ORIGINAL ARTICLE

IMPACT OF THE IMPLEMENTATION OF THE STORK NET IN NEONATAL DEATHS
IMPACTO DA IMPLANTAÇÃO DA REDE CEGONHA NOS ÓBITOS NEONATAIS
IMPACTO DE LA IMPLANTACIÓN DE LA RED CIGUEÑA EN LAS MUERTES NEONATALES

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ABSTRACT

Objective: to describe the impact of the implantation of the Stork Network on neonatal deaths due to preventable causes. *Method:* this is a quantitative, descriptive study, which included neonatal deaths due to preventable causes of adequate care for women in gestation, delivery and the newborn, between the years 2011 and 2015, based on the retrospective analysis of secondary data collected through the Information System on Live Births - SINASC, in DATASUS, whose results were presented in tables. *Results:* it was observed that neonatal deaths from preventable causes fell to 8.42/1,000NV in 2012, but reached 9.56 / 1,000NV in 2013. Among the preventable causes of prenatal quality, the respiratory distress syndrome of the newborn, while in the delivery assistance, the main cause of death was intrauterine hypoxia. *Conclusion:* low impact values were identified on the implementation of the Stork Network in neonatal deaths due to preventable causes in the State of Alagoas. The need for more efforts was made to make the program's effectiveness justified by the positive impacts of neonatal death rates. **Descritores:** Prenatal Care; Infant Newborn; Parturition; Maternal-Child Health Services; Infant Newborn Diseases; Perinatal Mortality.

RESUMO

Objetivo: descrever o impacto da implantação da Rede Cegonha nos óbitos neonatais por causas evitáveis. *Método:* trata-se de um estudo quantitativo, descritivo, onde foram incluídos os óbitos neonatais por causas evitáveis por uma adequada assistência à mulher na gestação, parto e ao recém-nascido, entre os anos de 2011 e 2015, baseado na análise retrospectiva de dados secundários coletados por meio do Sistema de Informações sobre Nascidos Vivos – SINASC, no DATASUS, cujos resultados foram apresentados em tabelas. *Resultados:* observou-se que os óbitos neonatais por causas evitáveis caíram, em 2012, para 8,42/1.000NV, mas atingiram 9,56/1.000NV em 2013. Destaca-se, entre as causas evitáveis por um pré-natal de qualidade, a síndrome da angústia respiratória do recém-nascido, enquanto, na assistência ao parto, a principal causa de óbito foi a hipóxia intrauterina. *Conclusão:* identificaram-se valores de baixo impacto acerca da implantação da Rede Cegonha nos óbitos neonatais por causas evitáveis no Estado de Alagoas. Evidenciou-se a necessidade de mais esforços para que a eficácia do programa seja justificada a partir de impactos positivos representados nas taxas de óbitos neonatais. **Descritores:** Cuidado Pré-Natal; Recém-Nascido; Parto; Serviços de Saúde Materno-Infantil; Doenças do Recém-Nascido; Mortalidade Perinatal.

RESUMEN

Objetivo: describir el impacto de la implantación de la Red Cigüeña en las muertes neonatales por causas evitables. *Método:* se trata de un estudio cuantitativo, descriptivo, donde se incluyeron las muertes neonatales por causas evitables por una adecuada asistencia a la mujer en la gestación, parto y al recién nacido, entre los años 2011 y 2015, basado en el análisis retrospectivo de los datos secundarios recogidos por medio del Sistema de Información sobre Nacidos Vivos - SINASC, en el DATASUS, cuyos resultados fueron presentados en tablas. *Resultados:* se observó que las muertes neonatales por causas evitables cayeron en 2012 a 8,42 / 1.000NV, pero alcanzaron 9,56 / 1.000NV en 2013. Se destaca, entre las causas evitables por un prenatal de calidad, el síndrome de la angustia respiratoria del recién nacido, mientras que, en la asistencia al parto, la principal causa de muerte fue la hipoxia intrauterina. *Conclusión:* se identificaron valores de bajo impacto sobre la implantación de la Red Cigüeña en las muertes neonatales por causas evitables en el Estado de Alagoas. Se evidenció la necesidad de más esfuerzos para que la eficacia del programa esté justificada a partir de impactos positivos representados en las tasas de muertes neonatales. **Descritores:** Atención Prenatal; Recién Nacido; Parto; Servicios de Salud Materno-Infantil; Enfermeda desd El Recién Nacido; Mortalidad Perinatal.

