HOSPITAL ADMISSIONS FOR CONDITIONS SENSITIVE TO PRIMARY HEALTH CARE ARISING FROM CARDIOVASCULAR DISEASES[1]

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ABSTRACT

Objective: to analyze hospitalizations for conditions sensitive to primary care resulting from cardiovascular diseases and correlating them with the number of estimated and monitored people with hypertension who have coverage from the *Estratégia Saúde da Família* in the 78 municipalities of Mato Grosso do Sul (Brazil) from 2009 to 2012.

Method: ecological study with statistical analysis based on the composition of clusters that were formed, considering hospitalizations due to cardiovascular conditions who are sensitive to primary care, and associated with general hospital admissions and other hospitalizations due to sensitive conditions. Associations were also statistically performed between the proportion of people with monitored hypertension and coverage from the *Estratégia Saúde da Família*.

Results: there was evidence of an association between coverage from the *Estratégia Saúde da Família* and hospitalizations due to cardiovascular diseases. Although there was an increase in the records of people with registered and monitored hypertension, no reduction in the number of hospitalizations or in the mortality due to the causes analyzed was observed.

Conclusion: family health as a primary care intervention strategy in general contributed to the reduction of hospitalizations due to cardiovascular diseases. However, the low number of patients registered and monitored indicates problems in the implementation mechanisms of the strategy and work processes.

DESCRIPTORS: Health policy. Levels of health care. Cardiovascular diseases. Hypertension. Hospitalization. Primary health care.

INTERNAÇÕES POR CONDIÇÕES SENSÍVEIS À ATENÇÃO PRIMÁRIA À SAÚDE DECORRENTES DAS DOENÇAS CARDIOVASCULARES

RESUMO

Objetivo: analisar as internações por condições sensíveis a atenção primária decorrentes das doenças cardiovasculares, correlacionando-as com o número de pessoas com hipertensão estimadas e acompanhadas e com a cobertura da Estratégia Saúde da Família nos 78 municípios de Mato Grosso do Sul, no período 2009 a 2012.

Método: estudo ecológico, com análise estatística a partir da composição de agrupamentos (*clusters)* que foram formados, considerando as internações por condições cardiovasculares, sensíveis à atenção primária, associadas às internações gerais dos municípios e demais internações por condições sensíveis. Associações também foram estatisticamente realizadas entre a proporção de pessoas com hipertensão acompanhadas e cobertura da Estratégia Saúde da Família.

Resultados: evidenciou-se associação entre cobertura da Estratégia Saúde da Família e internações decorrentes de doenças cardiovasculares. Embora tenha aumento no registro de pessoas com hipertensão cadastradas e acompanhadas. Não foi observada redução no número de internações e na mortalidade pelas causas analisadas.

Conclusão: a saúde da família como estratégia de intervenção na atenção primária em geral contribuiu para a redução das internações por doenças cardiovasculares. No entanto, o baixo número de pacientes cadastrados e acompanhados indica problemas nos mecanismos de implantação da estratégia e processos de trabalho.

DESCRITORES: Política de saúde. Níveis de atenção à saúde. Doenças cardiovasculares. Hipertensão. Hospitalização. Atenção primária à saúde.

HOSPITALIZACIONES POR ENFERMEDADES SENSIBLES A ATENCIÓN PRIMARIA DE SALUD RESULTANTES DE ENFERMEDADES CARDIOVASCULARES

RESUMEN

Objetivo: analizar las hospitalizaciones por enfermedades sensibles a la atención primaria como resultado de la enfermedad cardiovascular, en correlación con el número de personas estimadas y acompañadas por la hipertensión y la cobertura de la *Estratégia Saúde da Família* en los 78 municipios de Mato Grosso do Sul (Brasil), en el período 2009 al 2012.

