

ORIGINAL

Prevalence of Pneumonia in children under 2 years of age in the Public Hospital of Paraguay, during October 2023 to January 2024

Prevalencia de Neumonía en niños menores de 2 años en el Hospital Público de Paraguay, durante octubre del 2023 a enero del 2024

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ABSTRACT

Introduction: pneumonia is an acute condition that causes inflammation in the lungs, affecting the alveoli. It requires adequate attention, since factors such as viral or bacterial load, living conditions, diet and maternal care can increase children's predisposition to develop it. Pneumonia can cause severe lung damage and, in extreme cases, be fatal.

Objectives: determine the prevalence of pneumonia in children under 2 years of age at the Loma Pyta maternal and child hospital during the months of October 2023 to January 2024.

Method: observational descriptive cross-sectional, retrospective. Accessible population: breastfeeding patients who attend the Loma Pyta Maternal and Child Hospital, from October 2023 to January 2024.

Results: the prevalence was higher in females (61 %) and in children from 16 to 19 months of age (36 %). The majority of patients came from the urban area (60 %), related to the proximity at the healthcare center, the most frequent signs and symptoms were fever (100 %), cough (93,9 %), irritability (80,8 %) and dyspnea (78 %). The most prevalent pathogen was *Streptococcus pneumoniae* (80 %). The predominant treatment was antibiotics. Limitations included: a small sample, lack of analysis of risk factors such as breastfeeding, smoking, daycare attendance, low weight or nutritional status.

Conclusion: it was possible to determine the prevalence of pneumonia in children under 2 years of age from October 2023 to January 2024, identifying the sociodemographic and clinical data, describing the signs and symptoms of pneumonia and identifying the most frequent agent of pneumonia was *streptococcus pneumoniae*, more studies are required to draw conclusions on the epidemiology of pediatric pneumonia.

Keywords: Pneumonia; Respiratory Difficulties; Younger Children; Treatment.

RESUMEN

Introducción: la neumonía es una afección aguda que causa inflamación en los pulmones, afectando los alvéolos, requiere atención adecuada, ya que factores como la carga viral o bacteriana, las condiciones de vida, la alimentación y los cuidados maternos pueden aumentar la predisposición de los niños a desarrollarla. La neumonía puede provocar daño pulmonar grave y, en casos extremos, resultar fatal.

Objetivos: determinar la prevalencia de Neumonía en niños menores de 2 años en el hospital materno infantil de Loma Pyta de octubre del 2023 a enero del 2024.

Método: Observacional descriptivo transversal, retrospectivo. Población accesible: pacientes lactantes que acuden al Hospital Materno infantil de Loma Pyta, de octubre de 2023 a enero de 2024.

Resultados: la prevalencia fue mayor en el sexo femenino (61 %) y en niños de 16 a 19 meses de edad (36 %). La mayoría de los pacientes provenían de la zona urbana (60 %), relacionado a la cercanía del centro asistencial, los signos y síntomas más frecuentes fueron fiebre (100 %), tos (93,9 %), irritabilidad (80,8 %) y disnea (78 %). El patógeno más prevalente fue *Streptococcus pneumoniae* (80 %). El tratamiento predominante fueron los antibióticos. Las limitaciones incluyeron: una muestra pequeña, falta de análisis de factores de riesgo como lactancia materna, tabaquismo, asistencia a guardería, bajo peso o estado nutricional.

Conclusión: se logró determinar la prevalencia de neumonía en niños menores de 2 años de octubre del 2023 a enero del 2024, identificando los datos sociodemográficos y clínicos, describiendo los signos y síntomas de la neumonía y identificando el agente más frecuente de neumonía fue *estreptococos pneumoniae*, se requieren más estudios para obtener conclusiones sobre la epidemiología de la neumonía pediátrica.

Palabras clave: Neumonía; Dificultades Respiratorias; Niños Menores; Tratamiento.

INTRODUCTION

Acute respiratory infections cause pneumonia, with 5 million children worldwide contracting the disease. ⁽¹⁾ It is common in children under 2 years of age in the general population, related to the developing immune system, and causes deaths. ⁽¹⁾ In Latin America, pneumonia is related to 17 % of deaths, linked to malnutrition, anemia, and parasitic infections suffered by children under 2 years of age. ⁽²⁾ In Paraguay, 1 000 deaths from pneumonia are reported in children under 5 years of age.

