Childcare in the neonatal period: evaluation of neonatal mortality reduction pact in Rio Grande do Norte, Brazil

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Abstract *The objective was to evaluate the childcare actions in the neonatal period from the strategies recommended by the Ministry of Health. Cross-sectional study carried out from the database of the national population-based survey entitled "Chamada Neonatal" (Neonatal Call - in English): assessment of attention to prenatal care and to children under one year in the North and Northeast, which happened in the nine priority municipalities for the Pact of reducing child mortality and Neonatal in Rio Grande do Norte, Brazil with 837 mother/child pairs. The variables were composed by issues/actions regarding the neonatal period, followed by a descriptive and inferential analysis. The whole database sample was used, composed of 57.6% in the capital and 42.4% in all the interiors. The frequency of hospital environment actions ranges from 35% to 96% and those carried out in primary care from 57% to 91.2%. Most are associated with the nature of public hospitals and the state capital, and the actions of care for continuity of care and better economic conditions (p <0.05). Not all actions met the totality of what is advocated in the programs and childcare policies, and reveals regional inequalities in healthcare.*

Key words *Newborn, Healthcare services, Child health*

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Introduction

The neonatal period, comprising the first 27 days postpartum, is considered a stage of vulnerability to child health by biological, environmental, social and cultural risks. This requires proper care, greater vigilance and monitoring by health professionals, in order to ensure a better growth and development of the child. This period is also responsible for 60% to 70% of infant deaths in recent decades, occurring mainly until the 6th day of life, being the key indicator of quality of care to newborn[1].

Historically, due to this profile of vulnerability, the mother and childcare has excelled in the policies, agreements and government programs. Through actions aimed at the promotion of the health, growth and development, neonatal monitoring is supported by the principles governing the unified health system (SUS) and strengthened by the commitment that Brazil has signed with the World Health Organization (WHO) to reduce the number of infant deaths by 2/3 until 2015[1].

In Brazil and in Rio Grande do Norte, the infant and neonatal mortality rates have reduced substantially, already reaching the goal established in the 2011 Pact with a rate of 13 deaths/1000 live births, while the early and late neonatal period were respectively 7 and 2/1000 live births[2]. This is worrisome when compared to more developed countries, where the rate is two to six times lower[3]. This situation remains related to socioeconomic, health and demographic conditions, and the prenatal assistance, Cesarean delivery, prematurity, low birth weight, hospital assistance and attention to newborn infants in the neonatal period[4-6].

Currently, the public policies for health care of the child have as objective the protection, promotion and prevention of neonatal and infant mortality based on the completeness of the care and the pursuit of social equity[7]. These are recommended for the newborn and the mother (through programs, projects, agreements and actions) skilled attendance at prenatal care, delivery and postpartum (to promote mother-infant contact immediately); rooming; identification of the newborn at risk; first week of comprehensive health care for mother and newborn (with conducting domestic and neonatal screening visit); encouraging breastfeeding; monitoring of growth and development; immunization; Increasing the number of neonatal beds; improvement in the physical structure of the services; access and transport; professional training[6,7].

But the concern is that many of these actions are not being developed in its entirety, as it is shown in the limited literature[8,9]. The evaluation of healthcare services, which must be continuous and systematic, it becomes important to identify and modify the existing situation, in addition to promoting proper planning, prioritizing the main problems and the actions needed to improve the care and the child's quality of life[10].

In this context, considering the importance of the implementation of the comprehensive care and in the midst of the contradictions of the programs and services offered and the quality of the same, as well as the lack of studies in this area and the importance of health assessment for the assurance of a better care, this research seeks to assess the actions of attention to children in the neonatal period from the strategies proposed by the Ministry of health (MH) using the database of research entitled Chamada Neonatal (*Neonatal Call - in English*). This survey was conducted by MH in the priority cities of Rio Grande do Norte, in 2010, for the Reduction Pact of Maternal and Neonatal Mortality in the Designated Northeast and Amazon.

Material and Methods

This is a cross-sectional study and performed from the database of the national population-based survey entitled "Chamada Neonatal: *(Neonatal Call - in English)*assessment of attention to prenatal care and to children under one year of age in the North and Northeast," which occurred in the first step of the multi-vaccination campaign in June 12, 2010 in 252 municipalities signed the Pact for reducing child mortality , located in the States of Legal Amazon (Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, Roraima and Tocantins) and Northeast (Alagoas, Bahia, Ceará, Paraíba, Pernambuco, Piauí, Rio Grande do Norte and Sergipe)[11]. The Chamada Neonatal *(Neonatal Call - in English)* used a probability sampling, random, by conglomerate, whereas a prevalence of 22% for maternal morbidity, with 4.0% error, design correlation (deff) of 1.5 and 95% confidence interval.

