

EPIDEMIOLOGICAL ANALYSIS OF PCR CASES IN THE SAMU SERVICE IN THE MUNICIPALITY OF CURITIBA

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Abstract: INTRODUCTION: Cardiorespiratory arrest (CPA) is a public health problem, with a high number of deaths occurring in Brazil, with half of the occurrences occurring in an out-of-hospital environment. Thus, the Mobile Emergency Care Service (SAMU) becomes essential, as it allows measures until the victim's arrival at the hospital to be carried out in a rationalized manner and in the shortest possible time. Furthermore, cardiopulmonary resuscitation (CPR) and the use of an automatic external defibrillator (AED), before help arrives, are actions that can significantly improve the outcome of cases, reducing the morbidity and mortality of victims. OBJECTIVES: To analyze the epidemiological characteristics and outcome of patients who had cardiorespiratory arrest and were treated by SAMU, in the city of Curitiba, in addition to defining the epidemiological profile of patients treated by this service and identifying whether there is a relationship between the variables analyzed and the outcome of service. METHODOLOGY: Quantitative, epidemiological and cross-sectional study, with patients who are victims of cardiac arrest treated by SAMU in Curitiba, who underwent cardiopulmonary resuscitation, from January to July 2023. Data were collected from the rescuers' care reports, coming from the SAMU database, which were tabulated and analyzed by Microsoft Office Excel. RESULTS: 556 medical records of patients undergoing cardiac arrest who were treated by SAMU were analyzed. The computed and verified data indicated that PCR was reversed in 14.93% of cases (83 patients), with death occurring in 69.78% (388 patients), and it was also verified that in 11.69% (65 patients) the cause of death was different and in 3.60% (20 patients) it was not indicated in the medical records. Of the 556 patients, 325 (58.45%) were male and 203 (36.51%) were female, with 28 patients (5.04%)

not having their sex identified. Regarding the time of activations, the afternoon period was the one with the highest number of cases, totaling 219 occurrences (39.39% of cases). Among the 388 patients who died, 268 (69.07%) were 60 years or older and in 307 patients (79.12%) the CA occurred at home. During SAMU care, 511 patients (91.9%) did not receive any type of drug, of which 501 (98.04%) died. Regarding reversible cases of CRP, 43 patients (51.81%) were 60 years old or older and 44 patients (53.01%) had CRP at home. Taking into consideration, the comorbidities analyzed, 113 patients (20.32%) were hypertensive and 78 (14.03%) were diabetic, with these diseases being significant for the CRP outcome. CONCLUSION: Of the 556 cases analyzed, it is understood that the majority of patients were male, aged over 60 years, with 388 patients dying, mainly at home and in the afternoon. Comorbidities, such as cardiovascular diseases, hypertension, cancer and diabetes, were more linked to the events. In patients in which the resuscitation protocol was used, with drugs and maneuvers, a reversal of the condition can be observed in most cases.

Keywords: Cardiorespiratory Arrest, Pre-Hospital Emergency Care, Cardiopulmonary Resuscitation

INTRODUCTION

First aid aims to prevent the condition from worsening, promote the victim's recovery and preserve life. Thus, in 2000 the Mobile Emergency Care Service (SAMU) was implemented as a component of the National Emergency Care Policy, with the mobile emergency component being normatively established (3). This way, access to emergency services becomes organized, enabling the first measures and arrival at the hospital to be carried out in a rationalized manner and in the shortest possible time.

Cardiorespiratory arrest (CRA) is one of the biggest public health problems, with a high number of deaths in Brazil annually. There are around 200,000 PCRs per year, half of which occur in hospitals and the other half in other locations (2). Cardiopulmonary resuscitation (CPR) depends on a sequence of actions and procedures, such as immediate chest compression together with early defibrillation, if indicated, for it to be successful. The speed of recognition, effectiveness and correct application of the maneuver increase the patient's survival rate (2). Basic support must be initiated by the person next to the victim after SAMU-192 is activated, with rhythmic chest compressions and without interruptions until the arrival of the emergency service (2,4). After resuscitation, special measures, such as ventilation and oxygenation, are necessary to correctly control vital functions (2).