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INTRODUCTION

The living conditions and socioeconomic development of a population, as well as access to health services and the quality of services and resources available for maternal and child health care through the infant mortality ratio are reflected, being an important health indicator.[1]

Among the components of the infant mortality coefficient, neonatal mortality is estimated to be an estimate of the risk of a live birth dying up to 27 days of life, where early neonatal mortality (zero to six days) and (seven to 27 days of life). The quality of the services offered to mothers and newborns during the prenatal, delivery and neonatal period by this component is reflected.[2-4]

Neonatal mortality can be determined by several factors, but many causes are considered avoidable, ie with existing knowledge and technology, it is possible to intervene effectively without the patient's death. Deaths from preventable causes can be an important tool for monitoring and evaluating health services. It is believed that avoidable deaths related to the newborn are those reducible by the adequate attention to the woman in the gestation, to the delivery and to the newborn.[5]

According to the literature, the main causes of death are prematurity, congenital malformation, intrapartum asphyxia, perinatal infections and maternal factors, with a considerable proportion of preventable deaths due to health, and in the world there are three causes: prematurity, perinatal asphyxia and neonatal infections.[6-8]

Despite the reductions at the national level, it is necessary to reduce the regional inequalities related to specific social groups, as it is known that the mortality indicators are variable in the different regions of the world. parents; while the average of Brazil in 2010 was 16.0 / 1,000 NV, the Northeast region had coefficients of 19.1 / 1,000 NV, and among the Brazilian states, Alagoas has the highest infant mortality rate in the country, in addition to presenting the second worst Child Development Index (CDI).[9-10]

In order to improve indicators in the country in 2000, the Prenatal and Birth Humanization Program (PBHP) was instituted to reduce the high rates of maternal and perinatal morbidity and mortality, adopting measures for the improved access, coverage and quality of prenatal care, delivery and puerperium care.[9]

In this context, the following guiding question emerged: "After the implantation of the Stork Network, was there a reduction in neonatal deaths due to preventable causes in the State of Alagoas?".

OBJECTIVE

♦ To describe the impact of the implantation of the Stork Network on neonatal deaths due to preventable causes.

METHOD

This is a quantitative, descriptive study. It is considered a quantitative study, when everything can be quantifiable, which means translating, in numbers, opinions and information to classify and analyze them. It is explained that the research is still descriptive, since it has the character of observing, recording, analyzing and ordering data without manipulating them, and thus to find out the frequency with which a fact occurs, its nature, its characteristics, causes and relationships with other facts.[11]

This study is based on the retrospective analysis of secondary data. Included in the study were deaths occurring up to the 27th day of life due to avoidable causes that could be reduced by adequate attention to the woman during pregnancy, due attention to the woman at delivery and appropriate attention to the newborn. The place of occurrence, maternal age and deaths due to malformations were considered as exclusion criteria for this study.

It is reported that the sample of this study is a census, considering the neonatal deaths of mothers residing in the period from 2011 to 2015. This temporal cut was taken considering the year of creation of the Cegonha Network (2011), up to 2015, it being understood that there was sufficient time for the generation of data that would serve as the basis for the analysis to answer the guiding question of this study.

Primary and secondary variables were evaluated for this study, with the primary variables being:

● Rate of neonatal deaths from preventable causes reducible by adequate attention to women during pregnancy - the early start of prenatal care in the first trimester; performing routine exams; the detection and treatment of maternal diseases and the provision of information on the effects of alcohol consumption, smoking and other care given to the mother, besides the number of consultations, factors that are

relevant for the reduction of neonatal deaths;[1]

● Neonatal mortality rate due to avoidable causes reducible by adequate attention to women at birth - factors associated with neonatal mortality are iatrogenic prematurity and asphyxia in childbirth as a result of undue interruption of pregnancy and interventions during labor and delivery;[12]

● Rate of neonatal deaths from preventable causes reducible by adequate attention to the newborn - one of the major causes of neonatal mortality is neonatal infections, which can be reduced with appropriate care for the newborn.[8]

It is detailed that the secondary variables that contributed to the understanding of the behavior of the primary variable are:

● Gestational age - a method used to evaluate gestational age, which can be estimated by ultrasonography (USG) or date of last menstruation (DLM). It is understood that this evaluation is important, since prematurity is the main cause of infant mortality and some important neurocognitive, pulmonary and ophthalmological morbidities;[13]

● Birth weight - increased risk of neonatal death is also associated with the characteristics of the newborn, with birth weight being one of the main factors related.[1]

It is known, with regard to the way of delivery, that the cesarean section brings more chances of neonatal prematurity and mortality, a greater period of separation between mother and baby, leading to delay and difficulty in lactation, longer hospitalization time[14], among others consequences that influence the neonatal outcome; despite this, this variable was not considered, because a significant number of "ignored" type of delivery was presented in the data available on the target collection platform, which makes this data unreliable for discussion.

