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# NEONATAL DEATH FACTORS IN VERY LOW BIRTH WEIGHT INFANTS

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**ABSTRACT**

***Introduction:*** Infant mortality rate (IMR) is one of the health indicators used to assess the health conditions, economic development and quality of life of a population. Neonatal mortality has been the main component of child mortality since the 1990s in the country and has been maintained at high levels, with a rate of 11.2 deaths per 1,000 live births in 2010.***Methods:*** The study was conducted in compliance with the provisions of the Guidelines and Regulatory Standards for Research Involving Human Beings imposed by Resolution CNS 466/12,the Department of Teaching and Research and the Research Ethics Committee of the Santa Casa de Misericórdia do Pará Foundation(CAAE 44804515.4. 0000.5171) with the approval of Plataforma Brasil through the opinion nº 1.074.331 dated 05/22/2015. ***Results:*** The findings of the present study showed women who underwent prenatal care incompletely and that despite a high record of prenatal complications, there were low records of antenatal corticosteroid use. Regarding data related to neonates, a predominant gestational age of 28 to 31 weeks was observed, with an average birth weight of 955g, with high data on the need for resuscitation in the delivery room accompanied by the use of surfactant, vasoactive drugs with invasive ventilatory support. Sedation and analgesia averaging 9.90 days and noninvasive mechanical ventilation averaging 9.19 days. The average length of stay in the intensive care unit was 13.15 days, which were reported as the cause of death, mainly pulmonary hemorrhage, septic shock and extreme prematurity, among others. ***Conclusion:*** Given these findings, we can see the fragility of health services in relation to the care of newborns with low weight in intensive care units. In addition, it is necessary to update routines, continuing education and studies to improve care according to the particularities of this population. This way newborns can have a better survival.



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## INTRODUCTION

Infant mortality rate (IMR) is one of the health indicators used to assess the health conditions, economic development and quality of life of a population (Santos *et al.,* 2014). In 2015, of the 5.9 million under-five deaths, 2.7 million occurred in the neonatal period. In Brazil, even with the 73% reduction in IMR, 16 infant deaths occur for every 1,000 live births (LB), which may vary due to regional disparities (You *et al.,* 2013).Neonatal mortality has been the main component of child mortality since the 1990s in the country and has been maintained at high levels, with a rate of 11.2 deaths per 1,000 live births in 2010 (Maranhão *et al.,* 2012). The main component of child mortality today is early neonatal (0-6 days of life) and most child deaths occur within the first 24 hours (25%), indicating a close relationship with childbirth care (França and Lansky, 2009).However, these mortality levels are considered to be below the country's potential, and reflect unfavorable living conditions of the population and health care, in addition to historical regional and socioeconomic inequalities (Victora *et al.,* 2011; Barros *et al.,* 2010). With the end of the era of the Millennium Development Goals in 2015, projections regarding mortality rates in the country, especially in the neonatal period, indicate that they will still remain high, varying their level of growth according to causes, among them. prematurity, congenital malformation, intrapartum asphyxia, perinatal infections and maternal factors stand out, with a considerable proportion of preventable deaths from health services (Maranhão *et al.,* 2012). In Brazil, the main causes of neonatal deaths are intrauterine and intrapartum asphyxia, low

birth weight, respiratory disorders of the newborn, infections and prematurity. These are situations linked to prevention failures, requiring improved access, quality and use of health services and equitable distribution of resources (Leite*et al.,* 1996).There is evidence that more than 70% of neonatal deaths occur due to preventable causes, especially due to the lack of adequate attention to pregnant women and newborns2-4. Prematurity stands out as the main cause of infant deaths occurring in the first week of life in all regions of the country, and the second cause of death is asphyxia / hypoxia in the North and Northeast Regions, and in other regions congenital malformations predominate (Gorgot *et al.,* 2011; Ministério da Saúde, 2011; Ministério da Saúde, 2018). The health care contexts of each region of Brazil have particular characteristics that need to be well known locally. They need to be transformed from simple data into reliable and valid information that can be processed and analyzed in a timely manner to support managers' actions in the various decision-making spheres. Given the relevance of the theme, the present study aimed to analyze the profile of newborns weighing less than or equal to 1,500 g in a neonatal intensive care unit relating their morbidity and mortality, length of stay and weight variations in a hospital. reference for high risk pregnancy located in the metropolitan region of Belém-Pará.

