

Hospital morbidity from stroke and speech-language therapy coverage in the state of Paraíba, Brazil

Morbidade hospitalar por acidente vascular encefálico e cobertura fonoaudiológica no Estado da Paraíba, Brasil

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ABSTRACT

Introduction: Stroke is a neurological disease associated with hospital morbidity, and its sequels requires speech-language therapy care.

Purpose: To analyze the profile of hospital morbidity from stroke and its relation to speech therapy coverage in the state of Paraíba, Brazil.

Methods: Ecological type study, carried out with data obtained from the Brazilian Hospital Information System (SIH / SUS – *Sistema de Informações Hospitalares / Sistema Único de Saúde*) and the National Registry of Health Facilities (CNES – *Cadastro Nacional de Estabelecimentos de Saúde*) in the years of 2010 and 2014, considering the number of approved inpatient hospital authorization, sex, age, average amount spent per admission, average length of stay and the number of speech-language therapists in the public hospital system. It was calculated the rate of hospitalization, the incidence rate of hospitalization from stroke and the proportion of hospitalization from stroke in relation to speech-language therapy coverage. **Results:** There was a decline in hospitalizations from stroke in the State of Paraíba, between 2010 and 2014. There was a higher concentration of hospitalizations outside the metropolitan area of João Pessoa, in both years, increase of 9.8% in the amount spent per admission and a seven day stay on average in the hospital. The number of hospitalizations was higher in individuals of 60 years or older, with a similar proportion of either sex. The number of Speech-language therapists linked to the public hospital system increased 82.8% in 2014, however, with the highest concentration in the metropolitan region of João Pessoa. In both years, the proportion of hospitalizations from stroke in relation to speech therapy coverage was higher outside the João Pessoa metropolitan area.

Conclusion: In the state of Paraíba, between 2010 and 2014, there was a decline in stroke hospitalization, greater concentration of admissions of elderly individuals outside the metropolitan region of João Pessoa, with the same proportion between the sexes. Speech-language therapy coverage was scarce in the most remote areas of the capital.

Keywords: Stroke; Morbidity; Speech, language and hearing sciences; Hospitals; Information systems

RESUMO

Introdução: O acidente vascular encefálico (AVE) é uma condição neurológica associada à morbidade hospitalar e que requer cuidados fonoaudiológicos, em razão de suas sequelas. **Objetivo:** Analisar o perfil de morbidade hospitalar por acidente vascular encefálico e sua relação com a cobertura fonoaudiológica no Estado da Paraíba, Brasil.

Métodos: Estudo do tipo ecológico, realizado com dados obtidos no Sistema de Informações Hospitalares (SIH/SUS) e no Cadastro Nacional de Estabelecimentos de Saúde (CNES), nos anos de 2010 e 2014, considerando o número de autorizações de internação hospitalar aprovadas, sexo, faixa etária, valor médio gasto por internação, média de dias de internação e número de fonoaudiólogos no regime hospitalar público. Calculou-se a taxa de internação hospitalar, o coeficiente de incidência de hospitalização por AVE e a proporção de internações por AVE, em relação à cobertura fonoaudiológica. **Resultados:** Houve declínio nas internações por AVE no Estado da Paraíba, entre 2010 e 2014. Ocorreu maior concentração de hospitalizações fora da Região Metropolitana de João Pessoa, em ambos os anos, aumento de 9,8% no valor gasto por internação e permanência de sete dias, em média, no ambiente hospitalar. O número de internações foi maior em indivíduos com 60 anos ou mais, com proporção semelhante quanto ao sexo. O número de fonoaudiólogos vinculados ao regime hospitalar público aumentou 82,8% em 2014, porém, com maior concentração na Região Metropolitana de João Pessoa. Em ambos os anos, a proporção de internações por AVE, em relação à cobertura fonoaudiológica, foi maior fora da Região Metropolitana de João Pessoa. **Conclusão:** No Estado da Paraíba, entre 2010 e 2014, houve declínio da hospitalização por AVE, maior concentração de internações de indivíduos idosos fora da Região Metropolitana de João Pessoa, com mesma proporção entre os sexos. A cobertura fonoaudiológica foi mais escassa nas regiões mais distantes da capital.

