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ORIGINAL ARTICLE

Intrauterine hipoxia and asphyxia at birth in a southern city of Brazil

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Abstract

Introduction: Intrauterine hypoxia and asphyxia at birth corresponds to the fourth cause of neonatal and perinatal death in Brazil, this data reflects the quality of care needed in maternity wards for the parturient and the newborn because it is preventable. Perinatal asphyxia is defined as there is an interruption in gas exchange or a damaged blood flow, leading to persistent hypoxemia and hypercapnia in the period before childbirth or intrapartum, which can lead to permanent lesions in several systems. **Objectives:** The study aims to analyze the epidemiological profile of the occurrence of intrauterine hypoxia and neonatal asphyxia considering maternal and fetal factors in the municipality of Pelotas, RS, between the years 2008 to 2018. **Methods:** Cross-sectional study where secondary data obtained on the DATASUS platform on the prevalence of intrauterine hypoxia and asphyxia at birth in Pelotas, RS. Results: It was possible to observe that the prevalence was higher in male newborns, in cesarean deliveries that occurred in the private system. In addition, mortality was 15.75%, higher in the maternal age group between 25 and 29 years, in single pregnancies lasting 37 to 41 weeks and birth weight between 1.500 and 2.499 grams. The majority of deaths occurred before delivery. **Conclusion:** Intrauterine hypoxia and asphyxia at birth is an important cause of preventable perinatal morbidity and mortality with prevalence in preterm newborns weighing less than 2.500 grams. It allows assessing the quality of care for pregnant women and newborns during prenatal and delivery.

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INTRODUCTION

Data from the World Health Organization (WHO) suggest that intrauterine hypoxia and birth asphyxia rank as the fourth cause of neonatal and perinatal death in Brazil, behind prematurity, congenital anomalies, and other transmissible, perinatal, and nutritional conditions[3]. The rate of perinatal asphyxia in a country reflects the quality of the care provided in maternity hospitals to mothers and newborns[4]. Therefore, higher rates are seen in countries with lower levels of access to healthcare or limited resources[5]. Intrauterine asphyxia and birth asphyxia are highly prevalent and preventable causes of perinatal death[5].

Perinatal asphyxia is defined as an interruption in gas exchange[1] or inadequate blood flow[2] leading to persistent hypoxemia and hypercapnia in the period before delivery or intrapartum[1,2]. Hypoxia can cause damage to various organs and systems[2], the most affected being the central nervous system, with the possibility of permanent sequelae such as seizures, mental retardation, and paralysis.

Risk factors can be divided into prenatal, natal, and postnatal, with the first two representing the majority of cases[1] and being treatable and/or preventable with adequate prenatal and childbirth care. However, one needs to know the regional epidemiological profile in order to develop measures that prevent the neonatal occurrence of intrauterine hypoxia and birth asphyxia. This article looks into the prevalence of these comorbid conditions in the period between 2008 and 2018 in the municipality of Pelotas, Rio Grande do Sul, Brazil, and analyzes the total number of cases in relation to sex, place of birth, skin color/ethnicity, and care provided at a public or private hospital, in addition to the number of deaths in relation to birth weight, gestational age, maternal age and education, type of pregnancy, moment in relation to delivery, and type of delivery.

To this end, this study aims to analyze the occurrence of intrauterine hypoxia and birth asphyxia in the municipality of Pelotas-RS, Brazil, considering maternal and fetal factors and possible preventive measures.

METHODS

This quantitative cross-sectional descriptive retrospective epidemiological study included secondary data obtained from the Disease and Complication Reporting System (SINAN) and the Mortality Information System (SIM) available on the DATASUS platform, processed on TABNET between the years 2008 and 2018.

Data about the prevalence of Intrauterine Hypoxia and Birth Asphyxia in the municipality of Pelotas-RS, Brazil, were analyzed relative to sex, ethnicity, maternal age and education, type and moment in relation to delivery, gestational age, place of birth, care provided at a public or private hospital, birth weight, and type of pregnancy.

RESULTS

The analysis of data on intrauterine hypoxia and birth asphyxia in the municipality of Pelotas-RS between the years 2008 and 2018 yielded a total of 165 hospitalizations, corresponding to 4.74% of the cases reported in the state of Rio Grande do Sul. Of these, 30.9% were recorded in public healthcare institutions, 36.96% in private healthcare institutions, and in 32.12% the place in which care was provided was not informed. Ninety-nine cases (60%) involved male newborns.

In terms of the hospitals in which the cases were recorded, 90% of the cases developed at the Teaching Hospital of the Federal University of Pelotas, 42.42% at the São Francisco de Paula University Hospital – UCPEL, and 3.03% at the Santa Casa de Misericórdia Hospital in Pelotas.

Regarding outcomes, 26 deaths were recorded in Pelotas in the evaluated time period, which corresponded to 15.75% of the total number of cases. Table 1 shows the analysis of the variables associated with death.

DISCUSSION

Intrauterine hypoxia and birth asphyxia can often be considered as conditions that trigger a roster of pathologies that lead to death. Thus, other conditions such as maternal comorbid conditions or prematurity may be reported in the death certificate as the underlying cause of death, even when hypoxia and/or asphyxia are cited as preceding factors, thus underestimating the total number of deaths reported[4].

