

ORIGINAL ARTICLE

HOSPITALIZATIONS DUE TO PRIMARY CARE-SENSITIVE CONDITIONS AMONG CHILDREN IN RONDÔNIA FROM 2008 TO 2017

Jeanne Lúcia Gadelha Freitas¹, Priscilla Perez da Silva², Kátia Fernanda Alves Moreira³, Daniela Ferreira Borba Cavalcante⁴, Maria Helena do Nascimento Souza⁵, Jéssica Cunha Alves⁶

ABSTRACT

Objective: To identify the causes and trends of hospitalizations due to primary care-sensitive conditions in children under five years in Rondônia, Brazil, from 2008 to 2017.

Method: Time series. Secondary data on hospitalizations available in the Hospital Information System between January and March 2018 were used. The trend analysis was based on the Prais-Winsten linear regression model.


Results: Infectious gastroenteritis was the main cause of hospitalization at all ages. Children under one year had the highest rates of hospital admissions, and the causes were lung disease, ear, nose and throat infection, kidney and urinary tract infection, with an increasing trend of prenatal and childbirth diseases. Hospitalizations due to epilepsy, skin infection and subcutaneous tissue showed an increasing trend at all ages.

Conclusion: The high rates of hospital admissions for children reflect the fragility of the care network. This study contributes to the improvement of public child health policies in Primary Health Care.


DESCRIPTORS: Child Health; Hospitalization; Primary Health Care; Time Series Studies; Epidemiology.


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¹Nurse. PhD, Biology of Infectious and Parasitic Agents. Nursing Professor from Universidade Federal de Rondônia. Porto Velho, RO, Brazil. 

²Nurse. PhD, Health Sciences. Nursing Professor from Universidade Federal de Rondônia. Porto Velho, RO, Brazil. 

³Nurse. PhD, Public Health Nursing. Nursing Professor from Universidade Federal de Rondônia. Porto Velho, RO, Brazil. 

⁴Nurse. Master degree in Teaching in Health Sciences. Nursing Professor from Universidade Federal de Rondônia. Porto Velho, RO, Brazil. 

⁵Nurse. PhD, Nursing. Nursing Professor from Universidade Federal do Rio de Janeiro. Rio de Janeiro, RJ, Brazil. 

⁶Nursing Student. Universidade Federal de Rondônia. Porto Velho, RO, Brazil. 

INTERNAÇÕES POR CONDIÇÕES SENSÍVEIS À ATENÇÃO PRIMÁRIA EM CRIANÇAS EM RONDÔNIA DE 2008 A 2017

RESUMO

Objetivo: identificar as causas e tendências de internações por condições sensíveis à atenção primária em crianças menores de cinco anos em Rondônia, Brasil, de 2008 a 2017.

Método: série temporal, com dados secundários de internações do Sistema de Informações Hospitalares, entre janeiro e março de 2018. A análise da tendência foi baseada na regressão linear de Prais-Winsten.

Resultados: as gastroenterites infecciosas foram a principal causa de internação em todas as idades. As maiores taxas ocorreram em menores de um ano por doenças pulmonares, infecção do ouvido, nariz e garganta, infecção do rim e trato urinário, com tendência crescente das doenças no pré-natal e parto. As internações por epilepsia, infecção de pele e tecido subcutâneo tiveram tendência crescente em todas as idades.

Conclusão: as elevadas taxas de internações em crianças refletem a fragilidade da rede assistencial. Este estudo contribui com as políticas públicas de saúde infantil na Atenção Primária em Saúde.

DESCRITORES: Saúde da Criança; Hospitalização; Atenção Primária à Saúde; Estudos de Séries Temporais; Epidemiologia.

INTERNACIONES POR CONDICIONES SENSIBLES A LA ATENCIÓN BÁSICA EN NIÑOS EM RONDÔNIA DE 2008 A 2017

RESUMEN:

Objetivo: identificar las causas y tendencias de internaciones por condiciones sensibles a la atención básica en niños con menos de cinco años en Rondônia, Brasil, de 2008 a 2017.

