried out in Londrina, Belo Horizonte, Porto Alegre, and two in Spain.[9,10,11,12,13] Studies have confirmed that, despite considerable efforts and advances made in the last decade, in the field of prevention, treatment and through strategies that increase the chances of success in CPA, the survival of out-of-hospital CRP remains low.

Asystole, as the most frequent rhythm found in this study, reflects the results of the association of the data discussed previously, highlighting the delays in requests for help and the extended time spent traveling mobile units to provide care. In this study, the median response time (RT) was 25.5 minutes. Compared to two Brazilian studies carried out in Porto Alegre (RT - 13 minutes) and Belo Horizonte (RT - 09 minutes), their results indicate that, despite the existence of other aggregated factors, the high RT may have contributed to impaired survival of CPA victims.[10,11] Two other Spanish studies attributed the lower incidence of shockable rhythms in out-of-hospital CPA to the delay in the management of the call alert, the activation of the emergency equipment and the care at the place of the occurrence, together with other factors. [12,13]

“In relation to a request for assistance to the victim of PCR, the traffic conditions of the Bahian capital deserve to be highlighted. There was a marked increase in the motorization rate of the population, the urban bus fleet and alternative transport.”

The first three numbers in the survival chain of care for out-of-hospital CPA are aimed at lay rescuers. The American Heart Association, in 2015, highlighted the importance of these people, listed in communities in: registering a CPA, requesting help, starting a CPR and applying a defibrillation, that is, having public access to an AED, until an BLS manages to arrive , assuming care.[18,19]

The BLS algorithm counts on the presence of trained rescuers, AED, in addition to other resources available in the ambulance, such as: devices for ventilatory insufflations such as bag-mask valve, oxygen and the possibility of receiving guidance from the regulator, through the SAMU regulation center.

CONCLUSION

The results found made it possible to point to the need for intervention in several fields: qualification of people, use of strategies and tools that reduce the RT to start BLS directed to the population, with the objective of early recognition of CPA, activation of SAMU and performance in CPR more effectively. The installation of AED in communities can approach the SAMU public, as well as increase the immediate survival of CPA injuries.

This study highlighted the importan-

ce of reorganizing services for quality care, as well as improving medical call center, considering effective, simple communication and the guarantee of sending necessary life support, increasing chances of survival until the arrival of mobile care. We recognize as a limitation of the study the fact that the findings are limited to one municipality and the incomplete completion of the attendance forms, making it impossible to collect data in a more effective and robust way.

It is understood that this research is important for nursing, since it allowed to contribute to new reflections on emergency care. The development of action strategies based on: networking, from the perspective of interdisciplinarity and intersectorality in the face of a cardiovascular emergency, will favor the dissemination of information and actions in the face of a CPA, empowering everyone as agents of health care.

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