Data was collected through the DATASUS platform, fed by the Information System on Live Births (SINASC), during the months of February and March of 2018. The data were tabulated manually, presenting them in the form of tables and graphs produced in Excel. Neonatal mortality rates of preventable causes were calculated based on the number of deaths of residents from seven to 27 days of age due to preventable causes/number of live births of resident mothers times thousand. Data were analyzed and discussed later, based on the scientific basis of articles referring to the research in question. Besides articles, books and official government documents were consulted for the elaboration of this research.

RESULTS

It is described that between the years 2011 and 2015, 2,383 neonatal deaths occurred due to avoidable causes due to adequate attention to women during pregnancy (37.9%), delivery (17%) and newborn (45.1%). The behavior of mortality rates over the years was analyzed in Figure 1 to analyze the effects of the implantation of the Stork Net on neonatal deaths due to preventable causes.
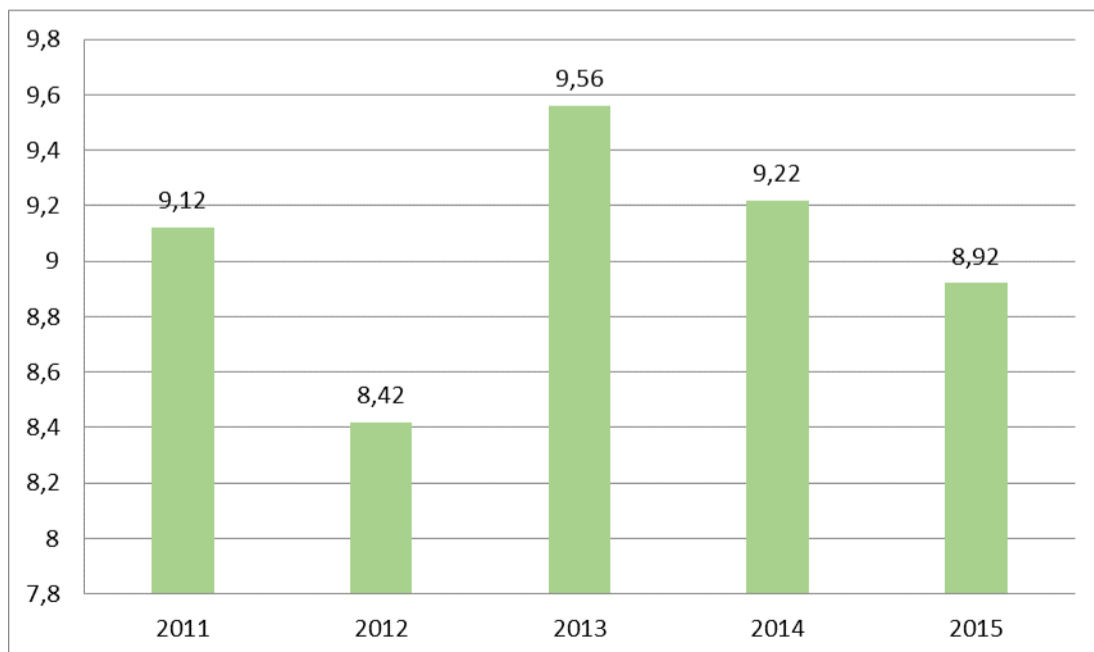

Figure 1. Neonatal mortality rate due to avoidable causes reducible by adequate attention to women in gestation and delivery and to the newborn per thousand live births. Maceió (AL), Brazil, 2018. Source: MS / SVS / DASIS - Information System on Live Births - SINASC

It was taken into account that each subgroup corresponds to a different area in the care and, to better demonstrate the effects of preventable deaths in the general numbers, considering their causes and effects, will be analyzed separately the causes reducible by adequate attention to the woman during pregnancy, in childbirth, and by adequate attention to the newborn.

As regards care for women during pregnancy, a reduction in the mortality rate in the second year of implementation of the SN in 2012 was 3.02 / 1,000 NV, while in 2013 it was 3, 28/1000 NV. The rate of 3.64 / 1,000 NV was achieved in 2014, while in 2015 its value was 3.42 / 1000 NV.

In order to better understand this behavior, we analyzed the main avoidable causes of neonatal deaths in the gestational period in Figure 2.