Método: serie temporal, con datos secundarios de internaciones del Sistema de Informaciones Hospitalarias, entre enero y marzo de 2018. El análisis de tendencia se basó en la regresión lineal de Prais-Winsten.

Resultados: las gastroenteritis infecciosas fueron la principal causa de internación en todas las edades. Las mayores tasas ocurrieron en niños con menos de un año por enfermedades pulmonares, infección de oído, nariz y garganta, infección de riñones y tracto urinario, con tendencia creciente de las enfermedades en el prenatal y parto. Las internaciones por epilepsia, infección de piel y tejido subcutáneo presentaron tendencia creciente en todas las edades.

Conclusión: las elevadas tasas de internaciones en niños reflejten la fragilidad de la red asistencial. Este estudio contribuye con políticas públicas de salud infantil en la Atención Básica en Salud.

DESCRIPTORES: Salud del Niño; Hospitalización; Atención Básica a la Salud; Estudios de Series Temporales; Epidemiología.

INTRODUCTION

Primary Health Care (PHC) has become an entry point for users to health promotion and prevention services in several countries^(1,2). In Brazil, these actions integrate the Unified Health System (SUS), established in the 1988 Federal Constitution, and which is based on the principles of universality, equity and integrality of care in health networks across the country^(2,3).

PHC's capacity of response impacts the dynamics of the health-disease process of individuals and the community. Hence, its performance must be continuously evaluated. For this purpose, morbidity indicators, such as the list of Hospitalizations due to Primary Care-Sensitive Conditions (ICSAP), are used. The tool is based on the health conditions in which PHC can intervene, avoiding unnecessary hospitalizations^(4,5). Furthermore, the ICSAP profile can portray the level of access and functioning of health services⁽⁵⁾. Specific and timely interventions in PHC can reduce the risk of hospitalizations of vulnerable groups such as children, by focusing on the prevention, diagnosis and early treatment of acute diseases prevalent in childhood and, at the same time, promoting cost reduction in control and monitoring of chronic diseases^(6,7).

Brazilian studies on the ICSAP in children have gained more visibility since 2008 when the Ministry of Health adapted and regulated the Brazilian list of hospital admissions due to primary care-sensitive conditions (ICSAP). The list classifies 19 groups of different health conditions and illnesses of individuals in their different life cycles, that is, from children to elderly⁽⁴⁾.

Unlike the adult population, children are predominantly affected by acute illnesses that can be avoided through timely assistance in PHC health services⁽⁸⁾. Different analyzes on ICSAP in children, carried out from 2011 to 2019 in Brazil, documented relevant findings in all regions of the country⁽⁷⁻¹¹⁾. These studies found differences in the rates of ICSAP by region, condition group and age group, with an emphasis on gastroenteritis in children aged 0-4 years in the North and Northeast regions⁽¹²⁻¹⁴⁾ and respiratory diseases in the South and Southeast⁽¹⁵⁻¹⁷⁾ and Center-West⁽⁹⁾ regions, and lower rates in the North region of the country⁽¹²⁾. These peculiarities show the influence of climate on the etiology of these diseases, and the regional inequality regarding access to health services and the living standards of the population^(7,8).

In the state of Rondônia, the only study on ICSAP in the 2012-2016 period, which comprised 52 municipalities, analyzed 133,958 notifications of public health services provided under the SUS. Of this total, ICSAP accounted for 24.8% of hospital admissions. In 14.8% of these, the patients were children up to five years old who occupied 26.3% of the beds in the analyzed period⁽¹²⁾.

Knowing the conditions that culminate in hospitalizations of children can help to understand the profile of illness in this group, in order to support strategies to fight and prevent diseases that generate hospitalizations⁽⁶⁾. In childhood, ICSAP entail socioeconomic and psychological costs from children and their families and absorb a large volume of SUS resources, as each pediatric hospitalization can predispose to other diseases⁽¹¹⁾.