Método: estudio ecológico, con análisis estadísticos a partir de la composición de grupos *(clusters)*, teniendo en cuenta las admisiones por enfermedades cardiovasculares, sensibles a la atención primaria, asociadas a las internaciones generales municipales y otros por condiciones sensibles. Las asociaciones también se realizaron estadísticamente entre la proporción de personas con hipertensión acompañados y la cobertura de la *Estratégia Saúde da Família*.

Resultados: se evidenció la asociación entre la cobertura de la *Estratégia Saúde da Família* y las hospitalizaciones salud de la familia debido a las enfermedades cardiovasculares. A pesar de aumento en el registro de personas con hipertensión inscrito y seguido, no hubo una reducción en el número de hospitalizaciones y mortalidad por causas analizadas.

Conclusión: la salud de la familia como una estrategia de intervención en atención primaria, en general, ha contribuido con la reducción de las hospitalizaciones por enfermedad cardiovascular. Sin embargo, el bajo número de pacientes registrados y acompañados indica problemas en los mecanismos de aplicación de los procesos estratégicos y de trabajo.

DESCRIPTORES: Política en salud. Niveles de atención en salud. Enfermedades cardiovasculares. Hipertensión. Hospitalización. Atención primaria de salud.

INTRODUCTION

Cardiovascular diseases are one of the most common chronic diseases in the world and are the main risk factor for complications such as stroke and myocardial infarction. The absence of signs and symptoms at the beginning compromises the early diagnosis, treatment and control of blood pressure levels.[1]

Chronic diseases account for 72% of the causes of death in Brazil and are responsible for the high frequency of hospitalizations, with high medical and socioeconomic costs.[2] In 2009, 28.5% of the total hospitalizations of the Brazilian Unified Health System (SUS, *Sistema* Único de Saúde) were due to conditions sensitive to Primary Health Care (PHC), excluding childbirth/deliveries. Among these, 6.5% corresponded to cerebrovascular diseases and 5.2% to hypertension.[3] In Mato Grosso do Sul (Brazil), these diseases and their risk factors accounted for 31.7% of deaths in 2008, which is above the 28.78% for national proportion and (29.48%) for the Center-West region.[4]

Of all the cardiovascular diseases, hypertension is the most common and has a prevalence of 32.5% in the country, reaching more than 50% in individuals between 60-69 years of age and 75% in people over 70 years of age.[1] Such context highlights that the disease is relevant to the definition of the epidemiological profile of the Brazilian population and, in the field of public policies in the national scenario, PHC plays a key role in the health system due to its capillarity and technical capacity to develop control, diagnosis and treatment.[5]

However, it is still common for people with high blood pressure in developing countries to remain without diagnosis and treatment, which contributes significantly to increased risk of death, hospitalization and disability.[6] Also, hospitalizations in low-income populations trigger stressful situations for the family and the patient who may have reduced functional capacity.[5]

The proportion of hospital admissions considered to be avoidable, based on timely and adequate care, is an important marker of quality care outcomes in the first level of care.[7] Developed in the late 1980s in the United States, this indicator has been used to evaluate the accessibility and effectiveness of primary care, or rather, the lower the number of hospitalizations due to conditions sensitive to primary care, the more efficient the primary care. In Brazil, through work developed by the Ministry of Health, a list was prepared with the Hospitalizations for Primary Care Sensitive Conditions (ICSAPs), with a similar purpose; to analyze the quality and access to health systems.[3]

Understanding the relevance of early diagnosis, control, treatment and follow-up of these conditions for the reduction of Hospitalizations for Cardiovascular Conditions Sensitive to Primary Care (ICCSAPs), the objective of this study was to analyze such hospitalizations, correlating them with the estimate of people with hypertension, including the patients registered and monitored using the coverage of the Family Health Strategy (*Estratégia da Saúde da Família*-ESF) in the municipalities of Mato Grosso do Sul (Brazil) in the period from 2009 to

2012. The results of this study can contribute to the evaluation and formulation of health policies aimed at the organization of assistance and identification of patients in the State.

METHOD

An ecological study was performed, including the 78 (100%) municipalities of Mato Grosso do Sul (Brazil) as an analysis unit. Secondary data extracted from several information systems were used. The survey occurred between August 2013 and May 2014.

