

## Cognitive condition of patients with CVA in primary health care in João Pessoa - PB

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### ABSTRACT

Cerebrovascular Accident or Stroke (CVA) has a high prevalence worldwide causing neurological disability in adults. Cognitive deficit is one of the most important consequences, since its recognition is difficult and thus may interfere with the rehabilitation process and lead to impacts on the life quality of affected people. **Objective:** The goal was to estimate the prevalence of cognitive impairment in stroke among those with Primary Health Care (PHC), as well as to describe the clinical and sociodemographic characteristics, and the cognitive dimensions affected. **Method:** This was a cross-sectional study carried out in the city of João Pessoa - PB with 140 people enrolled in the Family Health Program that had been affected by stroke within the previous five years. **Results:** Over half of the people studied had manifestations suggesting cognitive impairment (54.9%) in the following dimensions: memory recall (70%), attention and calculation (60%), and read and apply (60%). In addition, the majority was elderly (73.1%) and, regarding the clinical characteristics of stroke, had declared that in the previous five years had had only one episode (64.2%) triggered in the last 13 months or more (76.1%). Also, half of the participants (50.7%) were unable to tell us the type of stroke they had suffered. **Conclusion:** The cognitive dimensions affected by stroke require further investigation in order to provide more funding to improve the assistance provided under the PHC.

**Keywords:** cognition, neuropsychological tests, primary health care, socioeconomic factors, stroke

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## INTRODUCTION

A Cerebrovascular Accident (CVA) is the acute appearance of a neurological dysfunction due to a vascular disturbance, resulting in signs and symptoms that correspond to the compromising of the focal areas of the brain or the brain stem.<sup>1</sup> Among the cardiovascular diseases, the CVA is one of the pathologies with the most public health repercussions, for it is currently the second cause of death in Brazil and the number one source of disability in adults. In 2003, in the Northeast of Brazil, the CVA mortality rate was 54.6/100 thousand inhabitants.<sup>2</sup>

Among the repercussions provoked by a CVA, it is common to find a cognitive decline.<sup>3</sup> Cognitive disorders in the acute phase of a CVA such as compromising of attention, of memory, or of executive functions are common and important predictors independent of long term adverse events.<sup>4,5</sup> Cognitive decline occurs in 5 to 10% of the elderly population<sup>6,7</sup> and in CVA survivors it varies between 12 and 56%.<sup>8,9</sup>

The most common cognitive impairments found in people who suffered CVA are negligence, apraxia, anosognosia, and communication disturbances. These characteristics are difficult to recognize and may constitute barriers to the rehabilitation process.<sup>10</sup>

Especially from the CVA perspective, improvements in the quality of primary and secondary care for the population, in the Family Health Strategy, in the ambulatory clinic, in residential care, and in the prevention programs for CVA risk factors, can diminish the costs with hospital admissions and increase the chances of a favorable prognosis for those afflicted, leading possibly to a greater life expectancy and quality of life of the population.<sup>11</sup>

In Brazil, the Primary Health Care (PHC) has been configured as a potent strategy to identify CVA cases, however, it still faces difficulties in their characterization, mainly in relation to the cognitive deficiencies they present. The scarcity of research on the impact of cognitive deficit in people afflicted with CVA, at this level of health care, is revealed as an important gap and the findings in this field may bolster health care actions to people with deficiency in the PHC, so as to guarantee equality, effectiveness and holism in health care.

## OBJECTIVE

This study seeks to estimate the prevalence of cognitive deficits in stroke patients in the PHC, as well as to describe their socio-

demographic and clinical characteristics, and the cognitive dimensions affected.

## METHOD

This is a transversal study, made in a Brazilian capital. The target-population consisted of individuals with age equal to or greater than 18 years, afflicted by CVA in the period between the years 2006 and 2010, and who were covered by the Family Health Program. The sample distribution was assembled from lists of patients supplied by the Health Secretary of the city, and prepared by Family Health Teams (FHT), totaling 324 subjects with the characteristics described above.

