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PREVALENCE OF HOSPITALIZATIONS AND INFANT MORTALITY FOR RENAL INSUFFICIENCY IN BRAZIL

PREVALÊNCIA DE INTERNAÇÕES E MORTALIDADE INFANTIL POR INSUFICIÊNCIA RENAL NO BRASIL

PREVALENCIA DE INTERNACIONES Y MORTALIDAD INFANTIL POR INSUFICIENCIA RENAL EN BRASIL

Fernanda Lise¹, Bianca Pozza dos Santos², Aline Neutzling³, Viviane Marten Milbrath⁴, Eda Schwartz⁵

ABSTRACT

Objective: to know the prevalence of hospitalizations and the correlation with infant mortality due to renal failure. **Method:** ecological, descriptive study, based on information from the DATASUS database, referring to hospital admissions and mortality rate due to renal failure, using the following variables: sex, age, hospitalization and death by renal failure, in the five regions of Brazil, from 2008 to 2014. Pearson's correlation coefficient was used for intentional non-probabilistic sampling. **Results:** 11,802 hospitalizations for renal failure were recorded in Brazil, with an average of 8.4 to 13.8 days. The male gender and the age range of five to nine years were predominant. The Northeastern region had a higher number of hospitalizations and mortality and North, to lower. **Conclusion:** the disparity in information may be related to the socioeconomic and health care characteristics of each region. **Descriptors:** Child; Renal insufficiency; Prevalence; Mortality; Hospitalization.

RESUMO

Objetivo: conhecer a prevalência de internações e a correlação com a mortalidade infantil por insuficiência renal. **Método:** estudo ecológico, descritivo, realizado a partir de informações oriundas do banco de dados do Sistema de Informação em Saúde - DATASUS, referentes às internações e à taxa de mortalidade por insuficiência renal, utilizando as variáveis: sexo, idade, internação e óbitos por insuficiência renal, nas cinco regiões do Brasil, no período de 2008 a 2014. Empregou-se amostragem não probabilística intencional e o coeficiente de correlação de Pearson. **Resultados:** foram registradas 11.802 internações por insuficiência renal no Brasil, com média de 8,4 a 13,8 dias. Predominou o sexo masculino e a faixa etária de cinco a nove anos. A região Nordeste apresentou maior número de internações e de mortalidade e a Norte a menor. **Conclusão:** a disparidade nas informações pode estar relacionada às características socioeconômicas e de atenção à saúde de cada região. **Descritores:** Criança; Insuficiência Renal; Prevalência; Mortalidade; Hospitalização.

RESUMEN

Objetivo: conocer la prevalencia de internaciones y la correlación con la mortalidad infantil por insuficiencia renal. **Método:** estudio ecológico, descriptivo, realizado a partir de informaciones oriundas del banco de datos del Sistema de Información en Salud - DATASUS, referentes a las internaciones y a la tasa de mortalidad por insuficiencia renal, utilizando las variables: sexo, edad, internación y muertes por Insuficiencia renal en las cinco regiones de Brasil, en el período de 2008 a 2014. Se empleó un muestreo no probabilístico intencional y el coeficiente de correlación de Pearson. **Resultados:** se registraron 11.802 internaciones por insuficiencia renal en Brasil, con una media de 8.4 a 13.8 días. Predominó el sexo masculino y el grupo de edad de cinco a nueve años. La región Nordeste presentó mayor número de internaciones y de mortalidad y al Norte la menor. **Conclusión:** la disparidad en las informaciones puede estar relacionada con las características socioeconómicas y de atención a la salud de cada región. **Descriptores:** Niño; Insuficiencia Renal; Prevalencia; Mortalidad; Hospitalización.

