Original article

PROFILE OF INDIVIDUALS WITH NEUROLOGICAL DISORDERS ASSISTED BY A PREHOSPITAL MOBILE EMERGENCY CARE SERVICE

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ABSTRACT: This article aims to characterize the epidemiological profile of individuals with neurological disorders assisted by a prehospital mobile emergency care service. Exploratory and descriptive study with quantitative approach. Data was collected from January to June 2016, in an emergency and urgent care referral center in the state of Rio Grande do Norte. Seventy-three (73) neurological disorders were analyzed: 38 (52.1%) patients were male individuals, 43 (58.9%) were aged between 68 and 101 years. Regarding the characteristics of the neurological condition, 59 (80.8%) patients had a cerebrovascular accident (CVA), eight (11%) had seizures, three (4.1%) had low back pain related to spinal cord trauma and three (4.1%) patients had other types of neurological conditions. As for the response time to care, the average time was 31 minutes. The epidemiological profile identified was elderly men who had CVA (stroke) and whose care needs were not responded within an appropriate time.
DESCRIPTORS: Emergency medical services; Nervous system disorders; Cerebrovascular Accident (stroke); Epilepsy; Low back pain.

PERFIL DAS VÍTIMAS DE AFECÇÕES NEUROLÓGICAS ATENDIDAS POR UM SERVIÇO PRÉ-HOSPITALAR MÓVEL DE URGÊNCIA

RESUMO: Este artigo tem por objetivo caracterizar o perfil epidemiológico das vítimas de afecções neurológicas atendidas por um Serviço de Atendimento Móvel de Urgência. Trata-se de estudo exploratório, descritivo e de abordagem quantitativa dos dados. A coleta foi realizada no período de janeiro a junho de 2016, em um hospital referência em atendimentos de urgência e emergência do estado do Rio Grande do Norte. Foram analisadas 73 ocorrências neurológicas, 38 (52,1%) do sexo masculino, 43 (58,9%) entre a faixa etária de 68 a 101 anos. Quanto à característica da afecção neurológica, 59 (80,8%) sofreram Acidente Vascular Encefálico, oito (11%) crise convulsiva, três (4,1%) lombalgia associada a lesão medular e três (4,1%) eram de outra natureza neurológica. Quanto ao tempo resposta para o atendimento, a média foi de 31 minutos. O perfil epidemiológico identificado foi de homens idosos, que sofreram Acidente Vascular Encefálico e que não receberam atendimento no tempo resposta adequado.
DESCRITORES: Serviços médicos de emergência; Doenças do sistema nervoso; Acidente vascular cerebral; Epilepsia; Dor lombar.

PERFIL DE VÍCTIMAS DE AFECCIONES NEUROLÓGICAS ATENDIDAS POR SERVICIO PREHOSPITALARIO MÓVIL DE URGENCIA

RESUMEN: Artículo que objetiva caracterizar el perfil epidemiológico de víctimas de afecciones neurológicas atendidas por un Servicio de Atención Móvil de Urgencia. Estudio exploratorio, descriptivo, de abordaje cuantitativo de datos. La recolección se realizó de enero a junio de 2016, en hospital de referencia en atención de urgencias y emergencias del estado de Rio Grande do Norte. Fueron analizados 73 sucesos neurológicos, 38 (52,1%) en pacientes masculinos; 43 (58,9%) pertenecientes a faja etaria de 68 a 101 años. Respecto a características de la afección, 59 (80,8%) sufrieron Accidente Cerebrovascular, 8 (11%) crisis convulsiva, 3 (4,1%) lumbalgia asociada a lesión medular, y 3 (4,1%) fueron de otra naturaleza neurológica. Acerca del tiempo de respuesta, el promedio fue de 31 minutos. El perfil epidemiológico identificado fue de hombres ancianos, que sufrieron Accidente Cerebrovascular y que no recibieron atención en el tiempo de respuesta adecuado.
DESCRIPTORES: Servicios Médicos de Urgencia; Enfermedades del Sistema Nervioso; Accidente Cerebrovascular; Epilepsia; Dolor de la Región Lumbar.

