

Epidemiological Aspects of Microcephal Cases and Central Nervous System Changes in Newborn

ORIGINAL

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Abstract

Objective: To describe the epidemiological situation of cases of microcephaly and/or Central Nervous System changes in newborns in the Northeast region of Brazil.

Methods: Epidemiological, descriptive study with secondary data. Epidemiological data were collected in the Notifiable Diseases Information System, with cumulative data from the years 2015 and 2016. They were processed in the statistical software SPSS - version 21 and analyzed from the descriptive statistics.

Results: It was evidenced that, in the Northeast region, 6,481 cases of microcephaly and/or central nervous system disorders were reported. Of these, the states of Pernambuco and Bahia stand out with a higher percentage of reported and confirmed cases. About the reported deaths, the states of Pernambuco, Ceará and Bahia prevailed. Of the cases of deaths confirmed, the states of Rio Grande do Norte and Paraíba.

Conclusion: It is imperative to carry out an ongoing population awareness campaign on the prevention of ZIKAV and how important it is to follow up the pregnant woman during prenatal care. In addition to the constant updating of health professionals regarding microcephaly and the creation of more services to support the NB and their families. Therefore, it is suggested to carry out more studies to understand the reason for the increase in reported cases of microcephaly, being possible to draw up specific strategies for each locality in order to reduce the cases of this disease.

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Keywords

Epidemiology; Microcephaly;
Central Nervous System;
Children.

Introduction

Microcephaly corresponds to a multicausal condition characterized by the presence of a lower head circumference (PC) than expected and may be associated with structural malformations of the brain. However, the occurrence of microcephaly alone does not mean that there will necessarily have motor or cognitive changes in the individual, since it can occur without any neurological changes, especially if it is of a family origin. It can be classified according to the time of its onset as: congenital microcephaly, present at birth, or as postnatal microcephaly, referring to the failure in normal growth of the CP after birth [1].

The Ministry of Health, in November 2015, declared a national health emergency due to an outbreak of microcephaly in neonates in the state of Pernambuco, where 268 cases were registered, making it a cause for concern, since the value was much higher than the average of the period 2010-2014 with nine cases per year. It is worth noting that the increase in the incidence of this condition in newborns (NB) was associated with the cases of mothers infected with Zika virus (ZIKAV) [2, 3].

Thus, the early suspicion, the adequate notification and the timely registration of cases of microcephaly related to ZIKAV are fundamental to initiate the investigation process, which proposes to classify the notified cases, confirm or dismiss suspicious cases, as well as to subsidize the actions of health attention and description of this new health problem as a matter of urgency. It is recommended that all cases be recorded in the Public Health Events Registration form (RESP - Microcephaly), and these data are included in the National System of Notification Diseases (SINAN) [4].

Therefore, in view of the worrying increase in cases of microcephaly in the country, it is necessary to update and deepen the knowledge about this disease, in order to become more prepared and able to evaluate the health situation caused by it and, in this way, contribute to the design of actions in order

to prevent and control the consequences that the disease provides the population.

In view of the exposed problem, this study aimed to describe the epidemiological situation of cases of microcephaly and/or Central Nervous System disorders in newborns in the Northeast region of Brazil.

Methods

A descriptive, epidemiological study with secondary data, the scenario of which was the northeastern region of Brazil, due to its importance in the number of reported cases of microcephaly. This region is made up of nine states: Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte and Sergipe. Considering the problem of the increasing of the incidence of cases of microcephaly and updating the epidemiological information on the subject, the data collection comprised the month of September 2016, which allows a better proximity to the current epidemiological situation.

Epidemiological data were collected at SINAN, with cumulative data from the years of 2015 and 2016, with information for evaluation of: cases of Microcephaly and/or Central Nervous System (CNS) disorders suggestive of congenital infection in fetuses, miscarriages, stillbirths or newborns; Number of cases reported by municipality and cases confirmed by municipality; Classification of the cases reported with microcephaly and/or CNS changes that progressed to fetal or neonatal death.

The data were collected and organized in a database, processed in the statistical software Statistical Package for Social Sciences (SPSS - version 21) and analyzed through the evaluation of the indicators between the states of the Brazilian Northeast according to the Protocol of Surveillance, with descriptive statistics, data are presented with absolute and relative frequencies, in tables.

Because it is a research with information contained in the public environment, by resolution 466/12

that regulates research with human beings, it is not necessary to appear from the ethics committee.

Results

Distribution of reported cases of microcephaly and/or CNS disorders

Table 1 corresponds to the general reports about cases of microcephaly and/or CNS changes in the Northeast region. Between November 2015 and September 2016, 6,481 cases were reported. Of these, Pernambuco (24.4%), Bahia (19.7%) and Paraíba (10.5%) stand out in the number of confirmed cases of microcephaly related to Zika virus infection.

Table 1. Distribution of reported cases of microcephaly and/or CNS changes, according to the definitions of the Surveillance Protocol.