Avoidable causes	2011	2012	2013	2014	2015
Reduced by care for women during pregnancy	3.74	3.02	3.28	3.64	3.42
Fetus and newborn affected by maternal conditions	0.51	0.38	0.38	0.54	0.48
Fetus and newborn affected by maternal complications in pregnancy	0.28	0.40	0.46	0.35	0.34
Short-term and low birth weight gestational disorders	0.55	0.51	0.70	0.46	0.42
Respiratory distress syndrome in the newborn	1.69	1.2	1.05	1.56	1.47
Others	0.70	0.53	0.68	0.73	0.71

Figure 2. Neonatal mortality rate due to avoidable causes reducible by adequate attention to women during pregnancy. Maceió (AL), Brazil, 2018. Source: MS / SVS / DASIS - Information System on Live Births - SINASC

Figure 2 shows the most significant causes of mortality in relation to the gestational period of the woman that were observed. In "Others", the deaths from avoidable causes are condensed with less expressive values: congenital syphilis; diseases; fetus and newborn affected by complications in the placenta and membranes; delayed fetal growth and fetal malnutrition; pulmonary hemorrhage originating in the perinatal period; non-traumatic intracranial hemorrhage of the fetus and newborn; other haemolytic diseases of the fetus and newborn due to isoimmunization and necrotizing enterocolitis of the fetus and newborn.

Among the deaths affected by maternal affections mentioned in the table are: maternal hypertensive disorders; maternal renal and urinary tract diseases; infectious and parasitic diseases of the mother; maternal circulatory and respiratory diseases and maternal nutritional disorders.

Referem-se os óbitos causados por complicações maternas da gravidez, segundo a descrição do Ministério da Saúde e CID-10, a casos como incompetência do colo uterino, ruptura prematura das membranas, oligodrâmnio, polidrâmnio, gravidez ectópica, gravidez múltipla, morte materna e apresentação anormal antes do parto.

Low birth weight and low birth weight infants are known for the disorders related to short duration and low birth weight, as well as infants with extreme immaturity and the other preterm infants. It was observed that, between 2011 and 2015, most of them (29%) occurred between 22 and 27 weeks, weighing between 500 and 999 grams, in 41% of the cases.

As for respiratory distress syndrome, 40% of deaths occurred between 22 and 27 weeks, while between 37 and 41 weeks there was a percentage of only 4%.

Neonatal deaths can also be reduced by proper care of women during childbirth. It was observed that, in the first year of SN implantation, the mortality rate of preventable deaths for this subgroup was 1.45/1000 NV, reaching 1.68/1000 NV in 2013, 1.47/1000 NV, in 2014, and, in the year 2015, at 1.43/1000 NV.

The main causes of preventable deaths due to adequate childbirth care are shown in figure 3.

Avoidable causes	2011	2012	2013	2014	2015
Reduced by adequate attention to women at childbirth	1.67	1.45	1.68	1.46	1.43
Newborn fetus affected by other complications at birth	0.13	0.19	0.13	0.04	0.17
Intrauterine hypoxia and asphyxia at birth	0.88	0.65	0.97	0.73	0.63
Neonatal aspiration syndrome except milk and regurgitated foods	0.44	0.44	0.46	0.56	0.46
Others	0.22	0.17	0.11	0.13	0.17

Figure 3. Neonatal mortality rate due to avoidable causes reducible by adequate attention to the woman in childbirth. Maceió (AL), 2018. Source: MS / SVS / DASIS - Information System on Live Births - SINASC

The other causes were condensed, because they had little expressive numbers presented in "others", which correspond to deaths due to: placenta previa and other forms of placental detachment and hemorrhage; cord injury and birth trauma.

The complications of labor and delivery according to ICD-10, fetuses and newborns affected by childbirth and pelvic extraction, among other factors, include poor positions and disproportions during labor and delivery, use of forceps, vacuum extractor, cesarean delivery, precipitated delivery, abnormal uterine contractions, among other unspecified complications.

Neonatal aspiration syndrome is associated with aspiration of meconium, amniotic fluid, mucus, blood and syndromes by unspecified aspiration, and aspiration of milk and regurgitated food is not considered.

It is also noted that the last component analyzed was deaths due to preventable causes of adequate care for the newborn, and for this subgroup alone, 1,075 deaths were recorded in the State between 2011 and 2015.

The mortality rate for this subgroup was 3.7 / 1000NV in the first year analyzed (2011), reaching 3.94 / 1,000NV and 4.61 / 1,000NV in 2012 and 2013 , respectively, and in the last two years the values were 4.1 / 1,000NV in 2014 and 4.05 / 1.000NV in 2015.

