Adverse gestational events associated with prenatal, perinatal and postnatal variables in the Neonatal ICU

Eventos gestacionais adversos associados a variáveis pré-natais, perinatais e pós-natais em UTIN

Eventos gestacionales adversos asociados con variables prenatales, perinatales y postnatales en la UCI Neonatal

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ABSTRACT

Objective: To analyze whether maternal, obstetric, anthropometric and postnatal variables of neonates admitted to the neonatal intensive care unit (NICU) are different in pregnant women who had adverse gestational events (AGE). In addition, it seeks to analyze whether AGE are predictors of mortality. **Methods:** Observational, retrospective and quantitative study, with a descriptive and inferential approach based on the medical records of patients seen at the tertiary reference hospital in health located in a municipality in Pará, during 2017. Data were collected to verify the relationship between present and absent AGE. **Results:** AGE (+) were associated with alcoholism, loss of amniotic fluid, premature labor, breench presentation, increased capillary glycemia and pneumonia. AGE (-) were associated with absent prenatal care, intact amniotic membrane, amniotic fluid with thick meconium and fetal trauma at birth. The other data were not significant. **Conclusion:** Maternal, obstetric, anthropometric and postnatal variables in neonates admitted to the nicu are associated with AGE (+). The events analyzed did not increase the chances of death.

Keywords: Intensive care units, Maternal and child health, Pregnancy.

RESUMO

Objetivo: Analisar se as variáveis maternas, obstétricas, antropométricas e pós-natais dos neonatos admitidos na unidade de terapia intensiva neonatal (UTIN) são diferentes nas gestantes que apresentaram eventos gestacionais adversos (EGA). Além disso, busca-se analisar se a EGA é preditora de mortalidade. **Métodos:** Estudo observacional, retrospectivo e quantitativo, com abordagem descritiva e inferencial com base nos prontuários de pacientes atendidos no hospital terciário de referência em saúde localizado em um município do Pará, durante o ano de 2017. Os dados foram coletados para verificar a relação entre eventos gestacionais adversos presente e a ausência. **Resultados:** EGA (+) esteve associada ao alcoolismo, perda de líquido amniótico, trabalho de parto prematuro, apresentação pélvica, aumento da glicemia capilar e pneumonia. EGA (-) esteve associada ao pré-natal ausente, membrana amniótica intacta, líquido amniótico com mecônio espesso e trauma fetal ao nascimento. Os outros dados não foram significativos. **Conclusão:** Variáveis maternas, obstétricas, antropométricas e pós-natais em neonatos admitidos no nicu estão associadas à EGA (+). Os eventos analisados não aumentaram as chances de morte.

Palavras-chave: Unidades de terapia intensiva, Saúde materno-infantil, Gravidez.

RESUMEN

Objetivo: Analizar si las variables maternas, obstétricas, antropométricas y postnatales de los recién nacidos ingresados en la unidad de cuidados intensivos neonatales (UCIN) son diferentes en mujeres embarazadas que tuvieron eventos adversos del embarazo (EAE). Además, busca analizar si EAE es un predictor de mortalidad. **Métodos:** Estudio observacional, retrospectivo y cuantitativo, con enfoque descriptivo e inferencial

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basado en las historias clínicas de pacientes atendidos en el hospital terciario de referencia en salud ubicado en un municipio de Pará, durante 2017. Se recopilaron datos para verificar la relación entre eventos adversos del embarazo presente y ausente. **Resultados:** La EAE (+) se asoció con alcoholismo, pérdida de líquido amniótico, parto prematuro, presentación de presentación pélvica, aumento de la glucemia capilar y neumonía. La EAE (-) se asoció con ausencia de atención prenatal, membrana amniótica intacta, líquido amniótico con meconio espeso y trauma fetal al nacer. Los otros datos no fueron significativos. **Conclusión:** Las variables maternas, obstétricas, antropométricas y postnatales en los recién nacidos ingresados en el nicu están asociadas con la EAE (+). Los eventos analizados no aumentaron las posibilidades de muerte.