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INTRODUCTION

The current Brazilian epidemiological data reflect the changes in the population health profile. Infectious and parasitic diseases ceased to be the main causes of death in Brazil and c non-communicable chronicdiseases and external causes are now the leading causes of death in the country, impacting assistance by urgent and emergency services [1-2].

In view of the above, emergency care services had to adapt to the new health demands. The Mobile Emergency Care Service (SAMU) was then implemented in 2003 through Ordinance no. 1863/2003[3], according to theNational Emergency Care Policy (PNAU). The SAMU aims to provide immediate and life-saving care as well as prompt transport to an appropriate facility for the provision of definitive care. In 2014, in Brazil, the service assists 75% of the population, distributed in 2,921 municipalities[4].

In a North American study conducted in emergency care facilities, neurological complaints accounted for 4.7% of the cases [5]. According to aBrazilian study, the most common neurological emergencies are cerebrovascular accident, epilepsy, headache and other symptoms secondary to the clinical condition. The same study also showed that 11% of the patients treated in the emergency care units required neurological evaluation [6].

Delayed care and long waiting time prior to testing/exams are a major risk factor for complications in neurological conditions. Therefore, timelycare and identification of symptoms by SAMU professionals, as well as prompt transportation to a specialized health service are key [7].

This study will provide insight on the profile of users who seek mobile emergency care services, contributing to the elaboration of more effective care strategies, and warning health services and managers about the need for measures of prevention and control of the population at risk of neurological health disorders.

In view of the aforementioned, SAMU professionals should gain knowledge of the main neurological disorders assisted by this mobile emergency care service. The purpose of this study was to characterize the epidemiological profile of individuals with neurological disorders assisted by the Mobile Emergency Care Service 192 Rio Grande do Norte (SAMU 192 RN).

METHOD

This is an exploratory and descriptive study with a quantitative approach carried out in the emergency care facility of an emergency and urgent care referral center in the state of Rio Grande do Norte (RN).

The present study used a convenience sample of 73 individuals with neurological disorders[8] assisted by the SAMU 192 RN, after being stabilized and transported to the referred hospital.

The inclusion criteria were individuals aged 18 years or older; conscious or accompanied by a responsible person, in case of hemodynamic instability. Individuals with neurological disorders caused by trauma were excluded.

Data was collected from January to June 2016, through a questionnaire on sociodemographic data (age, gender, education, income and occupation), neurological disorder that affected the individual, response time of the emergency care service and the type of vehicle used in transport to the hospital.

The patients or the responsible persons were informed about the purpose of the study, its risks and benefits. Those who agreed to participate in the study signed the Free Informed Consent Form (TCLE) [9].

Data was entered in a Microsoft Excel (Office 2016) spreadsheet and descriptive statistics was used in the analysis.

The present study complies with all ethical aspects regulatedby Resolution No. 466, of December 12, 2012 [9], of the National Health Council, on research involving human subjects. According to the resolution, the study was subjected to analysis of the research ethics committee of *Hospital Universitário*

Onofre Lopes (HUOL), Natal/RN, and was approved under statement no. 437/2010.

RESULTS

Regarding the characteristics of the neurological disorders, it was found that 59 (80.8%) patients were assisted by the mobile emergency care service due to CVA (stroke), eight (11%) due to seizures, three (4.1 %) due to low back pain related to spinal cord trauma, and three (4.1%) received care to treat other neurological conditions, as shown in Table 1.

