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## Características das pessoas com Acidente Vascular Encefálico atendidas em um centro de referência estadual

Characteristics of Encephalic Vascular Accident patients treated at a state reference center

Características de las personas con Accidente Cerebrovascular atendidas em um centro de rehabilitación

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### ABSTRACT

Encephalic Vascular Accident is a clinical sign of brain dysfunction and it might result in permanent and irreversible lesions. **Objective:** Define the characteristics such as age, sex and date of the first treatment at a Santa Catarina State's Rehabilitation Center. **Methods:** This is a quantitative cross-sectional descriptive study. The

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Catarina, number 1024 reviewed this study. **Results:** CVA affected 25,11% of women between 71-80 years old and 34,09% of the men aged between 61-70 years old. The most common consequence due to CVA was hemiplegia and the study observed that many patients only looked for proper treatment after several years post CVA. **Conclusions:** The physical therapy is important, so patients can relearn daily tasks and furthermore reintegrate their social life.

**Descriptors:** Encephalic Vascular Accident, Rehabilitation, Physical therapy, Hemiplegic.

#### RESUMO

Acidente Vascular Encefálico (AVE) é uma disfunção cerebral que causa lesões permanentes e irreversíveis. **Objetivo:** Avaliar as idades, os sexos e a data do primeiro atendimento das pessoas com AVE atendidas no centro de reabilitação do Estado de Santa Catarina. **Métodos:** É um estudo quantitativo, descritivo e transversal, sendo a coleta de dados realizada com base documental nos prontuários. O presente estudo foi avaliado pelo Comitê de Ética em Pesquisa com Seres Humanos (CEPSH), Reitoria de Pesquisa e Extensão da Universidade Federal de Santa Catarina de número 1024. **Resultados:** O AVE afeta 25,11% de mulheres entre 71-80 anos e 34,09% de homens entre 61-70 anos. Observou-se que a seqüela mais comum é a hemiplegia e que muitos somente procuravam tratamento após muitos anos de seqüelas. **Conclusão:** Os dados encontrados mostram a importância da terapia física para que os pacientes reaprendam tarefas diárias e auxilia na reintegração social.

**Descritores:** Acidente Vascular Encefálico, Reabilitação, Fisioterapia, Hemiplegia.

#### RESUMEN

El Accidente Cerebrovascular (ACV) es un signo clínico de disfunción cerebral e ocasiona lesiones cerebrales permanentes e irreversibles. **Objetivo:** Evaluar las edades, sexos y la fecha del tratamiento inicial de los pacientes con accidente cerebrovascular tratados en el centro de rehabilitación en el estado de Santa Catarina. **Métodos:** El estudio cuantitativo, descriptivo y transversal. Este estudio fue revisado por el Pro Rector de Investigación y Extensión de la Universidad Federal de Santa Catarina para la Investigación Humana (CESPH). La recolección de datos se basó en registros documentales de las personas atendidas en el Centro de Rehabilitación del Estado de Santa Catarina, entre 2000-2009. **Resultados:** El AVC afecta 25,11% de las mujeres de 71-80 años y el 34,09% de los varones de 61-70 años. La hemiplejia es secuela más común. El estudio destaca que muchos pacientes buscan tratamiento sólo después de muchos años de secuela. **Conclusión:** Nuestros datos muestran la importancia de la terapia física, ya que permite que los pacientes pueden volver a aprender las tareas cotidianas.

**Descritores:** Accidente Vascular Encefálico, Rehabilitación, Fisioterapia, Hemiplejia.

## INTRODUCTION

According to the World Health Organization, the Vascular Accident (CVA), is a rapidly developing clinical sign of focal disturbance of cerebral function of presumed vascular origin and more than 24 hours duration.<sup>1</sup> The neurological deficit of CVA can be transient or permanent in

a brain area secondary to vascular injury.<sup>2</sup> A transient CVA is characterized when the disorder is of short focal length, or less than 24 hours and is considered, in these cases, a reversible dysfunction. However, when this disruption lasts longer than 24 hours, permanent and irreversible damage can be installed to the brain, characterized by the death of group of neurons.<sup>3</sup>