States	Cumulative total reported cases from 2015 to 2016		Remain under investigation		Investigated and confirmed		Investigated and discarded	
	N	%	N	%	N	%	N	%
Alagoas	345	3.6	55	3.2	84	5.3	206	6.5
Bahia	1309	13.8	655	38.2	312	19.7	342	10.7
Ceará	575	6	160	9.3	137	8.6	278	8.7
Maranhão	303	3.2	97	5.7	138	8.7	68	2.1
Paraíba	902	9.5	191	11.1	166	10.5	545	17.1
Pernambuco	2138	22.5	362	21.1	386	24.4	1390	43.7
Piauí	188	2	7	0.4	99	6.3	82	2.6
Rio Grande do Norte	460	4.8	128	7.4	138	8.7	194	6.1
Sergipe	261	2.7	60	3.4	123	7.8	78	2.5

Source: SINAN, 2016.

Distribution of municipalities with reported and confirmed cases of microcephaly and/or CNS disorders suggestive of congenital infection

Table 2 shows the distribution of Northeastern municipalities with reported and confirmed cases of

microcephaly related to ZIKAV. There was a higher percentage of cases reported in the states of Bahia with 19.7% and Pernambuco with 17.8%. About the confirmed cases, the same states stand out with 14.2% and 19.4% respectively.

Table 2. Distribution of municipalities with reported and confirmed cases of microcephaly and/or CNS alteration suggestive of congenital infection, according to Surveillance Protocol.

States	Municipalities with reported cases		Municipalities with confirmed cases	
	N	%	N	%
Alagoas	73	7.3	39	7.3
Bahia	198	19.7	76	14.2
Ceará	110	10.9	53	9.9
Maranhão	92	9.1	64	12
Paraíba	137	13.6	67	12.5
Pernambuco	179	17.8	104	19.4
Piauí	73	7.3	43	8
Rio Grande do Norte	88	8.7	48	9
Sergipe	56	5.6	41	7.7

Source: SINAN, 2016.

Table 3. Distribution of reported cases of microcephaly and/or CNS alteration with evolution to fetal or neonatal death.

States	Total deaths reported from 2015 to 2016		In research		Confirmed		Discarded	
	N	%	N	%	N	%	N	%
Alagoas	14	4.9	7	4.4	5	5.2	2	6.2
Bahia	36	12.5	27	16.9	5	5.2	4	12.6
Ceará	44	15.2	18	11.3	24	25	2	6.2
Maranhão	19	6.6	13	8.1	3	3.1	3	9.4
Paraíba	26	9	0	0	18	18.7	8	25
Pernambuco	91	31.6	81	50.6	8	8.3	2	6.2
Piauí	12	4.2	0	0	6	6.3	6	18.7
Rio Grande do Norte	34	11.8	9	5.6	21	21.9	4	12.6
Sergipe	12	4.2	5	3.1	6	6.3	1	3.1

Source: Secondary data taken from Sinan, 2016.

Distribution of reported cases of microcephaly and/or CNS disorders with evolution to fetal or neonatal

Table 3 shows the distribution of reported cases of microcephaly and/or CNS alteration with evolution to fetal or neonatal death. The states of Pernambuco, 31.6%, Ceará 15.2%, Bahia 12.5%, followed by Rio Grande do Norte 11.8% predominate about the deaths. Of the cases of deaths confirmed by microcephaly and/or CNS alteration, the states of Rio Grande do Norte-21.9% and Paraíba -18.7%, stand out.

Discussion

The data in **Table 1** correspond to the cumulative number of reported cases of microcephaly and/or CNS changes in the Northeast region. It should be noted that these data refer to both the definitions adopted in the Protocol of Surveillance and response to the occurrence of microcephaly and/or CNS changes that defined the CP of 32 cm for NB with 37 or more weeks of gestation and other protocol definitions as to the definition of a previous operating case that determined that newborns with CP were equal to or less than 33 cm 4.

It is noteworthy that suspected cases go through a process of investigation, given that microcephaly and/or changes in the CNS can be caused by a series of factors ranging from maternal malnutrition and drug abuse to infections during the gestational period. A range of abnormalities and metabolic, genetic syndromes, environmental aggressions, and still unknown causes can affect brain development and be associated with microcephaly [2].

However, the scenario that spread to the northeastern region of Brazil in the beginning of 2015 was somewhat surprising, since health authorities began to receive reports from physicians in the region regarding the increase in the number of newborns with microcephaly, which happened in consonance with an outbreak of ZIKAV infection.

In the same year, the Ministry of Health confirmed a growth in the prevalence of births with microcephaly in the northeast of the country, and shortly after it was announced on its website the increase in the number of cases of microcephaly and a possible association of the disease with ZIKAV infection during the gestation [5].