## METHODOLOGY

The study was conducted in compliance with the provisions of the Guidelines and Regulatory Standards for Research Involving Human Beings imposed by Resolution CNS 466/12, the Department of Teaching and Research and the Research Ethics Committee of the Santa Casa de Misericórdia do Pará Foundation (CAAE 44804515.4. 0000.5171) with the approval of Plataforma Brasil through the opinion nº 1.074.331 dated 05/22/2015. This is a retrospective descriptive epidemiological study through the analysis of medical records of newborns weighing ≤ 1500 grams at birth and who were hospitalized in the neonatal intensive care units of a high-risk university referral hospital in the Brazilian Amazon during the period. from January 1 to December 31, 2014. For operational reasons, the sample was random and convenient, based on hospitalizations and weight cutoff ≤ 1,500 grams. We excluded all medical records with incomplete information according to the data collection protocol of newborns greater than 1,500 g who were born in another hospital, with some kind of congenital and / or twin malformation. The maternal variables used in the research were: age (in years); provenance (own municipality versus others); schooling; parity (primiparous versus non-primiparous); number of prenatal consultations (<6 or ≥ 6 consultations); gestational risk (usual versus high); hospitalization during pregnancy; use of antenatal corticosteroids and type of delivery (vaginal versus cesarean).
The neonatal variables used were: gender, birth weight (in grams), gestational age (in weeks), Apgar score, delivery room resuscitation, use of mechanical ventilation, use of surfactant, corticosteroids and dosage number, use of sedation and vasoactive drugs, length of stay in the unit (in days), time of invasive and noninvasive mechanical ventilation (in days), use of drains, use of antibiotics, use of analgesia and discharge information. Data were processed in a database created by the Statistical Package for Social Sciences (SPSS) for Windows (version 20.0). Descriptive analysis of the data with absolute and percentage numbers was performed to obtain the absolute and relative average frequencies and standard deviation of the numerical variables studied, and the prevalence of the investigated outcomes. To verify if the differences between the cross variables were significant, we used nonparametric tests based on the sample, variable and data type (categorical). The chi-square independence test was applied a priori in the tables to verify if the differences were statistically significant. In cases where the chi-square became unfeasible, the non-parametric chi-square test was used. As G-test of independence in the sample composed of 176 individuals, respecting the basic assumptions for the application of these tests.

## RESULTS

The findings of the present study showed women who underwent prenatal care incompletely and that despite a high record of prenatal complications, there were low records of antenatal corticosteroid use. Regarding data related to neonates, a predominant gestational age of 28 to 31 weeks was observed, with an average birth weight of 955g, with high data on the need for resuscitation in the delivery room accompanied by the use of surfactant, vasoactive drugs with invasive ventilatory support. sedation and analgesia averaging 9.90 days and noninvasive mechanical ventilation averaging 9.19 days. The average length of stay in the intensive care unit was 13.15 days, which were reported as the cause of death, mainly pulmonary hemorrhage, septic shock and extreme prematurity, among others. Finally it was found that low birth weight, length of stay of up to seven days, use of surfactant and septic shock associated with sepsis were the variables that seemed to explain the recorded deaths. Thus, neonates weighing less than 1000 grams, submitted to mechanical ventilation for more than ten days and with shorter hospital stays were more likely to die than the others in the population studied. In this study, 248 medical records of newborns with birth weight ≤ 1,500 g and who were admitted to the hospital's intensive care units from January to December 2014 were identified. Of these, only 176 (71%) were eligible for the study. During the study period, the number of births in the capital studied (with birth weight between 1000 and 1499g) was 421 (Ministry of Health, 2018) and the sample studied was 41.8% of the total. Maternal age ranged from 44 years to 1 year with an average of 25.06 years. The age range between 24 and 30 years is characteristic of mothers coming from the interior of the state, being the municipality of Ananindeua the most prevalent. Most mothers had one or more children (59.1%). Regarding prenatal care, it was observed that most mothers had some consultation, but incompletely (75.2%), according to WHO (2012). Prenatal complications were high, with urinary tract infection being the most frequent (16.0%), followed by leukorrhea (15.3%) and preeclampsia (12.5%), respectively. The use of antenatal corticosteroids was low (17.0%) taking into account the study population that is the largest beneficiary of such practice. There was no influence on the type of delivery (vaginal delivery 46.89% versus 52.54% caesarean delivery).Regarding newborn-related data, gestational age ranged from 20 to 41 weeks, with an average of 29.85. With a predominance of 28 to 31 weeks, and the weight ranged from 496g to 1485g with an average of 955g. The Apgar score after 5 minutes was 7.36 on average, however, in most newborns some kind of resuscitation occurred in the delivery room. Regarding resources used, many made use of surfactant still in the delivery room, as well as the use of vasoactive drugs, with the most frequent combination scheme dopamine and dobutamine. In 67 (56.30%) newborns sedation and analgesia were