The CVA is the third leading cause of death in developed countries, surpassing those caused by heart disease and cancer, which are responsible for the main deaths in the population.<sup>4-5</sup> According to indicators of the Ministry of Health, mortality rate due to circulatory problems is 32.3%, the leading cause of death in Brazil. The CVA is responsible for about one third of the deaths.<sup>4,6</sup> It is believed, in some studies, that the risk of CVA increases in less affluent population, as well as the occurrence of death after a cerebrovascular accident. More than half of patients have between six and ten types of disabilities, and 77.4% had muscle weakness.<sup>4,7</sup>

In Brazil, between 2008 and 2011, there were 424 859 hospitalizations of elderly people aged over 60 years who had suffered a major CVA and a great rate of mortality. The risk of cerebrovascular accident increases with age.<sup>8</sup> Scientific and technological improvements have resulted in increased population survival, so people are susceptible to problems and morbidities of chronic diseases. The rapid aging of the population increases the need for health care for the elderly, especially those suffering from specific problems, such as those with CVA. About 85% of patients survive the CVA, living with its consequences. After a CVA, 50 to 70% can become functionally independent, but 15 to 30% progress to permanent disability.<sup>9-10</sup>

Risk factors for CVA are: Age, systemic hypertension, diabetes mellitus, heart disease, hyperglycemia, smoking, alcohol consumption, physical inactivity, sex, race and a poor diet.<sup>2,5</sup> Arterial hypertension is the major cause of CVA, corresponding to 70% of all cerebrovascular frames. The second major risk factor is heart disease, especially atheroembolic and embolic frames.<sup>7</sup>

Furthermore, the CVA can occur by occlusion of a vessel or a vascular rupture. In the first case there is the local ischemia and infarction, where there is no reception by the cells of nutrients essential for the metabolism. When a brain tissue is deprived of blood supply from the artery, follows a cell injury which, depending on their intensity, can express itself by a functional disorder. A vascular rupture causes a subarachnoid or intracerebral hemorrhage, mainly caused by hypertension.<sup>3,7,11</sup>

The location and extent of the injury determines the neurological symptoms presented by each patient, and its onset is usually sudden, ranging from mild to severe and may be temporary or permanent.<sup>3,10</sup>

The clinical picture of CVA can be divided into acute, chronic, and by hypotonia, flexor spasticity in the upper limb and lower limb extensor. Immediately after the CVA, the affected hemisphere shows a state of sagging without

voluntary movement, that is, the tone is low to start a motion, there is no resistance to passive movement, and the individual is unable to maintain the member in any position. Evolves eventually to hypertonia, where there is an increased resistance to passive movement, being typical of spastic patterns. In these cases, there is an intense muscle contraction and immediate return to the original position when the imposed force is ceased.<sup>3,12</sup>

As the CVA causes cognitive and neuromuscular disorders, and also psycho-emotional and socio-economic problems, the performance of various health professionals is essential for appropriate and comprehensive patient care. Many of them require intensive care for a long period, thereby requiring a multidisciplinary team for treatment and recovery.<sup>13</sup>

Nursing care is important in these cases because it helps to prevent complications, promotes the processes of rehabilitation after illness, seeks to meet the basic human needs and maximum independence in performing activities of daily living. Along with Nursing, Physiotherapy plays an essential role in the recovery of an individual, since this area has the role to preserve, maintain, develop or restore the integrity of the organs, systems or functions affected by CVA, thereby leading to social reintegration, in the family and return to work.<sup>2,14</sup> This study aimed to characterize people who suffered cerebrovascular accident and were treated at a rehabilitation center of reference of the State of Santa Catarina, in age, sex, date of first attendance and major sequelae found. The analyzed patients suffered CVA during the period 1967-2010. Data was collected between the years 2000-2010. It starts from the premise that knowledge of who these people are and the major sequels from CVA qualify for the health care, making it more geared to the needs of each. It also fills a gap in knowledge in Brazil about some epidemiological characteristics of people who have suffered cerebrovascular accident.

