

Evaluation of hospitalization of children aged 0 to 5 years admitted for respiratory infections at a large hospital

Avaliação das internações de crianças de 0 a 5 anos por infecções respiratórias em um hospital de grande porte

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ABSTRACT

Objective: To evaluate the admission of children aged 0 to 5 years due to respiratory infections at a major hospital in the Southern region of the city of São Paulo. **Methods:** A total of 4,240 clinical records of children hospitalized and diagnosed with pneumonia, bronchopneumonia, bronchiolitis and bronchitis were evaluated for the 2008-2009 period, based on age, gender and year season. **Results:** Out of this total of children aged 0 to 60-months, 139 (3.2%) presented with pneumonia, with a slight predominance in female babies, and 73.4% occurred between 12 and 60 months (102 cases), particularly during the winter. No significant difference was found as to gender in bronchopneumonia. Age range and year seasons showed to be significant. As regards to bronchiolitis, there was a slight increase in male babies (253 cases) aged less than 12 months and in the autumn season. A total of 182 (4.3%) presented with bronchitis, mainly boys (101 cases) in children aged 12 to 60 months, predominantly during autumn/summer seasons. **Conclusion:** The assessment of admissions of children aged 0 to 5 years due to respiratory infections at a major hospital at the Southern region of the city of São Paulo, in the 2008-2009 period, showed that respiratory diseases affect age groups, and gender in a different way occurring in specific periods of the year.

Keywords: Respiratory tract infections; Hospitalization; Child

RESUMO

Objetivo: Avaliar internações de crianças de 0 a 5 anos por infecções respiratórias em um hospital de grande porte da zona sul de São Paulo. **Métodos:** Foram utilizados 4.240 prontuários de crianças internadas com os diagnósticos de pneumonia, broncopneumonia, bronquiolite e bronquite, no ano de 2008 a 2009, utilizando-se como base idade,

gênero e estações do ano. **Resultados:** Desse total de crianças entre 0 a 60 meses de idade, 139 (3,2%) tiveram pneumonia, com discreto predomínio do sexo feminino, e 73,4% ocorreram entre 12 a 60 meses (102 casos), a maioria no inverno. Não houve diferença significativa quanto ao gênero na broncopneumonia; a faixa etária e as estações do ano mostraram-se significantes. Em relação à bronquiolite, houve um discreto predomínio do gênero masculino (253 casos), da faixa etária menor que 12 meses e da estação de outono. Apresentaram bronquite 182 (4,3%) crianças de 12 a 60 meses, com predomínio do sexo masculino (101 casos) com maior frequência no outono/verão. **Conclusão:** Ao avaliar as internações de crianças de 0 a 5 anos de idade internadas por infecções respiratórias em um hospital de grande porte da zona sul de São Paulo no período de 2008 a 2009, os dados evidenciaram que as doenças respiratórias afetaram de maneira diferente as faixas etárias e o gênero das crianças, ocorrendo em épocas distintas do ano.

Descritores: Infecções respiratórias; Hospitalização; Criança

INTRODUCTION

In developing countries, acute lower respiratory tract infection is an important cause of hospitalization of children younger than 5 years. For the most part, alveolar and bronchial infections are responsible for 90% of deaths from respiratory disease. In the bronchi and bronchioles, the first infection is viral in the vast majority of cases. Bacteria is a very common cause of pneumonia, and in many instances the involvement of viral agents is rarely identified⁽¹⁾.

Study carried out at Hospital Geral do Grajaú – HGG, São Paulo (SP), Brazil.

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Respiratory viruses, particularly respiratory syncytial virus (RSV), cause most of the acute infections of the lower respiratory tract⁽²⁾.

Bronchial obstructive syndrome and pneumonia are very common causes of child visits to primary care and emergency and specialized services, as well as many other respiratory diseases. They can be serious enough to require hospitalization, lead to high consumption of resources, predispose the child to life-long or nearly life-long chronic obstructive diseases and, in some cases, may cause death. The importance of these conditions has led medical specialists to unify criteria in order to prevent, diagnose, and treat all respiratory diseases, and it prompted the Brazilian Ministry of Health to develop programs and standards that include a specific focus on treatment for these patients, i.e., the availability of human resources, including specialist physicians and specific treatment policies. These respiratory diseases affect children, especially in the first 5 years of life, due to susceptibility and immaturity of the respiratory tract in this age group⁽³⁾.

Lower respiratory tract diseases tend to last for long periods of time and, if untreated, they can endanger the lives of children⁽⁴⁾.