In this specific study data were used for the interviews in nine priority municipalities of the State of Rio Grande do Norte (RN): Natal, Currais Novos, Mossoró, Caicó, Pau dos Ferros, São Gonçalo do Amarante, Macaíba, Ceará-Mirim eand Parnamirim. The consultations were held

from March 2013 to May 2014. The sample consisted of 837 mothers and children under 1 year of age, not twin births and not adopted, and 482 pairs of capital and 355 from the interior collection, which accounted for the proportion of participation of each child, according to census distribution of the year 2010 these municipalities.

The choice of response variables (dependent) was based on the actions envisaged in the Care Agenda for Children's Health[6] and divided in hospital-wide attention: breastfeeding in the first hour; stay m accommodation set; delivery of the Child Health Card (CHC), with registration of birth weight; and divided in hospital under care: feeding in the first hour; stay m rooming; delivery Child Health Card (CHC), weighing registration at birth; Gestational Age (GA); Apgar score; have birth certificate; receive the hepatitis B vaccine and BCG-ID; mother receive vitamin A and be advised to look for a service in the first week of the child's life; and primary health care: visit newborns receive agent or health care professional; carry out the newborn screening test and maintaining a healthy weight in the neonatal period. All being classified as Yes or No.

For the independent variables, the issues were selected to respond to the type or nature of the service in which the child was born (or private/particular/others) and the place of residence of the binomial during the research. To characterize mother and child, questions about socioeconomic and cultural conditions were chosen: age and maternal education, age and sex of the child, receipt of the Income Transfer Grant (Food Grant, School Grant, Family Grant).

The data was tabulated in the application SPSS® (*Statistical Package for Social Sciences,* 20, United States version) and used the command *complex sample (cluster = municipality and sample weight = weight)* for complex samples. Sample characteristics were obtained from the absolute and relative frequencies. The effect of the Association (bivariate analysis) between dependent and independent variables was evaluated using the chi square of Pearson, which were considered significant values of $p < 0.05$ on the outcomes with 95% confidence interval.

The study used secondary data of "Chamada Neonatal" *(Neonatal Call - in English)* which, because it is a survey of human beings, was submitted and approved by the Committee of ethics in research ENSP/Fiocruz. Thus complies with Resolution 466/2012.

Results

We used the database of 837 pairs of mother with child under one year old respondents in nine municipalities prioritized in the State of Rio Grande do Norte. Of these, 57.6% of the capital and 42.4% of the interior sets. Table 1 shows a slight predominance of male children (51.2%), over the age of 27 days of life (93.6%) and who were born in public healthcare service (81.8%). As the requirements for the mother, most was in the age group between 20 to 29 years (55.2%), had full secondary education (44.7%). Only 29.1% were in receipt of any income transfer program.

Table 1. Distribution of sociodemographic characteristics of the study population within the nine municipalities, signatories of the Pact for reducing child mortality in RN, Brazil, 2010.

Variables	N	%	BMI 95%
Child's gender			
Female	408	48.8	43.9-53.7
Male	429	51.2	46.5-55.9
Total	837	100	
Age of the children			
≤ 27 days	51	5.8	4.7-7.2
28 days to 1 year	786	93.6	92.8-95.3
Total	837	100	
Child's place of birth			
Public Service	678	81.8	75-87.1
Other services	151	18.2	12.9-25
Total	829	100	
Mother's age			
< 20	145	17.5	11.3 – 23.7
20 a 29	458	55.2	50.6 – 59.8
≥ 30	226	27.3	21.5 – 33.1
Total	829	100	
Mother's education level			
Elementary school incomplete (0 to 7)	202	24.3	18.4 – 30.2
Elementary school complete (8 to 10)	257	31.0	25.3 – 36.7
High school complete (≥ 11)	371	44.7	39.6 – 49.8
Total	830	100	
Grant recipient*			
No	591	70.9	67.2 – 74.6
Yes	243	29.1	23.4 – 34.8
Total	834	100	
Location of residence			
Capital	482	57.6	53.2 – 62.0
Interior	355	42.4	37.3 – 47.5
Total	837	100	

Source: Chamada Neonatal. Rio Grande do Norte, 2010. * Income Transfer Grant.