Data source

The hospitalization data were selected based on the Brazilian List of Conditions Sensitive to Primary Care, through Administrative Rule no. 221, dated April 17, 2008, from the Ministry of Health,[8] which presents the conditions grouped by causes of hospitalizations and diagnoses, according to the 10th Revision of the International Classification of Diseases (ICD-10). For the selection of ICCSAPs, groups 9, 10, 11 and 12 were selected, corresponding to ICDs: I10 - Essential hypertension, I11 - Hypertensive heart disease, I20 - Angina pectoris, I50 - Heart failure, J81 - Acute lung edema, I63 - Cerebral infarction, I64 - Stroke, I65 - Occlusion and stenosis of pre-cerebral arteries, I66 - Occlusion and stenosis of cerebral arteries, I67 - Other cerebrovascular diseases, I69 - Sequelae of cerebrovascular diseases, and G45 to G46 - Cerebrovascular diseases.

Based on the selection of the ICDs, a file derived from the tabulated data was constructed through the Tab for Windows application (Tab-Win) - Version 3.2, from the Department of Informatics of SUS, Ministry of Health. Information was generated considering the municipality of the patient's residence and not the place of treatment and hospitalization. Deliveries were excluded from the total of general admissions, since they are the natural outcome of gestation in part of the female population.[3]

The ESF coverage data were obtained from the, obeying the ESF team's proportion of population coverage estimation in defined territory.[9]

Due to the lack of reliable reports on the prevalence of hypertension in Mato Grosso do Sul, the data generated by Vigitel for Campo Grande were used. The number of people with hypertension estimated by municipality was calculated from the prevalence of self-reported hypertension in a telephone interview with the adult population (individuals ≥ 18 years of age) in Campo Grande, which was 24% in 2011.[10]

The number of people, in this age group, for each city was obtained from the Brazilian Institute of Geography and Statistics.[11] The data of people with hypertension were extracted from the TABNET report, with averages between 2009 and 2012. People with monitored hypertension are those individuals who received at least one home visit from the Community Health Agent in the referenced month. Registered persons are those people with hypertension who present information sheets and / or medical records registered at the ESF.

The Human Development Index (IDH/ HDI) was included as a variable because it allows to know the extent of social inequalities and the economic and social conditions that affect health and directly influence the ICSAPs.[12]

Studied variables

The variables had the averages analyzed for the period from 2009 to 2012, being: a) ICCSAP in relation to the general hospitalizations per municipalities; b) ICCSAP in relation to the ICSAP of the municipalities; c) people with monitored hypertension in relation to the number of people with estimated hypertension of each municipality; d) IDH (2010); e) proportion of ESF coverage.

The classification of FSH coverage was considered: high> 70% (municipalities ≤ 100,000 inhabitants) and> 50% (municipalities> 100,000 inhabitants); Average of 25% to 70% (municipalities ≤ 100,000 inhabitants) and 25% to 50% (municipalities ≥ 100,000 inhabitants); and low <25% .[13]

Data analysis

In order to aggregate the municipalities with similar results regarding the set of variables, non-hierarchical clusters (K-means) were constructed using the MiniTAB for Windows software, version 14.0. After their formation, the dissimilarities between them were evidenced.

The clusters were formed considering intervals of 60% to 70% in the level of dissimilarity, allowing for the observation of the differences between the clusters and to draw a profile of the municipalities from the variables.

By means of the variable similarities , three groups were formed and the municipalities were distributed as follows: Cluster 1 composed of 40; Cluster 2 with 13; And Cluster 3 with 21. The municipalities of Campo Grande, Corumbá, Dourados and Três Lagoas were grouped into a fourth cluster, as outlier municipals, because they are the municipalities with the largest structures for medium and high complexity care (hospital), have a population of more than 100,000 inhabitants and are constituted as headquarters of the four regions of State health.

