ABSTRACT

Objective: to identify reports of medical care services rendered by the Mobile Emergency Medical Service (SAMU). Methodology: retrospective, descriptive study, using a quantitative approach, conducted at the center-south macroregion of the Brazilian state of Minas Gerais. Data were collected from the computerized information system of medical care services provided by the SAMU between August 2012 and March 2013. Data analysis was performed by means of the Statistical Package for the Social Sciences (SPSS) software, version 15.0, employing descriptive statistics. Findings were displayed on tables. The research proposal was approved by the Research Ethics Committee under protocol number 276.315/2013. Results: a total of 34,625 (100%) medical care reports were identified. Among answered phone calls, 1,974 (5.7%) were prank calls, 12,890 (37.2%) were composed of medical orientation, and 3,182 (9.2%) constituted non-medical orientation. In 16,579 (47.9%) of the cases, an ambulance had to be dispatched. Conclusion: in the majority of the reports, women were identified as the ones who mostly needed medical support. The largest portion of reports was composed of clinical statuses, being the basic support units the most employed vehicle.

Descriptors: Health profile; Emergency Medical Services; Descriptive Epidemiology; Prehospital Care.

RESUMO

Objetivo: identificar os atendimentos prestados pelo Serviço de Atendimento Móvel de Urgência. Método: estudo retrospectivo, descritivo, de abordagem quantitativa, realizado em macrorregião Centro-sul de Minas Gerais/MG. Os dados foram coletados utilizando-se o sistema de informações dos atendimentos prestados pelo SAMU de agosto de 2012 a março de 2013. A análise dos dados foi realizada por meio do software Statistical Package for the Social Sciences (SPSS), versão 15.0, utilizando-se estatística descritiva, e os resultados foram apresentados em tabelas. O projeto foi aprovado pelo Comitê de Ética e Pesquisa, Protocolo 276.315/2013. Resultados: foram identificados 34.625 (100,0%) registros, sendo que, dentre as ligações atendidas, 1974 (5,7%) foram trotes, 12.890 (37,2%) consistiram em orientação médica e 3.182 (9,2%) constituíram não-medical orientation. Em 16.579 (47,9%) dos casos, foi necessário o envio de ambulância. Conclusão: as mulheres corresponsaram à maioria das ocorrências. As causas clínicas somaram a maior parte dos registros, sendo a USB o veículo mais utilizado.

Descritores: Perfil de Saúde; Serviços Médicos de Urgência; Epidemiologia Descritiva; Assistência Pré-Hospitalar.
INTRODUCTION

In Brazil, prehospital care (PHC) services emerged from demands related to traumatic emergencies. Such concern was based on epidemiologic data that pointed out a comprehensive increase in the number of victims of external causes represented by accidents and violence.1 This scenario is quite similar to those of developed nations, where morbidity-mortality rates caused by external reasons is a pattern. The impacts generated by the significant increase of population and technological advancements, especially in the transportation area, have been increasingly favoring the occurrence of such types of trouble.2

According to the World Health Organization (WHO), the estimates for the period between 2002 and 2020 indicate an increase of mortality rates caused by external issues, mainly those resulting from traffic violence and accidents.3 In Brazil, these figures correspond to the first cause of death among populations ranging between 1 and 39 years of age; however, other pent-up demands not cared for by the public healthcare network started being absorbed by PHC services, thus representing an overload in the medical care services, under the classification of clinical emergencies, which involve neurological, cardiovascular, and respiratory disorders, among others.1

If medical emergencies are properly coped with in advance, they can make prognostics more favorable toward reducing negative aftermaths and the number of deaths. Medical emergencies may be defined as a vital event for individuals, representing a serious pattern that implies risks to the person’s physical and psychological integrity, requiring rapid, decisive intervention.5

Prehospital care comprehends all actions carried out prior to the arrival of the victim at the hospital. In order to protect existing injuries, and to prevent the emergence of other causes of clinical, surgical, traumatic, psychiatric, pediatric, and gynecologic nature, the rendered medical care should be qualified and provided at the site of the accident, during the transport and at the early arrival of the victim to the healthcare institution.6