The sample size was defined from the formula:  $n = Z^2 PQ/d^2$ , with  $n$  = minimum sample size;  $Z$  = reduced variable;  $P$  = probability of finding the phenomenon studied;  $Q = 1-P$ ;  $d$  = precision desired. Due to it being a multidimensional evaluation,  $p = 50\%$  was adopted, and the precision desired for the study was 10%. Based on these criteria, the minimum sample size calculated was 147 subjects. Estimating the sampling losses at 10%, the sample size was defined as 161 individuals. However, it was possible to effectively interview 140 randomly selected patients from the initial list, due to the errors and obsolescence of the list, which was made of people who did not fit into the inclusion criteria either for not having a clinical diagnostic of CVA, for having their time of affliction greater than five years, or for being already deceased.

Subjects who presented speech or hearing impairment that would impede them from answering the Mini-Mental State Examination (MMSE) questions were excluded from the sample. This information will be better detailed in another section of the text.

The collection of data was made with the subjects at home, during visits previously scheduled by the CHA (Community Health Agents), where the researchers collected the data directly. The instrument utilized was prepared by the researchers and it contained questions referring to socio-demographic and clinical aspects so as to characterize the profile of the sample. In addition, to evaluate the cognitive functions of the patients, the Mini-Mental State Examination (MMSE) was utilized,<sup>12</sup> already validated in Brazil<sup>13</sup> and modified by Brucki et al.<sup>14</sup>

The MMSE score can vary from 0 to a maximum of 30 points. The scale is easy to use and can be easily administered in 5-10 minutes.<sup>15</sup> This test must, however, be interpreted

according to the education level and clinical context, for, in the absence of dementia, it can change in an individual who presents disturbances connected to an instrumental function, such as aphasia, or an amnesic syndrome.<sup>16</sup> The cut points of the MMSE used to indicate symptoms suggestive of cognitive decline were  $< 19/20$  points (illiterates) and  $< 23/24$  points (literate).<sup>15</sup>

The data obtained was tabulated and analyzed with the software *EPI INFO*™, version 3.5.1. Descriptive statistics and the chi-squared test were used with a significance level of 5% for the socio-demographic and clinical characteristics of the sample and of the MMSE scores, as well as for the description of the MMSE dimensions.

The Project was submitted for evaluation by the Committee for Ethics on Research from the *Hospital Universitário Lauro Wanderley (HULW)* (Lauro Wanderley University Hospital), and approved by Protocol no 430/09. Autonomy and the guarantee of anonymity of the participants were respected, assuring their privacy as to confidential data, as ruled by Resolution No. 196/96 of the National Health Council.

## RESULTS

From the initial sample of 140 patients interviewed in the research "Encephalic Vascular Accident (EVA): Analysis of Patients' Functionality in the Basic Attendance in Conformity with Access to Rehabilitation," 18 subjects were excluded who presented impairments in hearing ( $n = 2$ ), speech (aphasic = 14, dysarthria = 1), or sight ( $n = 1$ ) that impeded them from answering the MMSE questions. Thus, the subsample of this study was composed of 122 subjects.

As for the gender of the individuals, the sample was composed of 53.2% females ( $n = 65$ ), of which approximately two thirds were aged 60 years or more (73.0%), more than half were literate (56.8%), with 46.4% were classified as functional illiterates, taking as a reference the number of years in school (less than 04 years). Among those 63.9% declared themselves as married/stable union, and mostly living with three or more people in their residence (74.6%). Half of the subjects earned between one and two minimum wage salaries (50.8%), followed by those who earned three or more minimum wage salaries (43.4%). The prevalent type of CVA was ischemic (36.9%) when compared to the hemorrhagic, with most participants not able

to say which one they had had (51.6%). The duration of lesion was 13 months or more (68.9%), and the percentage of episodes in the last five years was 68.9%.

The research subjects with or without cognitive impairment along with the social-demographic and clinical CVA characteristics are presented in Table 1. A statistical association was observed ( $p < 0.005$ ) only between cognitive impairment and literacy (0.001), with no association with gender (0.912), age (0.960), number of CVA episodes (0.056), time of CVA (0.219), or type of CVA (0.081).

