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PROFILE OF PATIENTS WITH MANIFESTATIONS COMPATIBLE WITH ACUTE MYOCARDIAL INFARCTION TREATED BY THE EMERGENCY DEPARTMENT

Perfil de pacientes com manifestações compatíveis com infarto agudo do miocárdio atendidos pelo serviço de urgência

Perfil de los pacientes con manifestaciones compatibles con infarto agudo de miocardio atendidos en urgencias

Vannessa Maria Guedes Filgueira[1]
Sônia Maria Josino dos Santos[2]
Josilene de Melo Buriti Vasconcelos[3]
Emmily Ferreira de Farias Cardoso[4]
Letícia Lorrany Rocha Ribeiro[5]
Anderson Flor Guilherme[6]

RESUMO

Objetivo: investigar e analisar o perfil sociodemográfico e epidemiológico de pacientes com manifestações compatíveis com Infarto Agudo do Miocárdio atendidos pelo Serviço de Atendimento Móvel de Urgência de João Pessoa. **Método:** foram coletados dados das fichas de atendimento de janeiro de 2020 a junho de 2024. **Resultados:** foram avaliadas 535 fichas de atendimento. A maioria dos casos ocorreu em 2022, no turno diurno, em pacientes com "Dor precordial", adultos, do sexo masculino, hipertensos, cardiopatas e diabéticos, provenientes de João Pessoa. A maioria dos atendimentos foram realizados em até 10 minutos. O maior tempo de atendimento está relacionado aos casos atendidos em 2024, com Síndrome Coronariana Aguda e Infarto Agudo do Miocárdio, transportados pela Unidade de Suporte Avançado. **Conclusão:** os achados deste estudo

[1,2,3,4,5,6] Universidade Federal da Paraíba, Paraíba, João Pessoa, Brasil.

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CORRESPONDING AUTHOR: Vannessa Maria Guedes Filgueira
E-mail: vannessamg@gmail.com
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servem de base para o desenvolvimento de novas pesquisas, bem como subsidiar estratégias que visem reduzir o tempo de atendimento e, assim, melhorar os desfechos associados ao infarto.

DESCRITORES: Atendimento pré-hospitalar; Infarto agudo do miocárdio; Tempo para o tratamento.

ABSTRACT

Objective: to investigate and analyze the sociodemographic and epidemiological profile of patients with manifestations compatible with Acute Myocardial Infarction treated by the Mobile Emergency Care Service of João Pessoa. **Method**: data were collected from care records from January 2020 to June 2024. **Results**: 535 care records were evaluated. Most cases occurred in 2022, during the day shift, in patients with "Precordial pain", adult, male, hypertensive, heart disease and diabetic, from João Pessoa. Most care was performed within 10 minutes. The longest care time is related to cases treated in 2024, with Acute Coronary Syndrome and Acute Myocardial Infarction, transported by the Advanced Support Unit. **Conclusion**: the findings of this study serve as a basis for the development of new research, as well as to support strategies that aim to reduce the time of care and, thus, improve the outcomes associated with infarction.

DESCRIPTORS: Prehospital care; Acute myocardial infarction; Time to treatment.

RESUMEN

Objetivo: investigar y analizar el perfil sociodemográfico y epidemiológico de los pacientes con manifestaciones compatibles con Infarto Agudo de Miocardio atendidos por el Servicio de Atención Móvil de Urgencias de João Pessoa. **Método**: los datos se recolectaron de los registros de servicios de enero de 2020 a junio de 2024. **Resultados**: se evaluaron 535 registros de servicios. La mayoría de los casos ocurrieron en 2022, durante el día, en pacientes con "Dolor precordial", adultos, varones, hipertensos, cardiópatas y diabéticos, de João Pessoa. La mayoría de las citas se completaron en 10 minutos. El mayor tiempo de espera está relacionado con los casos atendidos en el año 2024, con Síndrome Coronario Agudo e Infarto Agudo de Miocardio, transportados por la Unidad de Soporte Avanzado. **Conclusión**: los hallazgos de este estudio sirven como base para el desarrollo de nuevas investigaciones, así como para sustentar estrategias que busquen reducir el tiempo de atención y, así, mejorar los resultados asociados al infarto.

DESCRIPTORES: Atención prehospitalaria; Infarto agudo de miocardio; Es hora del tratamiento.