Palabras clave: Unidades de cuidados intensivos, Salud materno-infantil, Embarazo.

INTRODUCTION

Promoting quality care to maternal health has become a priority in the decisions of the World Health Organization, care for women has become increasingly humanized, with specific assistance being made available to pregnant women and newborns during prenatal, delivery and postpartum, making women a protagonist about their rights to actively decide aspects such as, for example, the type of delivery that favors their expectations and according to their health can be contemplated during the pregnancy planning and process, the which in fact reflects the 38% drop in the last 20 years related to deaths from gestational complications, which may also be related to the increase in the number of qualified health professionals, which in 1990 were only 58% and in 2019 increased to 81% (WHO, 2020).

During the gestational period, many Adverse Gestational Events (AGE) may affect a more specific portion of pregnant women, causing complications for both mother and baby, and may increase morbidity rate and mortality during pregnancy or childbirth classifying these women as high-risk pregnancies (WHO, 2015 e PATRICIA L, 2017). High-risk pregnancy is characterized as the occurrence of any clinical or sociobiological condition that harms the health of the mother or fetus (MS, 2012).

It is observed that health problems during pregnancy have increased worldwide, and the evolution in the diagnosis of these complications Adverse Gestational Events (AGE) is the main factor that impacts this increase (NARAYAN B E NELSON P, 2017). In addition, many risk markers contribute to various complications reaching mothers, and consequently newborns. These indicators may be present even before the beginning of pregnancy, as well as may be inherent to it, being them: maternal, obstetric, demographic factors, environmental conditions, lifestyle, previous reproductive history, and associated clinical comorbidities (MS, 2012).

The gestational condition of the mother defines the clinical evolution and postnatal variables of the Z\neonate, and maternal psychological factors and mother-infant interactions are crucial factors for this prognosis (KABONI W,et al., 2017; JANINA E, et al 2019). Thus, some variable and socioeconomic sociodemographic scans may be positive for gestational conditions, as well as may also be related to greater maternal psychological distress or a less positive mother-infant interaction, which may even cause changes in anthropometric characteristics and postnatal variables of neonates, besides being able to permanently compromise structures and the optimal functioning of neonatal organs and systems (GOUTAUDIER N, et al., 2011; ULRICH F e PETERMANN F, 2016).

Thus, maternal clinical indicators have serious implications for the quality of mother-baby relationships, since the non-ideal maternal condition can influence the decrease in care in relation to the child's demands and needs, influencing cognitive, physical, motor and social development. (BELTRAMI L, et al., 2013; GALVÃO A, et al., 2013)

About 99% of all maternal deaths occur in developing countries. In Brazil, about 830 women die every day due to pregnancy-related reasons and many of these cases are due to preventable causes (WHO, 2019). Due the occurrence of maternal mortality, the follow-up of these women is extremely important. Prenatal care cannot predict all possible complications that this mother may develop, however, it helps to reduce risk factors that may favor a worse maternal prognosis, leading to other levels of attention if necessary (WILLIAM F, 2015).

It is necessary to emphasize that EAG are a public health problem, generating high costs and concerns in hospitals with the expenses and investments in technologies for early diagnosis (LIMA S, et al., 2012). In addition, as mothers with complications are responsible for 56% of hospital expenses in referral hospitals, in addition to having a significantly higher number of readmissions during pregnancy (CIARAN S, et al 2019; SHIBANI P, et al., 2018).

The Neonatal Intensive Care Unit (NICU) is an appropriate place, directed to the care of at-risk newborns with complications and/or abnormalities that may generate risk of death. Premature newborns (gestational age less than 30 weeks; less than 1kg) and newborns who need or have already undergone invasive or highly complex procedures are also directed to NICU care. The immediate identification of all these conditions are essential for the maintenance and recovery of neonatal health (FARIA T e AMADA I, 2018).

