

## Service Profile of the Mobile Emergency Care Service in The North of *Minas Gerais* State

Perfil de Atendimento do Serviço de Atendimento Móvel de Urgência no Norte de Minas Gerais

Perfil de Atención del Sistema de Atención Móvil de Urgencia en el Norte de Minas Gerais

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### ABSTRACT

**Objective:** Our aim herein has been to describe the profile of the assistance services performed by the Serviço de Atendimento Móvel de Urgência (SAMU) [Mobile Emergency Care Service] within the Expanded Health Region in the North of *Minas Gerais* State. **Methods:** It is a descriptive study using secondary data from the SAMU statistical sector related to the service utilization occurrences from May 2013 to August 2015. **Results:** There were registered 1,062,109 telephone calls, from which 32% were secondary calls. A total of 117,289 services were performed with a predominance of male users (55.22%), within the age group ranging from 20 to 60 years old (55.62%). Clinical causes (56.7%) and external causes (35.8%) were the most frequent. In the assistances of external causes, traffic accidents, falls and urban violence were the most prominent. The Basic Support Unit was used in 87.5% of the assistances; the users were referred to hospitals (65.43%). **Conclusion:** The results provide useful information to health authorities and managers of health sectors that are capable of supporting the service organization.

**Descriptors:** Health profile, Emergency Medical Services, Emergency Relief, Descriptive Epidemiology, Prehospital care.

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## RESUMO

**Objetivo:** Descrever o perfil dos atendimentos realizados pelo Serviço de Atendimento Móvel de Urgência (SAMU) na Região Ampliada de Saúde do Norte de Minas Gerais. **Método:** Estudo descritivo utilizando dados secundários do setor de estatística do SAMU referentes às ocorrências atendidas no período de maio de 2013 a agosto de 2015. **Resultados:** Foram registradas 1.062.109 ligações, sendo 32% ligações secundárias. Foram realizados 117.289 atendimentos, com predominância de usuários do sexo masculino (55,22%), na faixa etária de 20 a 60 anos (55,62%). Do total de atendimentos, as causas clínicas (56,7%) e causas externas (35,8%) foram as mais frequentes. Nos atendimentos por causas externas, destacam-se os acidentes de trânsito, quedas e violência urbana. A Unidade de Suporte Básico foi utilizada em 87,5% dos atendimentos; os usuários foram encaminhados para hospitais (65,43%). **Conclusão:** Os resultados fornecem informações úteis às autoridades sanitárias e gestoras do setor saúde capazes de auxiliar na organização do serviço.

**Descritores:** Perfil de saúde, Serviços médicos de emergência, Socorro de urgência, Epidemiologia descritiva, Assistência pré-hospitalar.

## RESUMEN

**Objetivo:** Describir el perfil de las atenciones realizadas por el Sistema de Atención Móvil de Urgencia (SAMU) en la Región Ampliada de Salud del Norte de Minas Gerais. **Método:** Estudio descriptivo utilizando datos secundarios del sector de estadística del SAMU sobre las ocurrencias atendidas entre mayo de 2013 y agosto de 2015. **Resultados:** Se registraron 1.062.109 llamadas, con 32% de llamadas secundarias. Se realizaron 117.289 atenciones, con predominio de hombres (55,22%), con edades entre 20 y 60 años (55,62%). Del total de atenciones, las causas clínicas (56,7%) y las causas externas (35,8%) eran las más frecuentes. En las atenciones por causas externas, accidentes de tráfico, caídas y violencia urbana tuvieron más destaque. La Unidad de Soporte Básico se utilizó en el 87,5% de las atenciones; los usuarios eran remitidos a hospitales (65,43%). **Conclusión:** Los resultados suministran informaciones útiles para las autoridades sanitarias y gestoras del sector de salud capaces de ayudar en la organización del servicio.

**Descriptores:** Perfil del salud, Servicios médicos de urgência, Socorro de urgência, Epidemiología descriptiva, Atención prehospitalaria.