Palavras-chave: Acidente vascular cerebral; Morbidade; Fonoaudiologia; Hospitais; Sistemas de informação

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INTRODUCTION

Stroke can be defined as a sudden focal neurologic deficit caused by a vascular lesion⁽¹⁾, which may be ischemic, when there is interruption of the passage of oxygen and glucose to the brain, or hemorrhagic, from an abnormal bleeding into the extravascular brain areas^(2,3). Stroke has a multifactorial etiology which includes hypertension, diabetes, dyslipidemia, atherosclerosis, smoking, alcohol consumption, physical inactivity, obesity, among others^(3,4).

Stroke is a condition that needs hospital care, both immediate and as during the hospital stay, resulting in a high social and economic costs⁽⁵⁾. The process of hospitalization for stroke usually starts with emergency assistance, in virtue of suggestive signs of the disease, diagnostic confirmation followed by clinical evaluation and laboratory tests⁽⁶⁾. Still in the hospital stay, among the various complications acquired after stroke are: muscle weakness; areflexia; hemiplegia; hemianesthesia and cognitive disorders⁽⁷⁾. By the speech-language perspective, the most common sequelae are associated with communication and swallowing.

Regarding communication, aphasia is the most common condition, ranging from a slight language change, such as the difficulty of saying names to a more serious condition, such as loss of the ability to issue and understand any language signal⁽⁸⁾. Already oropharyngeal dysphagia, is considered one of the most common functional sequelae of stroke and can cause lung and nutritional complications, involving the decline in the overall health of the individual and extension of the hospital stay^(9,10).

In these cases, the speech-language therapy care in the hospital can decrease the time of the use of alternative nourishment routes, helping in the improvement of the pulmonary clinical state, preventing communication complications reducing hospital stay, or can help to avoid or minimize damages caused by hospitalization⁽¹¹⁾.

The objective of this study was to analyze the profile of hospital morbidity from stroke inpatients and its relation to speech therapy coverage in the state of Paraíba, Brazil, in 2010 and 2014.

METHODS

This is an ecological study, conducted from data provided by the website of the Brazilian Ministry of Health, DATASUS (<http://datasus.saude.gov.br>). As the methodological design only included the collection of secondary data in public domain, it was not necessary to submit the study to the appreciation of the ethics committee.

The collection considered the years of 2010 and 2014 covering the most recent five-year period in the consolidated DATASUS at the time of consultation. Data on hospital morbidity were obtained through consultation with the Brazilian Hospital Information System (SIH / SUS – *Sistema*

de Informações Hospitalares / Sistema Único de Saúde). It was collected the number of inpatient hospital authorizations (IHA) by place of hospitalization in the State of Paraíba, whose cause was the stroke, classified according to the 10th revision of the International Classification of Diseases (ICD-10), by G45 codes (Transient cerebral ischemic attacks and related syndromes), I-63 (cerebral infarction) and I-64 (stroke, not specified as hemorrhage or infarction).

In addition, it was obtained the average amount paid in *Reais* (R\$) per IHA and the average hospital stay in days. For comparative purposes, the number of IHA was analyzed according to sex, age and two units of analysis based on the region where the hospitalization occurred: Metropolitan Region (MR) of João Pessoa and outside the MR of João Pessoa. The search was performed considering the data of the 223 municipalities in the state of Paraíba, and later was preceded categorization in the two units of analysis. It was only entered the admission data in the public hospital system, which includes most of the hospitalizations in the Unified Health System (SUS – *Sistema Único de Saúde*).

Through the National Registry of Health Facilities (CNES – *Cadastro Nacional de Estabelecimentos de Saúde*), the speech-language service coverage was characterized according to the number of speech-language therapist associated to the public hospital system in the state of Paraíba, distributed inside and outside the MR of João Pessoa.

The data were analyzed descriptively and presented in tables and graphs. To scale the magnitude of hospitalization for stroke in the State of Paraíba, it was proposed two indicators: the hospitalization rate for stroke and the incidence rate of hospitalization from stroke. The hospitalization rate from stroke considered the number of hospitalizations from stroke in the state of Paraíba in the year studied divided by the total number of hospitalizations in the state of Paraíba in the period studied ($\times 100$). Yet the incidence rate of hospitalization from stroke was calculated by the number of hospitalizations from stroke in the state of Paraíba in the year studied divided by the total residents in the state of Paraíba in the year studied ($\times 10^5$). The relationship between speech-language therapy coverage and hospitalization from stroke was analyzed by calculating the ratio between the number of IHA for stroke and the number of speech-language therapists associated to the public hospital service system, according to the investigated region each year.