¹Nurse, Specialist in Pediatric Nursing, PhD student, Post-Graduate Program in Nursing, Federal University of Pelotas / UFPel. Pelotas (RS), Brazil. E-mail: fernandalise@gmail.com; ²Nurse, Master of Science, PhD student, Post-Graduate Program in Nursing, Federal University of Pelotas / UFPel. Pelotas (RS), Brazil. E-mail: bi.santos@bol.com.br; ³Biologist, Master, Doctor. Pelotas (RS), Brazil. E-mail: neutzling@live.de; ⁴Nurse, PhD in Nursing. Professor at the Faculty of Nursing and the Post-Graduate Program in Nursing at UFPel. Pelotas (RS), Brazil. E-mail: vivianemarten@hotmail.com; ⁵Nurse, Professor of Nursing, School of Nursing, Post-graduate Program in Nursing, Federal University of Pelotas / UFPel. CNPQ scholarship holder. Pelotas (RS), Brazil. E-mail: eschwartz@terra.com.br; edaschwa@gmail.com

INTRODUCTION

Renal failure is characterized by loss of renal function, which may be an acute crisis or progress to chronicity. The etiology is related to abnormalities in renal structure or function and in a period of more than three months, when it is called Chronic Renal Failure (CRF).²

CRF is a major public health problem worldwide, little known about childhood epidemiology.³ The incidence of Acute Renal Failure (ARF) in the general population affects about 2000-3000 people per million per million Year.⁴ The prevalence of CRF in childhood is rare and has been reported as being between 15-74.⁷ per million children, impacting about 10% of the world population, of all age groups.⁵

In general, it can be stated that the prevalence of renal failure is growing worldwide.⁶ Brazilian censuses show data similar to international data, and, regardless of location, data for pediatrics are scarce.⁷ This information justifies the nephropathies being Among the research priorities of the Brazilian Ministry of Health, especially when related to the initial stages of CRF.⁹ and the World Health Organization (WHO) includes CRF in the list of non-communicable diseases.¹⁰

CRF in childhood is investigated in the personal and family history, in prenatal ultrasound information, in the history of Urinary Tract Infection (UTI) or in cases of malformations of the urinary tract (MFUT). Children with CRF may have few symptoms for long periods, so it is recommended to perform urine tests routinely at least once during each stage of childhood.

In childish reality, the repercussions of the diagnosis of CRF are more serious than for the adult, since they require differentiated attention. The transformations are particularly troublesome due to the limitations imposed by the disease with implications for the physical, mental and emotional development of the child, which has its daily life modified by restrictions caused by pathology, treatment and clinical control, having to experience the Adherence to the therapeutic triad (dialysis, diet and drug use) for the maintenance of life, being a different experience from the other children.¹¹ Moreover, they begin to experience frequent hospitalizations, separating themselves from living with their family and social group.

When analyzing articles that address the topic on the prevalence of hospitalizations and infant mortality due to renal insufficiency, there was, a lack of related quantitatives, in the literature. This fact was justified in an integrative review that observed a trend of these on renal insufficiency in children of a qualitative nature (64.2%).¹² Thus, this article aimed at:

- To know the prevalence of hospitalizations and the correlation with infant mortality due to renal failure.

METHOD

This study was carried out from the database of the Health Information System - DATASUS, in which the data on hospitalization and mortality of children from zero to nine years of age were consulted for renal failure in the five regions of Brazil, 2008 to December 2014. Data collection was carried out in March and April 2015.

This is an ecological and descriptive study. As for the sampling plan, an intentional non-probabilistic sample was used. The variables evaluated were: number of hospitalization records; Sex and age group; Days of hospitalization; Mean of days of hospitalization; Percentage of hospitalization; and, number of deaths.

For the number of hospitalization records, the comparison between the periods was performed by 95% confidence intervals. These intervals were plotted on the graph and the differences, considered significant, when there was no overlap between the vertical bars. For the other variables, a descriptive analysis was performed, expressing the data in absolute and / or percentage values over the periods, of the age groups identified (less than one, from one to four, and, four to nine years) and regions North, Northeast, Southeast, South and Midwest).

In order to establish the relationship between number of deaths, mean number of days of hospitalization and number of days of hospitalization, the Main Components Analysis (MCA) was extracted from a correlation matrix separately by region, period and Age group. Thus, the information contained in the original variables was projected in a smaller number of underlying variables called Main Components (MCs). The criterion for the disposal of variables (MCs) used was recommended by Jolliffe.¹³ This criterion establishes that a number of main components should be retained, with at least 70 to 90% of the total variation.

