

Epidemiological profile of diarrhea in children 1 to 4 years old in the state of Alagoas

Perfil epidemiológico da diarreia em crianças de 1 a 4 anos no estado de Alagoas

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Abstract

Introduction: Diarrhea is characterized by recurrent loose or liquid bowel movements. It is the second main cause of death in children under 5 years old, being also responsible for one third of their hospitalizations. Of the nine states in the Northeast Region, Alagoas has the second fewest municipalities with any type of sanitation planning – which has a negative impact on the population's health. **Objective:** To outline the epidemiological profile of diarrhea in children 1 to 4 years old in Alagoas between January 2014 and December 2018. **Methods:** This is a retrospective, descriptive study with a quantitative approach, conducted from October 2019 to January 2020 with data from the Hospital Information System of SUS (SIH/SUS), available at the DATASUS website. **Results:** Between January 2014 and December 2018, the number of hospitalizations due to presumable infectious diarrhea and gastroenteritis in Alagoas was relatively equivalent between the sexes, with a predominance of multiracial children. Arapiraca was the municipality with the most reports. Altogether, there were four cases of death. **Conclusion:** The results point to the need for a more in-depth study of the variables related to hospitalizations due to diarrhea and gastroenteritis, and thus develop health interventions to prevent this disease.

Keywords: diarrhea; diarrheal disease; child; epidemiology.

Resumo

Introdução: A diarreia se caracteriza por evacuações recorrentes, podendo ser soltas ou líquidas, e é a segunda causa de morte em menores de cinco anos, além de ser responsável por um terço das internações. Dentre os nove estados da região Nordeste, Alagoas, é o segundo estado com o menor número de municípios que possuem algum tipo de plano de saneamento, o que impacta negativamente na saúde da população. **Objetivo:** Traçar o perfil epidemiológico

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da diarreia entre crianças de 1 a 4 anos no estado de Alagoas no período de janeiro de 2014 a dezembro de 2018. **Métodos:** trata-se de estudo retrospectivo, descritivo, de abordagem quantitativa, realizado no período de outubro de 2019 a janeiro de 2020 por meio do Sistema de Informações Hospitalares do SUS (SIH/SUS), disponível no site do DATASUS. **Resultados:** no período de janeiro de 2014 a dezembro de 2018, o número de internações hospitalares por diarreia e gastroenterites de origem infecciosa presumível no Estado de Alagoas, foi relativamente equivalente entre os sexos, com predominância de crianças pardas, Arapiraca Foi o município com maiores notificações e, no geral houve quatro óbitos. **Conclusão:** Dessa forma, os resultados sinalizam para a necessidade de maior aprofundamento no estudo das variáveis que se relacionam as internações hospitalares por diarreia e gastroenterites, para a formulação de intervenções em saúde voltadas à prevenção desse agravo.

Palavras-chave: diarreia; diarreia infantil; criança; epidemiologia.

Introduction

Gastroenteritis is a term associated with pathologies of the gastrointestinal tract. It can be caused by parasite, bacterial, or viral infection, and its main manifestation is diarrhea. Diarrhea is characterized by recurrent, loose or liquid bowel movements¹.

From a global perspective, according to the World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF), 2 billion cases of diarrheic diseases occur worldwide, causing 1.9 million deaths of children under 5 years old in developing countries. Acute diarrhea is the second main cause of death in this age group and is responsible for one third of the hospitalizations. This condition impairs the child's health and development, as it triggers malnutrition and dehydration^{2,3}.

Childhood diarrhea is associated with biological, social, environmental, sanitary, economic, and cultural factors⁴. In this context, basic sanitation is notoriously precarious in Brazil, particularly in the Northeast Region. This commonly found situation is associated with a lack of access to information and instruction. Hence, there are consequences to the health of the low-income population, making them more susceptible to the disease⁵.

Furthermore, data from the *Instituto Brasileiro de Geografia e Estatística* (Brazilian Institute of Geography and Statistics – IBGE) show that, out of the nine

states in the Northeast Region, Alagoas, made up of 102 municipalities, has the second fewest cities with any type of sanitation planning⁶. Thus, there is a negative impact on the quality of life of the Alagoana population because, as pointed out by WHO, basic sanitation is one of the main forms to prevent diseases, including infectious diarrhea⁵.

Given the consequences of diarrhea and the factors that contribute to its onset, it is important to investigate variables that influence its incidence and thus develop childhood health promotion and prevention strategies – especially regarding prevalent diseases, such as diarrhea. Therefore, this study aimed to outline the epidemiological profile of diarrhea in children aged 1 to 4 years in Alagoas between January 2014 and December 2018.