It is important to emphasize the influence of epidemiological surveys in helping health teams to have information that improved clinical practice, in addition to helping to know the sociodemographic characteristics and the prevalence of the main diseases and EAG that most affect this population, directing as interventions for mothers at higher risk.

Therefore, the aim of this study was to analyze whether maternal and obstetric factors, anthropometric data and postnatal variables of neonates admitted to the intensive care unit are different in pregnant women who presented EAG. In addition, it seeks to analyze whether adverse gestational events are predictors of neonatal mortality.

METHODS

Ethical aspects

The research was conducted after approval by the Research Ethics Committee, n. 2,442,015. The design was performed in accordance with the ethical principles provided for in Resolution 466/12 of the National Health Council of Brazil and was conducted in accordance with the Declaration of Helsinki.

Study design

Observational, retrospective and quantitative study with descriptive and inferential approach.

Characterization of the place and period of study

The study was developed with data from medical records of patients treated at the tertiary reference hospital in health located in a municipality in Pará, during the year 2017.

Participants

Mothers of newborns of both sexes, born at the tertiary reference hospital in health located in a municipality in Pará, referred to the Neonatal Intensive Care Unit (NICU).

Sampling

The sampling was probability with a simple random sample.

Sample

The initial sample consisted of 651 medical records. After the inclusion and exclusion criteria, 609 records were selected, divided between groups: present Adverse Gestational Events (AGE $_{(+)}$ n = 470) or absent Adverse Gestational Events (AGE $_{(-)}$ n=139) AGE.

The minimum number of 398 medical records (present [n = 306] or absent [n = 92] AGE) to be analyzed was obtained after sample size calculation, based on pilot data from this study. This analysis was performed using the Odds ratio (OR: 2.352), provided with the analysis of the association between adverse gestational events with premature birth. For this calculation, it was established: two-tail, proportion p2: 0.14, relation of allocation N2/N1: 0.30, erro α = 0.05 and β = 0.2.

Exclusion criteria

Medical records with incomplete medical data that prevented the collection of information were excluded.

Inclusion criteria

This study included medical records of pregnant women with or without Adverse Gestational Events (AGE) who had their newborns directed to the Neonatal Intensive Care Unit (NICU). The medical records included were distributed in the groups present or absent AGE.

Data collection

For data collection, we used a form elaborated by the authors containing variables: Maternal factors, obstetric factors, anthropometric data of the newborn and its postnatal variables. After completing the forms with the information relevant to the research, the data were tabulated and compared to verify the relationship between the adverse gestational events and the different factors.

Primary outcomes

AGE analyzed were urinary tract infections (UTIs), leukorrhea, anemia, chorioamnionitis, hypertensive disorders of pregnancy [HDP], bleeding and diabetes. The maternal factors analyzed were: time of pregnancy, number of deliveries, occurrence of abortion, number of pregnancies, prenatal care regardless of the number of visits, alcoholism, amniotic fluid leakage, premature labor, premature rupture of membrane and sexually transmitted infection (STI's).

The obstetric factors studied were amniotic fluid (clear with or without lumps, thick and thin meconial or bloody), type of delivery (cesarean or vaginal), use of spinal anesthesia, fetal presentation (breench, cephalic or umbilical cord around fetal neck), fetal trauma at birth, single delivery and amniotic membrane condition (intact or rupture). Anthropometric data were height, weight, cephalic perimeter, thoracic perimeter, abdominal perimeter and capillary glycemia.

The clinical variables in the postnatal evaluated were signs of respiratory failure (apnea, cyanosis, nasal flaring, retraction [intercostal, subcostal, supracostal], wailing), resuscitation maneuvers, use of ventilatory support (continuous positive airway pressure [CPAP], invasive mechanical ventilation [IMV] and surfactant) complications (jaundice, atelectasis and pneumonia) and mortality.