indicated, and the most frequent association was midazolan with fentanyl. The minimum sedation / analgesia use time was 24 hours and the maximum 69 days, with an average of 8.73 days. In addition, the most commonly used ventilatory support was mechanical ventilation through the tracheal tube in time-limited pressure-controlled synchronized intermittent mechanical ventilation (SIMV-TCLP) with 162 (92.04%) cases. The maximum mechanical ventilation time was 69 days and a minimum of only one day (average of 9.90 days). From the total of 38 newborns (21.5%) used noninvasive ventilation, with a maximum time of 45 days, and a minimum of one day and an average of 9.19 days. Only four (2.27%) newborns required tracheostomy. The use of drainage corresponded to five babies (2.84%) and of these the thoracic was the most used for intervention of hypertensive pneumothorax. Table 1 describes the hospitalization data of the research neonates.

**Table 1. Data of hospitalization of newborns**

| ICU time | N | % |
|---|---|---|
| Até 7 | 98 | 55,68 |
| 8 a 14 | 24 | 13,63 |
| 15 a 21 | 23 | 13,06 |
| 22 a 28 | 12 | 6,81 |
| ≥ a 29 | 19 | 10,79 |
| Complications | | |
| Yes | 171 | 97,15 |
| No | 5 | 2,84 |
| Major Complications | | |
| Hypovolemic shock | 64 | 36,36 |
| Sepsis | 61 | 34,65 |
| Pulmonary hemorrhage | 30 | 17,04 |
| Pneumonia | 22 | 12,5% |
| Infection | | |
| Yes | 106 | 60,22 |
| No | 70 | 39,78 |
| Culture | | |
| ICS | 51 | 48,11 |
| Lung | 45 | 42,45 |
| Urine | 1 | 0,94 |
| LCR | 1 | 0,94 |
| Agents | | |
| Klebsiella *sp* | 28 | 26,41 |
| Cândida*sp* | 22 | 20,75 |
| Acinetobacter*sp* | 23 | 21,69 |
| Staphylococcus *sp* | 13 | 12,26 |
| Antibiotic generation | | |
| 1º generation | 124 | 70,45 |
| 2º generation | 13 | 7,38 |
| 3º generation | 21 | 11,93 |
| 4º generation | 18 | 10,22 |

Source: Research Protocol

The minimum ICU stay was only one day, and the maximum was 145 days, with an average length of stay of 13.15 days (TABLE I). Of the total of 176 neonates, 142 (80%) died, and 40.8% (58) reported pulmonary hemorrhage as the cause of death, followed by septic shock in 29 cases., 5% (42) and extreme prematurity in 16.9% (23), other etiologies reported were respiratory failure, obstructive shock and sepsis in 8.5% (15) of the records. Table 2 shows the result of the crossing between the newborn and hospitalization variables with the neonatal death outcome. Table 2 shows the variables that were statistically significant for the death outcome in the study population. Thus, low birth weight (p = 0.001), length of stay of up to seven days (p = 0.000), surfactant use (p = 0.000) and septic shock associated with sepsis (p = 0.001) seem to have contributed significantly to the occurrence of deaths in the institution investigated. This result was confirmed by logistic regression of death, observing that the lower the weight (<1000g) and the shorter the hospitalization time increased the chances of occurrence (3.85 / 0.07). Similar result occurred at ventilation time> 10 days (6,74).

**Table 2. Frequency of neonatal deaths according to variables on hospital stay**

| Variables | Death | | | | | | p |
|---|---|---|---|---|---|---|---|
| | Yes | | No | | Total | | |
| | n | % | n | % | n | % | |
| **Birth weight range** | | | | | | | 0,001 |
| 496 a 1000g | 92 | 64,8 | 11 | 32,4 | 103 | 58,5 | |
| 1001 a 1500g | 50 | 35,2 | 23 | 67,6 | 73 | 41,5 | |
| **Length of ICU stay** | | | | | | | 0,000 |
| Up to 7 days | 94 | 66,2 | 4 | 11,8 | 98 | 55,7 | |
| More than 7 days | 48 | 33,8 | 30 | 88,2 | 78 | 44,3 | |
| **Surfactant** | | | | | | | 0,000 |
| Yes | 128 | 90,1 | 21 | 61,8 | 149 | 84,7 | |
| No | 14 | 9,9 | 13 | 38,2 | 27 | 15,3 | |
| **Complications** | | | | | | | 0,001 |
| Hip.shock + Sepsis | 142 | 100,0 | 30 | 88,2 | 172 | 97,7 | |
| Pulmonary H. + PNM | 0 | 0,0 | 4 | 11,8 | 4 | 2,3 | |
| Total | 142 | 100,0 | 34 | 100,0 | 176 | 100,0 | ------- |

p: probability calculated by the chi-square test.