According an in-depth investigation of the reported cases is necessary to ascertain their cause. In the case of microcephaly resulting from ZIKAV, despite the scarce knowledge about the natural evolution of this disease and its pathogenesis, the present evidence is sufficiently consistent to establish the causal relationship between the infection by ZIKAV during pregnancy, specifically in the first trimester [6].

It is also observed that among the states of the Northeast region, Pernambuco presented the highest number of reported and confirmed cases of microcephaly related to ZIKAV, followed by the state of Bahia. Thus, in this context, it is worth mentioning that the epidemic has in most cases reached the children of northeastern and poor women, survivors of a broad policy of precarious life policies, which leads to a reflection on the effects of the epidemic on their lives. In this way, this situation corresponded to a tragedy of unintelligible lives to the recognition of the rights, since the numbers of the epidemiological surveillance consider their children as cases of notification or confirmation, but are silent about them [7].

In this way, managers can not ignore the need to improve public policies aimed at poor congenital formations, especially microcephaly. It is important to intensify scientific research on this problem, the need for trained professionals and the monitoring and evaluation of the data in the Information system and expansion of reference centers and against referral to attend the cases [8].

Table 2 shows the distribution of Northeastern municipalities with reported and confirmed cases of microcephaly and/or CNS changes related to con-

genital infection, and among the states, the states with the highest number of municipalities with reported cases were Pernambuco and Bahia.

It should be noted that these data are related to a social reality of vulnerability due to the region that has developed, on the face of it, it is necessary to take into account fragile health conditions and social determinants such as poverty added to the massive presence of the vector, so it is necessary to carry out actions to control the problem and, consequently, significantly reduce the number of cases of this aggravation, since ZIKAV infection in Brazil, especially in the northeast region, has become a serious public health problem [3, 6].

Thus, the question of why the number of cases reported as well as confirmed in the Northeast region, especially in the state of Bahia and Pernambuco, which were the states that presented the most cases of microcephaly in their municipalities, consists, in most cases, in the absence of preventive actions. There is a need for intense work to prevent the virus from infecting more pregnant women and for other families to face this difficult situation [3].

In addition to prevention, it is necessary to develop methods that can attest to the identification of the virus as early as possible. Given that defining the diagnostic method for ZIKAV is of paramount importance to rule out cases of suspicion, in addition to ensuring the patient who was actually diagnosed with the virus, all the humanized care required during pregnancy, and support in Their child, and it is important to highlight methods to be developed that need to be accessible to the population [9].

Thus, this situation becomes worrying, since congenital microcephaly can develop several alterations, such as: intellectual disability, cerebral palsy, epilepsy, anomalies of the visual and auditory systems, as well as behavioral disturbance [3].

Regarding fetal or neonatal death resulting from microcephaly and/or CNS alteration associated with ZIKAV, it was based on the isolation of the virus from the amniotic fluid in pregnant women in the

interior of some states such as: Paraíba, Rio Grande do Norte and Ceará. In these cases, the NB evolved in the first 5 minutes of life for death [10].

It is perceived that poor congenital formations represent one of the main causes of infant mortality in Brazil, it is known that there is a higher frequency of deaths in newborns associated with malformation in the nervous system [11].

There are considerable differences in the number of deaths from one state to another in the northeastern region, these differences may be related to environmental, social and economic factors, among others.

There is an increase in the number of cases in death investigation, when analyzed in the literature in relation to the year 2016, when the author states that in February of the same year there were 38 deaths of babies with microcephaly [12]. Regarding the cases of death confirmed by microcephaly and/or CNS changes, the numbers in Rio Grande do Norte and Paraíba are increasing, it is understood that there is an eight times greater risk of a newborn developing to death when it presents congenital malformation when compared to the newborn without congenital malformation[11].

It is worth emphasizing in the study the absence of data about the gender in the cases of microcephaly registered in SINAN, as well as in the literature on the subject, which would be important to be reported, since from the same, prevention actions would be even more specific and, in addition of it, a more detailed knowledge about this situation would be possible.

Conclusion

The present study evidenced the epidemiological situation of the cases of microcephaly in NB in the Northeast region of Brazil, demonstrating that there has been an increase in confirmed cases of microcephaly associated with ZIKAV in the states of this region, requiring a continuous investigation of the

same so that they may intensify prevention actions at all sites, especially in states that stand out in confirmed case numbers.

It is believed that this increase in confirmed cases in Northeastern municipalities is due to factors that influence social determinants, and directly affect the health of newborns born with microcephaly, as well as in the daily life of the mother of these children. It is imperative to carry out a population awareness campaign on the prevention of ZIKAV and how important it is to follow up the pregnant woman during prenatal care, in addition to the constant updating of health professionals regarding microcephaly and the creation of more services to support the NB and their families.

There are limitations in the small number of studies on gender and municipality comparisons regarding to microcephaly reports. Thus, this study makes it possible to identify states that are more pronounced in the reports of this pathology. It is suggested to carry out more research to understand why this increase in reported cases of microcephaly and to allow the development of specific strategies for each locality in order to reduce cases of the disease.

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