INTRODUCTION

Cardiovascular diseases are among the leading causes of death in Brazil. Among them, Acute Myocardial Infarction (AMI) stands out, with an increase in hospitalizations and mortality rates, reaching its peak between 2018 and 2020, with 32.26% of deaths.[1]

AMI is an Acute Coronary Syndrome (ACS), defined as an acute myocardial injury "with detection of a rise and/or fall in cardiac troponin (cTn) values with at least one value above the 99th percentile upper reference limit," associated with: symptoms of acute myocardial ischemia; new ischemic changes on electrocardiogram (ECG); presence of pathological Q waves; imaging evidence of new loss of viable myocardium or new regional wall motion abnormalities consistent with ischemia; or identification of a coronary thrombus by angiography or autopsy.[2]

According to the Ministry of Health, around 300,000 individuals per year are victims of AMI, of which 30% die.[3] Estimates indicate that by 2040, the incidence of infarctions in Brazil will increase by up to 250%. A study revealed that, from 2007 to 2016, there were 189,634 deaths from AMI in Brazilian capitals, of which 41.7% occurred outside the hospital setting.[4]

In AMI management, optimizing response time is essential, as the patient's prognosis tends to be better when appropriate interventions are carried out promptly. Therefore, it is crucial that healthcare professionals are properly trained to assist patients with signs of AMI, in order to minimize the time to first care in the pre-hospital setting, to save cardiac muscle and prevent worsening of the clinical condition.[5]

From this perspective, the concept of Total Ischemic Time (TIT) encompasses the time between symptom onset and health service care, related to the patient, and systemic delays, from AMI diagnosis to reperfusion therapy.[6]

In the context of the Emergency Care Network of Brazil's Unified Health System (SUS), the Mobile Emergency Care Service (SAMU) provides care to patients affected by

AMI and other cardiac emergencies in the Pre-Hospital Care (PHC) setting.[7]

Given this context, the following guiding question was formulated to direct the research: what is the sociodemographic and epidemiological profile of patients with manifestations compatible with AMI treated by SAMU-192 in João Pessoa?

Based on the theoretical assumptions supporting the research, this study starts from the following hypothesis: the delay in initiating treatment for individuals with manifestations compatible with AMI negatively influences case outcomes.

Considering the need for high-quality care to reduce the risk of complications in patients diagnosed with AMI, it is urgent to recognize the multiplicity of factors surrounding the illness process and influencing the start of treatment. From this perspective, the need and importance of conducting this study is justified.

Thus, the objective of this study is to investigate and analyze the sociodemographic and epidemiological profile of patients with manifestations compatible with AMI treated by SAMU-192 in João Pessoa.

METHOD

This is a documentary cross-sectional study with a retrospective, exploratory, and descriptive perspective, using a quantitative approach. Data collection was carried out through consultation of patient care records at the Regional SAMU of João Pessoa, located at the Municipal Administrative Center, Rua Diógenes Chianca, Água Fria district, João Pessoa - PB, ZIP code: 58073-480.

The sample consisted of retrospective data from January 2020 to June 2024, drawn from records of patients with clinical manifestations compatible with AMI. Records of patients under 18 years of age were excluded.

Data were collected using a form previously developed specifically for this research and validated by two specialists in Emergency and Urgent Care. In this instrument, information was transcribed from the pre-hospital care records of patients with manifestations compatible with AMI.

The form was composed of the following variables: (1) Data on the patient's sociodemographic and epidemiological profile: year of care, shift, reason for care, age group, sex, medical history, type of transport, and origin. (2) Clinical manifestations: pulmonary function, cardiovascular function, level of consciousness, and symptoms; (3) Time to care; and (4) Outcome.

Authorization for data collection from the SAMU-192 service records was granted by the Teaching and Health Management (GES) of the Municipality of João Pessoa. The project was approved by the Research Ethics Committee of the Health Sciences Center of the Federal University of Paraíba (CEP/CCS), under opinion No. 7.027.903, CAAE: 82059424.2.0000.5188.

The study complied with the criteria established by Resolution 466/2012 of the National Health Council, which regulates research involving human beings. Since this is a documentary study based on secondary data, the use of a Free and Informed Consent Form (FICF) was waived.

