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# Hospitalizations sensitive to primary care as an evaluation indicator for the Family Health Strategy

## ABSTRACT

**OBJECTIVE:** To identify variables associated with hospitalizations sensitive to primary care.

**METHODS:** A hospital morbidity survey was conducted using a random sample of 660 patients hospitalized in clinical and surgical wards of hospitals that had service agreements with the Brazilian National Health System, in the municipality of Montes Claros, Southeastern Brazil, between 2007 and 2008. Interviews were held with patients and members of their families using a specific form, and the patients' medical files were investigated. The definition of conditions considered sensitive to primary care was based on the Ministry of Health's list. Associations shown by socioeconomic and health variables in relation to hospitalizations sensitive to primary care were analyzed using bivariate and multiple logistic regression analyses.

**RESULTS:** The percentage of hospitalizations sensitive to primary care in the study group was 38.8% (n = 256). The variables that remained statistically associated with conditions considered sensitive to primary care were: previous hospitalization (OR = 1.62; 95% CI: 1.51;2.28); regular visits to healthcare units (OR = 2.20; 95% CI: 1.44;3.36); low schooling level (OR = 1.50; 95% CI: 1.02;2.20); health checks not performed by the family health team (OR = 2.48; 95% CI: 1.64;3.74); hospitalization requested by physicians who were not part of the family health team (OR = 2.25; 95% CI: 1.03;4.94); and age greater than or equal to 60 years (OR = 2.12; 95% CI: 1.45;3.09).

**CONCLUSIONS:** The variables associated with hospitalizations sensitive to primary care are particularly those relating to patients, such as age, schooling level and previous hospitalization, but regular health checks outside of the Family Health Strategy doubled the likelihood of hospitalization.

**DESCRIPTORS: Family Health Program. Patient Care Team. Primary Health Care, manpower. Hospitalization. Morbidity Surveys. Health Services Evaluation.**

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## INTRODUCTION

The Family Health Strategy (FHS) prioritizes actions to promote, protect and recover the health of individuals and families comprehensively and continuously. The first teams started to be established in Brazil in 1994, with the aim of reorganizing primary care practices, as a replacement for the traditional model that was centered on medical consultations oriented towards curing diseases and was implemented mainly in hospitals.[24]

Strengthened and adequately structured primary care is fundamental for organizing healthcare systems.[3,25] Within this context, the use of evaluation processes contributes towards enabling managers and professionals to acquire the knowledge needed for decision-making that meets healthcare demands and requirements, in order to expand the resolution capacity of the system.

Studies evaluating the healthcare services have been important in the recent literature and they present different methodological approaches.[6] One of the challenges consists of showing the positive impact of specific actions or programs. Particularly in relation to the FHS, few studies have detailed the results from this proposal and many of the evaluation studies in this country are still limited to the implementation and organization of the strategy within the healthcare system.[1]

The proportion of hospital admissions that are considered avoidable through opportune and adequate primary care is an important marker for healthcare quality results at this level of care.[3,7,18] This indicator was developed at the end of the 1980s in the United States and had been used to evaluate the accessibility and effectiveness of primary care.[5,9,10,14,22] Some studies have presented significant differences in hospital admission rates for certain complaints between different populations, thus denoting differing access to primary healthcare services.[8,21] Thus, although other factors, including cultural ones, may interfere with hospital admission indicators, the capacity of primary care services to resolve cases and prevent unnecessary hospitalization has been taken to be an indicator of healthcare quality.

In Brazil, there are few studies on hospitalizations that would be sensitive to primary care, and only in April 2008 was a national list of conditions sensitive to primary care published.[12,20] The present study had the aim of analyzing healthcare quality in areas attended within the FHS, using the parameter of the proportion of hospital admissions due to causes that would be sensitive to primary care.

## METHODS

A cross-sectional analytical study based on a hospital morbidity survey was carried out with a random sample of patients who had been admitted to clinical and surgical wards of public hospitals and other hospitals that had service agreements with the Brazilian National Health System (*Sistema Único de Saúde*, SUS), in the municipality of Montes Claros, Southeastern Brazil, between July 2007 and July 2008. The present study falls within the aims of primary care evaluation, with the hypothesis that patients attended through the FHS would be less liable to hospitalization due to avoidable causes.