The ideal time to apply an Automatic External Defibrillator (AED) is 3 to 5 minutes after cardiac arrest (2), where the onset time is directly related to the survival rate, with a drop of around 10% every minute passed (4). The AED is portable and easy-to-maintain equipment for lay users, as it has the ability to interpret the victim's heart rhythm and thus place the correct energy level in the body, with the main function of those at the scene being to locate the electrodes on the victim's chest and follow the device's instructions (1).

Despite the lack of reliable statistical records, there is a notable lack of AEDs in exhibition and easily accessible locations in the country, especially in high-traffic locations such as airports, shopping malls, cinemas, sports arenas, sidewalks and public parks. A greater number of this equipment, as well as a general understanding of the population on how to use them, would certainly bring benefits and increase the success rate of cardiopulmonary resuscitation in the country.

The objective of the work was to analyze the

epidemiological characteristics and outcome of patients who had cardiorespiratory arrest and were treated by SAMU, in the city of Curitiba, in addition to defining the epidemiological profile of patients treated by this service and identifying whether there is a relationship between the variables analyzed and the outcome of care.

METHODOLOGY

Quantitative, epidemiological and cross-sectional study, based on data provided by SAMU, from the city of Curitiba-PR and metropolitan region, Brazil, with an estimated population of 3 million and 700 thousand people. Data were collected from 556 medical records of patients who required care by SAMU with signs and symptoms of cardiorespiratory arrest. Of these, only 65 did not obtain the PCR outcome. The inclusion criteria are the occurrences of CRP in Curitiba, attended by SAMU from March 17, 2022 until July 31, 2022. The exclusion criteria are patients who did not suffer CRP and those who are not from the city of Curitiba.

The variables were analyzed: sex, age, patient destination, time of day, outcome. Regarding the approach, the use of vasoactive drugs, sedatives and analgesics, intubation, induced shock, other drugs and no use of medication related to the outcome of the cases were analyzed. Among the comorbidities analyzed are smoking, obesity, high blood pressure and diabetes.

The data collection period was between January and July 2023. The data was collected from SAMU rescuer service reports, filed by the service itself at the Paraná Government Security Center. All reports from the year 2022 were analyzed and only the records that met the inclusion criteria were chosen for data collection. The data were spreadsheet using the Excel program, as well as statistical analyzes were carried out.

This research was approved by the Ethics and Research Committee Involving Human Beings Faculdade Evangélica Mackenzie do Paraná - FEMPAR under opinion 5.611.776 – CAAE: 61637822.4.3001.0101. This study was funded and funded by the researchers.

RESULTS

556 medical records of patients who required care by SAMU with signs and symptoms of cardiorespiratory arrest (CPA) were identified. Of these, only 65 did not obtain the PCR outcome. The total value of some variables was lower due to the lack of information in the electronic medical record in the SAMU database.

Among the patients recorded, 325 were male (58.45%) and 203 were female (36.51%), while 28 did not have their sex identified in the medical records (5.04%). Regarding age, 4 patients were aged 0 to 9 years (0.72%), 7 were aged 10 to 19 years (1.26%), 5 were aged 20 to 24 (0.9%), 162 were aged 25 to 59 (29.14%) and 346 patients aged 60 or over (62.23%). There were also 32 medical records in which age was not reported (5.76%).

Regarding the destination of the patients, 67.45% were taken to the IML, 11.15% to a Public Tertiary Hospital, 7.37% to the UPA, 6.12% to other establishments and 4.14% to a Private Hospital. In 3.78% of cases the destination was not registered.

The period with the highest number of activations was the afternoon with 39.39% of cases, followed by the morning with 32.91%. 18.35% of cases occurred at night and, finally, only 6.29% occurred during the night. In 3.06%, the SAMU activation time was not informed.

In 69.78% of the cases analyzed, there was death. Furthermore, looking at the total number of cases, in 14.93% of these the outcome was CA without death. In the remaining 11.69%, the cause of death was

something other than cardiorespiratory arrest. In 3.6%, the outcome of the case was not determined in the medical records.