**Table 1.** Association between cognitive impairment and the sample characteristics - João Pessoa, 2011

Characteristics	With impairment		Without Impairment		p value
	n	%	n	%	
Gender					
Male	31	54.4%	26	45.6%	0.912
Age bracket					
60 years old or more	49	55.1%	40	44.9%	0.960
Literate					
No	36	73.5%	13	26.5%	0.001
Number of episodes in the last 5 years					
Two or more	24	63.2%	14	36.8%	0.219
Time of affliction					
Up to 12 months	16	42.1%	22	57.9%	0.056
Type of CVA					
Ischemic	28	62.2%	17	37.8%	0.081

64.2% reported having had only one episode in the last five years.

It was verified that more than half of the cognitively impaired population was composed of females (55.4%) aged 60 years or more (55.1%), and a large portion of them were illiterate (73.5%). Among the afflicted, the ischemic CVA was frequent (62.2%), with time of last episode being 13 or more months earlier (60.7%) with two or more episodes having occurred in the previous five years (63.2%).

Those who did not present cognitive impairment were mostly males (45.6%), aged less than 60 years old (45.5%), and literate (57.5%). They reported that the last episode had happened within the last 12 months (57.9%), and 48.8% informed that they had had only one episode in the last five years, with the hemorrhagic type being more frequent (64.3%).

Although the patients afflicted by CVA and with possible cognitive impairment had very defined characteristics, as presented on

The prevalence suggestive of cognitive decline based on the MMSE scoring was 54.9% (45.7 = 63.9), below the lower score proposed by Almeida,<sup>15</sup> with homogeneous distribution between the genders and in relation to education. Most subjects with cut points lower than those recommended were 60 or more years old (73.1%), among these and in relation to the clinical CVA characteristics, 50.7% could not give their type of CVA, 76.1% of the participants told us that they had had an episode 13 months or more before, and regarding their number of episodes

Strokes afflict individuals around 60 years of age, which concurs with the investigations of Meneghetti et al.<sup>22</sup> and Schelp et al.<sup>23</sup> It was also seen that more than half of the population interviewed was literate, findings that are contrary to those of Maineri et al.<sup>24</sup> and Santana et al.<sup>25</sup> However, one needs to consider that, according to the United Nations Organization for Education, Science, and Culture (UNESCO), functional illiteracy is defined by the proportion of people 15 or older who have completed less than 4 years of schooling,<sup>26</sup> which fits the present sample. In this study, the marital status of married/stable union and the family arrangement composed of more than two people predominated, data similar to that presented by Falcão et al.<sup>27</sup> Half of the subjects in this study earned between one and two minimum wage salaries, which was also described by Souza et al.<sup>28</sup>

The type of CVA most prevalent was the ischemic, which is in agreement with the observations of Almeida<sup>29</sup> and Nunes et al.<sup>30</sup> It was seen that most participants had their episode 13 or more months prior, while in the study of Araújo et al.<sup>31</sup> the average was much longer ago. In the work of Correia et al.,<sup>32</sup> it was evident that most stroke patients had suffered only one episode and, regarding the duration of affliction, most of them had a 3-year history of stroke.

In the present study, there was cognitive impairment in 54.9% of the sample evaluated, however, there was no statistical significance when we compared the MMSE score with the socio-demographic and clinical variables of the stroke patients attended by ESF. It is confirmed that the sample composition is predominantly elderly. The utilization of distinct cut points for literates and illiterates, as proposed by Almeida,<sup>15</sup> was necessary to confer more fidedignity to the exam, since some MMSE items are directly related to the capacity to read and write, however, the difference between the literate and the illiterate was minimal in the sample. Nevertheless, we must consider the possibility that the high number of functional illiterates did interfere with this result.

It was observed that most individuals could not perform the activities proposed by the MMSE, such as: copying a diagram or writing a complete sentence. It is important to note that these skills are related to the motor function that can suffer alterations, such as weakening or paralysis of a part of the body after a stroke,<sup>33</sup> however, they can also be influenced by the cultural baggage and basic knowledge of the schooling process provided

Table 2, no statistical association was verified ( $p < 0.005$ ) between cognitive impairment and gender (0.943), age (0.221), co-habitation (0.059), literacy (0.304), type of CVA (0.025), time of CVA (0.168), or number of CVA episodes (0.444) in this study's sample.

In relation to the MMSE dimensions, it was observed that the individuals presented a high percentage of errors in the execution of the exam in the following items: copying a diagram (80%), writing a complete sentence (80%), evoking memory (70%), attention and calculation (66%), and finally reading and executing (60%), as shown on Table 3.