## METHODS

This is a descriptive, quantitative and cross-sectional study. Data collection was based on documents in the records of persons treated at the rehabilitation center in the state of Santa Catarina, between the years 2000 to 2009, whose primary cause of entry into this center was to have suffered a CVA. The same occurred in the period from January to July 2011 and collected data were available in the medical records. The study analyzed data according to age, sex, sequels, date of injury and the initial treatment. For organization, tabulation and statistical data the software GraphPad Prism® 5 (GraphPad Software Inc., San Diego/CA) was used. Data was analyzed using descriptive statistics univariate and bivariate analyzes.

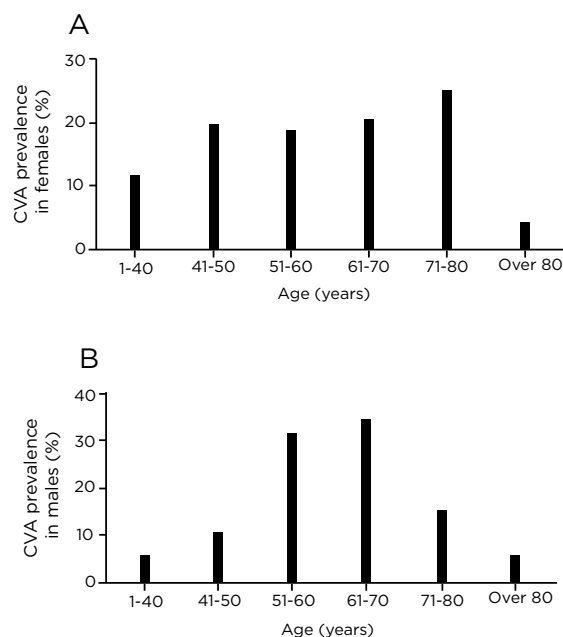
The project was approved by the Ethics Committee of the UFSC under number 1024 of 07/10/10. The research was funded by FAPESC contract No. 24 334/2010-5.

## RESULTS AND DISCUSSION

The term CVA is a sudden impairment of brain function, caused by numerous histopathological changes involving one or more intracranial and extracranial blood vessels.<sup>2,5</sup> The medical records of 443 people attending a Rehabilitation Center of Santa Catarina and who had suffered Accident vascular (CVA) were evaluated. By observing the documents, it was noted that some had CVA for a long time, dates ranged from 1967 to 2010. Of these 443 patients, 223 were female and 220 were male.

The ages of the patients evaluated at the time they suffered CVAs, ranging from 4-93 years totaling an average of 59.74 years. It was observed that among females (Figure 1A), 71-80 years old, there is a predominance of 25.11% in CVA, whereas in men (Figure 1B) it occurs between 61-70 years (34.09%).

**Figure 1** - CVA prevalence in females (1A) and males (1B) in the studied ages



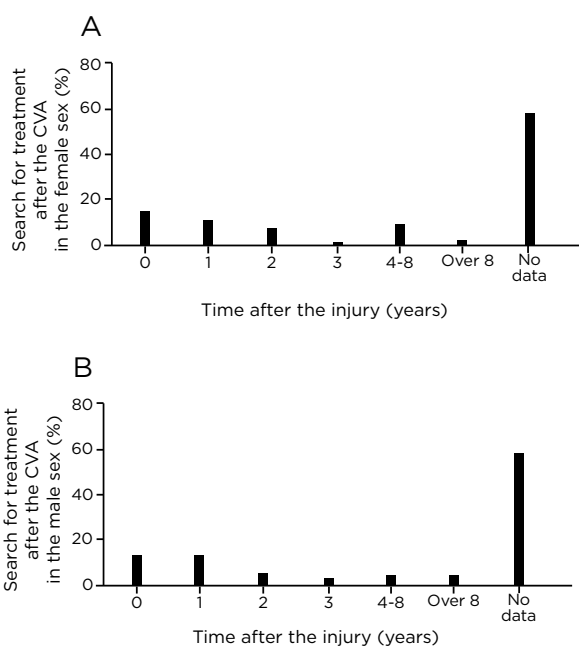
Men are more prone to be affected by CVA. This finding is not consistent with the findings in this study, since the 443 records analyzed, 223 were females while 220 were males.<sup>2,5</sup>