The data were tabulated in Excel and analyzed in SPSS, version 26.0. The analysis was performed through absolute and relative frequency of the data, as well as inferential analysis using Pearson's Chi-square Test or Fisher's Exact Test, the latter applied when more than 20% of the cells had an expected frequency lower than 5. For inferential tests, a significance level of 5% (p-value < 0.05) was adopted.

RESULTS

A total of 535 pre-hospital care records were randomly selected and evaluated, out of 2,378, representing 22.5% of the population, with a 95% confidence level and a sampling error margin of 3.73%.

Sociodemographic and epidemiological profile

When analyzing the sociodemographic and epidemiological profile of the patients in the sample, Table 1 shows that most were treated in 2022, n=121 (22.6%), during the daytime shift, n=325 (60.7%), and the most prevalent reason for care was "Precordial pain," n=381 (71.2%).

Regarding age group, adults (20–59 years), n=265 (49.5%), and older adults (≥60 years), n=258 (48.2%), stood out. The mean age was 59.88 years, with a standard deviation of 16.68, ranging from a minimum of 18 years to a maximum of 111 years.

Most participants were male, n=302 (56.5%), had arterial hypertension, n=181 (33.8%), heart disease, n=114 (21.3%), and diabetes mellitus, n=98 (18.3%). The most commonly used type of transport was the Basic Support Unit (BSU), n=322 (60.2%), and most patients came from João Pessoa, n=442 (83.6%).

Table 1 – Distribution of data regarding the sociodemographic and epidemiological profile of study participants. João Pessoa, Paraíba, Brazil, 2024

Variables	n	%
Year		
2020	117	21,9
2021	109	20,4
2022	121	22,6
2023	111	20,7
2024	77	14,4
Shift		
Day	325	60,7
Night	203	37,9
Not reported	8	1,4
Reason for care		
Precordial pain	381	71,2
AMI	130	24,3
AMI and Precordial pain	22	4,1
ACS	2	0,4
Age group		
Young	2	0,4
Adult	265	49,5
Older adult	258	48,2
Not reported	10	1,9
Gender		
Male	302	56,5
Female	218	40,7
Not reported	15	2,8
Medical history		
Arterial hypertension	181	33,8
Heart disease	114	21,3
Diabetes mellitus	98	18,3
Chronic medication use	47	8,8
Previous AMI	25	4,7
Others[1]	56	10,5
Not reported	240	44,9
Type of transport		
BSU	322	60,2
ASU	165	30,8

Variables	n	%
ML	37	6,9
Not reported	11	2,1
Origin		
João Pessoa	442	82,6
Cabedelo	36	6,7
Bayeux	27	5,0
Santa Rita	13	2,5
Other locations[2]	11	2,1
Not reported	6	1,1

Note: [1]Alcoholism, Stroke, Smoking, Mental Illness, Kidney Disease, Seizures, Respiratory Problems; [2]Conde, BR 230, Cruz do Espírito Santo, Lucena, Patos; AMI: Acute Myocardial Infarction; ACS: Acute Coronary Syndrome; Stroke: Cerebrovascular Accident.

Clinical manifestations

Table 2 presents the distribution regarding the patients' clinical condition during care. In most patients, respiratory rate was normal, n=366 (68.4%), as well as peripheral oxygen saturation (SpO_2), n=430 (80.4%).

With regard to cardiovascular function, most patients presented normal circulation, n=335 (62.5%), normal perfusion, n=417 (78.0%), and a regular pulse, n=302 (56.4%), with full pulse in n=140 (26.2%). Among participants who underwent ECG, 28 (5.2%) showed some alteration. As for blood pressure, 339 (63.3%) patients had arterial hypertension, and heart rate was normal in 358 (66.9%) of them.

Most patients presented hyperglycemia, n=385 (72.0%), and were conscious, n=403 (75.3%), and oriented, n=346 (64.7%). Regarding general clinical manifestations, 279 (52.1%) participants presented precordial or chest pain without radiation to the upper limbs, back, neck, or jaw. Other general symptoms were also present, the most prevalent being: dyspnea or respiratory discomfort, n=39 (7.3%); malaise, n=27 (5.0%); epigastric pain, n=26 (4.9%); vomiting, n=25 (4.7%); and nausea, n=23 (4.3%).