The total population of Paraíba residents was obtained on the public domain website of the Brazilian Institute of Geography and Statistics (IBGE – *Instituto Brasileiro de Geografia e Estatística*) (www.ibge.gov.br). For the year of 2010, the 2010 Census data were used and for 2014, the projection published by the IBGE.

RESULTS

There was a 16% reduction in the total number of

Table 1. Variables related to stroke hospital morbidity. Paraíba, 2010 and 2014

	2010	2014
IHA (stroke hospitalizations), n (%)		
João Pessoa Metropolitan Area	369 (19.5)	585 (36.8)
Outside of the Metropolitan Area of João Pessoa	1527 (80.5)	1004 (63.2)
Total	1896 (100)	1589 (100)
Stroke hospitalization rate *	1.31	1.19
Coefficient of incidence of stroke hospitalization **	50.33	40.29
Average amount per admission, in Reais (R\$)	959.71	1054.58
Average hospitalization in days	7.2	7.3

* Ratio of the number of inpatient hospitalization authorization for stroke and the total number of hospital admissions, multiplied by 100; ** Ratio of inpatient hospitalization authorization for stroke and the total number of residents in the state of Paraíba, Brazil, multiplied by 10⁵

Subtitle: IHA = Inpatient Hospitalization Authorization

hospitalizations among the study period. By analyzing the regions separately, there was an increase in the proportion of hospitalizations in the João Pessoa MR. However, in both years, there was a higher concentration of hospitalizations from stroke outside the MR of João Pessoa, especially in the municipalities of Patos, Campina Grande and Cajazeiras.

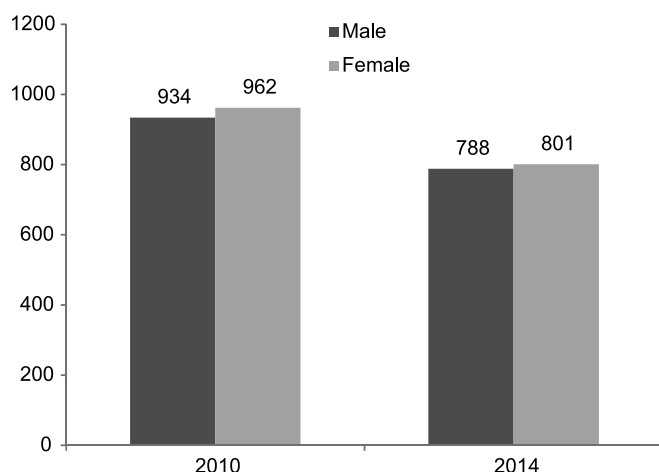
The rate of hospitalization showed that hospitalization for stroke represented just over 1% of all hospitalizations in Paraíba, in both years, with a slight decline in 2014.

The incidence rate for stroke hospitalization also decreased in 2014 compared to 2010.

The amount of money spent for hospitalization caused by stroke increased by 9.8% in 2014, compared to 2010, while the approximate average of 7 days of hospitalization remained stable.

The total number of IHA in 2010 and 2014 and the variables related to hospital morbidity from stroke in Paraíba are described in Table 1.

Regarding to stroke hospitalizations according to the sex, a balanced proportion was observed in approximately 1:1 in both years, with a slight predominance of females (Figure 1).

**Figure 1.** Number of inpatient hospitalization authorization, according to sex. Paraíba, 2010 and 2014

With respect to age, it was observed that as much in 2010 as in 2014, stroke hospitalizations occurred more frequently in patients after their 40-year-old with a stronger increase in patients over 60 years old (Figure 2).

In regard to the speech-language therapy coverage, CNES data revealed that, in Paraíba, the absolute number of speech-language therapists working in public hospitals nearly doubled between 2010 and 2014, both inside and outside the MR of João Pessoa. However, in percentage terms, it was evident the significant concentration of professionals in the MR of João Pessoa, in both years. Although it was observed that there was improvement in speech-language therapy coverage, however, more pronounced deficit remained outside the João Pessoa MR (Table 2).