Ethical aspects

The study was approved by the Research Ethics Committee of the Federal University of Mato Grosso do Sul, under opinion number 383.278 / 2013 (CAAE16526713.2.0000.0021).

RESULTS

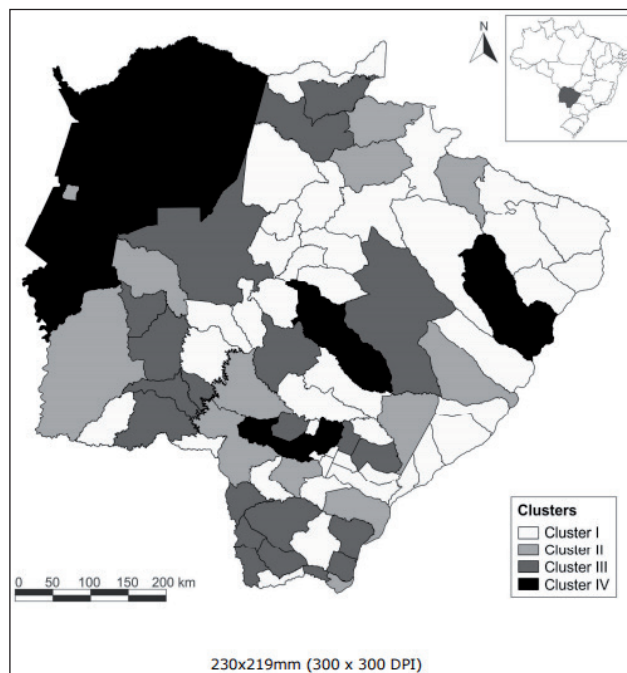The grouping of the municipalities of Mato Grosso do Sul can be visualized in clusters in figure 1.

Figure 1 - Distribution of the municipalities of Mato Grosso do Sul, Brazil grouped by cluster *
* Cluster 1 - 40 municipalities; Cluster 2 - 13 municipalities; Cluster 3 - 21 municipalities; Cluster 4 - municipalities Campo Grande, Corumbá, Dourados and Três Lagoas.

Occurred in Mato Grosso do Sul between 2009 and 2012 552,963 SUS hospitalizations, of the total number of hospitalizations, 132,325 (25.3%) were ICSAPs, of which 32,989 (24.9%) were ICCSAPs. The percentage of ICSAPs and ICCSAPs decreased by 4.7% and 4.6% when analyzed from 2009 to 2012, while general admissions decreased by 0.9% in the same period (Table 1).

Table 1 - Frequency of SUS hospitalizations: total number of general hospitalizations, due to conditions sensitive to primary care and cardiovascular conditions sensitive to primary care, in the municipalities of Mato Grosso do Sul, Brazil, 2009-2012

Hospitaliza-tions	Years				Δ
	2009	2010	2011	2012	
Total hospitalizations *	130.162	135.886	127.890	129.025	-0,9%
Total ICSAP**	33.005	36.236	31.578	31.456	-4,7%
Total ICCSAP***	8.311	8.860	7.889	7.929	-4,6%

* Excluding deliveries; ** ICSAP - Hospitalizations for Conditions Sensitive to Primary Care; *** ICCSAP - Admission for Cardiovascular Conditions Sensitive to Primary Care; Δ Percentage reduction in general admissions, ICSAP and ICCSAP, when analyzed from 2009 to 2012.

Table 2 shows the formation of the clusters obtained through the statistical calculations with groupings of municipalities in similar condition as the variables. It was verified that cluster 1 presented a better result in the relation between ICCSAP and general hospitalizations, where 5.9% of the general hospitalizations were due to ICCSAP, followed by cluster 3 (6.5%) and cluster 2 (6.8%). The best performance in the relationship between ICCSAPs and ICSAPs was that of cluster 3 with 18.7%, or rather, the lowest relationship between hospitalizations due to Cardiovascular Conditions Sensitive to Primary Care and hospitalizations due to Conditions Sensitive to Primary Care as a whole. Cluster 1 presented 21.6% and cluster 2, 24.5%. The fourth cluster, formed by the *outlier* municipalities with the best hospital structure, presents the highest frequency of ICCSAP in comparison with general hospitalizations (6.9%) and the highest frequency of ICCSAP in relation to ICSAPs (35.0%), More than 1/3 of the ICSAPs in this group occurred by ICCSAP (Table 2).