The present study fills a gap in the knowledge about the causes of ICSAP in children under five years in Rondônia. Nevertheless, a study on infant mortality in this region identified a higher incidence of deaths from causes that can be prevented by PHC, especially diseases related to prenatal care, childbirth and immunization compared to other types of preventable deaths⁽¹⁷⁾.

Therefore, this study aimed to identify the causes and trends of hospital admissions due to primary care-sensitive conditions in children under five years in Rondônia, Brazil, from 2008 to 2017.

METHOD

Time series that used secondary data on hospitalizations available in the Hospital Information System (SIH) of the Information Technology Department of the Unified National Health System – SUS (DATASUS), from January 2008 to December 2017. The 2008-2017 period was selected because 2008 was the year of creation of the Brazilian List of ICSAP⁽⁴⁾ and 2017 was the year with the greatest range of data available at the SIH-SUS. Data was collected, extracted and analyzed from January to March 2018

The study population comprised all hospitalized children under the age of five living in the 52 municipalities of Rondônia, notified from January 1, 2008 to December 31, 2017, with Hospitalization Authorization Forms (AIH) completed according to the International statistical classification of diseases and related health problems -10th revision (ICD-10) of the World Health Organization (1997), corresponding to the list of ICSAP that includes 19 groups of causes of hospitalization⁽⁴⁾.

All legible and fully completed AIHs, approved and funded by the SUS, including supplementary and philanthropic assistance that also provide services to SUS, were included. The following variables were considered: age group (children under one year old, one year old, two years old, three years old and four years old) and cause of ICSAP grouped according to ICD-10 and the List of Primary Care-Sensitive Conditions (CSAP) were considered⁽⁴⁾. ICSAPs with hospitalization rates of less than one hospitalization for every 1,000 children were excluded from the analysis.

Data was analyzed using the Stata®11 software, through descriptive statistical analysis, and results were expressed in frequencies. For trend analysis, defined as stationary, decreasing or increasing, linear regression was performed with the Prais-Winsten model, after verification of serial autocorrelation using the Durbin-Watson statistic test. The annual trend of the mortality rate due to external causes was presented with the 95% Confidence Interval (95% CI).

The study was part of the project “Assessment of Child Health Care in Porto Velho - RO” of the *Centro de Estudos e Pesquisa em Saúde Coletiva*. The research was in agreement with Resolution 466/12⁽¹⁹⁾ and was approved by the Research Ethics Committee of Universidade Federal de Rondônia under protocol no 1,849,757.

RESULTS

In the 10-year time series, the annual trend for ICSAP in children differed between groups (Table 1). In all age groups, there was a decreasing trend of ICSAP due to asthma, with a significant reduction (< one year old: -18.67%; one year old: -13.90; two years old: -12.49; three years old: -11, 07; four years old: 9.49%) in children less than one year old. Infectious gastroenteritis and its complications also decreased at all ages (<one year old: -9.77%; one year old: -9.28%; two years old: -8.98%; three years old: -8.71%; four years old: -7.17%).

Table 1 – Annual trend of hospitalizations due to Primary Care-Sensitive Conditions in children under five years old. Rondônia, Brazil, 2008-2017 (continues)