From the chi-square test and the comparison between the place where the patient was and the outcome of the case, there was a significant association with a value of $p < 0.01$ in which the place where the most deaths occurred was at home, totaling 79%, in addition to being the place with the highest number of deaths proportionally to its total.

Local	Death	PCR	Others	Total
Asylum	16	4	7	27
Residence	306	45	39	390
Public Highway	66	34	14	114
Total	388	83	60	531

When comparing the location where the patient was with the SAMU call time, there was a statistical significance showing that the majority of ambulances called in the morning and afternoon are destined for homes.

Time	Asylum	Domicile	Public Highway	Total
00:00 - 06:00	0	32	3	35
06:00 - 12:00	11	137	35	183
12:00 - 18:00	16	147	56	219
18:00 - 00:00	0	81	21	102
Total	27	397	115	539

When comparing the fate of SAMU with the outcome, there was a statistical relevance with $p < 0.01$ which shows that 55% of cases diagnosed as PCR were sent to a Tertiary Public Hospital, while 46% of those who had some other diagnosis were referred for the UPAs.

Destiny	PCR	Others	Total
Private Hospital	16	6	22
Tertiary Public Hospital	40	18	58
Others	11	8	19
UPA	6	27	33
Total	73	59	132

Observing the relationship between age group and case outcome, 69% of deaths occurred in patients aged 60 or over. In cases confirmed as PCR, 52% of patients were 60 years or older and 42% were in the range of 25 to 59 years ($p < 0.01$), demonstrating an important relationship between increased age and prognosis.

Age range	Death	PCR	Others	Total
0 a 9	3	0	1	4
10 a 19	0	5	1	6
20 a 24	4	0	1	5
25 a 59	109	34	14	157
60 years or more	256	42	40	338
Total	372	81	57	510

There was statistical relevance with $p < 0.01$ when separately relating the use of vasoactive drugs, sedatives and analgesics, intubation, induced shock, other drugs and no use of medication with the outcome of the cases. As shown in the table below, we observed that among the patients who did not receive any drug, 98% died. On the other hand, among those who received drugs, shock or were intubated, mortality occurred in only 1 to 3%. Therefore, when it comes to survival, the importance of appropriate management in the face of a case of PCR is evident.

Conduct	Death	Others	PCR	Death %	Others %	PCR %
Vasoactive drug	7	1	30	2%	2%	36%
Sedative/analgesic	2	1	8	1%	2%	10%
No drugs	379	63	49	98%	97%	59%
Others	5	0	8	1%	0%	10%
Intubation	4	3	27	1%	5%	33%
Shock	10	0	15	3%	0%	18%

Among the comorbidities analyzed, smoking, obesity, high blood pressure and diabetes were significant with $p < 0.05$, while the others presented a p greater than 0.05. Systemic Arterial Hypertension (SAH)

was the most frequent among the patients analyzed, as well as the one with the highest percentage in the number of deaths and CRP. The percentages were calculated in relation to the total values presented in the "Outcome".

Comorbidity	Death	Others	PCR	Death %	Others %	PCR %
HAS	29	7	17	7%	11%	20%
Diabetes	24	6	12	6%	9%	14%
Obesity	3	0	6	1%	0%	7%
Smoking	4	0	6	1%	0%	7%
Cancer	25	3	2	6%	5%	2%
Cardio-vascular disease	32	7	10	8%	11%	12%
Respiratory disease	9	4	3	2%	6%	4%
Kidney disease	5	0	3	1%	0%	4%
Neurological Disease	13	5	2	3%	8%	2%
Psychiatric Illness	13	4	3	3%	6%	4%
Alcoholism	9	4	3	2%	6%	4%
Others	39	8	5	10%	12%	6%

There was no statistical relevance in the relationship between the resources used and the case outcome, nor when comparing the patient's sex with the case outcome. In these situations, the p obtained was 0.83 and 0.82, respectively.

Resources	Death	Others	PCR	Total
Others	1		2	3
USA	283	52	70	405
USA + USB	43	9	9	61
Total	327	61	81	469
Gender	Death	Others	PCR	Total
F	147	23	29	199
M	228	34	52	314
Grand total	375	57	81	513

Furthermore, when comparing the SAMU activation time with the outcome of the case, the p obtained was 0.34, with no statistical relevance when correlating such data.