Table 1 - Characterization of individuals with neurological disorders assisted by SAMU 192 regarding gender, age and educational level. Natal, RN, Brazil, 2016

Variables	CVA* N (%)	Low back pain / Spinal Cord Injury N (%)	Seizure N (%)	Others** N (%)	Total N (%)
GENDER					
Male	32 (54.2)	1 (33.3)	5 (62.5)	0 (0)	38 (52.1)
Female	27 (45.8)	2 (66.7)	3 (37.5)	3 (100)	35 (47.9)
AGE GROUP					
18 to 35 years	1 (1.7)	1 (33.3)	1 (12.5)	1 (33.3)	4 (5.5)
36 to 67 years	19 (32,2)	3 (66.7)	5 (62.5)	0 (0)	26 (35.6)
68 to 101 years	39 (66.1)	0 (0)	2 (25)	2 (66.7)	43 (58.9)
EDUCATION					
Non-literate	22 (37.3)	0 (0)	0 (0)	1 (33.3)	23 (31.5)
Primary School I	18 (30.5)	0 (0)	3 (37.5)	0 (0)	21 (28,8)
Primary School II	11 (18.6)	1 (33.3)	2 (25)	0 (0)	14 (19.2)
Secondary school	7 (11.9)	2 (66.7)	3 (37.5)	2 (66.7)	14 (19.2)
Higher education	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Postgraduate studies	1 (1.7)	0 (0)	0 (0)	0 (0)	1 (1.4)
Total	59 (80.8)	3 (4.1)	8 (11)	3 (4.1)	73 (100)

* CVA: Cerebral Vascular Accident
** Other: syncope and nonspecific paresthesias.

Of all the patients with neurological disorders assisted by the mobile emergency care service, 38 (52.1%) were men, 43 (58.9%) were aged 68-101 years and 23 (31.5%) were non-literate.Regarding their monthly income, 51 (69,9%) patients earned one to two minimum wages (SM); 19 (26.0%) earned less than a minimum wage, and three (4.1%), earned three to five minimum wages.

Table 2 shows that 48 (65.8%) of the patients do not work outside the home or are retired, followed by workers in retail trade and other services, with 11 (15.1%) and four (5.5%) were unemployed.

Table 2 - Characterization of the individuals with neurological disorders assisted by the team of SAMU 192 regarding occupation. Natal, RN, Brazil, 2016

OCCUPATION	CVA* N (%)	Low back pain / Spinal cord injury N (%)	Seizure N (%)	Others** N (%)	Total N (%)
Rural worker	3 (5.1)	0 (0)	0 (0)	0 (0)	3 (4.1)
Unemployed	3 (5.1)	0 (0)	1 (12.5)	0 (0)	4 (5.5)
Civil construction	1 (1.7)	1 (33.3)	1 (12.5)	0 (0)	3 (4.1)
Retail trade and other services	6 (1.7)	2 (66.7)	3 (37.5)	0 (0)	11 (15.1)
Independent professional	1 (1.7)	0 (0)	0 (0)	0 (0)	1 (1.4)
Self-employed	2 (3.4)	0 (0)	0 (0)	1 (33.3)	3 (4.1)
Not working outside the home or retired	43 (72.9)	0 (0)	3 (37.5)	2 (66.7)	48 (65.8)
Total	59 (80.8)	3 (4.1)	8 (11)	3 (4.1)	73 (100)

* CVA: Cerebral Vascular Accident
** Others: syncope and nonspecific paresthesias.

Regarding the time period (shift) of the care provided by the SAMU team to the patients (Table 3), most calls (37 (50.7%) patients) were made in the morning shift (00 hour 01 minute at 11:00 59 minutes), followed by calls in the afternoon shift (12 hours at 18 hours 59 minutes): 29 (39.7%) patients.