Statistical analysis

After verifying the normality of the data by the Lilliefors test, they were presented as mean and standard deviation (parametric data) or median with interquartiles (first and third) (non-parametric data). To verify intergroup differences, unpaired t tests (parametric data) and Mann-Whitney (nonparametric data) were used. Categorical variables were presented with absolute frequency.

The Chi-square test with Yates correction was used to analyze the association between categorical variables. To quantify the level of association, odds ratios (OR) with a 95% confidence interval (95% CI) were used.

RESULTS

Maternal age differed between groups (AGE (+): 25 [20-31] years; AGE (-): 23 [19-29] years; Mann-Whitney test p = 0.0344). Among the AGE, the most prevalent were anemia (n = 63), amniotic fluid leakage (n = 25), bleeding (n = 94), chorioamnionitis (n = 13), diabetes (n = 9), HDP (n = 111), leukorrhea (n = 217), urinary tract infection (n = 252). The pregnant women presented to one event (n = 224), two (n=168), three (n = 6) and four events (n = 12). Male neonates were more prevalent in both groups (AGE (+): n= 265; AGE (-): n= 83).

The maternal and obstetric factors analyzed are presented in **Tables 1 and 2**, respectively. The maternal factors are presented in **Table 1**. Among the maternal variables analyzed, alcoholism during pregnancy, loss of amniotic fluid and premature labor were associated with women who had AGE, while absent prenatal care was presented more by women without complications.

Table 1 - Maternal factors of neonates admitted to the intensive care unit.

Variables	AGE (+) n= 470	AGE (-) n= 139	OR	95% CI	p
Time of pregnancy					
≤24 weeks	39	14	0.8079	0.4250-1.5357	0.6308
25-28 weeks	90	23	1.1945	0.7224-1.9752	0.5693
29-32 weeks	198	52	1.2179	0.8552-1.7976	0.3707
33-36 weeks	108	39	0.7650	0.4987-1.1735	0.2642
37-40 weeks	27	9	0.8804	0.4038-1.9192	0.9077
Uninformed	8	2	-	-	--
Number of deliveries					
00	165	50	0.9630	0.6488-1.4291	0.9311
01	164	42	1.2378	0.8225-1.8627	0.3565
02	58	21	0.7910	0.4612-1.3567	0.4781
≥03	80	21	1.1526	0.6833-1.9443	0.6869
Uninformed	3	5	-	--	-
Abortion					
00	356	115	0.6517	0.4001-1.0615	0.1066
01	75	16	1.4597	0.8202-2.5977	0.2475
≥02	32	3	3.3120	0.9986-10.985	0.0626
Uninformed	7	5	-	-	-
Number of pregnancies					
00	4	4	0.2897	0.0715-1.1737	0.1557
01	181	50	1.1148	0.7525-1.6516	0.6581
02	124	38	0.9525	0.6223-1.4580	0.9087
≥03	158	43	1.1306	0.7523-1.6992	0.6255
Uninformed	3	4	-	-	-
Absent prenatal	39	38	0.2405	0.1464-0.3952	0.0001*
Alcoholism	15	0	-	-	0.0285*
Amniotic fluid leakage	25	0	-	-	0.0024*
Premature labor	98	14	2.3522	1.2967-4.2668	0.0058*
Premature rupture of membrane	42	9	1.4174	0.6721-2.9894	0.4556
STI's	4	3	0.3891	0.0860-1.7599	0.4138

Subtitle: * p ≤ 0.05, Chi-square test with Yates correction. OR: Odds ratio; 95% CI: confidence interval; AGE: adverse gestational events; UTI: urinary tract infection; STI's: sexually transmitted infection. **Fonte:** Rocha ES, et al., 2020.