## INTRODUCTION

The need of organizing a attention system to urgencies and emergencies in the country was recognized by the Health Ministry through the Legal Act nº 2.048/2002, which established the principles and guidelines of the Urgency and Emergency State Systems, along with the norms and criteria to operation, classification and registration of the services.<sup>1</sup> Subsequently, in 2003, the *Política Nacional de Atenção às Urgências (PNAU)* [National Policy of Emergency Care] was established guided by the *Sistema Único de Saúde (SUS)* [Unified Health System] principles. The PNAU proposed the establishment of attention systems for the emergency services in the municipal, regional and state levels. The following four components were considered for the organization of comprehensive care networks for urgent care: Fixed Prehospital, Mobile Prehospital, Hospital and Post-Hospital.<sup>2</sup> The *Serviço de Atendimento Móvel de Urgência (SAMU)* [Mobile Emer-

gency Care Service], which is a mobile prehospital component, was instituted by the Legal Act No. 1.864/2003 as the main element of the PNAU to be implemented throughout the Brazilian territory.<sup>3</sup>

The SAMU aims to attend people with high life risk, which in most cases is a local urgency and emergency service with municipal management. In the Expanded Health Region in the North of *Minas Gerais* State (MG), as proposed in 2008 by the health care regionalization, the SAMU was incorporated into a network of emergency care at the regional level, consisting of a pioneer action in the State. This new format of regional organization refers to the need of understanding the service profile of this service, as a way of contributing to monitor the urgencies and emergencies, and to support local health planning and evaluation, considering its population, geographic characteristics and people health conditions. The relevance of the present study is also due to the changes in demographic and epidemiological patterns in Brazil, characterized by increased morbidity and mortality due to external causes, chronic diseases and a greater number of elderly people, generating an increase in demand, overcrowding, and depletion of health urgency services, given that 24-hour open services tend to be the preferred gateway for users.<sup>4-5</sup>

In the Expanded Health Region in the North of MG, the organization of the Regional SAMU happened in a different way from other municipalities, since there was already a local SAMU under municipal management. Analyzes of the regional health situation showed high rates of deaths due to undefined causes, high number of visits due to acute chronic diseases, and the difficulty of access to health services due to the high territorial density, health actions fragmentation and inequality in the allocation of resources, which revealed the need to structure an *Rede de Atenção de Urgência e Emergência (RAUE)* [Urgency and Emergency Care Network] in the Region.<sup>6</sup>

The RAUE is comprised by the hospital care points classified according to their typology and function, the Manchester Protocol for risk classification and the Regional SAMU with 37 decentralized bases, with its own Regulatory Center, which coordinates the prehospital units services.<sup>7</sup>

Although the assistance to users under urgency and emergency situations has presented advances, it still reveals structural problems of the health system, including access barriers to users, inadequacy in the training of health professionals, resources precariousness, crowded hospital emergency rooms, insufficient number of specialized beds and fragility of reference mechanisms, which are indispensable for the flow organization of integral attention to emergencies.<sup>8-9</sup>

The organization of the Regional SAMU was aimed in order to minimize these difficulties and to overcome

past challenges by extending not only the access and use of common equipment at a lower cost, but also by qualifying care at all attention points of the entire network. Thus, acquiring knowledge about the service profile can support the optimization of resources in the region, as well as it can help in the process of decision making by the health managers.

This study is relevant considering that the regionalized SAMU was a pioneering experience in the MG and its organization and management was a reference to the formation of other regional networks already structured in the Expanded Health Regions of the South Center, Jequitinhonha Northeast, Southeast and South of Brazil. The study purpose was to describe the service profile provided by the Mobile Emergency Care Service in the Expanded Health Region in the North of MG.

## METHODS

This is a descriptive study of the service profile of urgency and emergency care performed by the SAMU in the Expanded Health Region in the North of MG, which was carried out from May 2013 to August 2015. The choice for this time period is due to the fact of SAMU statistical department headquartered in the municipality of Montes Claros was implemented in May 2013. Prior to this date, the service did not have a computerized system and a specific team to record information about the services.

The service in focus integrates the Urgency and Emergency Network of the MG Health Expanded Region and has 37 decentralized bases, with an operational center in Montes Claros city and management of the *Consórcio Intermunicipal de Saúde da Rede de Urgência do Norte de Minas (CISRUN)* [Intermunicipal Health Consortium of the Emergency Network in the North of Minas]. The Expanded Region covers 86 municipalities of 09 Health Regions, namely: 1) Montes Claros / Bocaiúva; 2) Brasília de Minas/São Francisco; 3) Salinas/Taiobeiras; 4) Janaúba/Monte Azul; 5) Pirapora; 6) Januária; 7) Francisco Sá; 8) Sleeve; 9) Coração de Jesus.<sup>10</sup>

Regional SAMU has 07 Advanced Support Units (ASU) and 40 Basic Support Units (BSU), strategically distributed throughout the region and has an organization with a wide area of coverage for clinical and traumatic urgencies. The BSU are installed in all Health Regions and ASU in only six of these Regions. Each region has a reference municipality, Montes Claros with 02 ASU, Brasília de Minas, Taiobeiras, Janaúba, Pirapora and Januária, which have 1 ASU.