## DISCUSSION

The study of 176 newborns less than or equal to 1500g showed the predominance of mothers in the constant age range of several studies, ie, 20-30 years. Thus, at the extremes of maternal reproductive life, complications often occur, which may cause, among others, preterm birth and low birth weight, and consequently greater need for hospitalization of the newborn in neonatal ICU. Although adolescence in itself is not a risk factor for pregnancy, there is a greater possibility of psychosocial risk and emotional immaturity, with several reflections on the pregnant woman's life, which may translate into non-adherence to the recommended during the follow-up. prenatal care (Azevedo *et al.,* 2002). Regarding parity, the study showed that almost 60% of pregnant women were multiparous. Ribeiro in his research sought to associate the number of pregnancy as a risk factor for newborns admitted to the NICU of Recife, not finding statistical significance in this category, emphasizing the contrary, that mothers with more than one child would have more experience in pregnancies, not causing possible pathologies triggered by stress. Studies associate prenatal care and neonatal morbidity in a NICU of a public hospital in southern Brazil, showing that 87% of mothers had more than six prenatal consultations completely. In another NICU in the same region, 79.8 of the mothers had the complete prenatal care. It was observed that the use of corticosteroids was minimally used, as about 82% of mothers did not receive it. Nevertheless, of the 30 (17%) of the NBs benefited, only seven (23%) were discharged and of the 23 (76.6%) who died, early mortality occurred in 16 (69.5%) of these. These results differ from other studies without obtaining in an NICU of University Hospital of Niterói / RJ, margin of 82.7% of newborns with gestational age of up to 34 weeks and weight of up to 1,500g whose mothers received antenatal corticosteroids (Drummond*et al.,* 2014). Other studies have also reported the use of antenatal corticosteroid therapy in mothers of newborns younger than 34 weeks, and this may have occurred to the detriment of incomplete prenatal care (Granzotto *et al.,* 2012; Risso *et al.,* 2010). Regarding the type of delivery, there was no difference between cesarean section and vaginal delivery (52.54% X 46.89%). A 2014 study found higher cesarean-type percentages in a NICU of a public maternity and maternity referral hospital in Piauí with 55.1% of cesarean deliveries. The number of cesarean deliveries in this study can be explained by the fact that these hospitals, as well as the other hospitals mentioned above, constitute teaching and reference hospitals in the state of prenatal care, high-risk delivery and birth, with a high flow rate. Intensive

and continuous pregnant women from all over the state, with care provided by spontaneous demand or referenced. Therefore, it is assumed that the small difference of 52% x 46% may suggest poor prenatal primary care as well as quality, often placing these women in preterm labor that could not be inhibited. Although 55% of newborns were male, there was no statistical difference between genders. In the literature, results similar to those found in this study were observed with a slight predominance of males over females in the NICUs, such as studies with 376 newborns in a Piauí NICU, of which 207 (55.1%) were male. male, with 302 neonates admitted to the NICU of the University Hospital of Santa Maria / RS, with 192 (58%) male (Arrué *et al.,* 2013), with information from 491 newborns admitted to the NICU of Taubaté / SP from 2005 to 2007 and 272 (55.40%) male newborns (Risso, 2010). The literature demonstrates the strong association of preterm male newborns and higher risk for morbidity and mortality compared to females, in addition to the association with lower gestational ages at birth, longer hospital stays, higher oxygen dependence, greater pulmonary hemorrhage. and use of postnatal steroids, lower Apgar scores at birth. For the most frequent gestational age variable, a variation of 28 to 31 weeks was found in the survey 47.15%. High percentages of prematurity, even to a lesser extent than found in this study, were also obtained in other studies(Risso, 2010) in three consecutive years of a NICU in Pelotas / RS with percentages of premature newborns of 71.1%, 72.8% and 75, 2%, in a Neonatal ICU of a teaching hospital in Santa Maria / RS with 65% of premature newborns (Basso *et al.,* 2012), in Itajubá / MG NICU with 70.58% of premature newborns, in 34 High Risk Neonatal Units of the Northern Network. Northeastern Perinatal Health in 9 states of the Northeast region of Brazil with 78.9% of premature infants (Silva *et al.,* 2014) and in NICU of Campo Grande / MS in 2002 with 64.1% of premature infants.