This city is the main regional center and its population of approximately 350,000 inhabitants is predominantly urban. The FHS units are located in peripheral areas of the city and attend to communities with greater needs. They cover around 50% of the total population. The Municipal Health Department also maintains 15 healthcare centers distributed among the macroregions of the city that provide attendance within internal medicine, pediatrics and gynecology/obstetrics. Regarding the hospital network, the city has five general hospitals, one psychiatric hospital, three public walk-in clinics and one emergency medical care service. A central hospital bed regulatory body was recently established in the municipality, but its actions were only just starting at the time of this study. There is still no organized system for referrals and cross-referrals.

The numbers of beds and admissions in each hospital sector were supplied by the Municipal Health Department, which is responsible for regulating the beds under service agreements with SUS. In calculating the sample size, the parameters considered were the number of admissions made in each of the institutions during the preceding year and an expected frequency of the event of 50%, given the lack of previous data on the indicator, with an acceptable error of 5% and a confidence level of 99%. This calculation resulted in a sample size of 610 individuals.

Patients in clinical and surgical wards who had been admitted to the selected hospitals through SUS and who lived in the municipality were considered eligible for interviewing if they were able to provide responses in this interview, or if they were accompanied by a family member who could do so. The psychiatric hospital and two smaller-sized hospitals that did not have accreditation for hospital admissions through SUS for all fields were excluded from the analysis. The three hospitals that participated in the study had walk-in clinics that were open to the public.

To gather data, semistructured questionnaires were used. In addition to investigating the nosological condition that gave rise to the hospital admission, data on demographic and socioeconomic variables were obtained. A pilot study in one of the hospital institutions tested the questions used. The team of interviewers for the fieldwork was formed by undergraduate medical students and was specially trained for these procedures.

Each of the hospitals was visited once a week over the course of one year, with simple random selection of the hospitalization units and days of the visits, on a rotating schedule. Thus, each hospital received visits to different sectors on different days of each week. All of the patients in the ward that was drawn were allocated to the study. The number of beds could vary according to the number of beds occupied, number of extra beds in the wards and whether the patient had already been interviewed in previous visits. This procedure had the aim of obtaining greater sample

heterogeneity within the same hospital and over the course of the data gathering period.

The sociodemographic characteristics (age, sex, marital status, schooling level and housing conditions) were defined as independent variables, along with the following variables relating to healthcare service use: previous hospitalization; regular health checks (given by regular and periodic seeking of healthcare services); referral location for regular health checks; registration in FHS units; perception of the quality of the healthcare received as an outpatient; and the professional who indicated hospitalization.

The definition of the geographical areas attended by the FHS was supplied by the Municipal Health Department, and the registration in the healthcare unit was confirmed by the patient or accompanying person. Since the link with the family's healthcare team (registration) did not necessarily imply patient follow-up, the referral locations for health checks were sought for all the patients. To define the conditions for which hospitalization would be sensitive to primary care, the list published by the Ministry of Health was used.[a] The diagnoses were defined through consulting the patients' medical files. Only the main diagnosis was considered. In cases in which both interviewers had doubts regarding the diagnosis, the data gathering coordinator defined it.

Interviews were held with 660 patients in the clinical wards of the selected hospitals, including surgical beds.

The Epi Info and SPSS 15.0 software were used for data entry and analysis. Logistic regression was used to jointly evaluate the variables associated with hospitalization conditions that would be sensitive to primary care. The variables that were shown to be statistically significant up to the level of 20% ($p < 0.20$) in bivariate analysis were selected for multivariate analysis, which was done using the unconditional backward stepwise method (likelihood ratio). Variables that maintained a p-value $\leq 0.05$ after adjustments were kept in the multiple regression model. The quality of the adjustment was assessed using the Hosmer-Lemeshow test.

The study was approved by the Research Ethics Committee of the *Universidade Estadual de Montes Claros*. The interviews were held after receiving authorization directly from the patient or from the family, by means of a free and informed consent statement.

