THE ASSOCIATION BETWEEN ATTENDING PRENATAL CARE AND NEONATAL MORBIDITY

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ABSTRACT: The objective of this study was to characterize the morbi-mortality of newborns at the neonatal intensive care unit of a teaching hospital located in Southern Brazil, and verify the association between the following variables: prenatal care attendance, complications at birth, and newborns' length of stay at the unit. This is a retrospective, quantitative study. Data collection was performed using the medical records of inpatients of a neonatal intensive care unit, in the year 2006. The data were subjected to statistical analysis. The mortality rate of the studied population was 14.16%. The main causes of death were cardiorespiratory arrest and prematurity. Hospital admissions occurred mainly because of respiratory complications and low birthweight. In conclusion, although most mothers attended prenatal care, no statistical significance was found when this variable was crossed with birth complications. Length of stay at the unit, on the other hand, showed statistical significance when associated with prenatal care attendance.

DESCRIPTORS: Neonatal nursing. Neonatal mortality. Child health. Intensive care, neonatal.

ASSOCIAÇÃO ENTRE REALIZAÇÃO DE PRÉ-NATAL E MORBIDADE NEONATAL

RESUMO: Objetivou-se caracterizar a morbimortalidade de recém-nascidos internados na unidade de terapia intensiva neonatal de um hospital de ensino do sul do Brasil e verificar a associação das variáveis: realização do pré-natal, intercorrências ao nascimento e tempo de permanência do recém-nascido na unidade. Pesquisa quantitativa retrospectiva, com coleta de dados em prontuários de crianças internadas em uma unidade de terapia intensiva neonatal, no ano de 2006. Os dados foram submetidos à análise estatística. O índice de mortalidade da população estudada foi de 14,16%, apresentando como principais causas de óbito a parada cardiorrespiratória e a prematuridade, tendo como principais motivos de internação as causas respiratórias e o baixo peso ao nascer. Conclui-se que, apesar de a maioria das mães ter realizado pré-natal, ao cruzar esta variável com intercorrências ao nascimento não houve significância estatística. Já o tempo de internação na unidade apresentou significância estatística quando associado com a realização do pré-natal.

DESCRITORES: Enfermagem neonatal. Mortalidade neonatal. Saúde da criança. Terapia intensiva neonatal.

ASOCIACIÓN ENTRE LA REALIZACIÓN DE ATENCIÓN PRENATAL Y MORBILIDAD NEONATAL

RESUMEN: Este estudio objetivó caracterizar la mortalidad de los recién nacidos hospitalizados en la unidad de cuidados intensivos neonatales de un hospital universitario en el sur de Brasil y la asociación de variables: la terminación de complicaciones en el parto pre-natal, y la duración de la hospitalización. Investigación cuantitativa, retrospectiva que examinó las historias clínicas de los niños ingresados en la unidad de cuidados intensivos neonatales en el 2006. Los datos fueron analizados estadísticamente. La tasa de mortalidad de la población fue de 14,16%, las principales causas de muerte fueron paro cardiorrespiratorio y prematuridad. Las causas para la hospitalización, fueron respiratorias y bajo peso al nacer. Se concluyó que, aunque la mayoría de las madres recibieron atención prenatal, al cruzar esta variable con un parto sin complicaciones no tiene significancia estadística. Mientras que la duración de la estancia en la unidad fue estadísticamente significativa cuando se asoció con la atención prenatal.

DESCRIPTORES: Enfermería Neonatal. Mortalidad neonatal. Salud del Niño. Cuidado Intensivo Neonatal.

INTRODUCTION

Infant mortality is among the main health indicators, as it permits to measure the quality of life of a given population, and assess the level of development and accessibility to health services. Therefore, knowing the profile of infant morality is highly important, because it helps to develop control strategies.[1]

Recent data show there has been a 64% drop in the Brazilian infant mortality rate between 1980 and 2006.[2] Among other factors, the improvement of this indicator is a result of the Program for Comprehensive Child Health Care (*Programa de Assistência Integral à Saúde da Criança* - PAISC), created in 1984 with the main goal to promote specific actions in child health care, focused on primary health actions, thus aiming to reduce infant morbi-mortality.[3]