Table 3 - Characterization of the individuals with neurological disorders assisted by the team of SAMU 192 regarding the time period (shift) of care and type of transportation used. Natal, RN, Brazil, 2016

Variables	CVA*	Low back pain / Spinal cord injury	Seizure	Others**	Total
	N (%)	N (%)	N (%)	N (%)	N (%)
SHIFT					
Morning (00:01 at 11:59 min)	30 (50.8)	3 (100)	1 (37.5)	1 (33.3)	37 (50,7)
Afternoon (12 a.m. 18:59 p.m.)	24 (40.7)	0 (0)	4 (50)	1 (33.3)	29 (39.7)
Evening (7 a.m. to 4 p.m.)	5 (8.5)	0 (0)	1 (12.5)	1 (33.3)	7 (9.6)
TYPE OF VEHICLE USED IN TRANSPORTATION					
Basic Support Unit (UBS)	37 (62.7)	3 (100)	5 (62.5)	2 (66.7)	47 (64.4)
Advanced Support Unit (ASU)	20 (33.9)	0 (0)	3 (37.5)	1 (33.3)	24 (32.9)
Search and Rescue Unit (RU)	1 (1.7)	0 (0)	0 (0)	0 (0)	1 (1.4)
Helicopter	1 (1.7)	0 (0)	0 (0)	0 (0)	1 (1.4)
Total	59 (80.8)	3 (4.1)	8 (11.0)	3 (4.1)	73 (100)

* CVA: Cerebral Vascular Accident
** Others: syncope and nonspecific paresthesias.

Regarding data related to the type of vehicle used in patient care, Table 3 revealed that the Basic Support Unit (USB) provided assistance to 47 (64.4%) patients. The Advanced Support Unit, which provides assistance to the most critical patients, was used in 24 (32.9%) cases.

As for the response time, which corresponds to the time spent between the call to the emergency care service until the arrival of the ambulance to the site, the average time was 31 minutes, the shortest time being 10 minutes and the longest time, 90 minutes.

DISCUSSION

This descriptive analysis of the epidemiological profile of the individuals with neurological disorders assisted by SAMU 192 RN found that CVA and seizures were the most common neurological problems. A Brazilian study obtained similar data [6]. Low back pain related to spinal cord trauma was also identified. A study conducted in the United States corroborated this finding, since 12 (8.3%) of the individuals assisted by the mobile emergency care service had this condition [7].

The data obtained provide a diagnosis of the health needs of the population assisted by the SAMU, which is necessary for the creation of effective strategies and improvement of the service itself, as well as of the infrastructure and equipment and well-trained personnel ready to respond to the problem.

There was a predominance of male individuals in the present study. It should be noted that men, despite their concern with the ideals of strength and manliness, are more likely to neglect their health. This explains the persistence of risk factors and vulnerability to neurological diseases [10-12].

In a study conducted in Porto Alegre, RS, most individuals with neurological disorders assisted by the SAMU were aged 41- 60 years. In contrast, in this study, the most common age range was 68-101 years. Regarding seizures, the age range of the sufferers is similar to that of the referred study, i.e. 40-60 years [13]. It can be seen that most individuals with neurological disorders were elderly. Population aging is unquestionable, and hence investment in physical and human resources, training of professionals and increased supply of public services and policies are needed[14].

In the present study, the number of non-literate individuals was significant, as well as the number of individuals aged 68-101 years. These findings are comparable to those in the national scenery. According to the 2015 census of the Brazilian Institute of Geography and Statistics (IBGE), most non-literate individuals in Brazil are over 65 years old. A low educational levelhas a negative impact on the sickening-health process, because this population may have lower access to health education and is less likely to change their lifestyles and control risk factors [14-16]. Therefore, it is necessary to develop strategies accessible to this population.

A study carried out in Pernambuco found that most patients assisted by mobile emergency care services had a monthly incomeranging from 1 to 3 minimum wages: 99 patients (83.2%). In the present study, most patients earned 1 to 2 minimum wages. Regarding occupation, the study conducted in Pernambuco found that 42 (35.3%) of the patients were unemployed, contrasting with the findings of the present study in which most patients did not work outside the home or were retired. The lower economic status of these patients may have a negative impact on their recovery, because the drug therapy involves high costs. No studies showing a direct relationshipbetween monthly income and occupation of individuals with neurological disorders and SAMU were found in the literature. Therefore, this relationship was investigated in the general scenario of emergency care services [17].