## RESULTS

The sociodemographic characteristics of the study population are presented in Table 1. The group was seen to be relatively homogenous in relation to sex and marital status. The interviewees' ages ranged from 14 to 99 years, with a mean of 53 years. The mean schooling level of the group was five years, and it was noteworthy that 19.8% (n = 131) of the patients were illiterate.

The social conditions investigated revealed that this was a population with generally limited access to goods and services who lived in small homes (not more than six rooms) and often with many people living in the home (Table 1).

Among the interviewees, 455 (68.9%) said that they underwent regular health checks. Of these, 229 (34.7%) had follow-ups at FHS units, 203 (30.8%) at healthcare centers or polyclinics and 23 (3.5%) in private consultation offices.

The percentage of hospitalizations that would be sensitive to primary care among the group studied was 38.8% (n= 256). The mean duration of the hospitalization was nine days and the median was five days. Among the patients evaluated, 283 (42.9%) mentioned previous episodes of hospitalization. The main causes of hospitalization, as measured by consulting the medical files, were heart failure, pneumonia, tumors in general, coronary disease, diabetes and its complications, trauma and external causes, elective surgical conditions and skin and subcutaneous infections.

Table 2 presents the results from the bivariate analyses between the variables studies and the type of hospitalization, categorized according to the diagnostic code as conditions that were or were not sensitive to primary care. In this first analysis, the variables that were shown to be associated with hospitalizations due to conditions that would be sensitive to primary care were age, schooling, previous hospitalization, regular health checks, links with the FHS, health checks within the FHS, duration of hospitalization and the professional who indicated hospitalization.

Table 3 presents the results from the multiple logistic regression analysis. The variables that were shown to be statistically associated with conditions that would be sensitive to primary care were: reports of previous hospitalization (OR= 1.62; 95% CI: 1.51;2.28); reports of undergoing regular health checks (OR= 2.20; 95% CI: 1.44;3.36); schooling level of less than four years of elementary education (OR= 1.50; 95% CI: 1.02;2.20); health checks outside the family health units (OR= 2.48; 95% CI: 1.64;3.74); request for hospitalization made by physicians who do not work within the FHS (OR= 2.25; 95% CI: 1.03;4.94); and age over 60 years (OR= 2.12; 95% CI: 1.45;3.09).

[a] Ministério da Saúde. Portaria nº 221, de 17 de abril de 2008. Define que a Lista Brasileira de Internações por Condições Sensíveis à Atenção Primária será utilizada como instrumento de avaliação da atenção primária e/ou da utilização da atenção hospitalar, podendo ser aplicada para avaliar o desempenho do sistema de saúde nos âmbitos Nacional, Estadual e Municipal. *Diario Oficial Uniao*. 18 abr. 2008;Seção 1;70.

**Table 1.** Characteristics of the study population hospitalized in the clinical and surgical sectors. Municipality of Montes Claros, Southeastern Brazil 2007-2008.

| Variable | n | % |
|---|---|---|
| Age (years) | | |
| 14-19 | 23 | 3.5 |
| 20-39 | 153 | 23.2 |
| 40-59 | 208 | 31.5 |
| ≥60 | 276 | 41.8 |
| Sex | | |
| Male | 342 | 51.8 |
| Female | 318 | 48.2 |
| Marital status | | |
| Married/stable partnership | 366 | 55.5 |
| Single/widowed/separated | 294 | 44.5 |
| Schooling level (years of study) | | |
| None | 131 | 19.8 |
| 1-4 | 213 | 32.3 |
| 5-8 | 161 | 24.4 |
| 9-11 | 143 | 21.7 |
| ≥12 | 12 | 1.8 |
| Number of people living in the home | | |
| 1-3 | 282 | 42.7 |
| 4-6 | 306 | 46.4 |
| ≥7 | 72 | 10.9 |
| Number of rooms in the home | | |
| 1-3 | 76 | 11.5 |
| 4-6 | 403 | 61.1 |
| ≥7 | 181 | 27.4 |
| Previous hospitalization | | |
| Yes | 283 | 42.9 |
| No | 377 | 57.1 |
| Health checks | | |
| Yes | 455 | 68.9 |
| No | 205 | 31.1 |
| Place where health checks were performed | | |
| Healthcare center | 174 | 26.3 |
| FHS | 229 | 34.7 |
| Private consultation office | 23 | 3.5 |
| Polyclinic | 29 | 4.4 |
| Not done | 205 | 31.1 |
| Duration of hospitalization (days) | | |
| 1-4 | 321 | 48.6 |
| 5-9 | 153 | 23.2 |
| 10-14 | 67 | 10.2 |
| ≥15 | 119 | 18.0 |