DISCUSSION

Overall, the results showed a reduction in the number of hospitalizations from stroke between 2010 and 2014 confirming the trend of decline in the incidence of stroke in northeastern Brazil⁽¹²⁾ mainly in Paraíba⁽¹³⁾, a trend observed since 2002^(12,13).

As regards the number of IHA by region, a higher concentration of hospitalization for stroke in municipalities outside João Pessoa MR, especially Patos, Campina Grande and Cajazeiras. It should be considered that these three municipalities are large referral centers in health care, with high potential for development when compared to surrounding cities and can thus justify the high number of hospitalizations from stroke in these municipalities.

Moreover, in some cities in the Brazilian Northeast, there are people who live in rural areas and / or areas that still lack assistance units with quickly support for health, with lack of trained professionals, human resources and supplies for immediate action in cases of stroke⁽¹²⁾. Access to health services for the residents of these more distant sites is restricted and, possibly, they are directed to other municipalities considered referral centers, when they require hospitalization for stroke,

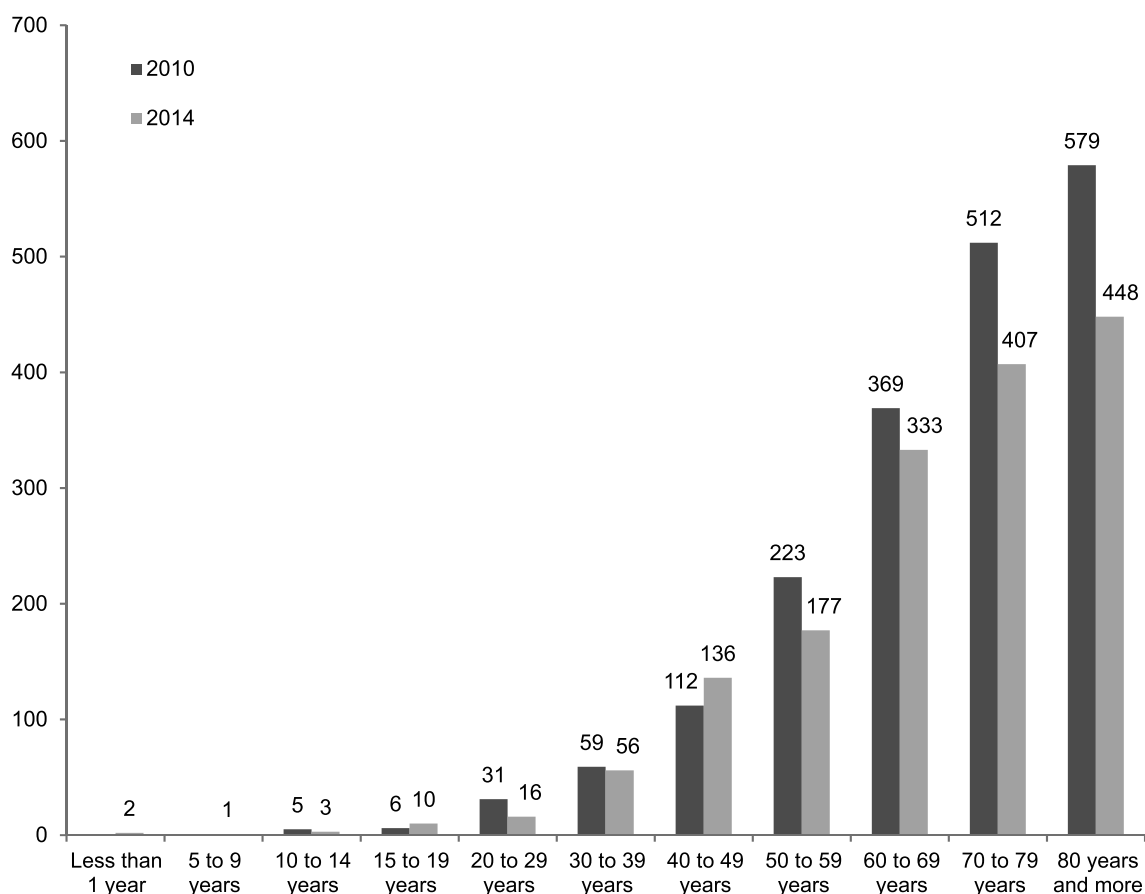


Figure 2. Number of inpatient hospitalization authorization, according to age group. Paraiba, 2010 and 2014