Materials and Methods

Sample and type of study

This is a retrospective, descriptive study with a quantitative approach on 4,379 reported cases of diarrhea in children 1 to 4 years old in Alagoas between January 2014 and December 2018.

Research design

The data were collected between October 2019 and January 2020 from the Hospital Information System of the Brazilian public health care system (SIH/SUS), available on the website of its

information technology department⁷ (DATASUS).

Inclusion and Exclusion Criteria

The study evaluated the number of hospitalizations due to presumable infectious diarrhea and gastroenteritis in children 1 to 4 years old in Alagoas over the previous 5 years, from January 2014 to December 2018. The variables investigated were age group (1-4 years), sex (males and females), color/race (white, black, multiracial, and East Asian), year of the report (2014-2018), number of deaths, and mortality rate – which is calculated based on the proportion of the number of deaths in the period in relation to the population in the middle of the period, multiplied by a constant⁸. This age was chosen for investigation because it is not only a fixed variable in DATASUS but also the public most affected by this pathology. Although the state comprises 102 municipalities, this study approached information of 33 of them, as they were the only ones available in DATASUS, namely: Água Branca, Anadia, Arapiraca, Atalaia, Batalha, Boca da Mata, Cajueiro, Campo Alegre, Capela, Coruripe, Girau do Ponciano, Igaci, Limoeiro de Anadia, Joaquim Gomes, Junqueiro, Maceió, Matriz de Camaragibe, Murici, Olho d'Água das Flores, Palmeira dos Índios, Pão de Açúcar, Penedo, Pilar, Piranhas, Porto Calvo, Quebrangulo, Rio Largo, Santana do Ipanema, São José da Laje, São Luis do Quitunde, São Miguel dos Campos, Teotônio Vilela, União dos Palmares.

Procedures

Data was obtained crossing the following variables: the number of hospitalizations due to presumable infectious diarrhea and gastroenteritis, age group 1 to 4 years, municipalities in Alagoas, sex, and color/race of the children affected. The data were entered into Microsoft Excel for analysis. Since the study used public domain secondary data, it did not have to be submitted to the Research Ethics Committee (REC). The study complies with the Human Research Regulatory Norms and Guidelines – National Health Council Resolution 466/12.

Results

It was observed that from 2014 to 2018 in Alagoas, the number of hospitalizations due to presumable infectious diarrhea and gastroenteritis in children 1 to 4 years was relatively equivalent between the sexes, totaling n=2,206 hospitalizations (50.4%) of females and n=2,173 hospitalizations (49.6%) of males. Also, there was a predominance of multiracial children hospitalized, totaling n=3,429 (78.3%), highlighting that n=765 (17.5%) of the reported cases did not provide this information, as shown in Table 1. Of the 4,379 reports between 2014 and 2018, there were four deaths, none of which was registered in either 2015 or 2017; hence, the mortality rate was 0.94.

Table 1 – Number of hospitalizations due to presumable infectious diarrhea and gastroenteritis in Alagoas in children 1 to 4 years old, according to sociodemographic data. Alagoas, Brazil, 2014-2018. (n=4,379)

Variables	Year of Report											
	2014		2015		2016		2017		2018		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Sex												
Males	554	50.2	368	49.1	432	50.6	449	47.3	370	51.2	2173	49.6
Females	550	49.8	381	50.9	422	49.4	501	52.7	352	48.8	2206	50.4
Total	1104	100	749	100	854	100	950	100	722	100	4379	100

Color/Race												
White	36	3.3	21	2.80	31	3.6	35	3.7	24	3.3	147	3.3
Black	2	0.2	2	0.3	2	0.2	14	1.5	1	0.2	21	0.5
Multiracial	781	70.7	503	67.1	655	76.7	838	88.2	652	90.3	3429	78.3
East Asian	5	0.4	5	0.7	4	0.5	3	0.3	-	-	17	0.4
Not informed	280	25.4	218	29.1	162	19	60	6.3	45	6.2	765	17.5
Total	1104	100	749	100	854	100	950	100	722	100	4379	100

Source: Developed by the authors based on DATASUS, 2020.

It was also verified that, of the 33 municipalities in Alagoas that reported the disease between January 2014 and December 2018, Arapiraca stood out, with

n=2,275 hospitalizations (52.0%). On the other hand, 10 other municipalities had 10 or fewer registered hospitalizations (Table 2).