Regarding the repercussions caused by prematurity, a systematic review on the subject reveals the strong association between this condition and increased neonatal and infant morbidity and mortality compared to term newborns, with the main complications being respiratory, metabolic, infectious, intracranial hemorrhage. , necrotizingenterocolitis, increased admission to the Neonatal Intensive Care Unit and prolonged hospitalization, as well as long-term sequelae and complications (Silva *et al.,* 2014). A study on risk factors for neonatal mortality identified low birth weight associated with inadequate prenatal care and ICU admission as strong contributors. Other similar studies in which very low birth weight Rn's at birth admitted to the Neonatal ICU of a University Hospital in Campo Grande / MS showed a significant association for the occurrence of metabolic, neurological and infectious comorbidities, longer hospitalization and early neonatal death (Soares *et al.,* 2010).Unlike most studies, the Apgar score was seven at the fifth minute (Drummond *et al.,* 2014; Granzotto *et al.,* 2012; Risso, 2010; Machado Júnior *et al.,* 2017). However, such a positive result did not preclude the need for resuscitation in the delivery room, which occurred in 100 (56.81%). Of these, 81 (46%) were resuscitated with bag valve mask using 100% oxygen. However, in the NICU 162 (92%) babies arrived intubated with the 100% mask bag valve. In this context, the evidence demonstrates that such use in high oxygen concentration could be minimized with the use of Babypuff keeping a low PIP and PEEP, avoiding barotrauma and oxidative stress, harmful to the premature lung (Bittencourt *et al.,* 2014).The use of pharmacological management reported in research (Tronco *et al.,* 2010) corroborates the assistance found in the present study, the use of vasoactive drugs in neonates with hemodynamic shock, after volumetric resource, has been much discussed which scheme to use. He found that the use of dobutamine in combination with noradrenaline exerts an early reversal effect on hemodynamic instability. This relates to improved prognosis and the rate of cardiac resuscitation. Studies show concern about describing the use of sedatives and analgesics in newborns. Their findings were similar to the present study, reporting that the use of midazolam and fentanyl to relieve neonatal pain and stress, triggered by several factors such as prolonged mechanical ventilation, inadequate nutrition, episodes of oxygen saturation drops, intense lighting, constant noise, multiple procedures, describing that the use must be individualized. When evaluating the ventilatory resources performed in the study, mechanical ventilation was present in most infants, 162 (92.04%), noninvasive in nine (5.11%) and circulating oxygen therapy in five (2.82%).Regarding the length of stay in this study, we found that most newborns remained in the NICU up to seven days 98 (55.68%), and 78 (44.7%) had a longer stay in the units. In the studies found in the literature, a mean hospitalization of approximately that found in this study in Rio Grande do Sul NICU in 2006 was observed, with hospitalization time of low birth weight infants ranging from 01 to 160 days, with average hospitalization time of neonates. 19.6 days (Araújo *et al.,* 2005) and in the NICU of Minas Gerais, between 2012 and 201316, with an average of 21 days, showing a considerable discrepancy of our average results of 13.15 days. Therefore, such data may infer that the average length of stay tends to be characterized according to the severity of the public assisted there, suggesting higher average length of stay in those more complex NICUs located in hospitals with high risk of maternal and child referral. The present study showed that the main complications during hospitalization occurred in almost all of the research subjects 171 (97.15%), and of these the hypovolemic shock occurred in 64 (36.36%) followed by sepses 61 (34.65%) followed by pulmonary hemorrhage 30 (17.04%) demonstrating that the same ventilatory, nutritional and drug strategy needs to be differentiated according to gestational age and weight of the newborns at work.

Complications and reasons for hospitalization were diverse, similar results to this research were found in the literature (Soares and Menezes, 2010) in the Santa Maria / RS NICU with Prematurity in 172 (57%) of 302 newborns, followed by Respiratory Discomfort also with 172 (57%) and hypovolemic shock in 29 (10%) and NICU also in Santa Maria / RS between 2002 and 2006 with prematurity in 888 (54.5%) of 1628 neonates, respiratory causes in 881 (54.1%) and low weight 288 (17.7%) as the main reasons, and there was an association of complications at the time of hospitalization. It was noted that in 106 (60.22%) newborns admitted to the study, there was a positive infection for positive culture of bloodstream infection in 51 (48.11%) and the prevalent agent was Klebsiella sp in 28 (26.41%). %) followed by Candida sp, 22 (20.75%). These findings denote the poor quality of prenatal care, the importance of CCIH continuing education for prevention and hand washing, the overcrowding of NICUs, the failure of early enteral nutrition to minimize exuberant neonatal mortality in this study. A study in 2013 analyzed infection in NICU infants in Belo Horizonte / MG, finding a strong association of central catheter infection in very low