After selecting the number of MPs, their respective eigenvalues were obtained, with their corresponding eigenvectors. The adopted graphic procedure was the biplot, from the scores and loads of the selected main components. The presence of correlations between the study variables was analyzed using Pearson's correlation coefficient ($p \leq 0.05$). All analyzes were performed in software R.¹⁴

RESULTS

There were, 11,802 hospitalizations of children aged zero to nine years due to renal failure in the five regions of Brazil, highlighting the year 2008, with 800

hospitalizations, and a reduction to 551, in 2011. The prevalence of hospitalizations due to renal insufficiency in childhood in Brazil showed that there was no significant difference between the years 2009 and 2010 and, similarly, between 2013 and 2014. No statistical differences were obtained between the years 2009 and 2010.

Of the total number of hospitalizations, 7,152 were males and 4,650, females. There was a predominance of children in the age group of five to nine years, corresponding to 4,880 hospitalizations (Table 1).

Table 1. Characterization of the profile of children from zero to nine years old hospitalized for renal failure, from 2008 to 2014, in the five regions of Brazil.

Variables	Period							
	2008	2009	2010	2011	2012	2013	2014	Total
Sex								
Male	989	1.055	1.046	975	1.004	1.049	874	7.152
Female	625	675	725	628	617	682	616	4.650
Total								11.802
Age group								
> one year	419	326	373	371	352	412	335	2.652
1 to 4 years	611	681	629	561	540	578	555	4.270
5 to 9 years	584	723	769	671	729	741	600	4.880
Total								11.802

It was also verified 125,255 days of hospitalization due to renal failure of children from zero to nine years, with a predominance of five to nine years, followed by children from one to four years. The mean number of

days of hospitalization ranged from 8.4 to 13.8 days (Figure 1). In the historical series evaluated, children with renal failure and less than one year of age remained longer hospitalized.