## DISCUSSION

According to the findings of this study, the predominance of the female gender was observed in the sample studied, concurring with the studies of Cavalcante et al.<sup>17</sup> and Reis et al.<sup>18</sup> However, in the literature greater prevalence of male gender is reported.<sup>19-21</sup>

**Table 2.** Characteristics of subjects with scoring below the cut suggested by Almeida (1998) - João Pessoa, 2011

Characteristics	n	%	IC 95%
Gender			
Female	36	53.7	34.0-58.9
Age bracket			
60 years old or more	49	73.1	60.9-83.2
Literate			
No	36	53.7	41.1-66.0
Number of episodes in the last 5 years			
One Um	43	64.2	51.5-75.5
Time of affliction			
13 months or more	51	76.1	64.1-85.7
Type of CVA			
Ischemic	28	41.8	29.8-54.5
Did not know	34	50.7	8.2-63.2

**Table 3.** MMSE dimensions according to sample - João Pessoa, 2011

MMSE Dimensions	Total of points	Average of right answers	Percentage of right answers
Temporal orientation	5	3.3	66%
Spatial orientation	5	4.1	82%
Acknowledgements	3	2.4	80%
Attention and calculation	5	1.7	34%
Evoking memory	3	0.9	30%
Naming two objects	2	1.7	85%
Repeating	1	0.6	60%
Commanding of stages	3	2.2	74%
Writing a complete sentence	1	0.2	20%
Reading and executing	1	0.4	40%
Copying a diagram	1	0.2	20%

along the years of formal education. The other MMSE items that had lower scores included cognitive functions such as: deficits of attention, memory and learning, processing information, language, intellectual functions, and planning, in addition to perceptual, recognition, and motor planning difficulties.<sup>34</sup>

In research with patients afflicted by CVA, the MMSE is used to identify cognitive deficiencies and select the patients able to answer the questionnaire. It was observed that from 44 patients evaluated, only 18 obtained scores lower than 18 (40.9%) points, which suggests cognitive decline.<sup>35</sup> In the investigation made by Rodrigues et al.,<sup>36</sup> a prevalence of cognitive deficit of 35.5% was confirmed, which is far from the results obtained in our study in João Pessoa.

In the city of Natal-RN, Costa<sup>37</sup> developed a study that investigated the neurological state and cognitive performance of patients

with CVA sequelae, and the results demonstrated a significant difference between the cognitive averages of the patients in relation to education, neurological state, and cognitive performance, confirming that the more serious the neurological state of the patients, the lesser their cognitive performance. In addition, they noted that the MMSE average for literates and illiterates was 19.3 and 15.92, respectively. However, the fact must be considered that the studies mentioned were developed in an outpatient environment in which the sample was accessed out of convenience, which can partly justify the discrepancy between the comparative prevalences.

A study made in a Geriatric Rehabilitation Unit in Israel<sup>38</sup> that attends patients 60 or over, confirmed that after the first CVA, 55.2% of them presented cognitive deficits, which is very similar to the present findings;

however, we must take into consideration that this study was made in a reference center and also that there are differences in the attendance functioning and structuring of the health system in Israel in relation to the Brazilian system, nevertheless, the similarities and discrepancies between the prevalences showed the need to investigate this research data more.

It is important to point out in the Israeli investigation, that the presence of cognitive impairment at admission is a predictor that can negatively affect the result of the rehabilitation as a whole. The importance of this evaluation is important in the ambit of services for its low cost, time, and for its ease of execution. The potential that the cognitive evaluation has in admission is to indicate cases that will need more attention from the teams involved with rehabilitation.<sup>38</sup>

The present study highlights the high frequency of elderly stroke victims who are afflicted with cognitive impairment. In an international study made with 243 elderly (aged 70 years and older) who had lived with a stroke an average 20 months, it was observed that the prevalence of dementia was of 28% in the patients with CVA whereas only 7.4% in the control groups, in this study 72% of the patients had cognitive problems compared with 36% of the control groups. Cognitive deficiencies were more common in CVA patients without dementia (61%) than in the control groups with the same characteristics, 31%.<sup>39</sup>

Tatemichi et al.,<sup>9</sup> investigated 227 patients 60 years old or more, both genders, with an ischemic CVA diagnosis, three months after their hospital admission, and 240 without CVA (control group); they found a cognitive decline in 35.2% of the patients with CVA, compared with 3.8% in the controls ( $p < 0.001$ ).