In figure 4, the death rates of the most significant causes of death in this component.

Avoidable causes	2011	2012	2013	2014	2015
Reduced by adequate attention to the newborn	3.70	3.94	4.61	4.1	4.05
Specific respiratory disorders of the neonatal period	1.21	1.43	2.05	1.21	1.16
Perinatal infections except SNS and congenital viral hepatitis	1.93	1.96	2.27	2.43	2.48
Others	0.55	0.55	0.28	0.46	0.4

Figure 4. Neonatal mortality rate due to avoidable causes reducible by adequate attention to the newborn. Maceió (AL), 2018. Source: MS / SVS / DASIS - Information System on Live Births - SINASC.

The causes with the number of less significant deaths were described as "others", which correspond to the following causes: neonatal hemorrhage; other neonatal jaundice; transient endocrine and metabolic disorders; disorders of the digestive system, except necrotizing enterocolitis, and conditions that compromise the tegument and thermal regulation of the newborn.

The specific respiratory disorders of the neonatal period are related to transient tachypnea of the newborn and to other respiratory disorders, except respiratory distress syndrome.

It is added that the infections included in this data are: cytomegalovirus congenital infection; herpes (simple) and other congenital viral diseases, with the exception of viral hepatitis and congenital rubella. Septicemias in general are considered in addition to these, since in 2015 alone, 130 deaths occurred due to neonatal infections in the State of Alagoas.

DISCUSSION

It is understood that prenatal and hospital care provided to women and the newborn are the main determinants of neonatal mortality in health services, [1] thus avoidable deaths related to the newborn are those that are reduced by adequate attention to women during pregnancy, delivery and the newborn.[5]

According to the data collected, it was noted that, after the reduction in the second

year of program implementation, there was a significant increase in deaths in the year 2013, reaching 9.56 / 1,000 NV, and in the following years, however , the fall in the indexes was again observed; even though the reductions that occurred after 2013 did not reach the levels found in 2012, from 8.42 / 1,000 NV.

This behavior can be better analyzed by observing the main causes of preventable deaths occurring in each of the years in question (Tables 1, 2 and 3). It is also possible to raise the hypothesis of underreporting in 2012 of cases of neonatal deaths due to preventable causes, which would lead to a significant reduction in rates.

It is believed that gestation is a physiological phenomenon where several expected changes occur in the woman's body, however, there may be problems in their evolution, where the health of the mother and baby may be put at risk.[15]

It is pointed out that risk factors that bring complications to gestation can be controlled by prenatal care, as well as the detection and timely treatment of complications that may be permitted, contributing to favorable perinatal and maternal outcomes.[16]

There was a reduction in the mortality rate in the second year of SN implantation, from 3.02 / 1,000 NV, with a consecutive increase in the year 2013 to 3.28 / 1,000 NV. However, it is possible to observe that, in relation to the avoidable deaths in prenatal care, shown in table 1, there was also an increase in the rate expressed in 2014, unlike Chart 1, reaching 3.64 / 1,000 NV , and despite the slight drop in the mortality rate due to preventable causes in the gestation presented in the year 2015, its value, of 3.42 / 1,000 NV, is still higher than that verified in the years of 2012 and 2013.

It was found that, in 2012, there was an increase only in cases of deaths caused by maternal complications of pregnancy; already in 2013, in addition to the maternal complications, there was also an increase in the disorders related to gestation of short duration and low birth weight.

It should be noted that, in 2014, however, the second highest mortality rate due to avoidable deaths during gestation was achieved, especially the increase in deaths due to maternal affections and respiratory distress syndrome in the newborn, where they were demonstrated the highest rates among all preventable causes during the gestational period, reaching 1.69 / 1,000 NV in 2011.

The developmental disorder due to respiratory distress syndrome is the largest cause of death in the subgroup "Attention to women in gestation", which is characterized by respiratory failure, of variable degrees, related mainly to premature birth and related injuries.[20] It can be observed, as observed in the literature, that there is, in this study, the demonstration of an inversely proportional relation of gestational age with the percentage of deaths of newborns affected by respiratory distress syndrome.

The need for improvement in prenatal care in the predominance of deaths due to respiratory distress syndrome is demonstrated. It is necessary, for significant advances, in the adequate management of this condition, including the development of prenatal diagnosis, in order to identify neonates at risk by preventing the disease by antenatal administration of glucocorticoids, improvements in perinatal treatment and neonatal, advancement in respiratory support and surfactant replacement therapy.[17]

In the prenatal component of SN, the evaluation and classification of risk and vulnerability, access to prenatal high-risk in a timely manner, as well as the accomplishment and receipt of test results in a timely manner,[18] so that any intercurrence that may occur during pregnancy is prevented.