Secondary data provided by the SAMU statistical sector were used, referring to attend occurrences from May 2013 to August 2015. The occurrences are considered to be incoming calls, even if they are false calling, secondary calls or result in connection loss. The number of occurrences does not correspond to the number of visits, considering that these relate to situations that required the intervention of

either the basic or advanced support teams, which requires ambulance sending service.

The data was entered in a spreadsheet in the Microsoft Office Excel software version 2007, obtaining the grouping of variables available in (i) demographic data (gender, age); (ii) calls origin; (iii) attendance to occurrences made with the ASU and the BSU; (iv) occurrences and transfers/interception of patients performed by the ASU; (v) casuse attendance and (vi) evolution of attendance. Data were submitted to analysis using descriptive statistics and presented in absolute numbers, percentages and averages, using the Microsoft Office Excel software version 2007.

Regarding the research ethical aspects, the precepts of the Resolution no 466/12 from the National Health Council have been met. The project was approved by the Research Ethics Committee of the *Universidade Federal de Minas Gerais*, under the Legal Opinion CAAE no 50185515.4.0000.5149, after institution authorization.

## RESULTS

In the time period from May 2013 to August 2015, a total number of 1,062,109 calls were recorded, of which 341,137 (32%) were secondary calls that is a second call to the same event already registered; 225,229 (21.20%) were false calling and 167,890 (16%) resulted in non-medical guidance, mostly provided by nursing technicians who occupy the position of Auxiliary Medical Regulatory Technician (AMRT) (Table 1).

**Table 1** - Characterization of telephone calls in the Mobile Emergency Care Service of the Expanded Health Region in the North of Minas Gerais State, from May 2013 to August 2015. Montes Claros, MG, Brazil, 2015 (N = 1,062,109)

Telephone Calls	Year						Total	
	2013		2014		2015		N	%
False calling	46,605	18.6	98,197	21.9	80,427	23.0	225,229	21.2
Non-medical guidance	29,295	11.7	75,651	16.0	62,944	18.0	167,890	16.0
Medical guidance	44,892	17.9	34,528	7.7	24,479	7.0	103,899	9.8
Ambulance sending service	36,340	14.5	45,399	9.8	31,453	8.0	113,192	10.6
Connection loss	16,577	6.4	52,233	11.0	41,962	12.0	110,762	10.0
Secondary calls	77,396	30.9	155,339	33.6	108,402	31.0	341,137	32.0
<b>Total</b>	<b>250,105</b>	<b>100</b>	<b>461,347</b>	<b>100</b>	<b>349,686</b>	<b>100</b>	<b>1,062,109</b>	<b>100</b>

**Source:** Data provided by the SAMU statistical sector of the Expanded Health Region in the North of Minas Gerais State.

Regarding the number of services provided by the SAMU, a total of 117,289 were registered. The majority of the services provided were to male users within the age group ranging from 20 to 60 years old, corresponding to 64,679 of the attendances (55.62%), as shown in the Table



2. The difference between the totality by sex and age group is due to a lack of information records.

**Table 2** - Services distribution performed by the Mobile Emergency Care Service (SAMU) of the Expanded Health Region in the North of Minas Gerais State, regarding the sex and age group, from May 2013 to August 2015. Montes Claros, MG, Brazil, 2015.