Figure 1 shows the frequency of actions taken in hospitals. It is observed that quite a few variables and more frequent delivery of documents such as birth certificate (92.9%) and CBC (96.7%), being this last bit used for registering Gestational Age (35.3%), birth weight (81.3%) and registration of the Apgar score (68.4%). Just over 60% had early contact with the mother and received vaccines while still hospitalized. A little more than half of mothers have received a dose of Vitamin A, the guidelines for seeking a health service to the binomial and the house call after hospital discharge. Since the test was carried out in 91.2% of newborns, and only 68.7% were heavy during this period, as recorded in the CBC (Figure 2).

Table 2 presents the results of the bivariate analysis of the actions recommended by the MH and the type of service in which the child was born, public or other (private, particular, among others). Table 3, the association with the location of the dwelling (capital and interior set). The implementation of hospital-wide activities was more significant and frequent in public services and in the State capital. Since the registration of GA and continuity of care, as well as the attention in the first week of life, were more associated with particular services and in the capital.

The income grant program, such as Family Grant, School Grant and Food Grant, was associated with the receipt of vaccines for newborns (p < 0.001) and receiving vitamin A by the moth-
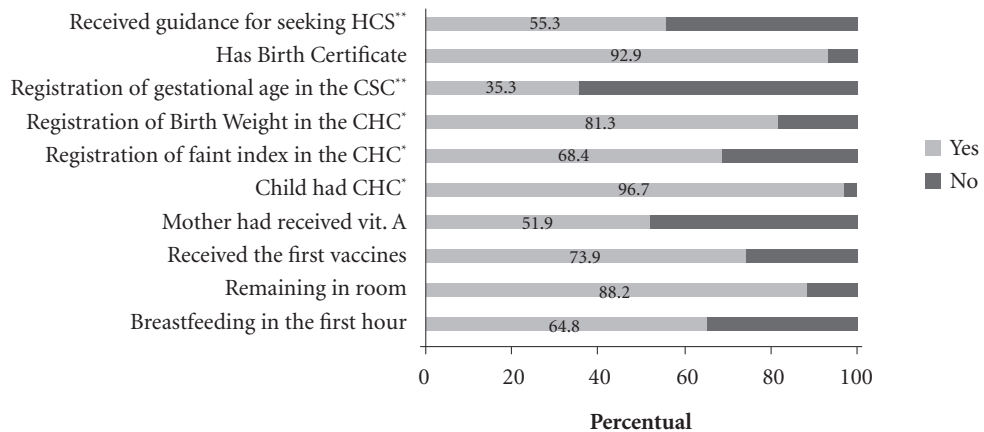

Figure 1. Percentage of actions taken with the neonate and the mother within the hospital. Chamada Neonatal, Rio Grande do Norte, 2010.

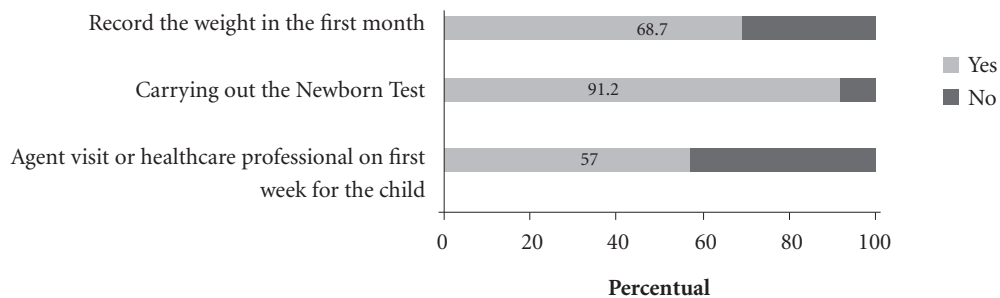* CHC: Child Health Card. ** HCS: Healthcare Service.

Figura 2. Percentage of actions taken with the neonate in the primary healthcare. Chamada Neonatal, Rio Grande do Norte, 2010.

Table 2. Bivariate analysis of the newborn care actions in the hospital and in Primary Health Care Units with the nature of the child's birth service. Chamada Neonatal, RN, 2010.