With insufficient care for the 0-6 month age group due to a lack of information from families or parents, infants are vulnerable and suffer from recurrent infections. ⁽³⁾

Pneumonia is an acute disease of the respiratory system that affects the lungs, causing inflammation in the lung parenchyma. ⁽⁴⁾ The alveoli, which are essential for gas exchange in healthy individuals, are compromised in this condition, as they fill with fluid or pus, causing breathing difficulties in patients. ⁽⁵⁾ It can be related to microorganisms: bacteria and viruses, and non-infectious factors such as food aspiration or the presence of foreign bodies, allergic reactions to drugs, hypersensitivity, or radiation. ⁽⁶⁾ Pneumonia requires adequate care because it represents a critical condition of acute respiratory disease. This concern should be intensified especially when the disease affects children under 2 years of age. ⁽⁷⁾ In this context, it is crucial to recognize that factors such as viral or bacterial load, living conditions, nutrition, and maternal care play an important role in children's predisposition to developing pneumonia. ⁽⁸⁾ Consequently, the disease can severely affect the respiratory tract, causing lung damage that, in extreme cases, can be fatal. ⁽⁸⁾ It is generally caused by the bacterium *Streptococcus pneumoniae*, and its onset is not spontaneous; various conditioning factors alter the respiratory system and can lead to preventable infections, and lack of attention and care in these infections can be fatal. ⁽⁹⁾ Common risk factors include overcrowding, exposure to pollutants, and tobacco smoke. ⁽¹⁰⁾ Other related factors include living with sick family members, lack of financial resources, lack of breastfeeding, malnutrition, incomplete vaccination schedules, and lack of knowledge about prevention and treatment. ⁽¹¹⁾ Host-related factors such as low birth weight and allergies should also be considered.

of various types that occur in children under 2 years of age. ⁽¹²⁾ To prevent infections, breastfeeding should be promoted as a way of receiving maternal antibodies and boosting the immune system, thereby avoiding hospitalization. ⁽¹³⁾ Currently, despite advances in vaccination against *Streptococcus pneumoniae* and *Haemophilus influenzae*, it is a challenge for public health programs to ensure that all infants aged 0 to 2 years are protected. ⁽¹⁴⁾ Therefore, it is necessary to conduct more detailed research and develop more effective preventive strategies to protect infants, as well as to promote the importance of proper care to prevent respiratory diseases in young children.

METHOD

The study was observational, descriptive, cross-sectional, and retrospective, focusing on patients under 2 years of age with pneumonia who attended the Loma Pyta Maternal and Child Hospital between October 2023 and January 2024. Children under 2 years of age with pneumonia, whether bacterial or viral, whose medical records were complete and legible were included. Those with other respiratory diseases, chemical fibrosis, asthma, heart disease, immunocompromised conditions, incomplete records, or older than 2 years of age were excluded. The sample was selected for convenience, with a minimum size of 297 patients based on an average of 150 monthly consultations. The data were reviewed and analyzed using statistical methods in Excel and presented in tables or graphs. The study complied with the ethical principles of the Declaration of Helsinki, was approved by the Research Ethics Committee of María Auxiliadora University, and obtained authorization from

the hospital's Medical Director, guaranteeing patient anonymity.

RESULTS

With regard to sociodemographic variables: 180 patients correspond to the female population (61 %), and 117 patients to the male population (39 %).

The predominant ages were 16 to 19 months (36 %), followed by 10 to 15 months (30 %). The origin of the younger children was 177 patients from urban areas (60 %) and 120 patients from rural areas (40 %). In terms of nationality, 276 patients (92 %) were Paraguayan, followed by 8 % of other nationalities.

Sociodemographic Characteristics	Absolute frequency	Relative frequency (%)
Sex		
Female	180	61
Male	117	39
Total	297	100
Age categories (months)		
1 - 3 months	9	3,03
4 - 9 months	33	11,11
10 - 15 months	90	30,30
16 - 19 months	108	36,36
20-24 months	57	19,19
Total	297	100
Area of residence		
Rural area	120	40
Urban area	177	60
Total	297	100
Nationality		
Argentine	3	1,01
Brazilian	15	5,05
Colombian	3	1,01
Paraguayan	276	93
Total	297	100

Among the most prevalent symptoms, 297 patients had fever (100 %), 279 patients had cough (93,9 %), and 240 patients had irritability with 80,8 % fever:

Lethargy: 105 cases representing 34 %, 213 with dyspnea, 27 cases with cyanosis 9,1 %, 231 patients 78 % with wheezing, 63 patients 21 % with vomiting, and almost all children with nasal congestion.

Signs and Symptoms	Absolute frequency	Relative frequency (%)
Fever	297	99
Irritability	240	80,8
Cough	279	93,9
Lethargy	105	35,4
Dyspnea	213	71,7
Cyanosis	27	9,1
Wheezing	231	77,8
Vomiting	63	21,2
Nasal congestion	99	33,3

80 % of patients (237) had cases of pneumonia caused by *Streptococcus pneumoniae* (table 3).