The National Policy of Emergency Care (NPEC), released in 2003, reinforced the actions directed toward emergency services. Above all, the policy highlighted that PHC should be grounded on the universality, comprehensiveness and equity of emergency care.7

The SAMU (Mobile Emergency Medical Service) was created as per resolution number 1864/GM, 2003, as the major element of the NPEC to be implemented throughout the national territory.7 The service is directed to emergency care at homes, workplaces and public roads. This emergency service is carried out following a free telephone call to the number 192. The call is taken at the Regulatory Headquarters of the Emergency Medical Service by radio operators who immediately transfer the call to a regulating physician. In accordance with the classification and prioritization of the care need, the physicians come up with a diagnosis and initiate the care service by dictating the first actions to be followed.7,8

The SAMU 192 national network is comprised of 147 Emergency Medical Care Services. Nearly 130 million people (67.73% of the Brazilian population) have access to the service in 1,234 cities all around the country. The main purpose of the Brazilian state is to expand the service to all municipalities, reaching 162.7 million people.9 With such achievement, SAMU stands out as one of the major healthcare strategies aimed at guaranteeing improvements to the morbidity-mortality rates in all three government levels (federal, regional and local).2

The implementation of SAMU at the center-south macroregion of the state of Minas Gerais encompasses 736,065 people distributed into three microregions: Barbacena, Conselheiro Lafaíete and São João del-Rei. Such distribution brought several benefits to the fifty municipalities that benefit from this network.

SAMU is a governmental program in the federal, regional and local levels. In the local level, managers sealed an alliance and created the Intermunicipal Healthcare Consortium (IHC), by which each city contributes with a certain amount of money per capita, in order to be able to subsidize the consortium and guarantee a high quality service.

At the level of the Brazilian Unified Health System, this service contributes to the comprehensiveness of the care offered to the population. Multiprofessional and interdisciplinary teams require a periodical qualification process, taking into account the specificities of each Brazilian region. In this sense, the acknowledgement of the major causes of events assisted by the SAMU allows for a qualification of the epidemiological profile of related patients, thus facilitating the elaboration of public policies aimed at coping with emergency services in the nation.
OBJECTIVES

- To identify the medical care services provided by the SAMU in the center-south macroregion of the state of Minas Gerais, following its implementation.
- To characterize the population assisted by the SAMU in the center-south macroregion of the state of Minas Gerais in accordance with sex, age group, and reported municipalities.
- To discriminate the types of medical care in accordance with the reported municipality in the center-south macroregion of the state of Minas Gerais.

METHODOLOGY

The present study was extracted from a final term paper in the graduate program in Emergency Services of the Presidente Antônio Carlos University/UNIPAC, Barbacena, Minas Gerais, Brazil, 2013.

It consisted of a retrospective, descriptive study, using a quantitative approach, carried out at the center-south macroregion of Minas Gerais.

The SAMU at the referred region encompasses three microregions: Barbacena, counting on 15 cities, among them four base municipalities; Conselheiro Lafaiete, counting on 18 cities, among them six base municipalities; and São João del-Rei, counting on 17 cities and eight base municipalities.

Base municipalities count on prehospital care service teams. The Barbacena microregion displays the Regulatory Care Complex, counting on an operational structure composed of a trained and qualified professional team aimed at guaranteeing the most effective and timely response.

The Regulatory Headquarters receives phone calls and identifies the need for medical or non-medical orientation. Based on the orientations, the physician performs the risk classification process, in accordance with the Manchester protocol\textsuperscript{10} and then assesses the need for dispatching an ambulance.

Advanced Support Units (ASU) and Basic Support Units (BSU) are employed in accordance with the defined risk classification status. In case these ambulances are not fully working, a spare ambulance is used to carry out the care services in the microregions, so that the bases are not inoperative. Other conditions in which the spare unit is activated are cases where support to catastrophic situations, disasters, among others, are demanded.

Care service teams allocated in the ambulances are called for duty by the Regulatory Headquarters’ satellite-based communication system. They receive all pertaining information on their tablets, including the status of the patient, the required type of service per care cause, location, among others. During the care service, the team can activate an instrument that allows it to exchange real-time information, receive instructions and provide feedback to the headquarters on the rescue process.