Pneumonia is an inflammation of the lung parenchyma and causes most deaths in children. Most cases of pneumonia are caused by microorganisms, but several non-infectious causes sometimes should be considered. These causes include but are not limited to pulmonary aspiration of stomach acid content, foreign bodies, hydrocarbon and lipid substances; hypersensitivity reactions; and drug or radiation-induced pneumonitis. Infections in neonates and other compromised hosts are distinct from those that occur in infants and children. The most common microbial causes of pneumonia in children include respiratory viruses, *Mycoplasma pneumoniae*, and selected bacteria⁽²⁾.

The pathogens in developing countries are similar to those of the economically advanced countries, but the frequency of primary and secondary bacterial infections is much higher⁽²⁾.

In bronchopneumonia, the infection presents itself as inflammatory foci affecting multiple lung lobes, and the agent is characteristically spread through the airways. This is a very common inflammatory disease in medical practice and most commonly affects children, elderly or debilitated individuals⁽⁵⁾.

Acute bronchiolitis, a common disease of the lower respiratory tract of infants, results from inflammatory obstruction of small airways. It occurs during the first 2 years of life, with a peak incidence around 6 months and, in many regions, is the most frequent cause of hospitalization of infants⁽²⁾.

Acute bronchitis is one of the most common diagnosis in clinical pediatric practice. It is a respiratory infection,

clinically characterized by the occurrence of cough, with or without phlegm, and a normal chest radiograph. The most common cause is viral, and the condition is self-limited, with resolution in approximately 3 weeks⁽⁶⁾.

OBJECTIVE

To raise the profile of 0-5 year-old children admitted to a large hospital in the Southern area of São Paulo, in the 2008-2009 period, due to respiratory diseases, according to age, gender, and season.

METHODS

This was a cross-sectional study conducted at *Hospital Geral do Grajaú* (HGG), a large hospital located in the Southern region of the city of São Paulo. This is a teaching hospital where students of various fields carry out their practical activities, in addition to activities for medical residents of different areas.

For data collection, the medical records of 0-5 year-old children admitted in 2008 to 2009, from the Medical Records and Statistics Service (SAME) of HGG, were used based on:

1. gender;
2. age;
3. season of the year.

The study included all children with a diagnosis upon admission of pneumonia, bronchopneumonia, bronchiolitis, and bronchitis during the study period.

A database was set up using Epi-Info version 6.04b.

To analyze the results, the chi square test was applied to evaluate possible associations between the variables studied. A level of 0.05 or 5% was established for rejection of the null hypothesis.

The study was approved by the Ethics Committee of HGG, and as it involved a search of records with preservation of anonymity, it was decided that an informed consent was not necessary.

RESULTS

During the study period, from January 1st 2008 to December 31st, 2009, a total of 4,240 children aged 0-60 months were seen in the Pediatric Emergency Unit at the HGG, with the following lower respiratory tract diseases: pneumonia, bronchopneumonia, bronchiolitis, and bronchitis, according to gender, as shown in table 1.

Table 2 shows data on children hospitalized with lower respiratory tract infections according to age group.

Table 3 displays data on children hospitalized with lower respiratory tract infections according to the season of the year.

Table 1. Children hospitalized with lower respiratory tract infections in 2008 and 2009, according to gender

Condition	Gender				Total
	Female		Male		
	n	%	n	%	
Pneumonia	71	3.8 (51.1)	68	2.9 (48.9)	139 (100)
Bronchopneumonia	1,560	82.7 (44.7)	1,932	82.1 (55.3)	3,492 (100)
Bronchiolitis	174	9.2 (40.7)	253	10.7 (59.3)	427 (100)
Bronchitis	81	4.3 (44.5)	101	4.3 (55.5)	182 (100)
Total	1,886	100	2,354	100	4,240

Chi square test = 4.92; p = 0.1785.

Table 2. Children hospitalized with lower respiratory tract infections in 2008 and 2009, per age group

Condition	Age group				Total
	0 –12 months		12 –60 months		
	n	%	n	%	
Pneumonia	37	3.3 (26.6)	102	3.3 (73.4)	139 (100)
Bronchopneumonia	806	72.2 (23.1)	2,686	86.3 (76.9)	3,492 (100)
Bronchiolitis	257	23.0 (60.2)	170	5.4 (39.8)	427 (100)
Bronchitis	16	1.4 (8.8)	166	5.3 (91.2)	182 (100)
Total	1,116	100	3,124	100	4,240

Chi square test = 315.35; p < 0.0001.