Table 2. Variables related to speech-language therapy care and its relation to stroke hospitalizations. Paraiba, 2010 and 2014

	2010	2014
Number of speech-language therapists in public hospitals, n (%)		
João Pessoa Metropolitan area	29 (82.85)	54 (84.38)
Outside the Metropolitan area of João Pessoa	6 (17.15)	10 (15.62)
Total	35 (100)	64 (100)
Proportion of IHA for stroke in relation to speech-language therapy coverage *		
João Pessoa Metropolitan area	12.72	10.83
Outside the Metropolitan area of João Pessoa	254.50	100.4
Total	54.18	24.82

* Ratio of the number of inpatient hospitalization authorization for stroke and the number of speech-language therapists associated to hospital services in the public system

Captions: IHA = Inpatient Hospitalization Authorization

which may explain the more pronounced concentration of admissions for stroke patients in some specific municipalities, when taking into account only the data outside of the MR of João Pessoa.

Already the MR of João Pessoa, covers 12 of the 223 municipalities in the state of Paraíba and of these 12, only two presented IHA record, highlighting the significant percentage of hospitalizations from stroke in the capital, João Pessoa. This result can be explained by the large number of referrals from neighboring municipalities to the referral hospitals located in the

capital, since the public hospital services in these municipalities usually do not have physical structure and enough human resources to maintain hospitalized stroke patients.

Thus, the differences between regions may be related to aspects involving habits and unequal access to health services, a set of factors that may help explain inequalities observed in the number of hospitalizations from stroke in different regions of Paraíba.

The decline in stroke hospitalizations in the State of Paraíba may also be related to the introduction of the control

programs of risk factors for disease. It is known, for example, hypertension (hypertension) and diabetes mellitus (DM) increase the risk for stroke. It is assumed, therefore, that programs like Hiperdia in existence in Brazil since 2002, have contributed to the decline in the number of stroke hospitalizations found in the country^(12,13,14) and in the present study. The Hiperdia is characterized by continuous monitoring of users with high blood pressure (hypertension) and diabetes mellitus (DM), with distribution of medicine and encouraging the promotion of healthy lifestyles⁽¹⁴⁾, such as regular physical activity, for example⁽¹⁵⁾.

In Brazil, there is evidence of decline over 70% of cases of ischemic stroke after the implementation of Hiperdia in 2002^(13,14) in all age groups and sexes, most of the federal units (FU), except Goiás, Roraima and Ceará, which were stable⁽¹³⁾. Therefore, the trend of reduction of hospitalizations for ischemic stroke is not regionalized and reaches throughout Brazil, including the State of Paraíba.

Analyzing the expenses on stroke hospitalizations in the State of Paraíba, in 2014, it was found that corresponded to 2.1% of the cost of IHA in the public hospital services that year, meaning an increase of 9.8% (R\$ 94.87), in relation to 2010. Whereas there was a decrease in the number of admissions, it is assumed that this increase is due to the self-adjustment of the values of the fee schedule, over five years.

Regarding the length of hospital stay, the seven day average hospitalization remained stable between the years studied and corresponds with other studies^(5,16). It is known that the period of hospitalization directly influences the mortality and, in parallel, contribute to increased hospital costs. The prolonged hospitalization is one of the determinants in maximizing this problem and is a major cause of hospital infection, particularly in elderly population⁽¹⁷⁾, most at risk hospitalization for stroke, as seen in the results of the present study.

As the stroke patient remains, on average, hospitalized for a week and usually are elderly, managers and teams of health services should be aware of the necessary precautions to avoid possible iatrogenic events in the hospital and thus minimize the need for additional expenses.