Seizure is a frequent problem in the emergency care services, and its etiology may involve several factors, such as hydroelectrolytic disorders, intoxication, drug withdrawal, sedatives or neurological injury. The identification of this disorder involves more complex tests. Therefore, it has not been possible to identify the cause of this clinical manifestation in the present study. However, another study revealed that delayed diagnosis does not interfere with the treatment and stabilization of the patient by the emergency care team. In contrast, a study conducted in Botucatu, São Paulo, found that seizure was the most common neurological disorder [18-20].

Cerebrovascular Vascular Accidents (CVA) or strokes are divided into ischemic stroke and hemorrhagic stroke, according to their pathological features. The treatment recommended for ischemic stroke is thrombolysis with the use of recombinant tissue plasminogen activator (et-PA). However, this therapy is only advantageous and safe when treatment starts within 4.5 hours after the onset of the disorder and after careful assessment using with laboratory and imaging tests, which is often difficult for these patients. Thus, bleeding and mortality risks increase [18,21-22].

Therefore, the present study showed that the patients with CVA accounted for a significant part of the care provided by SAMU 192 RN. Quick identification of the symptoms of this disorderby the prehospital mobile emergency care serviceteam is necessary to reduce the time taken to transport the

patient to the hospital and minimize the risks.

This study identified an average response time of 31 minutes for all neurological conditions. However, it is clear that time is the determining factor to minimize damage and increase the survival rate of these patients [23].

Some studies showed that a response time of less than 10 minutes is ideal in prehospital mobile emergency care services. The response time is one of the indicators that impact the quality of care [23-24].

Given the severe neurological impairment caused by CVA, the present study revealed the profile of the individuals affected by this disorder. Most were male, aged between 68 and 101 years, which corroborates a study in Denmark, in which most patients were of men (58%), with a mean age of 66 years. Regarding occupation, most patients did not work outside the home or were retired, as well as in a study carried out in Ceará, in which 54 (59.3%) of the individuals who had a stroke were retired, and regarding the educational level, according to a study in Cajazeiras PB, 19 (50%) were non-literate, which is similar to the findings of this study [25-27].

Considering low back pain related to spinal cord injury, this disorder was predominant in females; as to the occupation, none of the patients were unemployed, worked in civil construction and in retail trade and other services sector. Similar findings were reported in a survey conducted in the USA, where most patients were also women and worked full-time [28].

The time period (shift) in which most telephone calls were made to SAMU 192 RN was the morning shift. On the other hand, a study in Southern Brazil showed that 39% of the calls occurred from 12:00 to 17:59h. In this study,the afternoon shift was the second in number of calls to the emergency service after the morning shift, in contrast with another study that identified most calls to the mobile emergency care service in the afternoon [29,11].

As for the type of vehicle used in transportation, the Basic Support Unit (USB) was used to transport most patients. The findings are consistent with those of another study conducted in Southern Brazil, in which 1,319 (41.4%) individuals who called the emergency care service were transported by the Basic Support Unit. The Advanced Support Unit (USA) was also used to transport most patients who have had a stroke. This is probably due to the higher risk of complications during the transportation of these patients, which requires the use of specialized mobile emergency care service [11].

One limitation of this study was the impossibility of determining the time taken to transport the user (patient) from his/her place to the specialized health facility and the frequency of occurrence of the neurological disorder of the patient.

CONCLUSION

The epidemiological profile identified in this study was as follows: older men who have had a stroke, had low educational level and low income, whose care needs were not responded within an appropriate time and were transported to hospital by the Basic Support Unit.

The characterization of the profile of users can contribute to the elaboration of strategies to face these problems and to the improvement of the quality of care provided by prehospital mobile emergency care services. Further studies on this issue over longer periods of time are suggested.

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