It is suspected that for it being a population predominantly composed of the elderly, the behavior of the sample in this study, in relation to cognitive deficit, has similarities to what is found in other elderly populations in Brazil. In the approach made by Correia et al.<sup>40</sup> in Maranhão, where the population studied was composed of elderly females, 31.2% of them were classified with a cognitive disorder, and 68.8% with no cognitive disorder, in accordance with the cut point proposed in the study by Caramelli & Nitrini.<sup>41</sup> The elderly with cognitive disorders were in the age bracket of 81 - 85 years of age (71.4%).

In the test made by Machado et al.,<sup>42</sup> with elderly of both genders, only 36.5% showed cognitive decline. When the age bracket was

related to the cognitive decline, it was verified that most of them were 60-69 years old (24.32%).

A study made in Belo Horizonte with 98 elderly age over 65 years showed that 26 elderly presented the diagnosis of probable cognitive decline/dementia. They were mostly females ( $n = 19$ ), older ( $81.2 \pm 7.3$ ), had lower family income ( $2.0 \pm 1.0$ ), and performed worse on the cognitive test (MMSE:  $16.3 \pm 5.3$ ) than those with no evidence of cognitive decline.<sup>43</sup>

Another remarkable aspect is that the sample composition of this study is characterized as suffering from chronic disease with a neurological slant, which pushes us to verify the degree of similarity in the cognitive behavior of this population in relation to others also afflicted by chronic disease with neurological origin.

When comparing the results of this study with others that analyzed cognitive deficits from different chronic diseases it was noticed that 30% of the individuals diagnosed with Parkinson's disease showed dysfunctions in activities that required spatial orientation, memory, calculation, and linguistic expression, and the average age of those presenting impairment was 59.7. There was no association between the age of the individuals and the degree of cognitive impairment, and also it was confirmed that the sample number was reduced, which partially diminished the study's power of association.<sup>44</sup>

Findings from a study involving patients with Alzheimer's Disease (AD) attended at an outpatient clinic in São Paulo in the period from 1997 to 1999, showed that 34.5% presented light dementia, 12.5% moderate dementia, and 20.7% severe dementia, which was determined according to the MMSE scores.<sup>45</sup> In a different study with elderly subjects diagnosed with AD, 82% showed low cognitive performance.<sup>46</sup>

Laks et al.,<sup>47</sup> through the application of the MMSE, pointed out that illiterate schizophrenic patients presented a worse performance when compared to those with low/medium education, while, the other variables studied, such as duration of the disease, age, and duration of institutionalization, did not present differences between the two groups.

The comparison of the findings from this study with other chronic pathologies of a neurological order is complex, for the level of impairment depends very much on the cerebral area damaged and its involvement with cognitive aspects.

A study with a design similar to that, as far as location of data collection, evaluated 82 patients with a clinical CVA diagnosis within reach of the Family Health Program units in the city of Diamantina by the application of the mini-exam only as a criterion to consider whether the patients were apt to answer a questionnaire at home.<sup>48</sup> However, it was not part of the scope of the study mentioned to estimate the cognitive impairment of the patients, thus, the frequency of cognitive deficit was not presented, which emphasizes the need for deeper exploration of the cognition in population studies on dementia and cognitive impairment in the reachable PHC territories.

Investigations made in Brazil make it evident that there is a strong influence of the educational level on the MMSE scores.<sup>13-15,49-50</sup> In the present study, we did not find any statistical significance between the MMSE scores and the education of individuals who presented a cognitive deficit, which indicates the need for other investigations with a broader sample and with more specific instruments to examine this hypothesis.

It is important to note the scarcity of studies referring to the cognitive question of patients with clinical diagnosis of CVA, especially at the PHC level. Finally, despite the MMSE being easy to use, it also has restrictions in the application to patients with difficulties in communicating, hearing, and seeing, which makes it impossible to obtain a reliable cognitive evaluation from this group. Domestic and international studies presented on this occasion confer great importance to this instrument in the ambit of research, however, it is important to point out the need for more studies and for the adoption of other instruments that evaluate the cognitive condition of this population.