According to the literature, with regard to sex, the incidence of stroke is higher in men⁽¹⁸⁾, a feature not observed in study because, in both years, the proportion of incidence of stroke, between the sexes was approximately 1:1, similar to the data observed in studies conducted in Brazil⁽¹³⁾, specifically in the Northeast⁽¹²⁾. Previous study, which found similar results in relation to sex and hospitalization for ischemic stroke, presented: "there is no need to elaborate strategies aimed at specific subpopulation of men and women in regard to adherence measures and behavior change"⁽¹³⁾. However, it is still necessary to investigate in greater detail the differences and similarities inherent in the relationship between stroke and sex, considering the particularities of the many national territories.

As for sex, other risk factor for stroke is age. Among patients older than 65, stroke stands out as a major cause of hospitalization and prolonged hospitalization⁽¹⁹⁾. This scenario justifies the concern not only with the logistical support to the elderly, but also with the economic management and the actual effectiveness of intensive support in this population. The results of this study agree with the literature with regard to increased occurrence of stroke in elderly^(13,19,20), which reinforces the need for preventive measures to risk factors for stroke⁽²⁰⁾, especially in primary attention and through active aging philosophy, with targeted actions not only to the elderly but also to the younger, seeking thereby prevent risks and reduce stroke hospitalization.

In the case of stroke hospitalized patients, one must consider the role of the rehabilitation team, including speech-language therapists. During the hospital stay, the team begin the specialized care, in order to encourage deinstitutionalization and avoid or minimize potential complications of stroke⁽⁶⁾. The speech-language therapy in these cases can help reduce hospital costs⁽²¹⁾.

The results of this study showed that there was progress in the integration of the speech-language therapist in the public hospital services in Paraíba, between 2010 and 2014, as the total number of speech-language therapists associated to these sites almost doubled during the study period. This increase was more significant in the MR of João Pessoa, which increased by 86.2% the number of professional associated to public hospitals, while outside the MR of João Pessoa, the increase was 66.6%. Despite this increase, when comparing the proportion of speech-language therapists in and out of João Pessoa's MR, less than 20% are inserted into the outermost regions of the capital of Paraíba. This is a significant difference, including discrete expansion of this disproportion in 2014.

The difference becomes even more apparent when considering the number of stroke hospitalizations and the number of speech-language therapists. Despite the reduction in hospitalization for stroke and the increase in the absolute number of therapists have contributed to the improvement of this relationship, speech-language therapy coverage outside the João Pessoa's MR (100.4 hospitalizations per speech-language therapist) remained precarious compared to the capital and neighboring municipalities (10.83 hospitalizations per speech-language therapist).

Also, it should be considered, in practice, that the speech-language therapist who works in the hospital not only assists the patients with stroke sequelae. Hospital speech-language therapists covers several areas such as Emergency Department, Newborn Intensive Care Unit (NB-ICU), Pediatric and Adult Multiple Trauma Unit, Coronary Care Unit, Burnt Unit, Therapeutic Spaces for HIV+, Newborn Complex, Maternity and Wards of diverse specialties. Thus, it is likely that the number of speech therapists who provide assistance to hospitalized stroke patients is lower than that observed in

this study. As the database consulted does not offer elements that allow this type of analysis, it is suggested to conduct field studies to investigate the case and report how is the distribution of the speech-language therapy care in the hospital environment.

The inequitable distribution of the number of speech-language therapists among the studied regions indicates the need for investment in human resources, especially outside the João Pessoa's MR, where there is large number of hospitalizations for stroke and few speech-language therapists.

It is known that the speech-language assistance, from the time of hospitalization, can prevent or minimize functional complications and decrease the length of hospital stay and associated costs. Therefore, the results of this study may sensitize health managers to realize the need to strengthen actions to fight against stroke and increase the number of speech-language therapists in the hospital network of the public system in Paraíba, especially in geographically remote areas distant from the state capital.

CONCLUSION

In this study, there was a decline in stroke hospitalization in the State of Paraíba, between the years of 2010 and 2014. A higher concentration of hospitalizations outside the João Pessoa's MR of patients aged from 60 years, but no differences by sex. Despite the increase of speech-language therapists in the public hospital services between the years studied, there was a shortage of professionals in the number of hospitalizations from stroke, especially in more remote areas from the capital. Public policies focusing on health promotion, prevention of risk factors for stroke, as well as the expansion of speech-language therapy coverage in the state of Paraíba is needed.

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