Variables	Public Service		Other services			
	n	%	n	%	BMI	p*
Breastfeeding within the 1st hour	445	66.4	90	58.8	0.966-1.984	0.076
Room Accommodation	603	90.0	129	84.3	1.012-2.770	**0.043**
Dosage of the first Vaccines	553	82.9	40	27.4	8.481-19.983	**< 0.001**
Dosage of Vit. A for the mother	313	54.8	35	34.0	1.518-3.659	**< 0.001**
Delivery in the CHC**	656	97.6	152	96.8	0.487-3.739	0.564
Apgar Score Registration in the CHC**	501	74.6	78	49.7	2.075-4.244	**< 0.001**
Registration of birth weight in the CHC**	530	85.6	97	65.5	2.085-4.702	**< 0.001**
Registration of the GA*** in the CHC	222	33.0	70	44.6	0.431-0.873	**0.006**
Birth Certificate	591	92.6	142	94.7	0.327-1.533	0.379
Guidance to find a Healthcare Service	246	37.4	110	72.4	0.155-0.336	**< 0.001**
Visit by a health professional within the first week	384	57.4	113	72.4	0.350-0.752	**< 0.001**
Newborn Screening	594	89.6	153	99.4	0.006-0.408	**< 0.001**
Weight record in 1st month	397	66.5	94	69.1	0.594-1.325	0.558

Source: Chamada Neonatal, Rio Grande do Norte, 2010.
* P of the difference between the capital and the state. ** Child Health Card. *** GA: Gestational Age.

Table 3. Bivariate analysis among the care actions to the neonate in hospital and basic healthcare units with the location of the municipalities which are signatories to the Chamada Neonatal no RN, 2010.

Variables	Capital		Interiors			
	n	%	n	%	BMI	p*
Breastfeeding within the 1st hour	317	66.6	218	62.8	0.883-1.576	0.262
Room Accommodation	425	89.9	307	87.7	0.801-1.920	**0.340**
Dosage of the first Vaccines	357	76.1	236	68.6	1.068-1.991	**0.017**
Dosage of Vit. A for the mother	208	54.9	140	47.5	0.092-1.827	0.056
Delivery in the CHC**	475	98.5	341	96.1	1.113-6.976	**<0.023**
Faint Index Record in the CHC**	365	75.7	219	61.7	1.437-2.611	**<0.001**
Registration of birth weight in the CHC**	394	86.8	237	73.8	1.610-3.364	**<0.001**
Registration of the GA*** in the CHC	184	38.2	111	31.3	1.016-1.814	**0.039**
Birth Certificate	437	93.8	304	92.1	0.744-2.232	0.364
Guidance to find a Healthcare Service	210	45.0	146	42.6	0.832-1.461	**0.496**
Visit by a health professional within the first week	359	74.9	142	40.1	3.321-6.008	**<0.001**
Newborn Screening	442	92.9	313	89.7	0.915-2.442	0.106
Weight record in 1st month	275	63.5	222	72.3	0.485-0.915	**0.012**

Source: Chamada Neonatal, Rio Grande do Norte, 2010.
* P of the difference between the capital and the state. ** Child Health Card. *** GA: Gestational Age.

er (p < 0.021), for those who had one of Grants, while the home visit (p < 0.001) and carrying out the newborn screening (p < 0.002) was associated with mothers who did not receive the grant.

Discussion

Despite the expansion and strengthening of policies in the pursuit of universality, equity and integrity, the priority actions in the period of the Chamada Neonatal *(Neonatal Call - in English)* survey and incorporated in Schedule Commit-

ment to Comprehensive Child Health and Infant Mortality Reduction still are deficient, especially with regard to the continuity of care.

The practice of breastfeeding in the first hour of life, still in the delivery room, when the mother and the newborn are doing well, is one of the recommendations of the WHO, UNICEF, MH[1,12] and step 4 of the Baby Friendly Hospital Initiative[13], prioritized and before any procedure, because in addition to strengthen the mother-infant bonding (providing a moment of love, warmth and knowledge), also increases the duration of breastfeeding exclusive[14], which contributes to reducing child mortality[15].

In this study, the frequency of breastfeeding in the first hour of life is among the average of the other studies carried out here in Brazil (ranged from 31% to 68%). Natural childbirth was found as a facilitator[8,16] and as difficulties: the resistance of the medical staff[17], the delay in delivery of the result of the HIV test[8], the high turnover rate of childbirths in the sector and the refusal of the mother in breast-feeding[18] being that the latter is associated with the ignorance of the importance of the same (the result of a low number of prenatal appointments and low education)[19].