## CONCLUSION

It was verified that the data found made it possible to get to know the population afflicted with CVA in the city of João Pessoa in the health care network, demonstrating that more than half of the individuals analyzed presented cognitive impairment with difficulties in the functions of evoking memory, attention and calculation, reading and executing, since they were mostly elderly. As for the clinical characteristics of CVA, the participants reported having had a CVA episode in the last 13 months or more, and only one

episode in the last five years, and also, many could not identify the type of CVA they had.

It is possible that the very fact of their being elderly may have brought confusion to the relationship between the CVA and their cognitive deficit; besides, the study was composed of many functional illiterates, which compromises the evaluation of cognitive decline, even using the adjustments proposed by some authors when using the MMSE in these individuals. It is clear that the dimensions affected in the ambit of cognitive impairment can be studied more accurately by investigations designed with monitoring. The identification of cognitive function deficiencies must be the object of rehabilitation for stroke patients, for the treatment can bring important functional gains and point to other therapeutic possibilities, and be transformed into functionality and holism in the attendance given in the PHC and at other levels.

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## REFERENCES

1. Stroke--1989. Recommendations on stroke prevention, diagnosis, and therapy. Report of the WHO Task Force on Stroke and other Cerebrovascular Disorders. *Stroke*. 1989;20(10):1407-31.
2. Curioni C, Cunha CB, Veras RP, André C. The decline in mortality from circulatory diseases in Brazil. *Rev Panam Salud Publica*. 2009;25(1):9-15.
3. Khedr EM, Hamed SA, El-Shereef HK, Shawky OA, Mohamed KA, Awad EM, et al. Cognitive impairment after cerebrovascular stroke: Relation ship to vascular risk factors. *Neuropsychiatr Dis Treat*. 2009;5:103-16.
4. Nys GM, van Zandvoort MJ, de Kort PL, van der Worp HB, Jansen BP, Algra A, et al. The prognostic value of domain-specific cognitive abilities in acute first-ever stroke. *Neurology*. 2005;64(5):821-7.
5. O'Sullivan SB, Schmitz TJ. *Fisioterapia: avaliação e tratamento*. 4ª ed. São Paulo: Manole; 2004. p.519-81.
6. Luxenberg JS, Feigenbaum LZ. Cognitive impairment on a rehabilitation service. *Arch Phys Med Rehabil*. 1986;67(11):796-8.
7. Hamilton BB, Granger CV. Disability outcomes following inpatient rehabilitation for stroke. *Phys Ther*. 1994;74(5):494-503.