The PAISC aims at promoting comprehensive child health, with the objective to follow infant growth and development, promote breastfeeding, provide nutritional orientation and care to diarrheal diseases and acute respiratory infections, in addition to assuring greater vaccination coverage.[4]

Although over the last few years infant mortality has shown a tendency to decrease, the current rate remains high, and the main causes of death among children under the age of five years include perinatal complications, respiratory infections, malnutrition, and diarrheal diseases.[3] Perinatal complications are caused by problems that occurred during pregnancy, labor and birth, and the most common are neonatal infections, neonatal hypoxia/anoxia, congenital malformations, prematurity, and syndromic diseases.

In most cases, these perinatal deaths could be avoided if qualified prenatal, childbirth and postpartum care services were available. For this reason, in 1983 the Ministry of Health (MH) implemented the Program for Comprehensive Women's Health Care (*Programa de Assistência Integral à Saúde da Mulher* - PAISM), which, among other goals, aimed at improving prenatal, childbirth, and postpartum follow-up.[5]

In order to improve the qualification of prenatal care, the MH launched the Program for the Humanization of Prenatal and Childbirth Care (*Programa de Humanização no Pré-Natal e Nascimento* - PHPN) in the year 2000, and the National Policy for Comprehensive Women's Health Care (*Política Nacional de Atenção à Saúde Integral da Mulher* - PNAISM) in 2004, with the purpose to broaden the accessibility to healthcare services, and increase the coverage and quality of perinatal care. Furthermore, it is highlighted that the referred policy and program focus on comprehensive women's health care, aiming to assign women a leading role in health actions.

From this view, qualified and humanized prenatal care is essential for mothers and children's health, alike.[6] The quality of the care provided to women during pregnancy through prenatal care, together with the care provided during childbirth and to newborns, can contribute effectively to reduce morbi-mortality rates.

The objective of the present study was to characterize the morbi-mortality of newborn inpatients of the Neonatal Intensive Care Unit (NICU) of a teaching hospital located in Southern Brazil, in 2006, and associate the variables: mother's prenatal care attendance, complications at birth, and length of stay in the NICU.

This study is justified because it contributes to the development of knowledge in health and nursing. The relevance of this study lies on the need to qualify nursing care in the prenatal period and childbirth, with the purpose to minimize infant morbi-mortality, particularly regarding the neonatal component.

MATERIALS AND METHODS

This is a quantitative, retrospective and descriptive study. The data was collected from the medical records a teaching hospital in Southern Brazil, using an exclusive form, previously tested, in the period between July and September of 2010.

This article is an excerpt from the ongoing study: "Caracterização da morbimortalidade e das demandas de necessidades especiais de saúde dos recém-nascidos internados em uma UTI Neonatal, no sul do Brasil, entre os anos de 2002-2006" (*The Characterization of the morbi-mortality and the special health needs demands of newborn inpatients of a Neonatal ICU, in Southern Brazil, between 2002-2006*), in development since 2008.

The hospital where the study took place was established in 1970 and is a healthcare referral center for the central-west region of Rio Grande do Sul State (RS). Every month, an average of 30 children are admitted to the NICU, corresponding to about 350 admissions per year.[7]

The study population consisted of the neonates admitted to the NICU of the referred

hospital, between January 1st and December 31st of 2006, corresponding to 355 medical records. Medical records were excluded in they did not inform the birthweight and/or gestational age, or were incomplete. Nine records were disregarded after considering the exclusion criteria. Therefore, 346 medical records were analyzed.

The quantitative data were subjected to statistical analysis using the *Statistical Analysis System* (SAS version 9.2). The analysis used absolute and relative frequency distributions, bivariate analysis by cross tabulation and calculating the statistical significance between associations, using the Chi-Square Test, considering a 0.05 level of significance.

The study complied with all the recommendations of Resolution 196/96 of the National Health Council, regarding research involving human subjects.[8] The research proposal was approved by the Research Ethics Committee of the institution (CEP/UFSM), under number 23081.017031/2008-16.

RESULTS

In this study, "N" was considered as the total number of individuals studied (n=346) and "n" the total number of medical records containing the data referring to the variable to be analyzed.