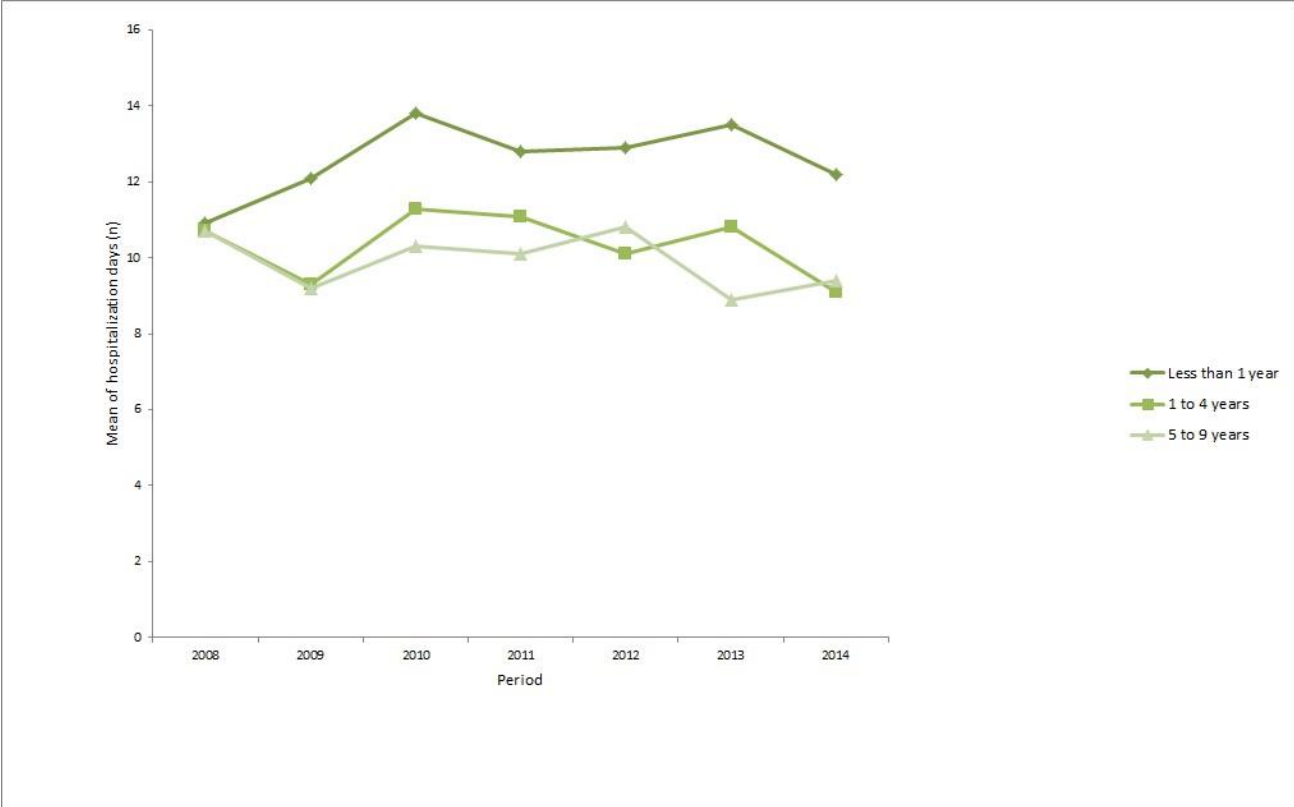


Figure 1. Average days of hospitalization per age group due to renal failure in children from zero to nine years, from 2008 to 2014, in the five regions of Brazil.

The Northeast Region had the highest number of hospitalizations, 1,667, during the study period, followed by the Southeast, with

1,039. The northern region had the lowest number of hospitalizations, 415 (Figure 2).