8. Ebrahim S, Nouri F, Barer D. Cognitive impairment after stroke. *Age Ageing*. 1985;14(6):345-8.
9. Tatemichi TK, Desmond DW, Stern Y, Paik M, Sano M, Bagiella E. Cognitive impairment after stroke: frequency, patterns, and relationship to functional abilities. *J Neurol Neurosurg Psychiatr*. 1994;57(2):202-7.
10. Smith J, McKnight B. Pacientes que sofreram um acidente vascular cerebral. In: Umphred D, Carlson C. *Reabilitação neurológica prática*. Rio de Janeiro: Guanabara Koogan; 2007. p.190-215.
11. Pereira AB, Alvarenga H, Pereira Júnior RS, Barbosa MTS. Prevalência de acidente vascular cerebral em idosos no Município de Vassouras, Rio de Janeiro, Brasil, através do rastreamento de dados do Programa Saúde da Família. *Cad Saúde Publica*. 2009;25(9):1929-36.
12. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res*. 1975;12(3):189-98.
13. Bertolucci PHF, Brucki SMD, Campacci SR, Juliano Y. O mini-exame do estado mental em uma população geral: impacto da escolaridade. *Arq Neuropsiquiatr*. 1994;52(1):1-7.
14. Brucki SMD, Nitrini R, Caramelli P, Bertolucci PHF, Okamoto IH. Sugestões para o uso do mini-exame do estado mental no Brasil. *Arq Neuropsiquiatr*. 2003;61(3-B):777-81.
15. Almeida OP. Mini exame do estado mental e o diagnóstico de demência no Brasil. *Arq Neuropsiquiatr*. 1998;56(3-B):605-12.
16. Cambier J, Masson M, Dehen H. *Neurologia*. Rio de Janeiro: Guanabara Koogan; 2005.
17. Cavalcante TF, Moreira RP, Araújo TL, Lopes MVO. Fatores demográficos e indicadores de risco de acidente vascular encefálico: comparação entre moradores do município de Fortaleza e o perfil nacional. *Rev Latino Am Enferm*. 2010;18(4):703-8.
18. Reis LA, Mascarenhas CHM, Marinho Filho LEN, Borges OS, Argolo SM, Torres GV. Prevalência e padrão de distribuição do acidente vascular encefálico em idosos submetidos a tratamento fisioterapêutico no município de Jequié, BA. *Rev Bras Geriatr Gerontol*. 2008;11(3):369-78.
19. Moreira RP, Araújo TL, Cavalcante TF, Guedes NG, Lopes MVO, Costa AGS, et al. Acidente vascular encefálico: perfil de indicadores de risco. *Rev RENE*. 2010;11(2):121-8.
20. Polese JC, Tonial A, Jung FK, Mazuco R, Oliveira SG, Schuster RC. Avaliação da funcionalidade de indivíduos acometidos por acidente vascular encefálico. *Rev Neurocienc*. 2008;16(3):175-8.
21. Bruno AA, Farias CA, Iryia GT, Masiero D. Perfil dos pacientes hemiplégicos atendidos no Lar Escola São Francisco - Centro de Reabilitação. *Acta Fisiátr*. 2000;7(3):92-4.
22. Meneghetti CHZ, Delgado GM, Pinto FD, Canonici AP, Gaino MRC. Equilíbrio em indivíduos com acidente vascular encefálico: Clínica Escola de Fisioterapia da Uniararas. *Rev Neurocienc*. 2009;17(1):14-8.
23. Schelp AO, Cola PC, Gatto AR, Silva RG, Carvalho LR. Incidência de disfagia orofaríngea após acidente vascular encefálico em hospital público de referência. *Arq Neuropsiquiatr*. 2004;62(2-B):503-6.
24. Mainieri NL, Xavier FMF, Berleze MCC, Moriguchi EH. Fatores de Risco para Doença Cerebrovascular e Função Cognitiva em Idosos. *Arq Bras Cardiol*. 2007;89(3):158-62.
25. Santana BAS, Fukujima MM, Oliveira RMC. Características sócio-econômicas de pacientes com acidente vascular cerebral. *Arq Neuropsiquiatr*. 1996;54(3):428-9.
26. Instituto Brasileiro de Geografia e Estatística. Síntese de indicadores sociais: uma análise das condições de vida da população brasileira. Rio de Janeiro: IBGE; 2008.
27. Falcão IV, Carvalho EMF, Barreto KML, Lessa FJD, Leite VMM. Acidente vascular cerebral precoce: implicações para adultos em idade produtiva atendidos pelo Sistema Único de Saúde. *Rev Bras Saúde Matern Infant*. 2004;4(1):95-101.
28. Souza LB, Abreu RNDC, Brito EM, Moreira TMM, Silva LMS, Vasconcelos SMM. O cuidado domiciliar de idosos acometidos por acidente vascular cerebral: cuidadores familiares. *Rev Enferm UERJ*. 2009;17(1):41-5.
29. Almeida ALM. Considerações sobre a avaliação da qualidade de vida em grupo de pacientes com acidente vascular cerebral. *Rev Neurocienc*. 2010;18(2):147-9.