Moreover, in this work, it was observed that women are more likely to suffer CVAs at older ages, ie, there is a greater prevalence between 71 and 80 years (25.11%), while men are affected by CVA earlier between 61 and 70 years (34.09%). This confirms the data found in the literature. According to the literature survey, men until 51 years suffer CVA more frequently, after this period, both sexes have similar risks. The risk for a cerebrovascular accident is higher after age 65, doubling every decade after 55 years.<sup>4</sup> Another factor that increases the risk of CVA is that the poorer the economic condition of the population, the more they are susceptible to

cerebrovascular accident, and in these cases, it also increase the risk of death.<sup>13</sup>

In the time elapsed between the time of CVA and the first visit, it was observed that women (Figure 2A) seek help earlier than men, and, among those studied, 14.79% sought care during the year they suffered CVA and 10.31% in the next year. But among men (Figure 2B), 12.7% seek care immediately after having suffered a CVA, while 13.18% only in the following year. There are individuals in the study who took 25 to 30 years to seek care. By performing the average age of individuals who received early treatment, there was no significant difference, in females the average age was 65.81 and in men 66.44. As shown in Figure 2.

**Figure 2** - Percentage of people who seek some sort of treatment after CVA



However, it is known that early rehabilitation for recovery is important in CVA sequelae. Therefore, should be started in the hospital environment with the aim of stimulating the patient, and to assist in the recovery of lost functions, adapting it to its new condition, so that in this way they can resume their activities in society. Rehabilitation serves to maximize functional recovery, seeking the highest level of independence within the limitations imposed by the disease and the environment, but also to teach the patient to acquire a correct posture in bed, in the chair, recover pace, balance and coordination.<sup>2-3</sup>

Rehabilitation should be undertaken by a multidisciplinary team, whenever possible with involvement of family and friends, because the psychosocial repercussions affect not only the patient but the whole family universe, which may create complex problems, such as financial costs, physical exhaustion, emotional stress, decreased in productive activity and loss of social life. Therefore, the

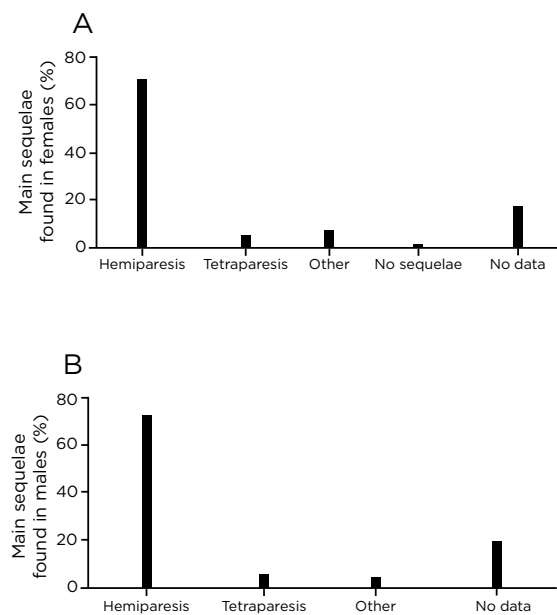
process of family adjustment is important to that individual and their new situation.<sup>3,15</sup>

In Figure 3, we observe the aftereffects found in females and males after CVA. In examining Figure 3A, we note that 70.85% of the women in the study had hemiparesis, these, 40.35% right and 30.5% left. The tetraparesis was present in 4.9% subjects. And in the remaining 6.72% we found other sequelae such as dystonia MSE, amputation MIE, aneurysm, headaches, epilepsy, neuropathic sequelae, osteoarthritis, pain in shoulder and facial paralysis. Only 0.45% had no neuromuscular sequelae, however, 17.04% of the records did not contain this information.

Figure 3B shows already found sequelae in males after suffering CVA.