A satellite-based regulation and communication system, responsible for the control of all involved phases, from the initial call to the medical regulation, ambulance activation, real care for the victim and conclusion of the occurrence, is employed. The information exchange process between the headquarters and the ambulance is activated by means of a telephone network. In uncovered areas, the communication is carried out by satellite messages (Figure 1).
A Free and Informed Consent Form was signed in order to allow researchers to access the SAMU database in the center-south macropregion of the state of Minas Gerais. Permission was given by the service coordinator.

The project was analyzed and approved by the Research Ethics Committee under protocol number 276,315/2013, and complied with the recommendations of Resolution 466/12 of the National Healthcare Council.

The data collection process took into account the reports recorded since the implementation of the computed-based system, in August 2012, through March 2013. The study applied the information of reports stored at the SAMU’s database.

The variables employed in this study were the ones available at the information system, including the categories of each type of care service, sex, age and reported municipalities.

The data analysis process was performed using the Statistical Package for the Social Sciences (SPSS) software, version 15.0, which employed descriptive statistics and the findings displayed on tables.

RESULTS

In the period between August 1st, 2012 and March 31st, 2013, the SAMU located at the center-south macropregion of the state of Minas Gerais totaled 34,625 (100,0%) incoming phone calls. From answered calls, 1,974 (5.7%) were deemed to be prank calls, 12,890 (37.2%) of phone calls resulted in medical orientation, and 3,182 (9.2%) generated non-medical orientation. In 16,579 (47.9%) of the cases, an ambulance had to be dispatched to the place, amounting 13,035 (78.6%) care services rendered by ASU and 3,544 (21.4%) by BSU.

Table 1 shows the distribution of service reports by sex and group age. Women corresponded to the majority of cases, 8,997 (54.3%), for both types of support units. The predominant age group was the one ranging 20|39 years old, with 11,236 cases (32.5%).
from 20 and 60 years old, with 9,961 (60.1%) cases.

The BSU was responsible for the largest amount of care services both for women, 6,988 (77.7%), and men, 6,047 (79.8%).

Table 2. Characterization of care services carried out by the Emergency Medical Service in the center-south macroregion of the state of Minas Gerais by sex and group age, according to the employed support unit. Barbacena, Minas Gerais, 2012-2013

<table>
<thead>
<tr>
<th>Microregion/Base municipality</th>
<th>Male</th>
<th></th>
<th></th>
<th>Female</th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
<th></th>
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<td>n</td>
<td>N</td>
<td>%</td>
<td>n</td>
<td>%</td>
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<td>4305</td>
<td>26.0</td>
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<td>119</td>
<td>1.3</td>
<td>210</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Carandai</td>
<td>391</td>
<td>5.2</td>
<td>400</td>
<td>4.4</td>
<td>791</td>
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<tr>
<td>Ibertioga</td>
<td>111</td>
<td>1.5</td>
<td>124</td>
<td>1.4</td>
<td>235</td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>13.1</td>
<td>1338</td>
<td>15.0</td>
<td>2321</td>
<td>14.1</td>
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<td></td>
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<tr>
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<td>450</td>
<td>5.0</td>
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<td>5.0</td>
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<tr>
<td>Nazareno</td>
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<td>102</td>
<td>1.1</td>
<td>184</td>
<td>1.1</td>
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<tr>
<td>Madre de Deus</td>
<td>157</td>
<td>2.1</td>
<td>185</td>
<td>2.1</td>
<td>342</td>
<td>2.1</td>
<td></td>
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<tr>
<td>Resende de Costa</td>
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<td>1.5</td>
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<tr>
<td>Tiradentes</td>
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<td>2.5</td>
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<td>423</td>
<td>2.5</td>
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<td></td>
<td></td>
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<tr>
<td>Conselheiro Lafaiete</td>
<td>1132</td>
<td>14.9</td>
<td>1325</td>
<td>14.7</td>
<td>2457</td>
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<td>Congonhas</td>
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<td>587</td>
<td>6.5</td>
<td>1194</td>
<td>7.2</td>
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<td>Entre Rios de Minas</td>
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<td>273</td>
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<td>475</td>
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<td>Ouro Branco</td>
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<td>498</td>
<td>5.5</td>
<td>965</td>
<td>5.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piranga</td>
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<td>1.2</td>
<td>85</td>
<td>1.0</td>
<td>180</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rio Espera</td>
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<td>1.3</td>
<td>93</td>
<td>1.0</td>
<td>194</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spare ambulance</td>
<td>342</td>
<td>4.5</td>
<td>411</td>
<td>4.6</td>
<td>753</td>
<td>4.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7582</td>
<td>45.7</td>
<td>8997</td>
<td>54.3</td>
<td>16579</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: SAMU’s Medical Regulation database in the center-south macroregion of the state of Minas Gerais.