Another factor that can lead to underreporting is the fact that meconium aspiration syndrome, directly linked to neonatal asphyxia, is listed by the International Classification of Diseases 10th Revision (ICD10) as other respiratory disorders of newborns[4,6].

As for variables related to fetal death due to intrauterine hypoxia and birth asphyxia, maternal age, maternal education, and duration of pregnancy were not informed in 30.76%, 42.30%, and 30.76% of the cases, which demonstrates the lack of commitment from healthcare workers in filling out medical forms.

Data from the WHO shows that intrauterine hypoxia and birth asphyxia are the fourth leading cause of perinatal death in Brazil, with 14.95% of the total. When compared with the data obtained in this article in the study period, it becomes clear that Pelotas has had significantly fewer deaths (6.11%) for this cause[3].

Regarding the type of delivery, both the absolute number of hospitalizations due to intrauterine hypoxia and birth asphyxia and the number of deaths from these complications were more prevalent in cesarean sections, which differs from studies conducted in other centers where the highest rate was found in vaginal deliveries[4]. A possible explanation for this discrepancy is the early intervention in labor when anomalies are identified, which might not only increase rate of cesarean sections, but also decrease

Table 1. Fetal deaths due to Intrauterine Hypoxia and Birth Asphyxia in the municipality of Pelotas-RS, according to place of occurrence, maternal age and education, birth weight, type of pregnancy, duration of pregnancy, moment in relation to delivery, and type of delivery in the period between 2008 and 2018.

Variables	Total Cases
Place of occurrence	
Hospital	24 (92.30%)
Home	1 (3.84%)
Not informed	1 (3.84%)
Maternal age (years)	
15-19	1 (3.84%)
20-24	3 (11.53%)
25-29	7 (26.92%)
30-34	6 (23.07%)
35-39	1 (3.84%)
Ignorado	8 (30.76%)
Maternal education (years of schooling)	
None	1 (3.84%)
1-3	3 (11.53%)
4-7	4 (15.38%)
8-11	4 (15.38%)
12+	3 (11.53%)
Not informed	11 (42.30%)
Birth weight (grams)	
<500	3 (11.53%)
500-999	5 (19.23%)
1000-1499	3 (11.53%)
1500-2499	6 (23.07%)
2500-2999	3 (11.53%)
3000-3999	4 (15.38%)
4000+	1 (3.84%)
Not informed	1 (3.84%)
Type of pregnancy	
Singleton	22 (84.61%)
Twin	3 (11.53%)
Not informed	1 (3.84%)
Duration of pregnancy (weeks)	
<22	5 (19.23%)
22-27	1 (3.84%)
28-31	2 (7.69%)
32-36	7 (26.92%)
37-41	8 (30.76%)
42+	-
Not informed	3 (11.53%)
Moment in relation to delivery	
Before delivery	24 (92.30%)
During delivery	2 (7.69%)
Type of delivery	
Vaginal	12 (46.15%)
Cesarean section	13 (50%)
Not informed	1 (3.84%)

Database from the Mortality Information System (SIM) available on platform DATASUS processed on TABNET between the years 2008 and 2018. Accessed on Nov/ 1, 2020 at 1:30 p.m.

the number of deaths from this complication as previously indicated. Another hypothesis stems from possible underreporting, since data from the city of Pelotas indicate that 36.96% of cases were recorded in private hospitals, at which cesarean section rates are higher[7], which differs from other Brazilian epidemiological studies that show higher prevalence of cases in public healthcare facilities.

The maternal age in which the prevalence of deaths was higher was between 25 and 34 years, an age group considered of low gestational risk, which might reflect inadequate prenatal and/or childbirth care[4].

As for birth weight, 65.36% of the deaths due to intrauterine hypoxia and birth asphyxia in the city of Pelotas occurred in newborns weighing less than 2,500 grams. Moreover, 57.68% of the pregnancies recorded on the database lasted for less than 37 weeks, 19.23% of which lasting for less than 22 weeks. Therefore, they cannot be characterized as preventable deaths according to previous studies that described higher risk of death among preterm newborns[4,8].

Regarding hospital institutions, data available in DATASUS show that the number of hospitalizations due to spontaneous labor in singleton pregnancies were similar in the three maternity hospitals in the city, with an absolute number of 4,578 in the Hospital School of the Federal University of Pelotas, 7,372 in the São Francisco de Paula University Hospital - UCPEL, and 7,884 in the Santa Casa de Misericórdia Hospital of Pelotas. Therefore, the maternity hospital with the highest number of births in the period between 2008 and 2018 according to DATASUS is the Santa Casa de Misericórdia de Pelotas. However, this institution accounts for only 3.03% of the total cases of intrauterine hypoxia and birth asphyxia in the municipality of Pelotas, probably due to underreporting.

Sixty percent of all cases recorded from 2008 to 2018 involved male newborns. Newborn sex was reported in every case.

CONCLUSION

Intrauterine hypoxia and birth asphyxia in Pelotas-RS were more prevalent in pregnant women aged 25+ years, preterm pregnancies, infants with a birth weight of less than 2500 grams, and in cesarean section deliveries performed at private hospitals. They rank fourth among complications of pregnancy and childbirth that cause perinatal death in Brazil, in addition to being an important cause of permanent sequelae. The rate of perinatal asphyxia in a country reflects the quality of the care provided in maternity wards to mothers and newborns. Underreporting is a significant issue that hinders the delineation of an epidemiological profile and the development of preventive actions.

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