It was observed that the number of hemiparesis is greater towards women. We found a hemiparesis of 72.27%, 34.09% on the right and 38.18% on the left. The tetraparesis was present in 5% of cases. In 3.63% had other consequences, such as: cerebellar syndrome, mental confusion, right tibia amputation, epilepsy, cerebral hematoma and osteoarthritis. And 19.09% had no data given in their chart. All assessed had some sequel.

**Figure 3** - Sequelae found in females and males after CVA (A and B, respectively)



According to the literature, the hemiparesis is a weakness on one side of the body, being the most frequent sequelae in patients who have suffered CVA, impaired upper limb occurs in 85% of the cases, and in three months, remains at 55 to 75% of patients.<sup>16</sup> Hemiplegia is the paralysis of the hemisphere contralateral to the lesion is common in both types of CVA, ischemic or hemorrhagic. Being one with a fast and brutal start. The ischemic settles suddenly in a few minutes or hours. In the case of hemorrhage, the occurrence

is accompanied by severe headache, vomiting, and short loss of consciousness and could extend into a coma.<sup>3</sup>

In the present study, we observed that a few patients reported shoulder pain. This fact confronts research in the area, because studies show that, in general, many CVA patients complain of pain. The pain in the shoulder joint is one of the most common and perhaps one of the most limiting.<sup>17</sup>

Patients who have suffered CVAs also present trunk control disorders resulting from postural problems and apraxia, which are respectively associated with lesions in the right and left cerebral hemisphere. The trunk control is essential for functional independence in basic activities such as mobility in bed and the sitting position. So after a brain injury, both voluntary limb movements and the muscle activity stabilizer are committed.<sup>18</sup>

Post-CVA individuals remain bedridden a greater time, reducing the capacity and lung volumes, such reduction may be of 25 to 50% of expected levels. These respiratory changes are frequently observed, being characterized by impaired lung mechanics and decreased respiratory muscle strength, principally those who remain more than 50% of the days bedridden.<sup>2</sup>

There is data reporting that 23% of individuals who have suffered CVA died within seven days, 31% in the next three weeks and 48% before the end of the first year after CVA. The recovery followed a rising curve between three and six months, about 85% to 90% recovered between 12 and 18 months. Studies have shown that only a small portion can return to work as a result of the physical and cognitive sequelae that limit the action of the individual.<sup>3</sup>

After the initial hospitalization, 80% of CVA survivors return to society. These, however, still require special care, often provided by families. The functional prognosis and recovery of function in altered brain injury depends on the type, extent and severity of the injury.<sup>3,5</sup>

Therefore several therapeutic modalities have been advocated, all aiming at minimizing the degree of neuronal injury that occurs after occlusion or arterial bleeding. Therefore, in recent decades, an enormous amount of resources have been invested in research, worldwide, in an attempt to reduce the mortality and morbidity of Encephalic Vascular Accidents.<sup>5</sup> Being the primary caregiver for rehabilitation and for meeting the daily physical needs of patients with CVA.<sup>19</sup>

## CONCLUSION

It is noted, in this study, that many individuals who have suffered CVA do not receive immediate care and perform rehabilitation late. Early Physiotherapy is very important for the patient to relearn certain lost or forgotten tasks, and thereby to reintegrate socially. It is also important to provide a continuous care and monitoring by Nursing, because they are those who spend more time with the patient. What

makes the difference in treatment is disciplined, ethical and consistent work of all professionals involved with the patient.

Furthermore, this study is important for all professions, but especially for Neurological Physiotherapy and Nursing, as it notes that the earlier the patient is mobilized, the better will be their recovery and their quality of life, it is also essential to general care and prevention of complications resulting from the disease. By virtue of the information collected in this study that is based on data contained in records and not all patients had a detailed assessment, it was difficult to tabulate the data.

## ABBREVIATIONS

CVA: cerebrovascular accident; UFSC, Federal University of Santa Catarina; FAPESC: Research Support and Innovation in the State of Santa Catarina Foundation; MSE: Left Upper Limb; MIE: Left Lower Limb.