## DISCUSSION

The present study shows that the population evaluated presented a high percentage of hospitalizations due to conditions that could have been controlled better within primary care (38.8%). Lack of health checks within the FHS implied a greater association with hospitalization due to conditions that would be sensitive to primary care (Table 2). The lack of links with the FHS remained in the final multivariate model, with twice as much chance of hospitalization due to conditions that would be sensitive to primary care.

In several studies in other countries, wide variations in hospital admission rates due to conditions that would be sensitive to outpatient care have been found. These differences were influenced by various factors connected with the accessibility of primary care physicians, accessibility of hospitals, socioeconomic level of the population evaluated, organizational characteristics of primary care, criteria adopted for hospital admission and health insurance coverage.[3,7,14]

There is difficulty in comparing the percentage of hospitalizations that would be sensitive to primary care in Brazil with the percentage in other countries. Both in Europe and in the United States, studies present different lists and use the ninth revision of the International Classification of Diseases (ICD-9), while the official list in Brazil uses the tenth revision (ICD-10). This may give rise to significant distortions in comparative analyses. Nonetheless, the pattern of diagnostic groups among the cases of avoidable hospitalization coincided with that of other studies, particularly with regard to pneumonia and heart failure.[3,8,18,23]

Although family income was not included in the present study, the characteristics of the study population made it possible to infer that this was a socially neglected population, since more than half of the patients did not report schooling levels beyond the first four years (first cycle) of elementary education. The observed association between hospitalizations due to conditions that would be sensitive to primary care and variables denoting low socioeconomic level, such as low schooling level (OR = 1.50; 95% CI: 1.02;2.20), is consistent with other studies.[4,19,23]

In the present study, adults with schooling levels less than or equal to the fourth year of elementary education presented a 50% greater chance of hospitalization due to conditions that would be sensitive to primary care. It can be seen that greater numbers of years of education signify greater possibilities of better income, work and health conditions, and consequently lower rates of hospitalization in general.[2] In the United States, patients benefiting from that country's public healthcare system (Medicare) who have better schooling levels present lower chances of hospital admission due to avoidable causes.[11]

The association between avoidable hospitalization and elderly patients that was observed in the present study has also been shown in other studies.[3,7,8] For

**Table 2.** Bivariate analysis on the association between the characteristics studied and hospitalization due to conditions that would be sensitive to primary care. Municipality of Montes Claros, Southeastern Brazil 2007-2008.