Table 2 – Distribution of absolute and relative frequency of data regarding the clinical condition of participants during care. João Pessoa, Paraíba, Brazil, 2024

Variables	n	%
Respiratory rate		
Normal (12-20 rpm)	366	68,4
Tachypnea (>20 rpm)	95	17,7
Not reported	72	13,5
SpO2		
Normal (95-100%)	430	80,4
Altered (<95%)	60	11,2
Not reported	44	8,2

Variables	n	%
Circulation		
Normal	335	62,6
Cold	75	14,0
Not reported	77	14,4
Perfusion		
Normal	417	78,0
Not reported	93	17,4
Pulse		
Regular	302	56,4
Full	140	26,2
Not reported	109	20,4
Electrocardiogram		
Not performed	66	12,3
Altered	28	5,2
Normal	16	3,0
Not reported	425	79,4
Blood pressure		
Normal (>90/60 and <120/80 mmHg)	84	15,7
Elevated (SBP=120–129 and DBP<80 mmHg)	48	9,0
Hypertension (SBP >130 or DBP ≥80 mmHg)	339	63,3
Not reported	42	7,9
Heart rate		
Normal (60-100 bpm)	358	66,9
Tachycardia (>100 bpm)	113	21,1
Bradycardia (<60 bpm)	22	4,1
Not reported	41	7,7
Capillary Blood Glucose (HGT)		
Normal (70-99 mg/dL)	51	9,5
Hyperglycemia (>99 mg/dL)	385	72,0
Not reported	93	17,4
Level of consciousness		
Conscious	403	75,3
Oriented	346	64,7
Not reported	109	20,4

Variables	n	%
Symptoms		
Precordial or chest pain with radiation*	74	13,8
Precordial or chest pain without radiation	279	52,1
Anginal equivalents[1]	140	26,2

Note: [1]Dyspnea, Malaise, Epigastric pain, Vomiting, Nausea. *To upper limbs, back, neck, or jaw. HGT: Capillary Blood Glucose Test; BPM: Beats per Minute; IRPM: Respiratory Rate per Minute; SpO_2: Peripheral Oxygen Saturation. SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure.

Time for service

The time to patient care, as shown in Table 4, was recorded in 375 (70.1%) care forms, with a mean response time of 11.22 minutes and a standard deviation of 7.05, ranging from a minimum of 0 minutes to a maximum of 73 minutes.

The variable "time to care" was dichotomized using the median cut-off point, which was 10 minutes. Thus, it was found that most calls were completed within 10 minutes, n=224 (59.7%).

Table 3 – Distribution of time to care for study participants. João Pessoa, Paraíba, Brazil, 2024

Time to care	n	%
Reported		
No	160	29,9
Yes	375	70,1
Time to care		
Up to 10 minutes	224	59,7
More than 10 minutes	151	40,3

Outcome

Table 4 presents the distribution of data on the outcomes of participants' care, where most patients were referred to the Hospital Unit, n=394 (73.6%).

Table 4 – Distribution of data on the outcomes of participants' care. João Pessoa, Paraíba, Brazil, 2024

Outcome	n	%
Referred to hospital unit	394	73,6
Treated on site and discharged	50	9,3
Occurrence canceled*	23	4,3
Refused care and/or transport	20	3,7
Death on site or during care	12	2,2
ASU or BSU support	12	2,3
Not reported	24	4,5

Note: *Patient assisted by third parties, prank call, or unspecified reasons. ASU: Advanced Support Unit; BSU: Basic Support Unit.

Association between factors influencing time to care

In the association between sociodemographic and clinical data and time to care (Table 5), a statistically significant association was identified with year of care (p-value=0.025), reason for care (p-value=0.024), and type of transport (p-value=0.001).

Thus, longer response times (>10 minutes) predominated among those treated in 2024, whose reasons for care were described as ACS and AMI, and whose transport type was the ASU.

Regarding the relationship between time to care and outcome, 164 (57.3%) patients who needed referral to the hospital unit were attended by SAMU within 10 minutes after the call. Likewise, 21 (65.6%) patients who were treated and released were also attended within 10 minutes. Conversely, 6 (60.0%) patients who progressed to death received care after more than 10 minutes, highlighting that delays in care are related to worse patient prognosis.