It is also determined a greater number of prenatal consultations for the reduction of neonatal mortality. Therefore, the importance of care during gestation is indicated, since a quality assistance to the pregnant woman ensures that problems are identified and that there is a prior intervention, reducing the risks and damages caused to the health of the newborn, since the premature newborns can rapidly evolve to death or require a long period of hospitalization.[19]

In addition to the number of consultations and the early start of prenatal care in the first trimester, routine examinations and the detection and treatment of maternal diseases are of paramount importance for quality assistance to pregnant women, being objectives of CR with regard to prenatal care.[1] It is known that preterm birth, failure to detect hypertensive disorders and other diseases initiated during pregnancy or that are discovered and not controlled during prenatal care can be caused by the lack of interventions at the appropriate time of pregnancy, thus generating , unfavorable results for both the mother and the child.[16]

There is now an intense medicalization of labor and birth, at the same time that the rates of maternal and perinatal morbidity and mortality remain high. This situation is possibly related to poor quality of care and to

the use of "obsolete and iatrogenic" practices, which may have repercussions on perinatal outcomes.[7]

It should be noted that, despite the reduction in the mortality rate observed in 2012, an increase from 0.13 to 0.19 deaths / 1,000 NV was presented in deaths related to complications of labor and delivery. A significant decline was observed in 2014, however, with the second highest rate in 2015, when their numbers were raised to 0.17 / 1000 NV.

It is seen, when observed complications of labor, that they affect perinatal outcomes when "obsolete and iatrogenic" practices are used [7]; However, although there are still deaths related to obsolete practices, the use of health-care practices based on scientific evidence is advocated by CR, according to the 1996 World Health Organization document: "Good practices in childbirth care and at birth".[18]

In 2013, a significant increase in the rates of the subgroup "Women's Care at Childbirth" was associated with an increase in the rate of intrauterine hypoxia and asphyxia at birth, which reached 0.97 / 1,000 NV, as well as an increase in deaths neonatal aspiration syndrome. It was verified, however, that in the year 2014 neonatal aspiration syndrome had its highest value reached of 0.56 / 1000 NV, and deaths due to hypoxia and intrapartum asphyxia, in turn, could be reduced in 36% in countries such as Brazil, with access to health care at birth and birth.[12]

The high values of neonatal aspiration syndrome have been maintained over the years, and one of the possible reasons for this specific neonatal mortality rate is the problems in the organization of the Brazilian perinatal care system, which forces women about to give birth. light to visit more than one hospital before being hospitalized in a maternity ward occasionally in a municipality far from their homes.[9]

It should be emphasized that the fourth component of CR refers to a set of actions related to the logistics system related to health transportation and its regulation, where one of the actions is, in emergency situations, access to safe transportation for pregnant women through of the Emergency Mobile Assistance System - SAMU Stork, as well as the implementation of the "Vaga Always" model, with a plan to link the pregnant woman to the place of birth.[18]

The challenge of reducing asphyxia in childbirth as a result of undue interruption of pregnancy and interventions during labor and delivery, still frequent in the Brazilian reality, is highlighted in relation to childbirth care, since these factors are associated with neonatal mortality. It has been related the increase of the prematurity, in studies, to the high cesarean rates in the country, demonstrating the importance of the incentive to the normal birth.[12]

Infants, considering that the main component of infant mortality is currently the early neonatal (0-6 days of life) and that a large part of infant deaths occur in the first 24 hours (25%) [7], a close relationship of these deaths with the assistance to the NB.

It is observed that among all the subgroups of avoidable causes considered in this study, the highest rates correspond to deaths related to newborn care, corresponding to 1,075 deaths between 2011 and 2015.

It is pointed out, unlike the other subgroups, that few falls were presented by the rates related to newborn care, maintaining their high rates over the years, where their peak was reached in 2013, with 4.61 / 1,000 NV, and despite the reduction that occurred in 2015, falling to 4.05 / 1000 NV, the rate still remained higher than in the first years of CR implementation.

From 2012 on, there was an increase in the rates of the main causes described, with the highest rate of specific respiratory disorders in the neonatal period presented in the year 2013, with 2.05 / 1000 NV. The following year, in 2014, the figures for 2011 were increased, with 1.21 / 1.1000 NV, and these continued to decline in 2015, with 1.16 / 1.000NV; however, despite the reduction presented, it is still a significant value.