ICSAP Group	Annual trend (CI 95%)		Trend
Children less than one year old			
1. Vaccine-preventable diseases/sensitive conditions	-11.02	(-20.68; -0.18)	Decreasing
2. Infectious gastroenteritis and complications	-9.77	(-10.69; -8.85)	Decreasing
4. Nutritional deficiencies	1.30	(-4.42; 7.36)	Stationary
5. Ear, nose and throat infections	9.88	(2.35; 17.98)	Increasing
6. Bacterial pneumonias	-22.29	(-31.94; -11.28)	Decreasing
7. Asthma	-18.67	(-21.68; -15.55)	Decreasing
8. Lung diseases	4.84	(0.31; 9.58)	Increasing
9. Hypertension	-21.01	(-33.45; -6.24)	Decreasing
14. Epilepsies	8.84	(4.32; 13.56)	Increasing
15. Kidney and urinary tract infection	-2.30	(-7.30; 2.97)	Stationary
16. Skin and soft tissue infection	12.88	(4.63; 21.78)	Increasing
19. Diseases related to prenatal care and childbirth	21.86	(15.81; 28.22)	Increasing
One-year old children			
1. Vaccine-preventable diseases/sensitive conditions	-12.56	(-16.51; -8.43)	Decreasing
2. Infectious gastroenteritis and complications	-9.28	(-12.23; -6.23)	Decreasing
5. Ear, nose and throat infections	9.08	(3.13; 15.37)	Increasing
6. Bacterial pneumonias	-17.55	(-29.23; -3.95)	Decreasing
7. Asthma	-13.90	(-18.83; -8.66)	Decreasing
8. Lung diseases	4.36	(-1.90; 11.01)	Stationary
14. Epilepsies	13.33	(3.00; 24.70)	Increasing
15. Kidney and urinary tract infection	0.83	(-1.59; -3.32)	Stationary
16. Skin and soft tissue infection	18.10	(5.16; 32.60)	Increasing
Two-year old children			
1. Vaccine-preventable diseases/sensitive conditions	-13.02	(-15.19; -10.79)	Decreasing
2. Infectious gastroenteritis and complications	-8.98	(-11.76; -6.12)	Decreasing
5. Ear, nose and throat infections	13.37	(2.20; 25.76)	Increasing
6. Bacterial pneumonias	-1.48	(-11.17; 9.26)	Stationary
7. Asthma	12.49	(-17.08; -7.65)	Decreasing
8. Lung diseases	2.10	(-4.86; 9.56)	Stationary
14. Epilepsies	13.73	(7.28; 20.56)	Increasing
15. Kidney and urinary tract infection	1.07	(-3.65; 6.03)	Stationary
16. Skin and soft tissue infection	18.46	(5.03; 33.62)	Increasing
Three-year old children			
2. Infectious gastroenteritis and complications	-8.71	(-11.94; -5.35)	Decreasing
5. Ear, nose and throat infections	3.70	(-7.83; 16.69)	Stationary
6. Bacterial pneumonias	-0.64	(-12.92; 13.37)	Stationary

7. Asthma	-11.07	(-17.54; -4.10)	Decreasing
8. Lung diseases	2.24	(-6.51; 11.81)	Stationary
14. Epilepsies	13.29	(3.99; 23.42)	Increasing
15. Kidney and urinary tract infection	0.63	(-3.39; 4.82)	Stationary
16. Skin and soft tissue infection	19.92	(5.05; 36.90)	Increasing
Four-year old children			
2. Infectious gastroenteritis and complications	-7,17	(-12.36; -1.69)	Decreasing
5. Ear, nose and throat infections	13,88	(5.98; 22.37)	Increasing
7. Asthma	-9.49	(-16.21; -2.23)	Decreasing
8. Lung diseases	2.07	(-8.51; 13.87)	Stationary
14. Epilepsy	13.63	(8.05; 19.51)	Increasing
15. Kidney and urinary tract infection	2.68	(-1.90; 7.48)	Stationary
16. Skin and soft tissue infection	18.82	(1.44; 39.19)	Increasing

The rates of ICSAP due to ear, nose and throat infections, epilepsy and skin and soft tissue infections had an increasing trend at all ages, except hospitalizations due to ear, nose and throat infections in three year-old children.

Kidney and urinary tract infection was the only cause of ICSAP with stationary rates at all ages, though with significant rates in 4-year-old children (2.68%). As for children less than one year old, there was a decrease in the annual trend of ICSAP due to bacterial pneumonia (-22.29%) and hypertension (-21.01%), but the annual trend of ICSAP due to diseases related to prenatal and childbirth increased (21.86%).

Regarding one-year-old children, there was a decrease in hospitalization due to vaccine-preventable diseases (-12.56%), bacterial pneumonia (-17.55%), asthma (-12.49%) and gastroenteritis (-9.28%). In children up to two years old, there was a decrease in the rates of ICSAP due to vaccine-preventable diseases and sensitive conditions.

