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RESEARCH

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INFLUENCE OF MATERNAL AGE IN PERINATAL CONDITIONS IN LIVE BIRTHS OF SÃO LUÍS, MARANHÃO

Influência da idade materna nas condições perinatais em nascidos vivos de São Luís, Maranhão

influencia de la edad materna en las condiciones perinatales en nacidos vivos de San Luís, Maranhão

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ABSTRACT

Objective: to investigate maternal and perinatal factors associated with extremes of women's reproductive age in São Luís, Maranhão. **Method:** this is a cross-sectional study conducted in São Luís/MA, with a population of 16,474 mothers. The data were collected in the Sinasc provided by the Municipal Health Secretariat. We used the Pearson Chi-square test and calculated the odds ratio with a significance level of $\alpha=0.05$. **Results:** it was verified that the adolescents had a higher chance of preterm birth (OR=1.37; $p<0.001$); Women aged 35 years or older were at increased risk for low birth weight (OR=1.22; $p=0.022$). Both adolescents (OR=2.09; $p<0.001$) and older mothers (OR=1.85; $p<0.001$) have an increased chance to perform less than six prenatal visits. **Conclusion:** perinatal outcomes, preterm birth, low birth weight and fewer than six prenatal visits are frequent in the pregnancies of adolescents and women of advanced age.

Descriptors: Maternal age; Perinatal care; Prenatal care.

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RESUMO

Objetivo: investigar os fatores maternos e perinatais associados aos extremos da idade reprodutiva da mulher em São Luís, Maranhão.

Método: trata-se de um estudo transversal, realizado em São Luís/MA, com população de 16.474 mães. Os dados foram coletados no Sinasc disponibilizado pela Secretaria Municipal. Utilizou-se o Teste Qui-quadrado de Pearson e calculou-se a *Odds Ratio* com nível de significância de $\alpha = 0.05$. **Resultados:** verificou-se que as adolescentes apresentaram maior chance de nascimento prematuros (OR=1,37; $p<0,001$); mulheres com idade avançada apresentaram maior risco para baixo peso ao nascer (OR=1,22; $p=0,022$). Tanto as adolescentes (OR=2,09; $p<0,001$) quanto as mães com idade avançada (OR=1,85; $p<0,001$) possuem chances aumentadas para realizarem menos que seis consultas de pré-natal.

Conclusão: os resultados perinatais, nascimento prematuro, baixo peso ao nascer e a realização de menos de seis consultas pré-natais são elevados nas gestações de adolescentes e mulheres em idade avançada.

Descritores: Idade materna; Assistência perinatal; Cuidado pré-natal.

RESUMÉN

Objetivo: investigar los factores maternos y perinatales asociados a los extremos de la edad reproductiva de la mujer en São Luís, Maranhão. **Método:** se trata de un estudio transversal cumplido en São Luís/MA, con población de 16.474 madres. Los datos fueron recolectados en el Sinasc disponible por la Secretaría Municipal. Se utilizó el Test Qui-cuadrado de Pearson y se calculó la *Odds Ratio* con nivel de significancia de $\alpha=0.05$. **Resultados:** se encontró que las adolescentes presentaron mayor probabilidad de nacimiento prematuros (OR=1,37; $p<0,001$); las mujeres con edad avanzada presentaron un mayor riesgo de bajo peso al nacer (OR=1,22; $p=0,022$). Tanto las adolescentes (OR=2,09; $p<0,001$) como las madres mayores (OR=1,85; $p<0,001$) tienen más probabilidades de tener menos de seis visitas prenatales. **Conclusión:** los resultados perinatales, nacimiento prematuro, bajo peso al nacer y la realización de menos de seis consultas prenatales son altos en embarazos adolescentes y mujeres en edad avanzada.

Descriptores: Edad materna; Atención perinatal; Atención prenatal.

INTRODUCTION

Pregnancy is a physiological and natural phase in woman's development.¹ However, the ideal age range for reproduction is between 20 and 29 years, since the best perinatal outcomes are observed during this period.² Outside this age, pregnancy requires particular attention to be paid to the fact that, as is well known, pregnancy at the extremes of reproductive life, before 20 and after 35 years of age, is linked to greater presence of perinatal complications and maternal morbidity and mortality.³

Teenage pregnancy is a worldwide phenomenon and, especially in developing countries, is considered a public health problem because it causes psychosocial and economic problems as well as obstetric complications.⁴ And late pregnancy, which occurs after 35 years, has increased considerably due to advances in assisted reproduction, higher level of education of women, delayed marriage, and advances in health care. However, this increase is worrying, as studies have demonstrated a significant association between advanced maternal age and adverse perinatal outcomes.⁵⁻⁶