Regarding the gender variable (n=346), it was found that most (52%) of the newborn NICU inpatients were male (n=179), and 48% were female (n=167).

Regarding the gestational age at birth, 65% of the neonates were preterm (n=226), while 34% were full-term (n=118), and only 1%, postterm (n=02).

Considering the 346 analyzed medical records, 33 did not include the variable mother's attendance to prenatal care, hence, n=313 was considered the total number of newborns whose medical records reported this datum. It was found that most mothers (87%) attended prenatal care (n=272), whereas 13% (n=41) did not.

Regarding the neonates' Apgar score, it was ranked into three groups: from 0 to 3 – low Apgar score; between 4 and 7 – moderate Apgar score, and from 8 to 10 – appropriate Apgar score. It was observed that most Apgar scores were appropriate, with an increase from 66% (n=205) at the first minute to 90% (n=281) at the fifth minute of life. In addition, the Apgar score between 4 and 7 decreased, comprising 28% (n=86) at the first and 9% (n=27) at the fifth minute. The Apgar score between 0 and 3 also decreased, totaling 6% (n=19) at the first minute and less than 1% (n=2) at the fifth minute of life.

Figure 1 shows the analysis regarding birth complications of the newborn NICU inpatients, of which 65% were affected.

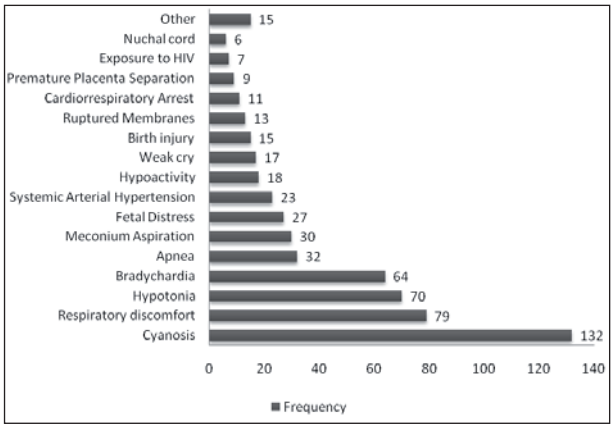

Figure 1 – Complications during pregnancy and childbirth of the newborn NICU inpatients admitted in 2006. Santa Maria-RS, 2010

The main birth complication was cyanosis, which affected 23.2%, followed by respiratory discomfort, with 13.9%, hypotonia, with 12.3%, bradycardia, with 11.3%, apnea, with 5.6%, meconium aspiration, with 5.3%, and fetal distress, with 4.7%, the other complications that appeared together accounted for 23.7%.

Furthermore, 54% of the neonates required respiratory reanimation at birth. In this regard, it was observed that more than one respiratory reanimation device was used. Oxygen masks were the most common device used, with 34.8%, followed by positive pressure ventilation, with 29.8%, and endotracheal intubation, totaling 16.1%.

Figure 2 demonstrates the causes for the newborns' admission in the NICU, in 2006.

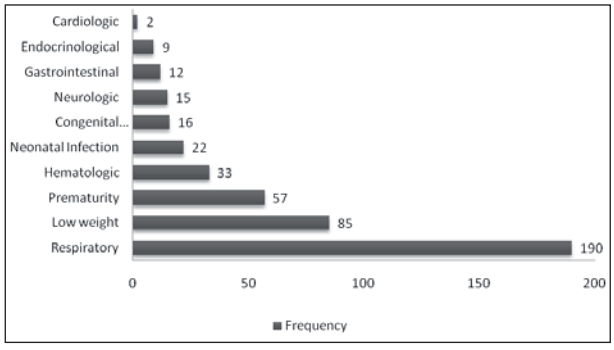

Figure 2 – Causes for the newborns' admission in the NICU in 2006. Santa Maria-RS, 2010

Respiratory complications were the main cause for admission to the NICU, with 43.1%, followed by low birthweight, accounting for 19.3%, and prematurity, with 12.9%.

Figure 3 lists the data regarding the diagnosis history during the stay in the NICU.