Table 5 – Distribution of the association between sociodemographic and clinical data from participants' care and time to care. João Pessoa, Paraíba, Brazil, 2024

Variables	Time to care		p-value
	Up to 10 minutes n (%)	More than 10 minutes n (%)	
Year			
2020	41 (71,9)	16 (28,1)	**0,025***
2021	43 (61,4)	27 (38,6)	
2022	56 (59,6)	38 (40,4)	
2023	61 (61,6)	38 (38,4)	
2024	23 (41,8)	32 (58,2)	
Reason for care			

Variables	Time to care		p-value
	Up to 10 minutes n (%)	More than 10 minutes n (%)	
Precordial pain	169 (63,3)	98 (36,7)	**0,024****
AMI	46 (49,5)	47 (50,5)	
AMI and Precordial pain	9 (69,2)	4 (30,8)	
ACS	0 (0,0)	2 (100,0)	
Age group			
Young	0 (0,0)	2 (100,0)	0,275**
Adult	110 (59,1)	76 (40,9)	
Older adult	110 (60,4)	72 (39,6)	
Gender			
Male	116 (56,6)	89 (43,4)	0,227*
Female	103 (62,8)	61 (37,2)	
Type of transport			
BSU	130 (58,3)	93 (41,7)	**<0,001***
ASU	61 (53,0)	54 (47,0)	
ML	30 (93,8)	2 (6,3)	
Shift			
Day	134 (60,6)	87 (39,4)	0,725*
Night	90 (58,8)	63 (41,2)	
Origin			
João Pessoa	191 (61,2)	121 (38,8)	0,102**
Cabedelo	21 (65,6)	11 (34,4)	
Bayeux	6 (46,2)	7 (53,8)	
Santa Rita	2 (33,3)	4 (66,7)	
Conde	1 (14,3)	6 (85,7)	
Other locations[1]	1 (50,0)	1 (50,0)	
Outcome			
Referred to hospital unit	164 (57,3)	122 (42,7)	0,258**
Treated on site and discharged	21 (65,6)	11 (34,4)	
Occurrence canceled[2]	9 (75,0)	3 (25,0)	
Refused care and/or transport	8 (61,5)	5 (38,5)	
Death on site or during care	4 (40,0)	6 (60,0)	
ASU or BSU support	7 (87,5)	1 (12,5)	

Note: [1]BR 230, Cruz do Espírito Santo, Lucena, Patos; [2]Patient assisted by third parties, prank call, or unspecified reasons; *Pearson's Chi-square Test; **Fisher's Exact Test; AMI: Acute Myocardial Infarction; ACS: Acute Coronary Syndrome; BSU: Basic Support Unit; ASU: Advanced Support Unit; ML: Motorcycle Ambulance.

DISCUSSION

It is known that variables related to sociodemographic and epidemiological profile, clinical manifestations, and the time elapsed between the event and care are directly associated with patient outcomes. Therefore, information on these data plays an important role in assessing the quality of care, minimizing risk situations that may influence negative outcomes. In this context, clinical evaluation of pain, electrocardiogram results, and myocardial necrosis markers (troponin) are parameters used to hypothesize the diagnosis of ACS, and when two of these elements are present, the diagnosis can already be defined.[8]

Based on the reviewed records, data were found on clinical manifestations compatible with AMI, including precordial pain and unspecified ACS, which include ST-segment elevation myocardial infarction (STEMI), non-ST-segment elevation myocardial infarction (NSTEMI), and unstable angina.[3] Regarding case and patient profile, there is evidence supporting the results of this study, which analyzed AMI hospitalizations between 2019 and 2023 and found that the highest percentage occurred in 2023 (27%), followed by 2022 (26%), with men comprising most of the sample (66%).[9] Another study reported a mean age of 69.66 years, differing from this study, which found a mean of 59.88 years.[10]

Regarding medical history, one study observed systemic arterial hypertension as the most prevalent clinical condition among adults (81.7%) and found that men were more affected by AMI, findings consistent with this study.[11] Similar results point to advanced age, male sex, family or personal history of Coronary Artery Disease (CAD), smoking, stress, and comorbidities such as hypertension, diabetes mellitus, dyslipidemia, and chronic kidney disease as factors associated with acute myocardial ischemia.[8,10,12,13]