birth weight preterm infants, about 67% (GEIB *et al.,* 2010). Exposing these patients to a high rate of complications and mortality. In the literature there is another study that corroborates the association of infection and mortality rate with very low weight, as well as relating to other comorbidities such as pulmonary hemorrhage, hyaline membrane syndrome, pulmonary hypertension, temperature instability, hypoglycemia and high intervention rates. in the delivery room. In this sense, it is vitally important to carry out Inter-sectoral interventions aimed at improving women's living and health conditions, both as a right and the needs of women themselves, as well as to ensure the safe birth and survival of newborns. Neonatal sepsis is extremely voracious and lethal, and the use of antimicrobials is of fundamental importance in the indicators of discharge, length of stay and hospital resources (Barros *et al.,* 1996). Sepsis remains one of the major significant causes of early infant morbidity and mortality. As well as early diagnosis and careful use of antibiotic therapy, thus avoiding overtreatment. Studies redone drawing the profile of neonatal nosocomial infection, describing the various peculiarities that cause greater susceptibility, survival of the same, as well as the invasive procedures that newborns suffered due to the use of broad spectrum antimicrobials. Infections affected at least 50% of newborns weighing less than 1500g, causing high mortality. And the most commonly found agents were gram-positive bacteria, S. aureus, S. epidermidis, E. coli, K. pneumonia and E. cloacae. Another factor found was resistance to multiple antimicrobial drugs. Mussi created the epidemiological surveillance program model adapted to the characteristics of the neonatal unit allowing the identification of outbreaks of infection, the rational use of antibacterials and the application of preventive measures. Unfortunately, this procedure is not observed in the research NICUs. Regarding the values related to discharge and death in the survey, most had an unfavorable outcome with 142 (80.68%) and only 33 (18.75%) were discharged. There was only one (0.0005%) transfer.

Similar data, there was only one study in NICU Pelotas / RS in 2006 where of the 172 newborns admitted, 29 died before completing one month of life, 20 (68.97%) occurred in the first week of life (early neonatal death) and 9 (31.03%) between the first and fourth week of life (late neonatal death). In a study of very low birth weight infants admitted to the FSCMPA Neonatal Unit from January 1 to June 30, 2003, 78% (39%) of the cases were the main cause of death in these infants, followed by of respiratory distress syndrome (RDS) in 34 (17%) and perinatal anoxia in 7 (3.5%), demonstrating that even after ten years the main cause of death among patients admitted to this institution is still associated with infectious factors[24]. These current findings reflect the need for major urgent preventive and protective interventions. Other results were found in the literature (De Assis, 2001) regarding the morbidity and mortality of NBs in a NICU of a referral hospital in high-risk pregnancies in Minas Gerais between 2006 and 2010, in which of the 50 NBs who died, 43 (86%) had prematurity as the main cause, followed by respiratory distress syndrome with 29 (58%) and acute respiratory failure with 14%, highlighting the presence of more than one associated morbidity. Several authors state that mortality in the first six days of life expresses the complex conjunction of biological, socioeconomic and care factors, such as the precariousness of care and the provision of public maternal and newborn health care services. In addition, they emphasize that maternal characteristics such as low education, less than six prenatal visits, multiple gestation, vaginal delivery, in addition to low birth weight and prematurity of the newborn may be associated with early neonatal mortality (Malveira *et al.,* 2006; Soares and Menezes, 2010). By correlating the variables low weight, length of stay less than seven days and use of surfactant in the delivery room with the outcome of discharge / death, the strong relationship and increased chances for the risk of death were found. Results related to birth weight as a risk factor for neonatal mortality are in accordance with several studies, where very low birth weight has been considered strongly associated with unsatisfactory results and death (Tronco *et al.,* 2010; Araújo *et al.,* 2005; GEIB *et al.,* 2010). There is a strong association between low birth weight and infant and neonatal death, evidencing the interaction between biological and social factors, consecrated in the literature, and reinforcing its maintenance as an isolated criterion for the identification of children vulnerable to death (Oliveira *et al.,* 2010).Contradicting the literature results, they reported a mortality rate of low birth weight newborns, with averages of 21% to 34% of death by death in public hospitals in Rio de Janeiro, much lower than found. Logistic regression showed that underweight, length of stay less than seven days and administration of surfactant in the delivery room increased the chances of death outcome. It should be considered that the smaller the preterm infant, the more complex will be the necessary assistance for their survival and the ICU treatment, with high cost and relatively restricted access due to the scarcity of beds, especially in public hospitals. Thus, generating concern about the cost-effectiveness of the neonatal ICU, especially in the limit of viability. A critical evaluation of the results obtained in each service should be made, with a view to knowing its limits and optimizing the use of technological resources available today to ensure quality and availability of neonatal care. It is observed that the interaction of professionals working in the multidisciplinary team in ICUs can never be regarded as routine, continuing education, humanization and commitment must be individualized, because the newborn especially the premature, has no voice and needs constant care, so that the outcome is high for the home.