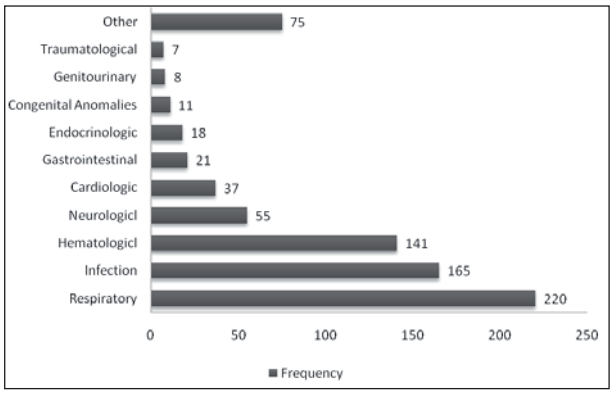

Figure 3 – Diagnosis history of the newborns during their stay in the NICU in 2006. Santa Maria-RS, 2010

Among the newborns, 29% developed respiratory disorders, and 21.8% developed infections, which together accounted for 50.8% of the cases of morbidities developed in the NICU.

The neonates' length of stay varied between one and 160 days, with 57% staying between one and 15 days in the unit, whereas 36% stayed between 16 and 50 days. It is highlighted that only 1% of the newborns stayed in the unit for over 100 days.

In this sense, the neonates' mean length of stay in the NICU, in 2006, was 19.6 days. Among the survivors, the mean length of stay was 20.1 days, and 16.7 days for those who died.

Of the 346 newborn NICU inpatients, 49 died, accounting for 14.2% of the population. Figure 4 presents the causes of death of newborns admitted to the NICU.

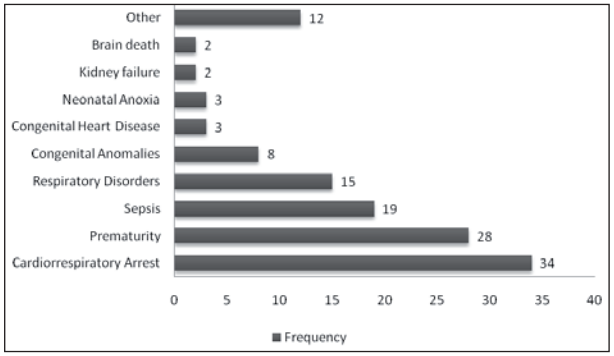

Figure 4 – Causes of death in the NICU in 2006. Santa Maria-RS, 2010

The main cause of death was cardiorespiratory arrest, with 27%, followed by prematurity, with 22.2%, septicemia, with 15.1%, and respiratory disorders, with 11.9%.

No statistical significance (p=0.3355) was observed for the association between the variables complications at birth and prenatal care attendance by the mother. In this sense, it is highlighted that 68.54% of the newborns of women who attended prenatal care presented complications at birth, while 61% of the newborns of women who did not attend prenatal care also developed some form of complication at birth.

Statistical significance ($p<0.05$) was observed for the association between the variable neonate's length of stay in the NICU and prenatal care attendance by the mother. Therefore, the length of stay of 59.2% of the newborns of women who attended prenatal care was between one and 15 days, while for 46.3% of the newborns of women who did not attend prenatal care, the length of stay was between 16 and 50 days.

DISCUSSION

Considering the studied population, 52% of the neonates were male, and 65% were premature. These results agree with a study performed in São Paulo,[9] which reported that 51.3% of the neonates were male, as well as the data regarding the live births in Brazil, in 2008, which reported that 51% were male.[10] A similar result was found in a study performed in Recife with the objective to describe the epidemiological profile of neonatal mortality, in the period between 1999 and 2009, in which 56.39% of the neonates were male.[11] Male newborns were also the majority in the city of Juiz de Fora, in the period between 2002 and 2008.[12]

A 14.16% mortality rate was found for the newborn NICU inpatients in 2006. It is observed that this rate has increased, considering that an earlier study, performed in this same unit in 2003 found a neonatal mortality rate of 10.3%.[13] The mortality rate found in the present study is also greater that the 8.2% rate registered in 2005 in Caxias do Sul, a city also located in Southern Brazil.[14] It is emphasized that the studied NICU is a referral center for the mid-western macroregion of RS, and is often overcrowded.