Table 3. Most common pathogen causing pneumonia in children under 2 years of age in the maternity and children's hospital during the months of October 2023 to January 2024

Pathogen	Absolute frequency	Relative frequency (%)
<i>Streptococcus pneumoniae</i>	237	80
Respiratory syncytial virus (RSV)	60	20
Total	297	100

The most common treatment in the cases recorded in patients 237 (79,8 %) was based on antibiotics and antivirals in 60 patients (20 %) (table 4).

Table 4. Therapeutic strategies for children under 2 years of age in the maternity and children's hospital during the months of October 2023 to January 2024

Treatment	Absolute frequency	Relative frequency (%)
Antibiotic	237	79,80
Antiviral	60	20,20
Total	297	100

DISCUSSION

When evaluating sociodemographic data, including gender, age, area of residence, and nationality, certain results were found to be consistent, while others differed. The predominant gender in this study was female, with 180 patients (61 %); however, in a study conducted by Rafael Gualaquiza et al. in 2020, a higher prevalence of male patients with pneumonia was observed. On the other hand, the prevalent age in the study was 16 to 19 months (36 %); however, in a study conducted by Miguel et al. in 2006, it was found that patients affected by pneumonia were in the 6-11 month age range. It could be said that the lack of immune development predisposes this age group to the disease, due to the lungs not being fully mature, the deficiency of the immune system, and the lack of vaccination, which are factors related to its onset.^(13,14) Regarding the origin of the patients: 60 % of the 177 patients came from urban areas. Comparing data with a similar study in 2017, a prevalence of patients from urban areas was detected in most of the sample, related to the proximity of the community health center. The decentralization of health services to rural areas reduces the morbidity and mortality associated with pneumonia in children under 2 years of age.⁽¹⁵⁾

All patients were Paraguayan. In terms of diagnosis, there is little evidence to differentiate between viral and bacterial pneumonia, even with chest X-rays, and there is no universally accepted and standardized diagnosis.⁽¹⁶⁾

Regarding the clinical characteristics of pneumonia, the study indicated that 297 patients had fever (100 %) related to the presence of the causative microorganism, 279 patients had cough (93,9 %), 240 patients had irritability (80,8 %), lethargy: 105 (34 %), 213 patients with dyspnea (78 %), 27 cases with cyanosis (9,1 %), 231 patients with wheezing (78 %), 63 patients with vomiting (21 %), and almost all children with nasal congestion, with fever, cough, and irritability being the most prevalent.

However, the signs and symptoms of pneumonia in children are nonspecific, and the gold standard test continues to be chest X-ray.⁽¹⁷⁾

The most prevalent pathogen in the study was *Streptococcus pneumoniae*, affecting 237 patients (80 %). *S. pneumoniae* causes various serious diseases in children, apart from pneumonia, meningitis, bacteremia, and other invasive and non-invasive infections.⁽¹⁸⁾ Comparing other studies, the prevalence of cough, fever, and wheezing are typical symptoms of viral and bacterial pneumonia, and correct diagnosis requires medical evaluation.⁽¹⁹⁾

The most commonly used treatment was antibiotics. Antibiotic resistance is a growing problem, with a very high resistance rate worldwide, and controlling the correct use of antibiotics is essential.⁽²⁰⁾

The use of antibiotics and the prevalence of acute infection prior to pneumonia are factors related to the severity of the condition. Guidelines are currently being developed to guide physicians in the use of antibiotics.⁽²¹⁾

Streptococcus pneumoniae is a bacterium that causes fatal diseases in young children. Appropriate treatment and vaccination reduce the morbidity and mortality of pneumonia.^(22,23)

The limitations of the study were that it was limited to studying only a small group of the population, and potential risk factors such as lack of breastfeeding, smoking by family members, daycare attendance, low weight, or nutritional status were not analyzed.

CONCLUSION

The prevalence of pneumonia in children under 2 years of age at the Loma Pyta Maternal and Child Hospital was established for the period from October 2023 to January 2024. In this study, sociodemographic and clinical data on patients were identified, the signs and symptoms associated with pneumonia were described, and the most common pathogen responsible for the disease was determined.

The public health system benefited children in urban areas due to the proximity of healthcare services. In our study, the most common pathogen among the various antigens that cause pneumonia was *Streptococcus pneumoniae*. The predominant treatment consisted of antibiotics, which proved to be highly effective and achieved a notable improvement in treated patients. Pneumonia can be prevented through immunization, adequate nutrition, and control of environmental factors: such as promoting housing with sufficient space to avoid overcrowding, which increases susceptibility to respiratory infections, prohibiting tobacco use by parents or guardians, improving socioeconomic conditions, vaccinating children, and promoting breastfeeding, would help reduce cases of pneumonia in the population aged 0 to 2 years.

We are confident that our research will help develop prevention strategies. Disseminating the results of this research will allow for a better understanding of the population and offer greater opportunities for early diagnosis by the academic community.

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FINANCING

None.

CONFLICT OF INTEREST

None.

AUTHORSHIP CONTRIBUTION

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