It is confirmed that an alarming finding that can be observed is the progressive increase in deaths from specific infections in the neonatal period from 2012 to 2015, when 2.48 / 1,000 NV was reached, with a total of 130 deaths in that year alone.

Neonatal infections are considered to be difficult to handle clinically, since in a hospital environment there is a wide variety of pathogenic microorganisms, since it is considered to be a contaminated environment, especially in Intensive Care Units (ICU), where there is frequent use of broad spectrum antibiotics associated with routine invasive procedures, increasing the risk of hospital infections.[20]

In this way, the NB in the Neonatal Intensive Care Unit (NICU) may become unstable due to the underlying disease itself or due to the treatment that is imposed as well as through the use of medications or

through mechanical ventilation. These factors may contribute to the fact that the newborn infants in these units are more susceptible to infections or other complications.[21]

In terms of care for the newborn, neonatal infections are one of the major causes of neonatal mortality[8]. This finding is found in the literature in the State of Alagoas, which has, year after year, increased the number of deaths due to neonatal infections, against the targets related to the reduction of neonatal mortality due to preventable causes.

It is noticed that, despite a series of mechanisms available by the NB, both specific and non-specific, to deal with the infection, many of these are not sufficiently developed in the NB, especially in the preterm; thus, insufficient cellular immunity, added to the condition that led to the hospitalization of the newborn, makes it more susceptible not only to infections, but also to the prolongation of its hospitalization in NICU for its recovery.[20]

It is also recommended, with the increasing number of deaths over the years that could be avoided with an adequate assistance to the NB, that one of the guidelines brought by SN is the guarantee of health care for children from zero to twenty-four months with quality and resolution, as well as the guarantee of good practices and safety in the attention to the newborn.[18]

In this study, the large percentage of data ignored in important and relevant aspects to be analyzed in neonatal mortality, such as the way of delivery and maternal age, as well as the lack of access to the annual reports of the Stork Network were analyzed. restrictive factors for this research.

CONCLUSION

It was possible to carry out, through this study, a description of the impact of the implantation of the Stork Network on neonatal deaths due to preventable causes in the State of Alagoas, as well as its main causes in the components related to prenatal care, childbirth and newborn care , after the implementation of the program.

It is inferred, however, that satisfactory results were not demonstrated by the Stork Network in the aspect under study, where a significant impact in rates of several avoidable causes of neonatal deaths was not identified, being possible until the observation of the increase in the number of deaths in some cases. Thus, the need for greater applicability of the actions advocated by the program, supervision by the responsible bodies and adherence by the professionals of the

recommendations made by this policy are observed.

It is therefore suggested that studies be carried out to deepen the theme, with the identification of possible external causes that may have generated oscillations in neonatal mortality rates in the State, so that the effectiveness of the actions recommended by the Stork Network is guaranteed.

REFERENCES

1. Gaiva MAM, Fujimore E, Sato APS. Maternal and child risk factors associated with neonatal mortality. Texto contexto-enferm. 2016 Dec; 25(4):e2290015. Doi: http://dx.doi.org/10.1590/0104-07072016002290015

2. Pinho JR, organizador. Conceitos e ferramentas da epidemiologia. São Luís: EDUFMA; 2015.

3. Reis RS, organizador. Epidemiologia: conceitos e aplicabilidade no sistema único de saúde [Internet]. São Luís: EDUFMA; 2017 [cited 2018 June 15]. Available from: https://ares.unasus.gov.br/acervo/handle/ARES/9070

4. Silva CF, Leite AJM, Almeida NMGS, Leon ACMP, Olofin I, et al. Factors associated with neonatal death in high-risk infants: a multicenter study in High-Risk Neonatal Units in Northeast Brazil. Cad Saúde Pública. 2014 Feb; 30(2): 355-68.Doi: http://dx.doi.org/10.1590/0102-311X00050013

5. Nascimento LFC, Almeida MCS, Gomes CMS. Neonatal mortality and avoidable causes in the micro regions of São Paulo state. Rev Bras Ginecol Obstet. 2014 July; 36(7):303-9.Doi http://dx.doi.org/10.1590/SO100-720320140005012

6. Carlo WA, Travers CP. Maternal and neonatal mortality: time to act. J Pediatr. 2016 Nov/Dec; 92(6):543-5. Doi: http://dx.doi.org/10.1016/j.jped.2016.08.001

7. Lansky S, Friche AAL, Silva AA, Campos D, Bittencourt SDA, Carvalho ML, Frias PG, et al. Birth in Brazil survey: neonatal mortality, pregnancy and childbirth quality of care. Cad Saúde Pública. 2014 Aug; 30 (Suppl 1): S192-S207. Doi: http://dx.doi.org/10.1590/0102-311X00133213