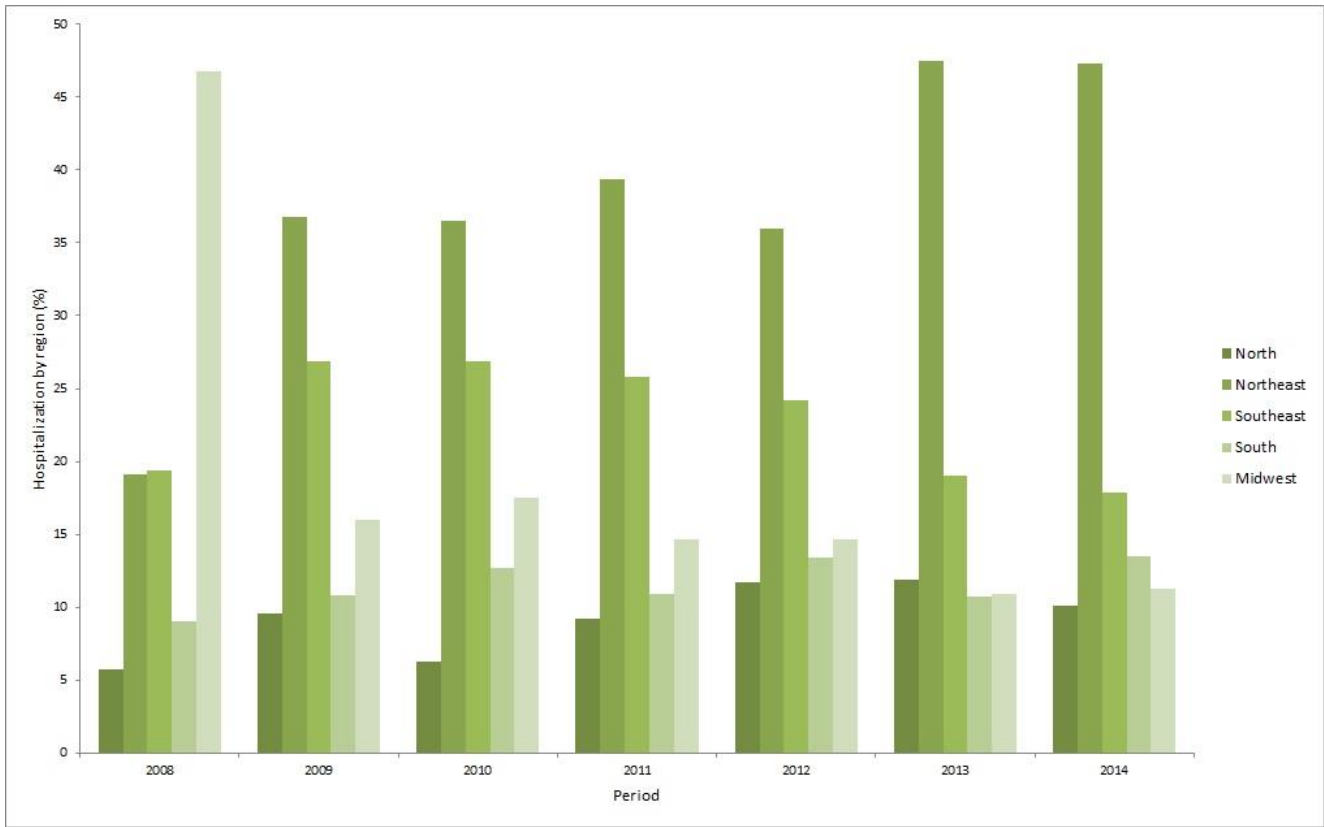


Figure 2. Percentage of admissions for renal failure in children from zero to nine years, from 2008 to 2014, in the five regions of Brazil.

The North region had the highest infant mortality rate due to renal failure, being 8.63%, in 2014. An increase of 300% when compared to the lower rate, also registered in the North region, of 2.07% in 2009. The Northeast and Central-West regions presented similar situation, as well as, the Southeast and South regions. Very similar and close to this group was the North region. In this context, the North region may present low infant mortality due to the low epidemiological notification, making it resemble the low mortality rates in the South and Southeast. During the study period, 602 children, died from total hospitalization records, due to renal failure, in the studied age group.

The new set of two orthogonal variables (MPs), generated by the MCA, was composed of the first and the second main component.

The first major component (MP1) had the highest eigenvalue of 2.38, and represented 79.31% of the variability in the data set. The second MP had an eigenvalue of 0.54, and was responsible for 18.02% of the variance in the data. The first two main components explained a large proportion of the total variation, that is, 97.33%, which allowed the plotting of scores and component loads for the periods and age range studied. Analyzing the eigenvectors corresponding to MP1, 0.63 was obtained for the number of deaths, 0.56 for mean hospitalization days and - 0.53 for the number of hospitalization days. In MC2, the main eigenvector was 0.77 for the number of days hospitalized (Figure 3).