Table 2 shows obstetric factors. The variables intact amniotic membrane, amniotic fluid with thick meconium and fetal trauma at birth were more associated with women who had no AGE, while breench presentation was presented by women of the AGE (+). We observed that in the AGE(-) group, the increase in the weight of neonates was a determining variable for the presence of fetal trauma at birth (present: 1060 kg (787.5 - 1548.7); absent: 1732.5 kg (1340 - 2398.7); Mann-Whitney test p = 0.0001) and amniotic fluid with thick meconium (present: 2547.5 kg (2070 - 2872.5); absent: 1570 kg (1087.5 - 2128.7); Mann-Whitney test p = 0.0021).

Table 2 - Obstetric factors of neonates admitted to the intensive care unit.

Variables	AGE (+) n= 470	AGE (-) n= 139	OR	95% CI	p
Amniotic fluid					
Clear with lumps	133	33	1.2677	0.8171-1.9669	0.3413
Clear or without lumps	177	45	1.2619	0.8448-1.2250	0.2997
Thick meconium	22	18	0.3301	0.1716-0.6352	0.0011*
Thin meconium	20	3	2.0148	0.5898-6.8833	0.3756
Bloody	28	3	2.8718	0.8597-9.5930	0.1163
Uninformed	90	37	-	-	-
Type of delivery					
Caesarean	264	73	1.1587	0.7928-1.6935	0.5068
Vaginal	196	61	0.9147	0.6243-1.3401	0.7188
Uninformed	10	5	-	-	-
Spinal anesthesia	254	63	1.4186	0.9701-2.0745	0.0871
Fetal presentation					
Cephalic	333	108	0.6977	0.4466-1.0900	0.1392
Breench	96	15	2.1219	1.1871-3.7930	0.0139*
Umbilical cord around fetal neck	4	3	0.3891	0.0860-1.7599	0.4138
uninformed	33	13	-	-	-
Fetal trauma at birth	19	46	0.0852	0.0477-0.1520	0.0001*
Single delivery	92	157	0.7703	0.4373-1.3597	0.4419
Amniotic membrane					
Intact	222	81	0.6410	0.4372-0.9398	0.0285*
Rupture	131	38	1.0271	0.6721-1.5695	0.9874
Uninformed	117	62	-	-	-

Subtitle: * p ≤ 0.05, Chi-square test with Yates correction. OR: Odds ratio; 95% CI: confidence interval; AGE: adverse gestational events.
Fonte: Rocha ES, et al., 2020.

Table 3 presents anthropometric data of neonates. The variable capillary glycemia was increased in the group of gestational complications present.

Table 3 - Anthropometric data of neonates admitted to the intensive care unit.

Variables	AGE (+) n= 470	AGE (-) n= 139	p
Height (cm)	40 [36.5-45.5]	41 [37.8-46]	0.0649
Weight (g)	1465 [1070-2176.2]	1545[1105-2185]	0.3786
Cephalic perimeter (cm)	29 [26-32]	29.5[27-33]	0.1214
Thoracic perimeter (cm)	25 [22-28]	25.5 [22.5-28]	0.4373
Abdominal perimeter (cm)	23 [20.5-27]	23.5 [21-26]	0.5231
Capillary glycemia	77 [57-101]	80 [65-109.5]	0.0448*

Subtitle: * p ≤ 0.05, Mann-Whitney test. **Fonte:** Rocha ES, et al., 2020.

Table 4 shows the postnatal data. We observed that pneumonia was less associated with the group with gestational complications.

Table 4 - Postnatal variables of neonates admitted to the intensive care unit.