Assistance Service by Sex and Age Group	Year						Total	
	2013		2014		2015			
	N	%	N	%	N	%	N	%
Male	21,878	54.0	26,135	57.0	16,741	54.0	64,754	55.2
Female	15,531	39.0	18,620	40.0	12,305	40.0	46,456	39.6
Uninformed	2,864	7.0	1,329	3.0	1,868	6.0	6,061	5.2
Total	40,273	100	46,084	100	30,914	100	117,271	100
Age from 0 to 1 y/o	3,500	8.7	534	1.0	330	1.0	4,364	3.7
Age from 2 to 9 y/o	1,032	2.6	360	1.0	252	0.8	1,644	1.4
Age from 10 to 19 y/o	3,668	9.0	4,361	9.0	2,835	9.2	10,864	9.3
Age from 20 to 60 y/o	21,923	54.4	25,568	58.0	17,188	55.6	64,679	55.6
Age > 60 y/o	9,926	24.7	11,058	24.0	7,601	24.6	28,585	24.6
Uninformed	224	0.6	3,223	7.0	2,706	8.7	6,153	5.3
Total	40,273	100	46,104	100	30,912	100	117,289	100

**Source:** Data provided by the SAMU statistical sector of the Expanded Health Region in the North of Minas Gerais State.

During the study period, the ASU was responsible for a total of 12,871 assistance services, from which 9,521 (73.97%) were for occurrences attendance (Table 3).

**Table 3** - Services distribution performed by the Advanced Support Units (ASU) of the Expanded Health Region in the North of Minas Gerais State, regarding the health regions listed by year, from May 2013 to August 2015. Montes Claros, MG, Brazil, 2015 (N = 9,521).

Health Region	Emergency assistance provided by the ASU						Total	
	2013		2014		2015			
	N	%	N	%	N	%	N	%
Montes Claros	1,595	50.6	1,718	48.5	1,420	50.1	4,733	49.7
Januária	280	8.9	350	9.9	280	9.9	910	9.6
Pirapora	358	11.4	367	10.4	302	10.7	1,027	10.8
Janaúba	508	16.1	568	16.0	389	13.7	1,465	15.4
Brasília de Minas	227	7.2	282	8.0	227	8.0	736	7.7
Taiobeiras	181	5.8	254	7.2	215	7.6	650	6.8
Total	3,149	100	3,539	100	2,833	100	9,521	100

**Source:** Data provided by the SAMU statistical sector of the Expanded Health Region in the North of Minas Gerais State.

The ASU was used in cases of patient transfers/interception, considering 3,350 cases (26.03%), which occurs when the SAMU of a Health Region needs to transfer the patient to another team located in another location/city. There is an interception protocol that defines the distance that each regional SAMU team must go through until the patient is transferred. Thus, the teams meet each other in the middle of the journey in order to proceed with the transfer mentioned.

In the transfers, two vehicles are sent to serve a single patient. The transfer is counted as a single call and corresponds to the sending of two vehicles, which justifies the difference between the number of assistances made by the ASU and the ambulances sending service. Regarding the total of 3,350 patient transfers/interceptions performed by

the ASU, the region of Montes Claros showed the higher case index frequency with 1,309 (39.1%).

In the study time period, the BSU performed 102,652 assistance services, of which 42,694 (41.60%) were in the Health Region of Montes Claros, as shown in the Table 4.

**Table 4** - Services distribution performed by the Basic Support Units (BSU) of the Expanded Health Region in the North of Minas Gerais State, regarding the health regions listed by year, from May 2013 to August 2015. Montes Claros, MG, Brazil, 2015 (N = 102,652).

Health Region	Assistance services provided by the BSU						Total	
	2013		2014		2015			
	N	%	N	%	N	%	N	%
Montes Claros	14,232	41.8	17,313	41.9	11,149	40.9	42,694	41.6
Januária	2,254	6.6	2,930	7.1	2,013	7.3	7,197	7.0
Pirapora	2,986	8.8	3,502	8.5	2,198	8.1	8,686	8.5
Janaúba	5,588	16.4	6,699	16.2	4,451	16.3	16,738	16.3
Francisco Sá	1,154	3.4	1,342	3.2	832	3.1	3,328	3.2
Coração de Jesus	624	1.8	727	1.8	533	2.0	1,884	1.8
Brasília de Minas	3,205	9.4	3,863	9.3	2,781	10.2	9,849	9.6
Taiobeiras	3,000	8.8	3,800	9.2	2,427	8.9	9,227	9.0
Manga	1,035	3.0	1,156	2.8	858	3.2	3,049	3.0
Total	34,078	100	41,332	100	27,242	100	102,652	100

**Source:** Data provided by the SAMU statistical sector of the Expanded Health Region in the North of Minas Gerais State

The ambulances sending service is less than the total number of assistance performed, because the staff of an ambulance can provide care to more than one victim, which depends of each event. The SAMU takes this data into account as one call and one ambulance sending service. On the other hand, there are situations in which the Regulation Center can send more than one ambulance to perform care, giving support to a team already engaged in an assistance service. In this case, the sending of more than one ambulance is counted, registering a single call received.