## Conclusion

According to the methodology employed and the results obtained in the present study, on the avoidability of neonatal morbidity in very low birth weight preterm infants admitted to an Intensive Care Unit in Pará, it can be concluded that:

1. The average length of stay was 13 days. Most of the babies did not stay more than seven days in the hospital.
2. There was a relationship between weight, length of stay and use of medication with mortality rate and discharge outcome, showing a strong relationship between lower weight and shorter ICU stay with death outcome.
3. The lower the weight, the more resources were used, not increasing the length of stay in the units and / or decreasing the mortality rate of newborns.
4. Most hospitalized low-weight patients used some ventilatory support, the most frequent being mechanical ventilation through the oro tracheal tube. However, the resource did not increase the length of stay of neonates.
5. Infection by bloodstream was prevalent among newborns, with Klebsiella sp being the main agent, the

most used antimicrobials were the 1st generation, showing no correlation with the mortality rate.

6. Thus, it was proposed to implement a multiprofessional routine, aiming at better results in the units and encouraging all professionals to participate in conducts.

Given these findings, we can see the fragility of health services in relation to the care of newborns with low weight in intensive care units. In addition, it is necessary to update routines, continuing education and studies to improve care according to the particularities of this population. This way newborns can have a better survival.

## REFERENCE


Araújo BF, Tanaka AC, Madi JM, Zatti H. Estudo da mortalidadede recémnascidosinternados na UTI neonatal do Hospital Geral de Caxias do Sul, Rio Grande do Sul. Rev Bras Saude Mater Infant. 2005;5:463-9.

Arrué AM, Neves ET, Silveira A, Pieszak GM. Caracterização da morbimortalidade de recémnascidosinternados em unidade de terapiaintensiva neonatal. Rev Enferm UFSM [Internet]. 2013

Azevedo GD, Freitas Junior RAO, Freitas AKMSO, Araújo ACPF, Soares EMM, Maranhão TMO. Efeito da IdadeMaterna sobre osResultadosPerinatais.ArtigosOriginais. Rev. Bras. Ginecol. Obstet., v. 24, n. 3, 2002.

Barros FC, Matijasevich A, Requejo JH, Giugliani E, Maranhão AG, Monteiro CA. Recent trends in maternal, newborn, and child health in Brazil: progress toward millennium development goals 4 and 5. Am J Public Health. 2010; 100: 1877-89.

Barros FC, Victora CG, Tomasi E. Saúdematerno-infantil em Pelotas, Rio Grande do Sul, Brasil: principaisconclusões da comparação dos estudos das coortes de 1982 e 1993. Cad Saúde Pública. 1996;12(Suppl 1):87-92.

Basso CG, Neves ET, Silveira A. Associação entre realização de pré-Natal e morbidade neonatal. *Texto Contexto Enferm*. 2012 Abr-Jun; 21(2):269-76.

Bittencourt RM, Gaíva MAM. Mortalidade neonatal precocerelacionadaaintervençõesclínicas. *Rev Bras Enferm* [serial on the internet]. 2014 [cited 2015 July 16];67(2):195- Available from: http://www.scielo.br/pdf/reben/v67n2/0034-7167-reben-67-02-0195.pdf.

BRASIL. Gestação de alto risco: manual técnico. 5. ed. Brasília, DF, 2010.

Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise de Situação de Saúde. Coordenação Geral de Informação e AnáliseEpidemiológica. Manual de vigilância do óbitoinfantil e fetal e do comitê de prevenção do óbitoinfantil e fetal. Brasília: Ministério da Saúde; 2009. 77 p. Disponível em: http://portal.saude.gov.br/portal/arquivos/pdf/Manual_Infantil_Fetal.pdf

deAssis, Heloísa Maria. "Perfis de morbimortalidade neonatal precoce: um estudo para a MaternidadeOdete Valadares de Belo Horizonte (MG), 2001-2006."

DIRETRIZES 2016 da SociedadeBrasileira de Pediatria 26 de janeiro de 2016

Drummond S, Souza TS, Lima FG, Vieira AA.Correlação entre o uso de corticoterapia antenatal, a reanimação e a mortalidade de recém- nascidosprematuros de muito baixo peso. Rev Bras Ginecol Obstet. 2014;36(5):211-5.