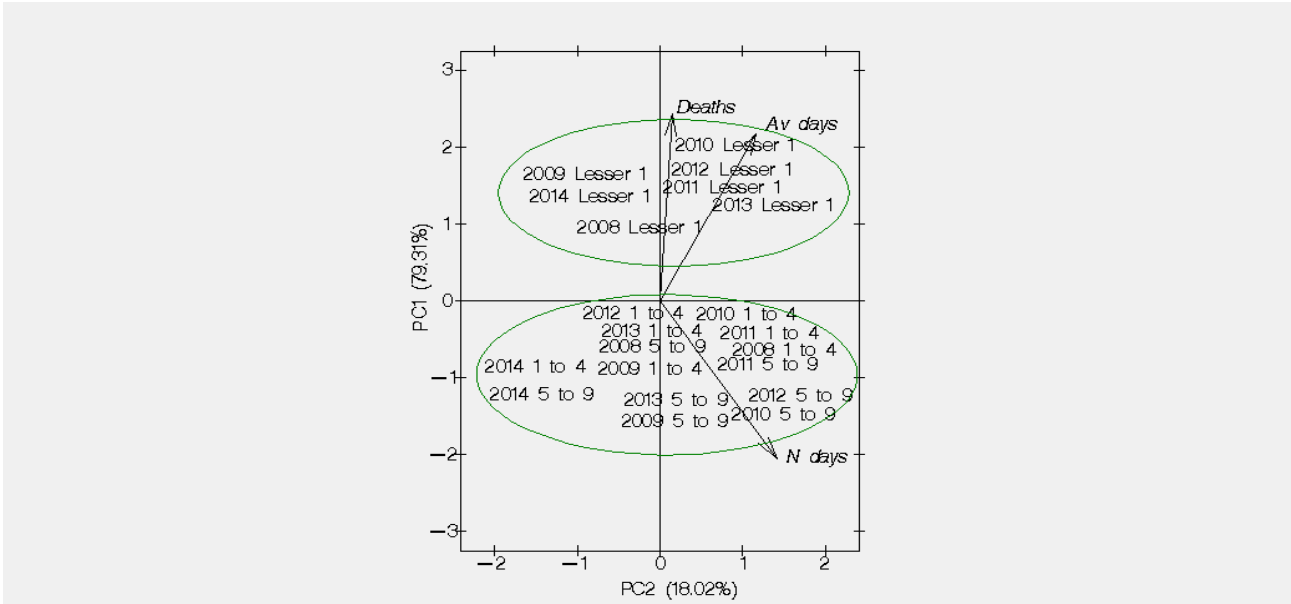


Figure 3. Plot of scores and loads of CP1-CP2 referring to the number of deaths (deaths), average days of hospitalization (Md days) and number of days of hospitalization (N days), considering the period from 2008 to 2014, in (1 to 4) and 5 to 9 (5 to 9) years of age.

Children in the age group less than one year old, in all years, characterized a group (separated by circle), differing from other age groups. These children, in this age group, had the highest number of deaths and the highest mean number of hospitalized days, with a positive correlation between them ($r = 0.90$), which confirms that the higher the average number of hospitalization days, the higher The number of deaths. Another correlation, also positive, occurred between number of hospitalized days and deaths ($r = 0.79$). In this age group, there was a direct association, the increase in the number of hospitalized days resulted in increases in the number of deaths.

The second group (separated by circle) was composed of children between one and four years of age, and five to nine years for all periods studied (Figure 3). In this group, the two age groups characterized higher values for number of days hospitalized in all periods, when compared to the age group less than one year old. For these age groups, during the periods evaluated, there were no significant correlations between the variables.

DISCUSSION

This study was motivated by the lack of information related to the prevalence of hospitalizations and mortality due to renal insufficiency in childhood in Brazil and, mainly, by the complexity with which children with renal insufficiency must be cared for, to reduce the overload in the other stages of life. In Brazil, during the study period, 11,802 admissions of children from zero to nine years old were observed in the five regions, with the Northeast region, being 47%, in the years 2013 and 2014. The North presented the lowest percentage of admissions, with 6% In

2008, which may be related to the low coverage of the notifications made by the health services.

The information related to the average number of days of hospitalization shows a variation between 8.4 and 13.8 days. Similar data were found in São Paulo / Brazil, where the majority remained 10 ± 6.2 days.¹⁵

It was identified that children in the age group corresponding to children under one year of age remained hospitalized, on average, of 10.9 to 13.8 days. A study carried out in São Paulo, Brazil, found that the average number of hospitalization days ranged from 9.3 to 12.8 years in the age group from zero to nine years.¹⁶ Another study, carried out in the African continent, Burkina Faso, found that the mean Age was 6.7 ± 3.4 years of age, and the mean number of days of hospitalization was 10.2 ± 10.1 days.⁶

With this information, it is highlighted that many patients with renal insufficiency are referred late to the specialist, when renal function is already quite compromised, often requiring dialysis or even emergency hospitalization, which demonstrates the fragility in the care actions of basic care, as well as a late referral of the patient to the nephrologist. Such an initial failure, to follow up the renal patient leads to the need for hospital admissions, since the renal problem is often discovered and diagnosed during urgent hospitalization.¹⁷