Physical examination is considered of low utility for diagnosis, as nonspecific alterations such as hypertension and tachycardia may appear, as observed in this study. However, it can help identify signs and symptoms that distinguish ACS from other conditions with similar manifestations.[8] Overall, in ACS recognition, the most common symptom is chest pain, more specifically precordial pain affecting the left hemithorax, in the precordial region where the heart is located. Chest pain is also a feature of many conditions beyond ACS, requiring precise evaluation for differential diagnosis.[13,14]

Pain characteristics such as onset and duration, quality, location, radiation, intensity, triggers, and relief factors are relevant for defining or hypothesizing AMI. Type A chest pain, classified as "definitely anginal," is described as tightness or burning, occurring at rest or triggered by exertion or stress, radiating to the shoulder, jaw, or inner arm, relieved by rest or nitrates. In contrast, atypical chest pain is stabbing, sharp, or worsens with breathing, localized in the shoulder or right hemithorax, and considered lower risk for ACS.[13,14]

A study of 125 medical records of women with ACS observed precordial pain in 74.4% of cases.[10] Another U.S. study reported that commonly reported ACS symptoms included jaw, neck, and throat pain, chest pain, and intercostal pain. Radiation to the left upper limb was strongly associated with ACS diagnosis.[15] In this study, precordial/chest pain with radiation occurred in fewer cases, mostly to the left arm, back, neck, or jaw. Precordial/chest pain without radiation was recorded in most cases, lowering but not excluding ACS risk. In diabetics, neuropathic compromise may cause absence of pain with sweating misinterpreted as hypoglycemia.[16]

Atypical ACS presentations are more common in women, elderly (>75 years), diabetics, and those with kidney disease or dementia. Symptoms include isolated epigastric pain, gastric fullness, stabbing pain, pleuritic pain, and dyspnea.[13] Anginal equivalents may also appear, such as dyspnea, nausea, vomiting, sweating, fatigue, and syncope.[8,14] A study in women reported anginal equivalents in 19.2% of cases, most commonly dyspnea (51.9%).[10] In this study, hyperglycemia was the most prevalent alteration, linked to worse 30-day prognosis compared to normal glucose levels, reinforcing the need for glycemic control to prevent ischemic area expansion in AMI.[13]

Regarding the 12-lead ECG, recommended pre-hospital or within 10 minutes of hospital admission,[8,13] this study observed that in most cases ECG was not performed, and when it was, various alterations were found. Repetition every 15 minutes is advised for symptomatic patients with normal results, since ECG may appear normal early in AMI.[8,13,17]

The time between the clinical event/emergency and SAMU/first care is crucial for AMI management, as reperfusion therapy must be delivered quickly to improve survival. Out-of-hospital AMI mortality is high, primarily due to delays between symptom onset and hospital arrival.[4] This corroborates the findings of this study, where most deaths were related to delayed care.

Pre-hospital response time may be influenced by factors such as inter-facility transfers and patient origin,[18] as well as geography, traffic conditions, availability of services, diagnostic challenges, and referral capacity.[19] Several studies conclude that clinical presentation influences care delay: patients with severe conditions seek emergency services faster, while those with atypical symptoms take longer.[20-24] Lack of knowledge of

symptoms delays diagnosis and treatment, leading to worse cardiac outcomes.[15]

Regarding sex, studies show that in women with ACS, the time from symptom onset to hospital arrival is longer than in men, delaying diagnosis and treatment and increasing poor prognosis risk.[25] However, in this study, no statistically significant association was found between female sex and care time (p-value=0.227).

CONCLUSION

In this study, statistical analysis showed that patients treated by the ASU, with ACS and AMI, experienced delays greater than 10 minutes before receiving first care, and that patients who progressed to death were attended after more than 10 minutes. This allowed us to answer the research question and confirm the study hypothesis: the delay in initiating treatment for individuals with manifestations compatible with AMI negatively influences case outcomes.

Thus, considering that the shorter the response time, the greater the patients' chances of survival, it is important to investigate the factors related to delays in initial care for these cases, since only by identifying such factors will it be possible to create effective strategies to mitigate them.

This study presents limitations related to difficulties in obtaining the authorization letter, which delayed data collection, lack of human resources, budget restrictions, and the fact that care records are not digitized but printed and stored in archives, with some information described illegibly.

The evidence provided by this study may serve as a basis for new research, as well as support new strategies aimed at reducing SAMU's response time and thus improving outcomes associated with AMI. It reinforces the importance of implementing protocols and systems of care for AMI, especially in the pre-hospital setting.

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