| Variable | Sensitive condition | | Non-sensitive condition | | OR (95% CI) | p |
|---|---|---|---|---|---|---|
| | n | % | n | % | | |
| Age (years) | | | | | | 0.000 |
| ≥60 | 148 | 57.8 | 128 | 31.7 | 2.95(2.10;4.16) | |
| <60 | 108 | 42.2 | 276 | 68.3 | 1 | |
| Sex | | | | | | 0.649 |
| Male | 136 | 53.1 | 206 | 51.0 | 1.09(0.78;1.51) | |
| Female | 120 | 46.9 | 198 | 49.0 | 1 | |
| Marital status | | | | | | 0.065 |
| Married/stable partnership | 130 | 50.8 | 236 | 58.4 | 0.73 (0.53;1.02) | |
| Single/widowed | 126 | 49.2 | 168 | 41.6 | 1 | |
| Schooling level (years) | | | | | | 0.000 |
| ≤4 | 165 | 64.5 | 179 | 44.3 | 2.28 (1.62;3.20) | |
| >4 | 91 | 35.5 | 225 | 55.7 | 1 | |
| Number of rooms in the home | | | | | | 0.698 |
| <5 | 71 | 27.7 | 119 | 29.5 | 0.92 (0.64;1.32) | |
| ≥5 | 185 | 72.3 | 285 | 70.5 | 1 | |
| Number of people living in the home | | | | | | 0.935 |
| <5 | 167 | 65.2 | 261 | 64.6 | 1.03 (0.73;1.45) | |
| ≥5 | 89 | 34.8 | 143 | 35.4 | 1 | |
| Previous hospitalization | | | | | | 0.000 |
| Yes | 135 | 52.7 | 148 | 36.6 | 1.93 (1.38;2.70) | |
| No | 121 | 47.3 | 256 | 63.4 | 1 | |
| Regular health checks | | | | | | 0.001 |
| Yes | 196 | 76.6 | 259 | 64.1 | 1.83 (1.27;2.65) | |
| No | 60 | 23.4 | 145 | 35.9 | 1 | |
| Link with the Family Health Program | | | | | | 0.000 |
| No | 142 | 56.3 | 168 | 41.7 | 1.81 (1.30;2.51) | |
| Yes | 110 | 43.7 | 235 | 58.3 | 1 | |
| Health checks within the Family Health Program | | | | | | 0.001 |
| No | 187 | 73.0 | 244 | 60.4 | 1.78 (1.24;2.54) | |
| Yes | 69 | 27.0 | 160 | 39.6 | 1 | |
| Health checks within the Family Health Program (only among those who underwent checks) | | | | | | 0.000 |
| No | 127 | 64.8 | 99 | 38.2 | 2.97 (1.98;4.48) | |
| Yes | 69 | 35.2 | 160 | 61.8 | 1 | |
| Perception regarding healthcare service | | | | | | 0.260 |
| Negative | 28 | 12.4 | 61 | 16.1 | 0.74 (0.44;1.22) | |
| Positive | 198 | 87.6 | 318 | 83.9 | 1 | |
| Duration of hospitalization (days) | | | | | | 0.025 |
| <5 | 110 | 43.0 | 211 | 52.2 | 0.69 (0.49;0.96) | |
| ≥5 | 146 | 57.0 | 193 | 47.8 | 1 | |
| Indication for hospitalization | | | | | | 0.002 |
| Physicians at walk-in clinic/others | 245 | 96.5 | 362 | 89.6 | 3.16 (1.44;7.15) | |
| Physicians within Family Health Program | 9 | 3.5 | 42 | 10.4 | 1 | |

elderly people, the main causes of hospital admission are generally conditions that would be sensitive to primary care.[26]

Two of the variables examined in the present study that remained statistically associated with hospitalization due to conditions that would be sensitive to primary

**Table 3.** Results from multivariate analysis for factors associated with hospitalization due to conditions that would be sensitive to outpatient care. Municipality of Montes Claros, Southeastern Brazil 2007-2008.

| Variable | p-value | Adjusted OR (IC 95% ) |
|---|---|---|
| Age over 60 years | 0.000 | 2.12 (1.45;3.09) |
| Schooling level not more then four years | 0.038 | 1.50 (1.02;2.20) |
| Previous hospitalization | 0.006 | 1.62 (1.15;2.28) |
| Regular checking of health | 0.000 | 2.20 (1.44;3.36) |
| Lack of link with the Family Health Strategy | 0.000 | 2.48 (1.64;3.74) |
| Indication of hospitalization by other physician | 0.042 | 2.25 (1.03;4.94) |

care were related to the patients' own health conditions. Previous hospitalization and undergoing regular health checks may denote conditions that are more severe and/or patients who are more vulnerable. Under normal conditions, a regular and continual source of healthcare is associated with lower hospital admission rates.[16,25] However, if patients present conditions that are more severe and reports of previous hospitalization, the insecurities of physicians, patients and patients' families lead to management that is more interventionist and generally at hospital level. In the present study, patients who reported undergoing health checks regularly also presented a greater chance of hospitalization due to conditions that would be sensitive to primary care (OR= 2.20; 95% CI: 1.44;3.36). In principle, this association seems to be paradoxical. It can be considered that it relates both to the possibility that patients are in a more critical condition and to the precarious quality of follow-up.