Corroborating with the literature, in this study, the male sex represented about 60% in hospitalizations. Such occurrence may be related to the high number of congenital malformations of the urinary tract, in the first six months of life.¹⁸ After the first year of life, UTI is predominant in females, since the

female urethra is short and provides a pathway for invasion of microorganisms, which may favor the occurrence of urinary infections,¹⁹⁻²⁰ and closure of the urethra, at the end of urination, can cause bacteria to return to the bladder.¹⁸

The main causes of childhood kidney failure are related to congenital and hereditary disorders and glomerulopathies.²¹ Glomerulonephritis is more frequent in children and adolescents in the age group of three to twelve years and males are more affected than females.¹⁸

However, children with congenital and hereditary malformations experience a slower progression to renal failure than those with glomerulonephritis, progressing to CRF in adulthood more frequently. In addition, the complications of many non-renal diseases that may affect the kidneys secondarily not only cause significant morbidity and mortality in childhood, but also result in health problems that go beyond childhood.^{3,21}

612 deaths were reported due to renal failure. Kidney disease death is highest in developing countries, and regional and national disparities in patient care and outcomes should be addressed.²¹

A study showed that in the neonatal period, deaths accounted for 87% of ICU hospitalizations,²² which may be related to the restricted number of nephrons in preterm infants, predisposing these patients to the development of renal failure, since the glomerular filtration rate Total is reduced.²³ Thus, the deaths of hospitalized children with renal insufficiency have, mainly, occurred due to cardiovascular causes and infections, and not to renal failure.³

The highest mortality rate (8.63) was recorded in the North region in 2014, as well as the lowest (2.07), in 2009. The high rates may be associated with low socioeconomic conditions. It should be emphasized that health information systems, such as DATASUS, may lack information on the absolute number of events, since those of private hospitals that are not contracted to the Unified Health System (UHS) are not notified.²⁴

The literature shows that renal failure in adulthood begins in childhood²¹, and recommends for the prevention of childhood diseases as a way to reduce infant mortality, including the prevention of childhood diseases,²⁵ which can be performed by monitoring the function Renal infarction in all pediatric ICU hospitalizations, since 10% of children with ARF can become chronic renal patients.²⁶

In this sense, the nurse who lives the family of the child with CRF, is called to make a commitment to notify hospitalizations and deaths caused by the disease, as well as to guide those involved in the maintenance of care, considering the vulnerability of the nephropatic child, Which includes impacts on growth and development. Thus, it is important to empower all stakeholders to improve the health, well-being and quality of life of children with kidney disease to ensure their longevity in adult life.²¹

CONCLUSION

The results allowed to know the prevalence of hospitalizations and the positive correlation with the mortality of children, under one year, due to renal failure.

Renal insufficiency is a serious problem in childhood and needs to be recognized and faced by the multidisciplinary team, because there is a lack of epidemiological information that represents the panorama of the disease in Brazil. Thus, there is a need for specific guidelines for its management and for clinical recognition by professionals and the implementation of appropriate care for each age group, since the clinical guidelines established by the Brazilian Ministry of Health do not address the health of this population.

It is understood that the disparity in information may be related to the socioeconomic and health care characteristics of each region of Brazil. It should be noted that the lack of death records is an aggravating factor that can distort estimates, limiting the analysis of infant mortality, since there is a need to improve attention to notifications in all regions, especially in the North, where Hospitalizations were lower and mortality was higher.

The limitations of this study are related to the fragility in the reliability of the data collected in a continuous recording system, which are conditioned to corrections due to the subnumeration of deaths. It is hoped that the information presented may contribute to a greater visibility of the prevalence of hospitalizations and of infant mortality due to renal failure in the five regions of Brazil, recorded by the Health Information System - DATASUS, so that, there may be other studies that Investigate the epidemiological health situation, stimulating the creation of protocols for the treatment and prevention of diseases.

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Corresponding Address

Fernanda Lise
Universidade Federal de Pelotas - Faculdade de Enfermagem -
Programa de Pós-Graduação em Enfermagem
Rua Gomes Carneiro, 01
Centro
CEP: 96010-610 – Pelotas (RS), Brazil