## REFERENCES

1. Lima MSDSM. Acidente Vascular Cerebral: conhecimento dos alunos do 3 ano do curso de Licenciatura em Enfermagem; Porto: Escola Superior de Saúde, Universidade Fernando Pessoa; 2009.
2. Motta E, Natalio MA, Waltrick PT. Intervenção Fisioterapêutica e tempo de internação em pacientes com Acidente Vascular Encefálico; *Rev Neurocienc.* 2008; 16 (2): 118-23.
3. Cancela DMG. O Acidente Vascular Cerebral – classificação, principais consequências e reabilitação [dissertação]; Porto: Universidade Lusíada de Porto; 2008.
4. Paixão CT, Silva LD. Características de Pacientes Disfágicos em Serviço de Atendimento Domiciliar Público; *Rev Gaúcha de Enferm.* 2010; 31 (2): 262-69.
5. Fonseca NR, Penna AFG. Perfil do cuidador familiar do paciente com sequela de acidente vascular encefálico; *Ciência &Saúde Coletiva.* 2008; 13(4): 1175-80.
6. Bhatnagar P, Scarborough P, Smeeton NC, Allender S. The incidence of all stroke and stoke subtype in the United Kingdom, 1985 to 2008: a systematic review; *BMC Public Health.* 2010; 10: 539.
7. Correia ALF. Factores Genéticos de risco para Acidente Vascular cerebral Jovem [dissertação]; Aveiro: Universidade de Aveiro; 2011.
8. Rodrigues RA, Marques S, Kusumota L, dos Santos EB, Fhon JR, Webhe F. Transition of care for the elderly after cerebrovascular accidents – from hospital to the home; *Rev. Latino Am. Enfermagem.* 2013; 21: 216-24.
9. Morais HCC, Holanda GF, Oliveira ARS, Costa AGS, Ximenes CMB, Araujo TL. Identificação do Diagnóstico de Enfermagem “Risco de Quedas em Idosos com Acidente Vascular Cerebral; *Rev Gaucha de Enferm, Porto Alegre.* 2012; 33(2):117-24.
10. Mota JF, Nicolato R. Qualidade de vida em sobreviventes de acidente vascular cerebral – instrumento de avaliação e seus resultados; *J Bras Psiquiat.* 2008; 57(2): 148-5.
11. Neves PP, Sissy VF, Fukujima MM, Matas SLA, Prado GF. Profissionais da saúde, que assistem pacientes com acidente vascular cerebral, necessitam de informação especializada; *Rev Neurociencia* 2004; 12(4): 173-81.
12. Adams et al. Guidelines for the Early Management of Patients With Ischemic Stroke; American Heart Association. 2011; 34: 1056-83.
13. Pompeu SMAA, Pompeu JE, Rosa M, Silva MR. Correlação entre função motora, equilíbrio e força respiratória pós acidente vascular cerebral; *Rev. Neurociencia* 2011; 19 (4): 614-20.
14. Lima MSDSM. Acidente Vascular Cerebral: conhecimento dos alunos do 3 ano do curso de Licenciatura em Enfermagem da Universidade Fernando Pessoa [dissertação]; Porto: Escola Superior de Saúde, Universidade Fernando Pessoa; 2009.
15. Duncan et al. Management of Adult Stoke Rehabilitation Care: A Clinical Practice Guideline; American Heart Association. 2008; 36: 100-43.
16. Conforto AB, Ferreira JR. Neuroestimulação e reabilitação motora no acidente vascular cerebral; *ComCiencia.* 2009; n 109.
17. Barbosa MTLMJ. Custos e Efectividade da Reabilitação Após Acidente Vascular Cerebral: Um Revisão Sistemática [dissertação]; Coimbra: Universidade de Coimbra; 2012.
18. Bonita R, Beaglehole. Recovery of Motor Function After Stroke; American Heart Association. 2013; 19(12): 1497- 500.
19. Araújo JS, Silva SED, Santana ME, Vasconcelos EV, Conceição VM. Sim, eu sei o que é o derrame. As representações sociais de cuidadores sobre o acidente vascular cerebral; *R.pesq.:cuid. Fundam. Online.* 2012. 4(1): 2849-59.

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