When the follow-up was associated with healthcare units without family health teams, it was observed that there was a greater chance of hospitalization due to conditions that would be sensitive to primary care (OR= 2.48; 95% CI: 1.64;3.74). This observation confirms the initial hypothesis of the study and corroborates other evaluation studies that have emphasized the advantages of the strategy.[13,17] In effect, the family health teams are in the best position to take preventive action regarding the chronic conditions that are the main causes of avoidable hospital admissions. Family health teams are almost always strategically located in peripheral areas of cities, thus facilitating timely access to healthcare. The longitudinal nature of the care assured by the FHS provides greater trust between patients and physicians, which have a favorable impact on adherence to treatment and health advice.[9,25] Nonetheless, one limitation regarding how the link to the FHS was measured was that only the area of coverage and patients' reports were considered, without making reference to the duration of the link.

Another factor strictly linked to the healthcare system was identified in the present study, with regard to hospitalizations due to conditions that would be sensitive to primary care: the physician who requested the hospitalization was almost always the physician on duty in the walk-in clinic. Thus, although 229 patients said that they had had follow-up from the family health team, the decision to hospitalize was made by a physician within the team in less than a quarter of the cases. It was observed that the chance of hospitalization due to conditions that would be sensitive to primary care was twice as great for patients whose admission was requested by physicians who were not working within the FHS (OR = 2.25; 95% CI: 1.03;4.94). This point has already been shown in other studies.[8,18] In many places, the healthcare system generally has little influence over the admission policies adopted by hospitals. Márquez-Calderón et al[18] (2003) showed that greater accessibility of hospital care was associated with higher rates of admissions due to conditions that would be sensitive to primary care. According to these authors, the number of hospital beds available gives rise to the notion that the resources for specialized care play an important role in the variability of these rates. Another study[8] showed that greater proximity to the hospital was associated with greater rates of admissions due to conditions that would be sensitive to primary care.[8] These authors also argued that the characteristics of the specialized care, ease of access to the hospital and the patterns of use among the population, to the detriment of primary care, might explain these findings. With regard to the physicians caring for such patients, it is believed that clinicians act on the basis of the context of their hospital practice, while primary care physicians are characterized by placing the social context within patients' problems, which explains the prudent and necessary clinical variability.[15] Thus, the lack of any well-established operative program of referrals and counter-referrals may have a favorable influence on the indicators observed.

Although Brazilian studies have shown good performance among family health teams, the indicator of hospitalizations due to conditions that would be sensitive to outpatient care has not yet been greatly disseminated. Further studies are needed in order to generalize the data. The municipality of Montes Claros has particular features that distinguish it from most of this country, since its primary care network is mostly composed of physicians and nurses with specific

training in the family healthcare type of medical and multiprofessional residence. Moreover, undergraduate students from several healthcare fields are active within the primary care network. Considering the characteristics and potential of this indicator and the increasing use of the FHS, new evaluation processes could establish this indicator within the healthcare teams' routine, thus enabling greater discussion on the list of conditions that would be sensitive to primary care, and on the effectiveness of the actions of primary care services. It should be borne in mind that the FHS is almost always strategically directed towards the population of greatest vulnerability. For such individuals, early access to good-quality healthcare services often represents the possibility of survival. Thus, measuring the quality of the care provided represents an ethical commitment towards this part of the community.

In the present study, certain limitations of this indicator were expected, such as the quality of the diagnosis in the medical files, which was measured "in situ" and not from secondary data such as the Authorization for Hospital Admission. Data gathering throughout the year avoided the influence of the seasonality of certain conditions. Nevertheless, some limitations still exist and should be taken into consideration in interpreting the results. The most important of these was the restriction of the hospitalizations to clinical and surgical cases. Thus, for example, admissions for childbirth (the largest reason for hospitalization in Brazil) or for mental health reasons were excluded. According to the Ministry of Health's list, these are not conditions that would be sensitive to primary care. Thus, the percentage of 38.8% reflects only the proportion of hospital admissions due to conditions that would be sensitive to primary care, among the group evaluated. Nevertheless, it needs to be repeated that this limitation is restricted to generalization from the data and is not a limitation on the analysis carried out in the present study.

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