30. Nunes S, Pereira C, Silva MG. Evolução funcional de utentes após AVC nos primeiros seis meses após a lesão. *Ess Fisi Online*. 2005;1(3):3-20.
31. Araújo PS, Silva PCF, Moreira RCPS, Bonilha SF. Prevalência dos fatores de risco em pacientes com acidente vascular encefálico atendidos no setor de neurologia da clínica de fisioterapia da UNIPAR, campus sede. *Arq Ciências Saúde UNIPAR*. 2008;12(1):35-42.
32. Correia ACS, Silva JDS, Silva LVC, Oliveira DA, Cabral ED. Crioterapia e cinesioterapia no membro superior espástico no acidente vascular cerebral. *Fisioter Mov*. 2010; 23(4):555-63.
33. Mutarelli EG. Neurologia-doenças do sistema nervoso. In: Helito AS, Kauffman P. *Saúde: entendendo as doenças, a enciclopédia médica da família*. São Paulo: Nobel; 2006. p.459-76.
34. Gouveia AR. Introdução à reabilitação neuropsicológica de adultos. In: Abrisqueta Gomez J, Santos FH. *Reabilitação neuropsicológica da teoria à prática*. São Paulo: Artes Médicas; 2006. p.73-82.
35. Scalzo PL, Souza ES, Moreira AGO, Vieira AF. Qualidade de vida em pacientes com acidente vascular cerebral: clínica de fisioterapia Puc Minas Betim. *Rev Neurocienc*. 2010;18(2):139-44.
36. Rodrigues JE, Sá MS, Alouche SR. Perfil dos pacientes acometidos por AVE tratados na clínica escola de fisioterapia da UEMESP. *Rev Neurocienc*. 2004;12(3):117-22.
37. Costa FA. Estado cognitivo e condição funcional de pacientes pós acidente vascular encefálico-AVC [Tese]. Natal: Universidade Federal do Rio Grande do Norte; 2010.
38. Heruti RJ, Lusky A, Dankner R, Ring H, Dolgopiat M, Barell V, et al. Rehabilitation outcome of elderly patients after a first stroke: effect of cognitive status at admission on the functional outcome. *Arch Phys Med Rehabil*. 2002;83(6):742-9.
39. Lindén T, Skoog I, Fagerberg B, Steen B, Blomstrand C. Cognitive impairment and dementia 20 months after stroke. *Neuroepidemiology*. 2004;23(1-2):45-52.
40. Correia MVG, Teixeira CCG, Araújo JF, Brito LMO, Figueiredo Neto JA, Chein MBC, et al. Perfil cognitivo em idosos de dois serviços públicos em São Luís - MA. *Rev Psiquiatr Clín*. 2008;35(4):131-7.
41. Caramelli P, Nitrini R. Como avaliar de forma breve e objetiva o estado mental de um paciente? *Rev Assoc Med Bras*. 2000;46(4):301.
42. Machado JC, Ribeiro RCL, Leal PFG, Cotta RMM. Avaliação do declínio cognitivo e sua relação com as características socioeconômicas dos idosos em Viçosa - MG. *Rev Bras Epidemiol*. 2007;10(4):592-605.
43. Freitas DHM, Campos FCA, Linhares LQ, Santos CR, Ferreira CB, Diniz BS, et al. Autopercepção da saúde e desempenho cognitivo em idosos residentes na comunidade. *Rev Psiq Clín*. 2010;37(1):32-5.
44. Prado ALC, Puntel GO, Souza LP, Tomaz CAB. Análise das manifestações motoras, cognitivas e depressivas em pacientes com doença de Parkinson. *Rev Neurocienc*. 2008;16(1):10-5.
45. Almeida OP, Crocco EI. Percepção dos déficits cognitivos e alterações do comportamento em pacientes com Doença de Alzheimer. *Arq Neuropsiquiatr*. 2000;58(2-A) 292-9.
46. Talmelli LFS, Gratão ACM, Kusumota L, Rodrigues RAP. Nível de independência funcional e déficit cognitivo em idosos com doença de Alzheimer. *Rev Esc Enferm USP*. 2010;44(4):1033-9.
47. Laks J, Vega U, Silberman C, Rozenthal M, Nigri FN, Freitas RC, et al. Rastreamento cognitivo em idosos esquizofrênicos institucionalizados. *Rev Bras Psiquiatr*. 2000;22(4):159-63.
48. Leite HR, Nunes APN, Correia CL. Perfil epidemiológico de pacientes acometidos por acidente vascular encefálico na estratégia de saúde da família em Diamantina, MG. *Fisioter Pesqui*. 2009;16(1):34-9.
49. Diniz BSO, Volpe FM, Tavares AR. Nível educacional e idade no desempenho no mini-exame do estado mental em idosos residentes na comunidade. *Rev Psiquiatr Clín*. 2007;34(1):13-7.
50. Lourenço RA, Veras RP. Mini-Exame do Estado Mental: características psicométricas em idosos ambulatoriais. *Rev Saúde Pública*. 2006;40(4):712-9.