The attendance causes are classified as follows: clinical, psychiatric, obstetric and external; They show a predominance of clinical situations, with 56.7% of the cases, followed by external causes with 35.8%, as shown in the Table 5.

It was verified that the total number of assistances by cause is lower than the total number of assistances by sex and age group, which may be related to the absence of data recording. In the case distribution by causes regarding to sex, the highest prevalence was for the male gender, in both clinical and external causes.

**Table 5** - Service distribution according its causes performed by the Mobile Emergency Care Service (SAMU) of the Expanded Health Region in the North of Minas Gerais State, from May 2013 to August 2015. Montes Claros, MG, Brazil, 2015. (N = 115,457).Claros, MG, Brasil, 2015 (N=115,457).

Assistance service by cause	Year						Total	
	2013		2014		2015			
	N	%	N	%	N	%	N	%
Clinical	22,333	58.0	25,173	56.0	17,007	55.0	65,513	56.7
Psychiatric	1,564	4.0	1,679	4.0	1,210	4.0	4,453	3.9
Obstetric	1,522	4.0	1,451	3.0	1,189	3.8	4,162	3.6
External causes	13,235	34.0	16,545	37.0	11,549	37.2	41,329	35.8
Total	38,654	100	44,848	100	30,955	100	115,457	100

**Source:** Data provided by the *SAMU* statistical sector of the Expanded Health Region in the North of Minas Gerais State.

Among the external causes, traffic accidents recorded the highest number with 27,305 (68.22%), followed by falls with 8,142 (20.34%), urban violence with 4,024 (10.05%), self-harm with 417 (1.04%) and work accident with 139 cases (0.35%). Motorcycle accidents were the number one in the traffic accident with 16,881 (61.82%), followed by automobiles with 5,667 (20.76%), bicycle with 2,598 (9.51%) and trampling with 2,159 (8%).

Observing the urban violence, there were 4,031 cases, where interpersonal aggressions were the first with 1,729 cases (42.9%), followed by firearm attacks with 1,319 (32.72%) and assault by 983 (24.38%).

Considering the assistance service evolution, 76,747 (65.43%) of the patients were referred to hospitals, 19,273 (16.43%) were liberated at the event site, 2,938 (2.5%) died, and in the other attendance services there was no evolution specification.

## DISCUSSION

The results show that 32% of the incoming calls were secondary, which usually happens in cases where there is a delay in sending ambulances to the place of occurrence, causing the requester to redo the call. The delay between the request for assistance and the team arrival at the place of occurrence may be related to the difficulties of operating the service, lack of ambulances or unavailability due to other events, traffic congestion, geographical barriers, roads of difficult access and retention of hospital stretchers of the *SAMU* in hospital emergency services.

The overcrowding of urgency and emergency services, insufficient funds and human resources are other factors that contribute to the delay in conduct beginning, which may compromise the case prognoses and the care quality.<sup>8,11</sup>

The "time response" factor corresponding to the time between the call and the arrival of the team to the scene is critical for the assistance service quality.<sup>3</sup> According to the Surgeons Committee on Trauma the ideal time for prehospital intervention in patients victims of traumas is 20 minutes.<sup>12</sup>

In Brazil, surveys showed that the average time response in *Manaus* was 2 minutes, 15 minutes in *Recife*, 10 minutes in both the Federal District and *Curitiba*, and 9 minutes in Rio de Janeiro.<sup>13</sup> In *Teresina/Piauí*, a study found that regarding the displacement to the occurrence place within the urban area, the *SAMU* spends about 36% more time than recommended by the Surgeons Committee on Trauma.<sup>14</sup>

Considering the total number of calls received, it was verified a high percentage of false calling, a situation that could compromise the assistance to victims that indeed need caring. In a study carried out in the *Teresina/Piauí*, the *SAMU* showed an average of 330 false calling per year.<sup>14</sup> The number of false calling received in the *SAMU* of the Expanded Health Region in the North of *Minas Gerais* State was higher than that

found in *Teresina* in 2014, with an average of 8,183 monthly false calling. In some instances, upon receiving the call from the requester, the AMRT can differentiate cases that evidence false callings. However, there are some situations where an ambulance is sent, and only upon reaching the place they get to know that is a false calling. These situations result in unnecessary displacement of ambulances, which generates costs and staff wear. Additionally, the poor use of the *SAMU* is harmful to severe patients, who under care need may face delays in sending ambulances that are often sent to requests originated from false callings.