Variables	AGE (+) n= 470	AGE (-) n= 139	OR	95% CI	p*
Signs of respiratory failure					
Apnea	83	35	0.6373	0.4062-0999	0.0645
Cyanosis	134	40	0.9871	0.6497-1.4997	0.9635
Nasal flaring	294	74	1.4673	1.0014-2.1499	0.0609
Wailing	206	55	1.1917	0.8103-1.7527	0.4270
Retraction	317	86	1.2769	0.8620-1.8914	0.2633
Resuscitation maneuvers	293	99	0.6688	0.4430-1.0097	0.0687
Uninformed	177	40	-	-	-
Ventilatory support					
CPAP	88	33	0.7400	0.4698-1.1655	0.2374
IMV	134	41	0.9533	0.6289-1.4449	0.9053
Surfactant	174	44	1.2692	0.8478-1.9000	0.2897
Complications					
Jaundice	217	71	0.8215	0.5624-1.1998	0.3567
Atelectasis	11	1	3.3072	0.4232-258439	0.3894
Pneumonia	14	12	0.3249	0.1466-0.7201	0.0079*
Mortality	118	41	0.8013	0.5265-1.2195	0.3548

Subtitle: * p ≤ 0.05, Chi-square test with Yates correction. OR: Odds ratio; 95% CI: confidence interval; AGE: adverse gestational events; CPAP: continuous positive airway pressure; IMV: invasive mechanical ventilation. **Fonte:** Rocha ES, et al., 2020.

DISCUSSION

NICU is the place for clinical care of premature newborns with risk complications. Knowledge of the characteristics involving newborns of pregnant women who presented AGE, contributes to recovery and better prognosis. In this context, this study found that AGE were associated with some maternal, obstetric, anthropometric and postnatal variables in neonates admitted to the NICU.

The most frequent AGE in the study was urinary tract infection. Infections are one of the most prevalent occurrences among pregnant women and may be symptomatic or non-symptomatic (DUARTE G, et al., 2017), according to the results of our study. During the gestational period many physiological changes occur in the urogenital tract of the woman, such as: urethral compression, increased urine output, vesicoureteral reflux, decreased antibacterial activity, among others (DUARTE G, et al., 2017). Moreover, in this period, the therapeutic possibilities against infectious agents and prophylactic possibilities are smaller, taking into account the malignancy of drugs for the fetus (DUARTE G, et al., 2017) thus contributing to the occurrence of infections during the gestational period.

AGE were associated with alcoholism. During pregnancy, women are guided and motivated by health professionals to make changes in daily living habits. The performance of health education addressing the effects of alcohol use in pregnancy and the specific risks to the fetus and perinatal involving the health of the newborn are practices of these professionals. High alcohol consumption in the second and third trimesters increases prostaglandin secretion, increasing uterine contractions and may induce increased intravascular coagulation, decreasing blood flow in the placenta (IKEHARA S, et al., 2019), which may be associated with preterm delivery and loss of amniotic fluid, as observed in this study. In addition, women are less tolerant of alcohol, making alcohol levels higher and thus more susceptible to the changes it can cause.

In pregnant women, ethanol can cross the placenta by concentration gradient without going through any process of change in its composition, resulting in a fetal level equivalent to the maternal one. In addition, alcohol also has the ability to cross the blood-brain barrier and cause complexes and, in some cases, even irreversible damage to the newborn's health, also causing neurological abnormalities (MESQUITA M, et al., 2010). In addition, alcoholism is related to damage to the newborn in the postnatal period, which may involve growth and weight gain disorders, behavioral dysfunctions, among others (FREIRE K, et al., 2019).

Premature labor, loss of amniotic fluid and Breech presentation were associated with AGE. Every pregnancy is subject to complications and women with AGE are more likely to have a premature delivery (VARELA P, et al., 2017; MEHARI M, et al., 2020) because they present high chances of developing stresses and disorders due to the history of previous diseases, which may result in loss of amniotic fluid.

This fact may be subject to the socioeconomic scenario to which this pregnant woman belongs, for this same factor, added to possible genetic and environmental conditions, studies congruent to our results reveal an association between gestational complications and the risk of pelvic fetal presentation. Regional socioeconomic status, genetic and environmental conditions are factors that influence these conditions and may result in increased risk of Breech presentation (NOLI S, et al., 2019; FREITAS P, et al., 2010).