França E, Lansky S. Mortalidadeinfantil neonatal no Brasil: situação, tendências e perspectivas. In: RedeInteragencial de Informações para Saúde-Ripsa. Demografia e Saúde: contribuição para análise de situação e tendências. Brasília(DF): Ministério da Saúde; 2009. p. 83-112.

GEIB, L T C; FRÉU C M; BRANDÃO, M; NUNES, M L. Determinantessociais e biológicos da mortali- dadeinfantil em coorte de base populacional em Pas- so Fundo, Rio Grande do Sul. ciênc. saúdecoletiva, Rio de Janeiro, v. 15, n. 2, Mar. 2010 .

Gorgot LRMR, Santos I, Valle N, Matisajevich A, Barros AJD, Albernaz E. Óbitosevitáveisaté 48 meses de idade entre as crianças da Coorte de Nascimentos de Pelotas de 2004. Rev Saude Publica 2011; 45(2):334-342.

Granzotto JA, Mota DM, Real RF, Dias CM, Teixeira RF, Menta Filho JC, *et al*. Análise do perfilepidemiológico das internações em uma unidade de terapiaintensiva neonatal. Rev Amrigs. 2012;56(4):304-7.

Leite AJM. Mortalidade perinatal e aspectos da qualidade da atenção à saúde no município de Fortaleza, 1995 [dissertação Mestrado]. São Paulo: Departamento de Epidemiologia da Escola Paulista de Medicina, Universidade Federal de São Paulo; 1996.

Machado Júnior LC, PassiniJúnior R, Rosa IRM. Prematuridadetardia: uma revisãosistemática. J Pediatr (Rio J.) [Internet]. 2014 May/June [cited 2017 Jan 15];90(3):221-31.

Malveira SS, Moraes NA, Chermont AG, Costa DL, Silva TF. Recém-nascidos de muito baixo peso em um hospital de referência.RevistaParaense de Medicina. 2006;20:41-6.

Maranhão AGK, Vasconcelos AMN, Porto DL, França E. Mortalidadeinfantil no Brasil: tendências, componentes e causas de morte no período de 2000 a 2010. In: Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde.Departamento de Análise de Situação de Saúde.SaúdeBrasil 2011: uma análise da situação de saúde e a vigilância da saúde da mulher. Brasília: Editora MS; 2012. p. 163-182.

Ministério da Saúde (Br). Saúde Brasil 2011: uma análise da situação de saúde e a vigilância da saúde da mulher. Secretaria de Vigilância em Saúde. Brasília (DF): Ministério da Saúde; 2012. [citado em 19 out 2014]. Disponível em: http://portalsaude.saude.gov.br/portalsaude/arquivos/pdf/2013/Fev/21/saudebrasil2011_parte1_cap1.pdf

Ministério da Saúde. DATASUS [Internet]. http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sinasc/cnv/nvpa.def.Acesso:11/09/2018.

Oliveira EF, Gama SG, Silva CM. Gravidez na adolescência e outros fatores de risco para mortalidade fetal e infantil no município do Rio de Janeiro, Brasil. Cad SaudePublica. 2010;26(3):567-78. Portuguese.

Risso SP, Nascimento LFC. Fatores de risco para óbitos em unidade de terapiaintensiva neonatal, utilizando a técnica de análise de sobrevida. Rev Bras Ter Intensiva. 2010 Mar; 22(1):19-26.

Santos HG, Andrade SM, Silva AMR, Mathias TAF, Ferrari LL, Mesas AE.Mortesinfantisevitáveisporintervenções do Sistema Único de Saúde: comparação de duascortes de nascimentos. Ciêncsaúdecoletiva.2014; 19: 907-16.

Silva CF, Leite AJM, Almeida NMGS, Leon ACMP, Olofin I. Fatoresassociados ao óbito neonatal de recém-nascidos de alto risco: estudomulticêntrico em Unidades Neonatais de Alto Risco no Nordestebrasileiro. *Cad Saúde Pública.* 2014: 30(2):355-68.

Soares ES, Menezes GMS. Fatoresassociados à mortalidade neonatal precoce. EpidemiolServSaúde. 2010;19(1):51-60.

Tronco CS, Paula CC, Padoin SMM, Langendorf TF. Análise da produçãocientíficaacerca da atenção ao recém-nascido de baixo peso em UTI. Rev GaúchaEnferm. 2010; 31(3):575-83.

Victora CG, Aquino EML, Leal MdC, *et al*. Maternal and child health in Brazil: progress and challenges. Lancet 2011; 377:1863-76.

You D, New JR, Wardlaw T. Levels and trends in child mortality: estimates developed by the UN Inter-agency Group for child Mortality Estimation (IGME) - report 2013. Washington DC; World Bank. 2013.


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