Table 2 - Distribution of the frequencies by clusters, according to the analyzed variables, from the municipalities of Mato Grosso do Sul, Brazil, between 2009 and 2012

Variables	Cluster			
	1	2	3	4*
Number of municipal	40	13	21	4
ICCSAP** in relation to general hospitalizations***	5,9%	6,8%	6,5%	6,9%
ICCSAP in relation to the ICSAPs****	21,6%	24,5%	18,7%	35,0%
Family Health Strategy coverage proportion	97,2%	54,0%	75,8%	51,0%
People with monitored hypertension in relation to the people with estimated hypertension	49,8%	31,8%	43,9%	30,0%
The Human Development Index	0,68	0,69	0,66	0,74

* Arbitrary clusters (Campo Grande, Corumbá, Dourados and Três Lagoas); ** ICCSAP - Admissions for Cardiovascular Conditions Sensitive to Primary Care; *** Excluding deliveries; **** ICSAP - Hospitalizations for Conditions Sensitive to Primary Care.

The variable that related people with monitored hypertension to the estimated ones presented a proportion of 49.8% of those followed in cluster 1, formed by 40 municipalities, followed by the highest percentage of ESF coverage (97.2%). Cluster 3, with 21 municipalities, presented 43.9% of hypertensive patients with ESF coverage (75.8%), followed by cluster 2, with 13 municipalities, with 31.8% of hypertensive patients followed up with ESF coverage (54.0%). Cluster 4 presented the lowest percentage of monitored hypertensive patients (30.0%) and lower ESF coverage (51.0%).

Clusters 1, 2 and 3 had an average IDH of 0.68, 0.69 and 0.66, respectively. Cluster 4 had a IDH of 0.74 which is considered to be high.[12] There were no marked differences in IDH between groups.

Coverage expansion of health services, especially primary care through the ESF in Brazil, contributed to the reorganization of the health system as a whole. It can also expand its capacity for resolution, as long as it takes the lead in coordinating care. Countries that structure their health systems based on primary care teams tend to be efficient.[15]

The implementation of the FHS is associated with the reduction of ICSAPs in Brazil and in its states, even while considering the factors that may influence the risk of hospitalization, such as economic, social and access to health services. In general, the states with the highest ESF coverage had a reduction in ICSAPs of around 5% over five years.[15] The same phenomenon was observed in this study for Mato Grosso do Sul where there was a reduction of ICSAPs with the expansion of the ESF, considered to be high for all clusters, except cluster 4, which has a coverage classified as average.

A similar condition to outlier cluster 4 results was found in Mexico, where the low coverage of primary health care is associated with a higher number of ICSAP, revealing that these are more frequent in regions with higher hospital structure and population density.[16] The insufficient supply of primary services closer to the population generates a demand for hospitals, especially in larger municipalities, which end up serving a large volume of patients with low complexity health complaints and complications.

There is an abundance of evidence that establishes a correlation between the reduction of hospitalizations due to conditions that are sensitive to primary health care and the expansion of coverage at the first level of health care.[17-22] Nevertheless, authors suggest caution in considering that, even with the established reduction of ICSAP, it is possible to find other determining factors besides the increase of primary care coverage and the ESF.[23-24]

In fact, our study found a relationship between the ESF coverage and the increase in the number of registered hypertensive patients and the monitored ones in Mato Grosso do Sul, with no significant results regarding the reduction of harm and mortality due to hypertension in the State,[4] since the proportion of people with monitored hypertension when compared to the number of estimated in all groupings still does not reach the majority of patients (<50%). Higher quality care coverage at the primary level should be monitored to give greater efficiency to the health system as a whole, resulting in better quality of life for those affected.[24-25]