There was a decrease in the annual trend of ICSAP due to gastroenteritis and asthma in four-year-old children. Also, some lung diseases and kidney and urinary tract infections remained stationary at all ages.

DISCUSSION

A child's growth and development can be affected by common childhood illnesses especially in unfavorable socioeconomic conditions⁽¹⁴⁾. On the other hand, access to PHC services and the effectiveness of prevention, protection and recovery actions of PHC can also influence the patterns of childhood morbidity and mortality⁽¹⁴⁻²⁰⁾.

In this study, infectious gastroenteritis and complications were the main cause of ICSAP in all ages, although with a decreasing trend in the analyzed years. This finding is similar to the results of systematic reviews^(7,8) and time series⁽¹⁴⁻¹⁶⁾, especially those in the North and Northeast regions^(12,13), in contexts similar to this study. However, despite their higher levels of socioeconomic development, the South/Southeast⁽¹⁵⁻¹⁷⁾ and Center-West⁽⁹⁾

regions of Brazil had high rates of ICSAP due to gastroenteritis, showing that this condition impacts child development in all regions of the country^(8,9).

A study of children's ICSAP in 300 cities in the North and Northeast regions of the country included gastroenteritis among the three groups of the most prevalent ICSAP. According to the authors, this profile reflects, in part, regional peculiarities such as high illiteracy rates, poor infrastructure and hygiene, low health coverage and river pollution⁽⁷⁾. In Rondônia, the region where the study was conducted, an analysis on ICSAP conducted from 2012 to 2016 reported a higher prevalence of gastroenteritis and other acute conditions in children up to nine years (42.8%), compared to adults⁽¹²⁾. This finding reinforces the impact of dietary and hygiene factors on the genesis of waterborne diseases in the area, which increases the demand for PHC services, since the state of Rondônia has only 9.61% of basic sanitation coverage, which favors the presence of common childhood illnesses, such as gastroenteritis⁽²¹⁾.

Analysis of ICSAP in children under one year revealed that bacterial pneumonia, asthma, lung diseases and kidney and urinary tract infections had rates higher than 10 hospitalizations/1,000 children in most of the years analyzed. Similar results were identified⁽¹¹⁾ in two municipalities of Paraíba from 2008 to 2013. Pneumonia, kidney and urinary tract infections and lung diseases were the main causes of ICSAP in children up to 12 months. On the other hand, the rates of hospitalizations due to infectious gastroenteritis and asthma of children over one year decreased compared to the rates of children under one year.

There was an increasing trend in ICSAP rates due to ear, nose and throat infections, epilepsy and skin and soft tissue infection at all ages, except for hospitalizations for ear, nose and throat infections in three-year-old children. These results differ from those of other regions such as the state of Bahia, which showed a decrease in the rates of ICSAP in the 2000-2012 period, though still facing high costs with hospitalizations⁽¹³⁾.

There was an increasing trend in prenatal/childbirth related diseases (21.86%; 95% CI 15.81; 28.22) in children under one year old. There was a six-fold increase between the initial and final years analyzed for this condition (1.30% in 2008 to 8.20% in 2017). This worrying scenario was identified by a study⁽⁶⁾ conducted in 2014 that analyzed the incidence of ICSAP in 330 Brazilian municipalities. In the referred study, the rate of pediatric hospitalizations related to prenatal/childbirth in the North region (2.90) was higher than the average national rate (2.29). In this region, high rates of ICSAP associated with pregnancy and childbirth can be attributed to the low quality of prenatal care. A survey with 13,205 pregnant women living in 252 municipalities in this region showed that 75.4% of them had six or more prenatal consultations, but only 3.4% had access to adequate prenatal care⁽²²⁾.

The results presented here also corroborate analyzes of infant mortality carried out in Rondônia from 2006 to 2010 where the main causes of preventable deaths in children up to one year were septicemia, hypoxia and birth asphyxia. In the same period, mortality rates were higher than those in Brazil (15.7/1,000 LB until 2015)⁽¹⁸⁾.