Time	Death	Others	PCR	Total
00:00 - 06:00	20	4	8	32
06:00 - 12:00	139	15	24	178
12:00 - 18:00	155	26	36	217
18:00 - 00:00	71	15	13	99
Grand total	385	60	81	526

DISCUSSION

The research results demonstrated that cardiorespiratory arrest occurs more frequently in males, as these accounted for 58.45% of the patients treated. These data agree with a publication by the Brazilian Society of Clinical Medicine, which states that an American study carried out by Northwestern University, in Chicago, demonstrated that men over 40 years of age have a risk of 1 in 8 each chance of suffering a sudden cardiac death, and for women this value reduces to 1 in every 24 chances. Data on deaths in Brazil from DATASUS in 2021 also show more deaths due to cardiorespiratory arrest in men, 1876, and for women this number was 1366.

The study also demonstrated that the majority of cardiorespiratory arrests occur in people over 60 years of age, since among the 556 patients, 336 were in this age group, in line with the study conducted in Belo Horizonte, which, through data analysis, from SAMU found that 68.3% of deaths resulting from PCR occurred in individuals over 60 years of age⁷. Furthermore, data from DATASUS demonstrate that of the 3,242 deaths from cardiac arrest that occurred in Brazil in 2021, 1,156 were in people over 80 years old, 653 between 70 and 79 years old, 590 between 60 and 69 years old and only 42 between 20 and 29 years old.

Regarding the most recurrent clinical comorbidities, our study found hypertension and cardiovascular disease to be the most related to CRP and the outcome of death, a result also found by Guimarães et al., and Salim et al.⁸. These results indicate the need

to emphasize the prevention and treatment of these illnesses with a view to reducing fatal cases and occurrences of cardiorespiratory arrests.

In the context of temporal analysis, the results found were different from other similar studies, such as that by Guimarães et al.⁷, carried out in Belo Horizonte between 2019 and 2021, in which the peak time for PCR cases by SAMU was in the morning, followed by the afternoon and evening, respectively.

According to the data studied, there is a relevant difference between the outcome of cardiorespiratory arrests in which vasoactive drugs, analgesics, sedatives, intubation or induced shock were used compared to those in which no medication was used. The results revealed that 98% of patients who did not receive medication died. For those who received some support or medication, this value was reduced to 3%. This information is contrary to a study by Pazin-Filho et al, which stated that the level of evidence for the use of medications in cases of CA is low, stating that only basic life support and defibrillation are highly relevant.

A limitation of the study lies in the impossibility of collecting data on comorbidities in more than 30% of the sample due to the lack of information provided by participants, which could result in a possible underestimation of the results presented. We also observed that occasional impossibility occurs due to the lack of uniformity in data transcription, which compromises the evaluation of similar research. Therefore, this study emphasizes the importance of correctly filling out pre-hospital care records. We also highlight the relatively small sample number, which reduces the statistical capacity to detect disparities of smaller magnitude.

CONCLUSION

The majority of individuals who suffered a cardiorespiratory arrest and were treated by SAMU are men over 60 years of age. More than 60% of the 556 patients analyzed died, which is still the most prevalent outcome for cases of CA.

The study demonstrated that incidents are more common in the afternoon, and that the majority occurred at home. The death rate from incidents at home was higher than on public roads or nursing homes.

The majority of patients undergoing PCR are referred to tertiary public hospitals, with the minority being referred to UPA.

The results demonstrate that the

relationship between some comorbidities and cardiovascular events is notable, with a greater relevance of cardiovascular diseases, systemic arterial hypertension, cancer and diabetes. The highest mortality rates were mainly related to cardiovascular diseases and hypertension.

Furthermore, it is evident that this study demonstrated that adequate life support for individuals undergoing cardiac arrest makes a total difference in the outcome of the cases, since the survival of patients who received vasoactive medications, analgesics, shock or intubation is much higher than that of those who received were not assisted by these resources.

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