AGE were associated with higher capillary glycemia. During pregnancy, fetal glucose is influenced by maternal circulation through transplacental transfusion, thus seeking to establish the normality of this parameter in ⅔ of maternal glucose. Neonates with respiratory disorders are more likely to develop hyperglycemia in the postnatal period, and ICU are sites with neonates largely premature and affected by respiratory problems (FALCÃO M e RAMOS J, 1998) thus justifying the change in this population.

AGE were associated with pneumonia. Respiratory diseases are one of the main reasons for admission of newborns to the NICU, including pneumonia (BASEER K, et al., 2020) provided by infections of bacteria, viruses, fungi and parasites. These infections may come from vertical contamination. Generally, it presents early onset that occurs due to pathogens aspirated by the newborn from the intrauterine environment or the birth canal during vaginal delivery, or, late caused by pathogens found in the postnatal environment (KAWAKITA T, et al., 2017).

Among the AGE analyzed, urinary tract infections and gestational diabetes mellitus may be indicative of risk for neonatal respiratory morbidity. Insulin seems to decrease the expression of surfactant protein present in fetal lung tissue, in addition, this factor can also be attributed to prematurity, (KAWAKITA T, et al., 2017) which increases respiratory distress in neonates (LIU J, et al., 2014; BECKLAKE MR e KAUFFMANN F 1999; BAUMERT M, et al., 2012).

Intact amniotic membrane was associated with absent AGE. This anatomical structure contributes to the maintenance of pregnancy (MOORE K.L, 2013). However, we also observed the association with prenatal absentee. The absence of consultations may be related to the adequate development of pregnancy. However, the Northern region of Brazil presents the worst performance associated with geographical difficulties, long distances, barriers in access to diagnostic centers, absence of qualified professionals and the late onset of prenatal care in women (LEAL M, et al., 2020).

In Brazil there are a number of deficiencies in this process, such as number of inadequate consultations, incomplete procedures and others with late onset, behaviors that directly affect perinatal aspects (NUNES J, et al., 2016; SAAVEDRA JS e CESAR JA, 2015).

Therefore, these factors should be considered in relation to prenatal absentee. Still, in women with absent AGE, the amniotic fluid with thick meconium and fetal trauma at birth have been increased. However, we observed that these associations were due to increased birth weight, as observed by other studies (BURJONRAPPA S, et al., 2010; HAILU LD e KEBEDE DL, 2018).

Knowing the maternal, obstetric, anthropometric and postnatal variables that may be associated with the AGE is essential for the development of public policies. It is possible to observe a large number of uninformed data that impair and greatly limit the analysis carried out in studies using the database. Although there is a reduction in underreporting, there is still a lot to improve of the data.

Thus, in our study, the findings indicated that the variables analyzed are multifactorial related indicating the relevance of this type of study both for the scientific community and for the development of public policies for the Unified Health System (SUS) that favor responses directed to the most present adversities. In addition, to promote a better training of professionals who crave biopsychosocial ideals in both maternal and neonatal treatment.

Health professionals should stimulate through strategies to raise awareness about prenatal care already in the first trimester of pregnancy, aiming to promote the health of pregnant women and newborns. We know that there is a high incidence of neonatal deaths due to preventable causes, so professional follow-up with the mother is extremely important to generate the perception of possible diseases during pregnancy.

CONCLUSION

In this study, we found that the maternal, obstetric, anthropometric and postnatal variables in neonates admitted to the NICU are associated with AGE. AGE $_{(+)}$ were associated with alcoholism, loss of amniotic fluid, premature labor, Breech presentation, increased capillary glycemia and pneumonia. AGE $_{(-)}$ were associated with absent prenatal care, intact amniotic membrane, amniotic fluid with thick meconium and fetal trauma at birth. The events analyzed did not increase the chances of death.

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