After early contact, ideally the neonate healthy low-risk and/or stay beside the mother in accommodation together, to strengthen the mother-baby bond, encourage the practice of breastfeeding and rapprochement with the health professionals[20]. Despite having been instituted as law, this study showed that not all newborns remained in the accommodations, what could have happened to those born in situation of risk, with indication of remaining in pathological nursery or Neonatal ICU.

During the stay in accommodation in the first 12 hours of life, it is recommended that the neonate to receive dose of vaccines BCG-ID and hepatitis B, a way to fight infant morbidity and mortality. However, in this study, the coverage was less than accepted by the MH, which is 90%. It is worth mentioning that this is a practice that relies on trained health professionals, since it requires differentiated technique in the application of BCG ID and, during this period, the health situation in the State was not the best (too much talk in the reduction of professionals in all areas of the care).

Vaccination after discharge will depend on the knowledge[21] and the mother's initiative in seeking the service, as well as the care provided by the primary health care, initiated by the active search for the full service. In the report published by the United Nations on child survival, it was presented that mothers with higher level of education contribute to immunization of children at birth, being important ally in reducing child mortality[3].

The low frequency of the supplementation of vitamin A, which is administered with the objective of improving the concentration of retinol in human milk for up to 3 months and to reduce infant mortality by diarrhea, HIV, among other causes[22], despite the existing policy was superior to that found in the study held in Belo Horizonte, Brazil in 2008[9].

Among what is advocated by the MH, the compromise Agenda also prioritizes the health monitoring. The CHC is today one of the main tools of evaluation of the child, as it enables the realization of monitoring of growth and development, encouraging breastfeeding and healthy eating, nutritional disorders prevention, immunization and care management, oral health, mental health, prevention of accidents and maltreatment, as well as specific actions addressed to women and newborns[23].

The CSC must be delivered to the mother before hospital discharge, with records related to pregnancy, childbirth, puerperium and birth of the child. Evaluating the top three records that indicate the State of health of the neonate (weight, GA and Apgar score), these were scarce, especially that of the GA. The deficiency of these records do reflect on professional training and permanent education, one of the pillars of the programs, pacts and recommended actions in the health policies for the completeness of the care for children, but that usually are limited by the working conditions and the number of existing professionals in the services.

The non-fulfillment of the CHC may be an indicator that the child is not being properly assisted, which can interfere with the monitoring process and the quality of life. The studies point to better education of the mother, the follow-up on Basic Health Unit (BHU) and the explanation of the CHC, as well as live in the metropolitan region, as facilitators for carrying out such action[24,25].

The birth certificate, document which formalizes the existence of the child as a citizen (right that must be acquired at birth, at no charge to the family), were missing in a few children, but less than other regions of the Chamada Neonatal *(Neonatal Call - in English)*. Given this situation, which is common in several regions of Brazil, the National Council of Justice has promoted cam-

paigns to improve the number of records. Since the period of 2010, in the State of Rio Grande do Norte, Brazil, a pilot study in 5 cities was initiated with the partnership between the hospitals/maternities, the municipal offices and the State Government to ensure the registry prior to hospital discharge.

The last action within hospitals is the orientation for the mother to find a health service to the first week of full health, ensuring the continuity of care. This orientation used to be noted on page 2 of the CHC, along with the data. From the circulation of 2009, that information consisted more in CHC, which may have contributed to the reduction of this practice, as identified in this study in just over 50% of the sample, being lower than that of the other priority areas for the reduction of infant mortality, which was 73%[11]. This action was associated significantly to the service otherwise not be public, implying that there may be high and that these institutions regulated professionals are more attentive to the maintenance of the neonate care.

Continuity of care after discharge is very important and can reduce between 30% to 61% of the deaths in the neonatal period[26]. It is an activity assigned to the primary care team, which is responsible for the health surveillance through monitoring of growth and development, the home visits and returns guidelines to BHU for the procedures required in the first week of full health of the binomial mother/child, strengthening the bond between the neonate and BHU, the neonatal screening (newborn screening , little ear and little eye), breastfeeding guidance (which was not prioritized in the research of the Chamada Neonatal *(Neonatal Call - in English)*), the application of vaccines not performed during hospitalization and the identification of the children at risk.