The reality described reveals the need to sensitize and guide the population regarding the priorities of triggering the service, as well as the damages to the service and population arising from promoting false situations.

The nonmedical orientation presented a high frequency in the characterization of telephone calls. It is a practice in the Regulation Center, regulated by the service protocol. The center is composed by the primary and secondary regulatory doctors, and an AMRT oriented to act in the Regulation Center. The call is first received by an AMRT to identify the requester, the call type, locate the occurrence, and provide the required information. If there is no need for medical advice, the AMRT will terminate the request without the intervention of the regulatory doctor.<sup>15</sup>

In situations that require the guidance of the regulatory physician, it is the AMRT responsibility to accommodate the requester, to establish an initial estimate of the urgency degree of each case, triggering an adequate and equitable response to the request.<sup>15</sup> In situations where the team intervention in the event place is needed, it will perform the care. But, when it is not characterized as an urgency or emergency, the requester will be advised about the first aid and also oriented to go to the health unit by its own means.

In the present study, 9.79% of the guidelines were provided by the physician, with no need to sending ambulances to the occurrence place, avoiding costs for the *SAMU* and, therefore, a positive practice for the Regulation Center. However, structural factors hamper communication, such as signal quality of antennas and fiber optics, used by telemedicine and interruptions due to environmental weather conditions that compromise the functioning of this system, resulting in a drop in connection in 10% of the calls.

The results show that the majority of the assistance services were for males within the age group between 20 and 60 years old. Studies<sup>16-7</sup> carried out by the *SAMU* showed that there was a predominance of males in both the ASU and BSU assistance service.

The greater number of male appointments may be related to the fact that men frequently request these services due to acute illnesses and cases of aggravation of chronic diseases already in place. Women seek other services from the care network, such as Primary Health Care (PHC), undergoing preventive actions. On the other hand, men tend to delay

the search for care and are resistant to seeking prevention and health promotion services.<sup>18</sup>

Regarding the users age range that received care in the SAMU, it was verified that the economically active population has been affected by injuries that require service intervention. A study carried out along with the SAMU air transport of the Pernambuco State indicated that the majority of the attendances occurred in the age group from 21 to 30 years old and from 20 to 49 years old.<sup>19</sup> Users in the age group of 60 years old or more, registered the second largest number which is related to the changes that occurred in the age pyramid of Brazil, characterized by the aging of the population and by the epidemiological transition, with a predominance of noncommunicable chronic diseases, and the urgency service is frequently requested in cases of acute chronic problems.

In emergency calls by mobile units, BSU was predominant, with 87.5%. These units are equipped to perform the first emergency care and have a nursing technician and a driver/rescuer, who intervene by means of non-invasive measures under the guidance of physicians of the regulatory centers.<sup>15</sup> The BSU is in larger number in the SAMU and its use signals the care of patients without immediate risk of life. In some cases, BSU supports the ASU in dealing with victims in critical condition.

The ASU is used to attend situations of imminent risk of life. There was assistance with the ASU in all health regions because the service was regionalized and decentralized. These units are also used for inter-hospital transfer of patients to more complex services as regulated by the National Emergency Care Policy,<sup>15</sup> and also are sent after evaluation by the basic support team. The ASU has materials needed to meet all types of injuries and the team consists of doctors, nurses and drivers.

Studies performed in various SAMU of other regions of the country present similar data to the present study. In *Catanduva-SP*, out of a total of 76,296 assistance services performed by the SAMU from January 2006 to August 2012, the BSU was used in 90% of the cases.<sup>16</sup> In *Porto Alegre-RS* basic support teams were also the most used. In the SAMU of *Belo Horizonte* the assistance to the victims of traffic accidents was made predominantly by ASU.<sup>21</sup>

In the interhospital transfer with ASU, the Health Region of *Montes Claros* showed a higher percentage (39.1%). Although the data do not reveal the place of transfer of the patients, it can be inferred that these patients were admitted to hospital located in *Montes Claros*, the largest urban center in the North of *MG*, with infrastructure capable of meeting urgent and emergency demands, referenced procedures of other municipalities of the Expanded Health Region, as well as accommodating patients seeking complex services that do not exist in their places of origin.<sup>22</sup>