Table 2 – Number of hospitalizations due to presumable infectious diarrhea and gastroenteritis in Alagoas in children 1 to 4 years old, according to the municipalities. Alagoas, Brazil, 2014-2018. (n=4,379)

Variables	Year of Report											
	2014		2015		2016		2017		2018		Total	
Municipalities	n	%	n	%	n	%	n	%	n	%	n	%
Água Branca	-	-	-	-	-	-	3	0.3	2	0.3	5	0.1
Anadia	1	0.1	-	-	-	-	-	-	-	-	1	0.0
Arapiraca	521	47.2	310	41.4	459	53.8	579	61	406	56.2	2275	52
Atalaia	40	3.6	17	2.3	7	0.8	3	0.3	-	-	67	1.5
Batalha	69	6.2	33	4.4	15	1.8	3	0.3	2	0.3	122	2.8
Boca da Mata	10	1.0	10	1.3	1	0.1	-	-	1	0.1	22	0.5
Cajueiro	4	0.4	2	0.3	1	0.1	-	-	-	-	7	0.2
Campo Alegre	1	0.1	7	0.9	8	0.9	5	0.5	2	0.3	23	0.5
Capela	6	0.5	9	1.2	3	0.4	2	0.2	5	0.7	25	0.6
Coruripe	1	0.1	2	0.3	6	0.7	2	0.2	6	0.9	17	0.4
Girau do Ponciano	3	0.3	-	-	-	-	-	-	-	-	3	0.1
Igaci	7	0.6	-	-	-	-	-	-	-	-	7	0.2
Limoeiro de Anadia	4	0.4	1	0.1	-	-	-	-	-	-	5	0.1
Joaquim Gomes	6	0.5	-	-	2	0.2	3	0.3	1	0.1	12	0.3
Junqueiro	1	0.1	-	-	-	-	-	-	-	-	1	0.0
Maceió	-	-	3	0.4	8	0.9	16	1.7	17	2.4	44	1.0
Matriz de Camaragibe	1	0.1	3	0.4	1	0.1	3	0.3	2	0.3	10	0.2
Murici	18	1.6	14	1.9	10	1.2	-	-	-	-	42	1.0
Olho d'Água das Flores	1	0.1	3	0.4	5	0.6	-	-	-	-	9	0.2
Palmeira dos Índios	62	5.6	35	4.7	72	8.4	65	6.9	65	9.0	299	6.8
Pão de Açúcar	25	2.2	19	2.5	17	2.0	9	1.0	7	1.0	77	1.8
Penedo	1	0.1	-	-	-	-	-	-	11	1.5	12	0.3
Pilar	24	2.2	26	3.5	-	-	57	6.0	48	6.6	155	3.5
Piranhas	41	3.7	58	7.7	47	5.5	48	5.0	68	9.4	262	6.0
Porto Calvo	-	-	-	-	-	-	19	2.0	7	1.0	26	0.6
Quebrangulo	12	1.1	7	0.9	13	1.5	25	2.6	9	1.3	66	1.5
Rio Largo	2	0.2	3	0.4	1	0.1	2	0.2	2	0.3	10	0.2
Santana do Ipanema	29	2.6	18	2.4	10	1.2	24	2.5	11	1.5	92	2.1

São José da Laje	-	-	2	0.3	5	0.6	5	0.5	2	0.3	14	0.3
São Luis do Quitunde	23	2.1	4	0.5	-	-	-	-	1	0.1	28	0.6
São Miguel dos Campos	151	13.7	112	15	105	12.3	31	3.3	22	3.0	421	9.6
Teotônio Vilela	13	1.2	17	2.3	17	2.0	31	3.3	22	3.0	100	2.3
União dos Palmares	27	2.4	34	4.5	41	4.8	15	1.6	3	0.4	120	2.7
Total	1104	100	749	100	854	100	950	100	722	100	4379	100

Source: Developed by the authors based on DATASUS, 2020.

Discussion

This study identified that the number of hospitalizations due to infectious diarrheas in children under 5 years old still reaches relevant proportions, corroborating other studies conducted in different parts of Brazil^{5,9,10}. The higher incidence in this age group (from 1 to 4 years old) is related to the immaturity of their immune system and the social health determinants to which the child belongs, as they have a direct impact on the onset of the disease¹¹.