Table 2 shows a predominance of care services toward women, 8,977 (54.3%) in all microregions.

The city of Barbacena concentrated the largest amount of care services for both sexes, totaling 4,305 (26.0%) cases.

As for the classification of care reports, 11,231 (67.7%) corresponded to clinical causes, 4,010 (24.2%) encompassed traumatic causes, 547 (3.3%) displayed obstetric causes, 471 (2.8%) showed psychiatric causes, 219 (1.3%) presented pediatric causes, and 101 (0.6%) reported other causes. The vast majority of the microregions showed a similar pattern (Table 3).

Table 3. Distribution of the type of occurrences assisted by the Mobile Emergency Medical Service in the center-south macroregion, in accordance with the prehospital care form (PHCF). Barbacena, Minas Gerais, 2012 - 2013

| Cause | Microregion | Barbacena | | | São João Del-Rei | | | Conselheiro Lafaiete | | | Spare Ambulance | Total | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | n | % | n | % | n | N | % | n | % | n | N | % |
| Clinic | 3881 | 70.0 | 3296 | 68.4 | 3542 | 64.8 | 512 | 68.0 | 11231 | 67.7 | | | |
| Traumatic | 1189 | 21.5 | 1139 | 23.6 | 1517 | 27.8 | 165 | 21.9 | 4010 | 24.2 | | | |
| Obstetric | 184 | 3.3 | 181 | 3.8 | 153 | 2.8 | 29 | 3.9 | 547 | 3.3 | | | |
| Psychiatric | 157 | 2.8 | 104 | 2.2 | 177 | 3.2 | 33 | 4.4 | 471 | 2.8 | | | |
| Pediatric | 85 | 1.5 | 80 | 1.7 | 47 | 0.9 | 09 | 1.2 | 219 | 1.3 | | | |
| Others | 45 | 0.8 | 20 | 0.4 | 31 | 0.6 | 05 | 0.7 | 101 | 0.6 | | | |
| Total | 5541 | 100.0 | 4820 | 100.0 | 5465 | 100.0 | 753 | 100.0 | 16579 | 100.0 | | | |

Source: SAMU’s Medical Regulation database in the center-south macroregion of the state of Minas Gerais.

DISCUSSION

Taking the number of reports into account, it was possible to verify that the majority of reports required medical orientation. In 47.9% of incoming calls, an ambulance was dispatched to the place, and BSUs corresponded to the majority of rendered...
care services. Studies have found similar results\(^\text{11}\), showing that 91.8% of the care services provided by the SAMU in Porto Alegre, Rio Grande do Sul, were delivered by a BSU. In a study carried out in São Paulo, BSU were the most used vehicle (89.0%).\(^\text{12}\)

The percentage of prank calls was low (5.7%) when compared with the findings of other studies, therefore standing out as a positive result, since the unnecessary dispatch of ambulances generates costs and wears down the medical team.\(^\text{3}\)

Women corresponded to the majority of reports in all regions for both support units. It is worth highlighting that the female population in the macroregion corresponds to 51.0% of the inhabitants. The predominant age group was 20 - 60 years old, similar to the findings of other studies.\(^\text{11,13}\)

On the other hand, other investigations found different results, where most of the care reports corresponded to the male sex.\(^\text{5,12,14,15}\) The age group comprised of “75 years old and over” was responsible for the largest demand.\(^\text{12}\)

The city of Barbacena concentrated the largest amount of care reports for both sexes. This result is justified by the fact that this microregion counts on the largest number of inhabitants; at the same time, it also stands out as the city where the SAMU’s Regulatory Headquarters is located, in the center-south macroregion of the state of Minas Gerais.