Among the attendance causes, the clinical causes predominated, followed by external, psychiatric and obstetric causes. Similar data were found in *Catanduva*, *Porto Alegre-RS* and in the Macroregion South-Central of *MG*.<sup>16,20-3</sup>

In the male population, clinical and external causes were pointed out with a higher percentage of attendances. Studies carried out in various SAMU in Brazil reveal the increase in clinical and traffic accidents caused by traffic and urban violence in men, which points to the importance of the implementation of intersectoral actions to promote health and prevention these occurrences, aiming to reduce their numbers based on the consequences that recklessness in traffic may result.<sup>16,23-4</sup>

Considering the external causes, traffic accidents predominated (68.22%). This result is superior to the SAMU findings in *João Pessoa-PB*, which percentage of traffic victims represented approximately 25% of the services performed by the service.<sup>25</sup> Accidents with motorcycles occupied the first place, with 61.82% of the attendances. In other studies, the percentage of motorcycle involvement was lower than this finding.<sup>23-6</sup>

The number of accidents with motorcycles reveals the increased use of this vehicle in large urban centers, as it is economical and fits to alternative services, such as service companies, which use it as a fast way of transport.

The falls represented the second largest causes of attendance due to external causes (20.34%). Although they were not specified in the SAMU attendance records, it is inferred that this type of event may be associated with the use of motorcycles, which is responsible for the greater number of traffic accidents, and also, cases of falls of elderly patients, the second largest population assisted (24.58%). The elderly have the greater risk of falling and are particularly vulnerable to increased morbidity and mortality following a fall.<sup>27</sup>

Regarding the urban violence cases, it was verified a greater number of victims of interpersonal aggression (42.9%), situations in which there is an intentional use of physical force from one person to another, resulting in injuries that demand SAMU care. Firearm attacks ranked second (32.72%) in the cases of urban violence. A study carried out in *Sorocaba* indicated lower statistical data results when compared to the present study. Considering a total of 10,401 assistance services performed by the SAMU regarding violence causes, 0.45% of them were victims of a firearm projectile.<sup>28</sup>

Urban violence represents the third highest rate of death in the Latin American countries, especially in people age between 15 to 44 years old, which is the sixth-largest cause of hospitalization.<sup>29</sup> In Brazil, despite the creation of the Disarmament Statute, under the Law 10.826/03, which regulates the registration, possession, and sale of firearms, urban violence persists as a public health problem.<sup>30</sup>

In the assistance services evolution, the referral of patients to the hospital was predominant, which was also verified in other studies.<sup>16,26</sup> The victim release in the event place shows its favorable health conditions, and that there is no need to be referred by the SAMU to others health care services. Nevertheless, it is also possible that there may be a refusal by the victim to be taken to another service.



## CONCLUSION

In the period from May 2013 to August 2011, a number of 117,289 cases were registered in the SAMU of the Expanded Health Region in the North of *Minas Gerais* State, in which there has been a need to sending ambulances. Male gender has accounted for the majority of users attendance. The age group ranging from 20 to 60 years old had the greatest demand, followed by those over 60 years old. The BSU was the most used in assistance services. The clinical cases were predominant, followed by the external causes. The majority of users attended were referred to hospitals.

The results reinforce the need for the development of intersectoral actions to promote health and prevention related to clinical causes and external causes, especially motorcycle accidents. There were difficulties in the service operationalization, revealed by the secondary calls, the loss of call connections in the Regulation Center, high frequency of false calling, which caused waste of resources and loss of time, which is one of the primordial factors for high-quality service assistance.

The study has had some limitations because it does not specify the nature of the clinical, psychiatric and obstetric causes; also the data were consolidated by health regions, which makes it difficult to plan specific actions for each municipality. Additionally, consolidated data does not allow for more accurate event analyses. The external validity is conditioned to the geographic territory studied, where is only allowed the transfer of conclusions to similar realities. The absent registration of some data reveals the importance of orienting the professionals to the significance of filling up attendance forms for monitoring the SAMU services profile.

The analysis of the service profile carried out by the SAMU enabled the acquisition of useful information to the sanitary authorities and managers of health sectors in the region. The results can contribute to the adoption of strategies aiming to organize and improve the service offer. It is expected that the results here showed will lead to new studies.

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