Moreover, this research revealed that the number of hospitalizations due to presumable diarrhea and gastroenteritis in children 1 to 4 years old in Alagoas was relatively equivalent between the sexes. A study conducted by Rocha in Bahia¹², in the Northeast Region of Brazil, assessed the epidemiological and etiologic profile of 499 children with acute diarrhea in pediatric emergency units. It demonstrated a result of 52.5% of females and 47.5% of males. In contrast, research conducted in São Paulo, which aimed to find the epidemiological characteristics of this pathology in the municipality of Avaré, came to a percentage of 54.0% of males and 46.0% of females among the 408 investigated ones¹³. It is interesting to point out that, despite the difference between the studies carried out in separate regions, the difference between the sexes does not predominate in them. This may indicate that this variable does not make them more susceptible or not to diarrhea.

In the ethnic-racial classification, a predominance of multiracial children was noted among those hospitalized, while 17.5% of them did not have the information on the record. However, when compared with the literature available, there is a lack of studies approaching the relationship between this variable and hospitalization due to diarrhea. Hence, further studies approaching this issue are needed, especially regarding the Brazilian population and its heterogeneity in terms of color/race and social vulnerability.

Concerning the municipalities, 2,275 out of the 4,379 hospitalizations due to diarrhea and gastroenteritis occurred in Arapiraca, making it the municipality with the most reports in the state. The municipality grew quickly in the last years, and the urban development and local water resources were not planned, resulting in health-related complications. The population of the municipality is currently estimated at 231,747 inhabitants¹⁴. The results indicate a need for sustainable development, interconnecting the environment, society, and economy. Poor planning of the water supply and the distribution of poor-quality water are potential disease transmitters, particularly diarrhea¹⁵. In 2013, there was an outbreak of diarrhea in Alagoas and, of the 25 municipalities reported, Arapiraca had the second highest number of deaths due to diarrhea¹⁶.

Alagoas is divided into regions for health care, based on a model whose criteria are the population density and the

specialized and hospital attention technology. Thus organized, Arapiraca is the seat of the second health macro region in the state, encompassing four health regions and serving as a reference to 46 municipalities¹⁷. Therefore, the combined factors related to a large population, an ineffective urban development, and its position as a reference in health services in the state may explain why this is the municipality most affected by diarrhea in the previous 5 years when compared with the other 33 municipalities reported.

Only 33 of the 102 municipalities in Alagoas reported the indices of hospitalization due to diarrhea in children 1 to 4 years old. Ten of them had 10 reported cases or less. Of the 4,379 reports registered between 2014 and 2018, four resulted in death – although no deaths were registered in either 2015 or 2017. A similar situation in the relationship between reported cases and deaths is seen in the study by Meneguessi et al. (2015)¹⁸ conducted in the Federal District. They verified a low number of deaths due to diarrhea with a presumable cause in children 1 to 4 years old. Such a result is explained by the increased access to health services, improved quality of pediatric attention, encouraged use of oral rehydration, and so forth. However, the actual representativity of these data is questioned, considering the social and economic context of the state, characterized by the population's social vulnerability.

In this context, when this system fails – i.e., when the cases are underreported –, information is consequently not generated. However, such information is extremely necessary to direct disease prevention, administer the services, and implement, follow up, and assess health actions¹⁹. Health professionals, including nurses, also need to be trained so they can observe all the variables related to this pathology. Thus, they will be prepared for the various practices in comprehensive care, associated with intersubjective and

dialogical techniques. The biomedical model needs to be overcome, giving room to the analysis of all the factors related to the health-disease process²⁰.

This study had some limitations, especially related to the shortage of scientific articles approaching the relationship of sex, age, and ethnic-racial classification with the hospitalizations due to presumable infectious diarrhea and gastroenteritis. Also, part of the records had incomplete information, lacking some variables analyzed, possibly due to underreporting. Thus, further study on the theme is necessary to improve/qualify the characterization of the epidemiological profile and stimulate a critical look on the part of the health professionals regarding this disease.

Conclusion

The epidemiological profile of diarrhea in children 1 to 4 years old in Alagoas between January 2014 and December 2018 was characterized by a relatively equivalent incidence between females and males. There was a predominance of multiracial children, and four deaths were registered. Concerning the municipalities studied, Arapiraca was the one with the highest number of cases in Alagoas.

Thus, the results point to the need for more in-depth study of the variables related to hospitalizations due to diarrhea and gastroenteritis, since the literature indicates an association between the disease and the deficient basic sanitation planning. Therefore, it is essential to know the epidemiological profile and the variables involved in the onset of diarrhea in children of this age group. Once obtained, such information will help develop health interventions aimed at preventing this disease.

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