The main causes of death were cardiorespiratory arrest and prematurity. A study performed with low birthweight newborns reported that 78% of the births were premature, thus corroborating

with the fact that the duration of pregnancy is one of the determining factors for intrauterine growth.[15]

Although 87% of the women attended prenatal care, it was found that 68% of those women's neonates presented some form of complication at birth. According to data by the MH, in Brazil, only a small percentage of mothers do not attend prenatal, corresponding to less than 2%, and, yet, most (57%) women attended seven or more prenatal appointments.[10] In the present study, prenatal care was considered as performed only for the women who attended six or more appointments, thus, the other 13% most likely attended fewer than six appointments, which would be included in the 43% of the data by the MH.

The probability of neonatal death reduces significantly as the frequency of attendance to prenatal care appointments increases.[9] From this perspective, maternal and perinatal morbi-mortality is related to the provision of inadequate care according to the Policy for the Humanization of Labor and Childbirth.[16] A study regarding avoidable infant mortality evidenced that there was a 28.3% increase in the number of deaths related to inadequate healthcare to women during pregnancy, accompanied by a 28.2% increase in the mortality rates of disorders related to short-term pregnancy and low birthweight.[17]

In this study, the Apgar score of 66% of the newborns was equal to or greater than 8 at the first minute of life, and 90% had an adequate Apgar score at the fifth minute. The Apgar score permits to assess the health of newborn children, in which higher scores represent better health conditions and lesser probability of risks for complications at birth.[18]

Data by the MH corroborate the findings of the present study, considering that, in 2008, nearly 80% of the live newborns had an Apgar score greater than eight at the first minute of life, and few more than 91% of the cases showed good health at the fifth minute.[10]

Low birthweight, gestational age, mother's age, marital status, mother's education level, and the number of prenatal care appointments attended are variables directly related with poor NB health associated with an Apgar score below four.[19]

In the present study, it was found that 65% of the neonates presented complications at birth, among which the most common was the development of cyanosis and difficulty breathing, and oxygen masks and positive pressure ventilation were the most frequently used respiratory reanimation devices.

A study evaluated the perinatal factors associates with death in premature very low birthweight infants in the state of São Paulo, Rio de Janeiro and Rio Grande do Sul, and found that the following devices were used for respiratory reanimation: between 61 and 77% used positive pressure ventilation; between 0 and 26%, ventilation together with cardiac massage and/or drugs. In addition, these values referring to perinatal asphyxia are strongly associated with an early neonatal death.[20]

The main causes for admission found in the present study were respiratory complications and low birthweight. In Brazil, the causes of hospital admissions by the SUS, relates to perinatal complications, include respiratory disorders followed by disorder related with the gestational age and fetal growth.[10]

The neonatal morbi-mortality tend to increase with low birthweight, and, more significantly, with the low gestational age at birth. In this sense, the preterm low birthweight newborn has unique characteristics that require a complex adjustment to the extrauterine environment, in view of the biological, social, and psychological aspects.[21]

A NICU study performed in Tubarão-SC, found that nearly half of the admissions of newborn inpatients were due to prematurity, followed by acute respiratory failure, neonatal pneumonia, meconium aspiration syndrome and neonatal jaundice. During the length of stay, the neonates developed respiratory complications, comprising nearly 50% of the cases, followed by cardiac, infectious, gastrointestinal, neurologic and hematological complications.[22]

In the present study, most neonates developed respiratory disorders during the length of stay. A similar result was found in premature neonates born in birthing centers of the Brazilian Network for Neonatal Research, most of which developed respiratory distress syndrome, patent ductus arteriosus do canal arterial and septicemia.[20]

Furthermore, the present study highlights the development of neonatal infection in the NICU, which could be attributed to the newborn's deficient immune system in association with the several invasive procedures performed in the NICU.

In most countries, neonatal infections have a high neonatal morbi-mortality rate, between 15 and 45%, and, often, these rates are higher when the prenatal care and newborn care is inefficient.[23]

It was observed that the mean length of stay at the NICU was 19.6 days. It is emphasized that similar outcomes were found in other studies, which identified a mean length of stay of 19 days.[14,24] Another study found the neonates' mean length of stay in the NICU was 14 days, and of 20 days among those who survived,[14] which agrees with the present study, considering that the mean length of stay of surviving newborns at the NICU of the referred institution was 20.1 days.