There was a decrease in ICSAP due to bacterial pneumonia, asthma, vaccine-preventable diseases and infectious gastroenteritis in children aged one year. However, in this group and in the age group of two and three years, there was an increasing trend in ICSAP due to ear, nose and throat infections, epilepsies and skin and soft tissue infection. In a literature review of the last ten years in Brazil, skin and soft tissue infection was the leading cause of ICSAP in children up to five years old⁽⁹⁾. As for the hospitalizations due to epilepsy, there was an increasing trend in all age groups in Rondônia, a result that contrasts with those obtained by some studies in the Southeast^(15,16), Center-West⁽⁹⁾ and Northeast⁽¹⁴⁾ regions of the country where the trend in the rate of general ICSAP due to epilepsy decreased.

These differences in results compared to other studies may be related to regional socioeconomic disparities, access and quality of health services⁽¹⁰⁾, climatic peculiarities of each region and the diseases prevalent in childhood⁽¹⁰⁻¹²⁾. Therefore, it is possible that each region has different morbidity profiles that, in turn, reflect the response capacity of local

health services^(2,4-6).

In this study, some ICSAP remained stationary at certain ages, such as nutritional deficiencies (less than one year old), lung diseases (two to four years old) and kidney and urinary tract infections (all age groups). Although they are stationary conditions, it is necessary to reinforce preventive actions, such as in nutritional deficiencies, which, by themselves, compromise the child's immune defenses. This finding is a cause for concern, since children under the age of five, living in the North and Northeast regions of the country showed a higher association of thinness with children in families with lower income and of black color race⁽²³⁾. This finding reinforces the relevance of programs to fight malnutrition such as the Bolsa Família (a social welfare program of the Brazilian government), which, although politically questionable, helps to reduce nutritional deficiencies and promotes healthy eating habits that somehow protects children from ICSAP in early childhood⁽²⁴⁾.

The growing or stationary trend in ICSAP rates in children under five years, found in this and other studies, reflects an unsatisfactory PHC response, especially in regions where the Family Health Strategy has not been established or works poorly^(1,8,14), as the state of Rondônia. Thus, high rates of ICSAP are serious warning signs that deserve a deeper analysis by managers in different locations^(1,11).

Although the results of this study corroborate those of other studies, it has a limitation, which is the use of secondary databases, subject to typing errors and/or underreporting. Furthermore, they are accessible and comprehensive sources that allow the identification of diseases that affect children's health. This study highlights weaknesses that should be considered in the planning of strategies aligned with the guidelines of the National Policy for Comprehensive Child Health Care (PNAISC) within the scope of SUS⁽²⁵⁾, in order to provide better responses to the problems caused by ICSAP in the child population.

Therefore, managers should invest in the qualification of health professionals working in PHC, as these are essential for the early identification and adequate management of diseases prevalent in childhood, such as nurses, who play a key role in prenatal and childcare appointments.

CONCLUSION

In Rondônia, infectious gastroenteritis and complications were the main cause of ICSAP in children up to five years. The high rates of hospitalizations in all age groups reveal weaknesses in the care network and may result from the difficulty of access and quality of preventive actions in PHC, especially in the pregnancy-puerperal cycle. In addition to these factors, socioeconomic, health and climatic factors and diseases prevalent in childhood and characteristic of the region may be present, such as anemia and parasitic infections.

Therefore, it is necessary to reorganize and qualify the health care network of children and their families, investing in the qualification of PHC services and professionals, in order to identify and treat preventable health problems in a timely and appropriate manner, particularly those related to the pregnancy – puerperal cycle, valuing prenatal and childcare appointments as basic practices in the prevention of ICSAP in childhood.

The present study reinforces the importance of nursing care for child health and contributes to the improvement of care in the context of PHC. Understanding the trend in ICSAP rates also helps to guide public policies aimed at child health care.

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Corresponding author:

Jeanne Lúcia Gadelha Freitas

Universidade Federal de Rondônia

R. Foz do Iguaçu, 296 - 76808-648 - Porto Velho, RO, Brasil

E-mail: jeannegadelha@unir.br

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