The registration and follow-up of hypertensive patients in the ESF, in different teams and municipalities can vary from 50%-97%.[14] In Mato Grosso

do Sul, a greater homogeneity in the findings was found, with follow-ups of 30 to 49.8% of the total number of patients. Differently from the situation of the set of 66 municipalities in Santa Catarina, among them, more than 60% do not have a register for patients with hypertension and diabetes, and in up to 83% of the actions do not have an impact on the disease.[26]

Such failures in registration and follow-up in general point to the fragility in the work processes, where the teams present difficulties to act based on protocols with the patient / family and not only the complaint / illness as the central focus. We believe that it is the paradigm shift, the assimilation of the proposed care model by the professionals, which will give a new and important meaning to the registration and follow-up for patients.[27] Multicentric studies funded by international centers of excellence point to a wide variation in the treatment and control of blood pressure levels between countries. Pharmacological treatment may vary from 33% to 63% in different communities and the average of controlled hypertension among treated subjects may range from 16.2% in China to 71.2% in Peru.[28]

In general, evidence suggests that there are improvements in the quality of life and indicate reduction of health complaints in people with monitored hypertension. A multicentric study in Finland, France, and the Netherlands highlighted the importance of monitoring and follow up appointments elderly patients for the reduction of health complaints caused by cardiovascular diseases.[29] In the United States, a systematic review demonstrated the benefits of monitoring people with hypertension in community-based services , especially in low-income populations.[30]

The IHD/HDI mean for the four clusters in this study did not differ significantly, except in the fourth, which is high in relation to the international classification. However, it is a consensus that human development is implicated in population health as far as health interferes with the degree of population development. Chronic diseases such as cardiovascular diseases and diabetes have a prevalence associated with economic development, income, and schooling.[14,31-32] These findings reinforce the importance of including this variable while defining the grouping of municipalities by similarities, such as the formation of clusters, for example, the Index expresses the three basic dimensions of human development: health, education and income in the ICSAPs. It is worth noting that this study has some limitations such as possible failures in secondary data records, inadequate registration of ICDs, limitation to admissions occurring in SUS, which corresponds, on average, to 70% of hospitalizations in the country, possibility of duplicate counts, and not considering readmissions and transfers. It is a consensus, however, that the SUS Hospital Information System has internal consistency and reliability.[33] Another factor limiting the findings is the use of SUS databases, without the identification of patients with hypertension who use the private health network. And finally, the percentage of ICCSAPs does not reveal whether hospitalized patients are those registered and monitored or are those who are part of the percentage of individuals without diagnosis or follow-up.

CONCLUSION

The results of this research allowed for a better approximation to the reality, since the methodology allowed the grouping of the municipalities by internal similarity allowing for the observation of the differences between them. The analysis identified the weakness in the care for cardiovascular diseases and, from the system management's point of view, reviews the ways in which the actions are implemented.

A reduction of ICSAPs and ICCSAPs were observed, noting that it occurs in an inhomogeneous way, verifying itself in a relationship between the coverage from the ESF and the greater proportion of registered and monitored patients with hypertension.

A paradox in the findings of this research is that, considering the medium and high ESF coverage, a proportion less than 50% of registered and monitored

patients was found when associated with the estimated prevalence of hypertension. The low number of registered and monitored hypertension patients, despite the weaknesses in the information recording system, can lead to two hypotheses that merit investigation: either there is an estimate of patients with hypertension higher than existing patients or there are significant failures in the identification of this population group by the health system. When considering mortality indicators in the state due to cardiovascular diseases, with cardiovascular disease accounting for more than 30% of total deaths, the second hypothesis is likely to be proven by other studies.

Future research should focus on the structure and work processes of PHC to identify factors that

interfere with the early diagnosis and monitoring of patients with hypertension. This would contribute to the reduction of ICCSAP and to the improvement of the quality of life of the population, with better epidemiological results for the diseases.

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