8. Daripa M, Caldas HM, Flores LP, Waldvogel BC, Guinsburg R, Almeida MF. Perinatal asphyxia associated with early neonatal mortality: populational study of avoidable deaths. Rev Paul Pediatr. 2013 Jan/Mar;31(1):37-45. Doi: http://dx.doi.org/10.1590/S0103-05822013000100007

9. Kassar SB, Melo AMC, Coutinho SB, Lima MC, Lira PIC. Determinants of neonatal death with emphasis on health care during pregnancy, childbirth and reproductive history. J Pediatr. 2013 May/June; 89(3):269-77.Doi: https://doi.org/10.1016/j.jped.2012.11.005

10. Pinheiro JMF, Tinoco LS, Rocha ASS, Rodrigues MP, Lyra CO, Ferreira MAF. Childcare in the neonatal period: evaluation of neonatal mortality reduction pact in Rio Grande do Norte, Brazil. Ciênc Saúde Coletiva. 2016 Jan; 21(1):243-52.   Doi: http://dx.doi.org/10.1590/1413-81232015211.09912014

11. Prodanov CC, Freitas EC. Metodologia do Trabalho Científico: Métodos e Técnicas da Pesquisa e do Trabalho Acadêmico [Internet]. 2nd ed. Novo Hamburgo: Universidade FEEVALE; 2013 [cited 2018 Aug 08]. Available from: http://www.feevale.br/Comum/midias/8807f05a-14d0-4d5b-b1ad-1538f3aef538/E-book%20Metodologia%20do%20Trabalho%20Cientifico.pdf

12. França EB, Lansky S, Rego MAS, Malta DC, França JS, Teixeira R, et al. Leading causes of child mortality in Brazil, in 1990 and 2015:estimates from the Global Burden of Disease study. Rev Bras Epidemiol. 2017 May; 20(Suppl 1):46-60. Doi: http://dx.doi.org/10.1590/1980-5497201700050005

13. Araújo BF, Zatti H, Madi JM, Coelho MB, Olmi FB, Canabarro CT. Analysis of neonatal morbidity and mortalityin late-preterm newborn infants. J Pediatr. 2012 May/June; 88(3): 259-66. Doi: http://dx.doi.org/10.2223/JPED.2196

14. Bittencourt F, Vieira JB, Almeida ACCH. Pregnant women's conceptions regarding caesarean birth. Cogitare Enferm. 2013 July/Sept; 18(3):515-20. Doi: http://dx.doi.org/10.5380/ce.v18i3.33565

15. Borba GG, Neves ET, Arrué AM, Silveira A, Zamberlan KC. Factors associated with neonatal morbidity and mortality: a review. Saúde (Santa Maria). 2014 Jan/July; 40(1):09-14. Doi: http://dx.doi.org/10.5902/223658347774

16. Pereira JA, Escobar EMA. Nursing care to premature newborn with respiratory distress syndrome: an integrative review. Saúde Foco. 2016 July/Dec;3(2):17-36. Doi: http://dx.doi.org/10.12819/rsf.2016.3.2.2

17. Ministério da Saúde (BR), Gabinete do Ministro. Portaria nº 1.459, de 24 de junho de 2011. Institui, no âmbito do Sistema Único de Saúde - SUS - a Rede Cegonha [Internet]. Brasília: Ministério da Saúde; 2011 [cited 2018 Aug Sept 10]. Available from: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2011/prt1459_24_06_2011.html

18. Pereira RC, Figueirosa MN, Barreto IC, Cabral LNC, Lemos MLC, Marques VLLR. Epidemiological profile of perinatal mortality and preventability. J Nurs UFPE on line. 2016 May; 10(5):1763-72. Doi: https://doi.org/10.5205/1981-8963-v10i5a13555p1763-1772-2016

19. Carvalho ML, Araújo TRN, Santos CFB, Sousa AFL, Moura MEB. Hospital infections in intensive care unit neonatal. R Interd [Internet]. 2014 Oct/Dec [cited 2018 June 9];7(4):189-98. Available from: https://revistainterdisciplinar.uninovafapi.edu.br/index.php/revinter/article/view/539/pdf_176

20. Vasconcelos GAR, Almeida RCA, Bezerra AL. Repercussion of physiotherapy in the neonatal intensive care unit. Fisioter Mov. 2011 Jan/Mar; 24(1):65-73. Doi: http://dx.doi.org/10.1590/S0103-51502011000100008

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