Table 3. Children hospitalized with lower respiratory tract infections in 2008 and 2009, per season of the year

Condition	Season of the year								Total
	Spring		Summer		Fall		Winter		
	n	%	n	%	n	%	n	%	
Pneumonia	32	6.2 (23)	28	2.6 (20)	39	2.5 (28)	40	3.6 (28)	139 (100)
Bronchopneumonia	388	75.5 (11)	886	83.1 (25.4)	1,270	81.6 (36.4)	948	85.9 (27)	3,492 (100)
Bronchiolitis	79	15.4 (18.5)	106	9.9 (24.8)	155	10.0 (36.3)	87	7.9 (20.0)	427 (100)
Bronchitis	15	2.9 (8.2)	46	4.3 (25.3)	92	5.9 (50.3)	29	2.6 (15.9)	182 (100)
Total	514		1,066		1,556		1,104		4,240

Chi square test = 61.55; p = 0.0001.

DISCUSSION

Acute diseases of the lower respiratory tract are the main causes for the continuing high rates of morbidity and mortality in children under 5 years in developing countries, accounting for more than 4 million deaths per year. Among the risk factors already identified, environmental conditions (seasonality, crowding, air pollution, indoor air pollution, and smoking habit) play a major role in the causal chain of these diseases. Crowding is extremely common in families of less developed regions, where the birth rate is often very high and housing conditions are poor, including a limited number of rooms used by the residents. Especially considering the number of residents and the number of children under 5 years in the household, there is a clear association between crowding and respiratory diseases⁽⁷⁾.

Among the hospitalizations due to acute respiratory infections (ARI), pneumonia stood out as an important cause. In developed countries, the lethal effect of pneumonia affects less than 2% of children aged 0-5 years, whereas in developing countries it reached an estimated 10 to 20%⁽⁸⁾.

Of all children aged 0-60 months included in this study, only a small number had a diagnosis of pneumonia. There was a slight predominance of females, but the difference was not statistically significant. No data were found in literature comparing the incidence in both sexes. As to age, most cases of pneumonia occurred in children aged 12 to 60 months. These data showed that the difference was statistically significant when comparing the age groups analyzed. In the literature, we did not find data comparing the incidence in these two age groups. With regard to seasons, the largest number of cases of pneumonia occurred in winter, followed by autumn. Spring was the third in the number of cases, and summer was the season with fewer cases. In literature, we found no data on differences between the incidences of pneumonia according to seasons with which to compare our results.

Analyzing the cases of pneumonia, it was the diagnosis of the largest number of cases of this series, and there was no significant difference as to gender. However, age and season showed significant differences. There was a predominance of cases in children aged

over 12 months, and fall was the season of the year with the largest number of cases. These data were consistent with the literature.

As to bronchiolitis, there was a slight predominance of males. The age group under 12 months was prominent, and fall had the highest number of cases during the years 2008 and 2009, coinciding with the literature data, which reported that the disease affects more individuals of the same gender, aged under 2 years, and in late fall and early winter⁽⁹⁾.

As to the diagnosis of bronchitis, of the total number of children in the sample, a small number presented bronchitis episodes from January 2008 to December 2009. There was a male predominance in our sample, but this difference in relation to female patients was not significant. Considering age, there was a significant difference, bronchitis being more frequent in older children than in children aged from 0 to 12 months. The data in the literature point to the same result and show that the incidence of acute bronchitis is higher during the second year of life and decreases gradually until adolescence⁽¹⁰⁾. As to seasons, contrary to what was expected, it was interesting to analyze the results, because it was found that, in emergency cases, there was a greater frequency of visits for bronchitis during fall/summer combined, the rainy season, in which the frequency was higher than in the dry season. The highest rate of lower respiratory tract infections in the emergency room found in the rainy season was possibly related to the excess moisture in the living environment of the child, due to heavy and constant rains, and the results could range from a simple cold to a more severe ARI⁽¹¹⁾. In addition, children spend more time indoors and in contact with allergenic substances, which are more numerous in this period, due to a greater growth of fungi related to excessive moisture⁽¹²⁾.

An epidemiological profile of admissions for respiratory diseases in this population, highlighting the periods of the year and the age groups most at risk, will lead to preventive measures that can be applied to prevent hospitalizations for these various conditions.

CONCLUSION

The epidemiological profile of children aged 0-5 years hospitalized for ARI in a large hospital in the Southern region of São Paulo, in the 2008-2009 period, according to age, gender, and season, showed that respiratory diseases affect children differently, according to age and gender, and occur at different times of the year.

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