In the Chamada Neonatal *(Neonatal Call - in English)* report, it points to the precariousness of healthcare network of the child, as well as the establishment of properly qualified health professionals to meet, showing also that half of the mothers were not visited at any time. The North and northeastern regions are priority areas for the implementation of the FHS program[11]. The literature addresses the reduction of visits without the contribution of the FHS and the authorization of the mother by taboo and belief[27-29], which can contributes to reducing the growth and development monitoring record.

However, the newborn screening was one of the most common and was associated with the receipt of the Income Transfer Grant and the children born in another service that is not public. The Ministry of health provides skilled professional and reference in each regional health to accomplish active search of births, conducting the tests and delivery of the results.

The SUS defends health as a right of all and duty of the State. The current policies of child health protection attempt to prioritize the most vulnerable families. The programs and strategies attempt to strengthen and qualify the public service to develop these actions, of which depends on the majority of the Brazilian population.

This study made it possible to evaluate the Association of actions taken in the neonatal period with the nature of the child's birth service, public or other (private, private, other), with the income transfer program and the place of residence, whether capital or interior. The strong association with the service of public nature, evidenced in most hospital-wide actions, demonstrates that they are trying to follow what is advocated by the MH. However, when it comes to primary health care, it favored those who possessed better socioeconomic conditions, contrary to what is prioritized by the FHS. It is worth mentioning that these actions are conditions, as well as the assessment of nutritional status, so that the family remain benefiting some income transfer program (such as the Family Grant and/or Food Grant), approaching the same social and health policies in Brazil[30].

SUS has some inequities in care to the population, such as the provision of resources and services and the social position of the individual in access, use and quality of these services, corroborating with what is presented in this study[31]. According to Aquiar[32], there are constant challenges do SUS work, due to socio-economic inequalities, the heterogeneity of the structures and institutions of health and epidemiological conditions that characterize the various regions and municipalities.

The cities here studied are characterized by various economic transformations, demographic, social and health policies, which did improve some indicators determinants of the health condition[33,34]. Despite the increase in GDP (Gross Domestic Product), and the improvement of the HDI (Human Development Index), the GINI coefficient, which measures inequality, continues growing and high, especially in the city of Natal (capital), which has increased *per capita* income, increased number of health professionals to meet the population and greater coverage of the FHS[34].

It is known that the effectiveness of actions depending on permanent education policy and able to keep skilled professionals who can understand and work in the SUS with technical skills, critical thinking and political commitment. In primary care, the performance with a participatory team, from the management to the planning and implementation of actions, will reach the attributes necessary for the quality of care[35].

On the Appointment Agenda for Comprehensive Child Health is prioritized in the continuing education of health professionals. However, it is known of the lack of structure of health services especially in the interior, transport and adequate distribution and training of these professionals; the constant stoppages resulting from the strike movements; and the insufficient amount of money and its poor distribution, as well as the need for greater commitment[36].

Conclusion

The results point to the need to strengthen the planning and execution of actions and monitoring in the care to the neonate. What was observed was a weak follow-up, fragmented, represented by a frequency below that recommended by the MH with regard to the breastfeeding in the first hour, the record in the CHC, the receipt of vaccines, guidance for mothers and the visit during the first week of integral healthcare, especially for those residing in vulnerable areas that lack sufficient FHS and professionals for better care. Although the public hospital has met a greater number of actions, these aspects demonstrate the need to incorporate these practices, know the limitations of health professionals and define its powers, seeing a way to ensure full and humanized care that neonates need.

The differences of the actions carried out in the capital and in the Interior, as well as the type of service nature of child birth, represent what was pointed out in the literature and reality found in the year 2010 in Rio Grande do Norte, Brazil. This is not different from other regions of the country, revealing inequities in health in less developed areas and the need for better monitoring in the partner institutions of the SUS.

Further studies are needed to evaluate some actions other than those referred to in the research of the Chamada Neonatal *(Neonatal Call - in English)*, as the guidance to the mother about the importance of breastfeeding and the study of other variables that might explain the outcome found, as well as the need for new research on new programs and actions created recently, and the new socio-economic profile of the population. The disclosure thereof may contribute to the reflection and discussions with managers and health professionals to provide the better incorporation of care practices.

Collaborations

JMF Pinheiro: authorship. LS Tinoco and ASS Rocha participated in the tabulation and data interpretation. MP Rodrigues participated in the data collection and the revision of the text. CO Lyra coordinated the project, and participated in the data collection, statistical analysis and revision of the text. MAF Ferreira was the Advisor and participated in the statistical analysis and revision of the text.

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