A similar result was obtained in a study that addressed the risk factors for death in the NICU, using the survival analysis technique, in which the mean length of stay of newborns who were discharged was 19 days.[24]

It was found that there is no statistical significance between the occurrence of complications at birth and prenatal care attendance by the mother, considering that the results show that most newborns, of either mothers who did or did not attend prenatal care, presented some form of complication at birth.

A similar study associated prenatal care attendance with neonatal mortality and also found no statistical significance. One possible explanation is that only a small portion of mothers did not attend prenatal care, or, yet, because the effect of this factor is more related to the quality of the appointments rather than to the quantity.[25]

In this study, although most mothers attended prenatal care, the percentage of complications at birth, mortality rates, and the prevalence of several morbidities were high. Therefore, it is inferred that the accessibility to healthcare services is currently effective, but the quality of the prenatal care is uncertain. There is consensus in literature that neonatal mortality is related with the quality of prenatal care, in a way that many deaths could be avoided by providing better care in the prenatal period and during labor and childbirth.[14-16,26]

According to data by the MH, 64% of the neonatal deaths in Brazil could be avoided by improving the quality of care provided during pregnancy, childbirth and to the newborn. Furthermore, the high neonatal death rates in the state of RS (62.9%), and in the city of Santa Maria, which is even higher (73.7%), could also have been avoided.[10]

Many challenges must be overcome to improve prenatal care. Such challenges include training healthcare professionals and improving the compliance to the objectives proposed by the public health policies regarding prenatal care to reduce the rates of infant morbi-mortality. A study developed in Santa Maria-RS found that 76% of the puerperal women had attended at least four prenatal appointments, and 43% attended seven or more, thus confirming the present study findings, in which mothers showed good compliance to the prenatal care. [15]

Another study showed that an insufficient number of prenatal appointments could be a risk factor for low birthweight.[27] Therefore, it is emphasized that it is necessary to adopt actions that promote care of higher quality in the prenatal period and childbirth, developing more effective strategies for diagnosis and intervention, considering there is a high potential of avoiding low birthweight and prematurity.[27]

It is emphasized that nurses play a determinant role in adhering to public policies, and, therefore, in improving the quality of prenatal care, considering that they participate in all levels of women and children's health care.[28] Nurses can, thus, work as a team, by means of an effective humanization of care, aiming at reducing the rates of infant morbi-mortality.

CONCLUSIONS

It is concluded that, regarding the characteristics of the newborn inpatients at the NICU of a teaching hospital in Southern Brazil in 2006, most were male, premature and had an adequate Apgar score at the first minute. Most newborns presented complications at birth, of which cyanosis and respiratory distress were the most frequent, requiring respiratory reanimation, and the most frequently used device was the oxygen mask.

The main reasons for the admission of the newborns to the NICU were respiratory disorders and low birthweight. The main causes of death were cardiorespiratory arrest and prematurity.

Despite the fact that a high percentage of mothers attended prenatal care, no statistical significance was found when this variable was crossed with complications at birth. However, statistical significance was observed for the association between prenatal attendance by the mother and the newborn's length of stay at the NICU.

It is believed that these findings are relevant and will contribute to planning healthcare

services to women in the perinatal period and to newborns, during labor and childbirth, in the city and region addressed by the study, and, also, that they will beacon other similar studies developed in the national reality. The limitations of the present study are the incomplete notes on the medical records.

It is recommended that nurses, as professionals committed to health promotion, aim at strategies that permit offering women the accessibility to high quality prenatal care, which contemplates the health needs of the mother-baby binomial. In this sense, it is believed that, from the moment that the pregnant women receive adequate health care, it is possible to minimize the harms to the health of newborns, thus providing quality health care to the mother and newborn.

The authors hope that the present study promotes a critical reflection about how this theme is being addressed in the education and training of future nurses, and that it encourages the development of other studies that elaborate on the issue of prenatal care quality, aiming at minimizing the rates of infant morbi-mortality in its neonatal component.

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