As for the classification of care services, the clinical causes corresponded to the majority of reports. A city in the countryside of the state of São Paulo showed, in a period of five years, that 50.7% of the care services provided by the SAMU were a result of clinical causes.\(^\text{11}\) A similar research, which analyzed the occurrences assisted by the SAMU in Olinda, Pernambuco, revealed similar proportions, i.e., from a total amount of 1,956 occurrences, 57.0% of care services were motivated by clinical causes.\(^\text{6}\) A study developed in Porto Alegre, Rio Grande do Sul, corroborated the predominance of clinical causes, showing 49.3% of cases.\(^\text{11}\)

Traumatic causes amounted 24.2% of care services, being the second highest type of service demanded. Traffic accidents, violence and falls, among others, are included in this classification, and constitute one of the major causes of death in the nation, corresponding to the third cause of death, preceded only by cardiovascular disorders and cancer.\(^\text{13}\)

In a study carried out in 2011 in the Federal District and in 24 Brazilian capitals at emergency services rendered by the SAMU, from 47,455 care services aimed at assisting victims of accident and violence, 90.4% corresponded to accident causes and 9.6% were related to events resulting from aggression.\(^\text{16}\)

Another study carried out in the SAMU of Palmas, Tocantins, showed that 42.6% of the care services were originated from external causes. From these, traffic accidents with motorcycles stood out, with 48.1% of cases.\(^\text{7}\)

Obstetric causes, with 3.3% of care services, reached a lower percentage in comparison with gynecologic and obstetric cases shown by a previous study.\(^\text{3}\)

Psychiatric causes totaled 2.8% of rendered care services. On the other hand, a research carried out in a similar period of time and employing the database of the SAMU in the state of Mato Grosso found a high percentage (23.9%) of reports related to psychiatric causes.\(^\text{17}\)

Although the number of such types of causes found in the present study is low, it should be highlighted that the city of Barbacena became known as the “city of crazy people”, due to the high demand of psychiatric patients cared for throughout the years. Nevertheless, after the psychiatric reform, services were restructured and the city turned out to be a reference in care services for this population.\(^\text{18}\)

Results showed that the implementation of the SAMU in the center-south macroregion of the state of Minas Gerais brought meaningful healthcare-related contributions to the region, as it provided populations with access to this service. Several positive results have been achieved following the implementation of the SAMU in Brazilian capitals, in addition to the benefits generated by the sorting system carried out in medical regulation headquarters. By means of quick responses, these centers are able to direct the teams according to the severity of injuries and location of patients.\(^\text{19}\)

Taking into account the increase in the incidence of cardiovascular diseases and events related to external causes, above all in emergency situations, this service constitutes an indispensable element toward improving the public healthcare system in the country.\(^\text{20}\)

Hence, the evidences provided by the present study show that the SAMU decentralization process toward cities located in the countryside generated benefits to the population. The advantages were clearly shown by the low percentage of causes in care services, compared to other studies.

It should also be highlighted that the computerization process of the SAMU facilitated care services and optimized...
resources and teams. In this sense, a similar study carried out in Cuiabá, Mato Grosso, pointed out the fact that the lack of a computerized data system related to the care services rendered by SAMU in the past was a considerable limitation. 5

**CONCLUSION**

The present study showed that women corresponded to the major portion of care services rendered by the SAMU in this region, and that the predominant group was the one ranging between 20 and 60 years.

Clinical causes were responsible for the majority of reports, being the BSU the main vehicle employed in the care services. Phone calls were concentrated in the municipality that stands out as the headquarters of the Regulation Center.

Results showed that the implementation of the SAMU in the center-south macroregion of the state of Minas Gerais brought significant contributions to the healthcare status in the region, as it enabled access of the population to this service; therefore, the acknowledgment of the profile of care services rendered by the SAMU contributes to the implementation of public policies toward preventing clinical, traumatic, psychiatric or pediatric troubles, as well as to the planning of actions toward training the professional teams working in these services, since the profile of prehospital care services is very diverse and responds to a significant part of the population.

The limitation of this study was the lack of information concerning the location of the care services provided by the spare ambulance.

**ACKNOWLEDGEMENTS**

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Profile of medical care reports at a mobile emergency...