Other adverse outcomes associated with teenage pregnancy include intrauterine growth restriction, premature birth, low Apgar score and low birth weight.⁶ In late pregnancies, the highest occurrence of chromosomal abnormalities, preterm birth, low birth weight, macrosomia, low vitality of newborns and congenital anomalies are observed.⁷ In this context, the Ministry of Health reinforces the importance of special attention to these women during prenatal care.⁸

Prenatal care is an important component of women's health care in the pregnancy-puerperal period.⁹ It is an important indicator of health status of the mother-child binomial and, for both adolescents and older women, it is crucial for perinatal outcomes, since the better the care provided, the better the outcomes are achieved and the lower the maternal and perinatal mortality rates.^{4,10}

Thus, we sought to answer the following guiding question: What are maternal and perinatal factors associated with the extremes of reproductive age in live births in São Luís/MA in 2014? The objective of this research, therefore, was to investigate the maternal and perinatal factors associated with extremes of women's reproductive age in São Luís/MA in 2014.

The purpose of this study was to provide subsidies for health action planning - especially for nursing professionals - that will favor improvements in perinatal outcomes. In addition, this research will provide reflections on the care that has been provided to pregnant women at the extremes of their reproductive life.

METHODS

This is a cross-sectional and analytical study with 16,474 records of the Live Birth Information System (SINASC) in the municipality of São Luís, Maranhão, northeast of the country. The study population consists of 16,474 mothers of live births, of all age groups, residing in São Luís/MA and whose deliveries occurred in hospitals or other health facilities in 2014. The criteria for exclusion were the records that presented information as "ignored" in all study variables, totaling (01) one record.

The selected variables were: maternal age group (10-19 years, 20 to 34 years and 35 years or older); years of schooling (0 to 9 years, >9 years); marital status (single, married, widow, stable union, divorced), for the association analysis had been considered: with partner (married and stable union) and without partner (single, widow, divorced); previous pregnancies (nulligravida, primigravida, secundigravida, multigravida); number of prenatal consultations (0-5 and > 6 consultations); gestational age (preterm [<37 weeks] and term [37- 41 weeks]); 5-minute Apgar score (low [0-7] and adequate [8-10]); birth weight (low weight [$<2,500$ g] and adequate [2500g to 3999g]) and type of delivery (vaginal and cesarean section). The dependent variable of this study was the maternal age group.

Data were processed using the Epi-Info Program version 7.1.3.0 and analyzed by Pearson's Chi-Square Test

for the presentation of descriptive and analytical data. The determination of association strength was calculated by Odds Ratio (OR) and 95% confidence interval (95% CI). The significance level was set at $p < 0.05$.

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RESULTS AND DISCUSSION

From the total of 16,474 mothers who constituted the population in this study, 2,833 (17.20%) were adolescents, 11,839 (71.86%) young adults and 1,802 (10.94%) were 35 years old or older.

Regarding education, there was a slight difference between adolescent mothers and older mothers, 2,746 (97.93%) of the adolescents attended 9 or more years of schooling, while among mothers with advanced age the

percentage was 96.39% (1,755). Marital status data showed that 1,354 (75.14%) of older women were married or living in a stable union, while among adolescents, this number was 1,666 (58.80%). In previous pregnancies, it was observed that 2,086 (73.63%) of adolescent mothers were nulligravidae, while the proportion of nulligravidae among mothers aged 35 years or older was 393 (21.81%) (Table 1).

Regarding the number of prenatal consultations, 456 (25.31%) of older mothers had zero to five consultations, while among adolescents this number was 1,609 (56.79%). Regarding gestational age, there is a relevant frequency of preterm births, although it appears in close percentages for all age groups in the study 394 (13.91%) in adolescents, 1,313 (1.09%) in young adults and 233 (12.93%) in older women. The proportion of cesarean sections was higher in women aged 35 years or older, 1293 (71.75%), while among adolescents the occurrence of this type of delivery was 877 (30.96%) (Table 1).

The low fifth minute Apgar score was identified in less than 3% of adolescents and older women. Low birth weight was detected in low percentages among older women 175 (9.71%) and adolescents 270 (9.56%) (Table 1).

Table 1 - Distribution of maternal characteristics and perinatal outcomes according to the age range of the mothers. São Luís, MA, 2014.

Characteristics	Maternal age		
	10-19 yrs n (%)	20-34 yrs n (%)	35 yrs or more n (%)
Years of study			
0 to 9 years	30 (1,06)	120 (1,01)	29 (1,61)
> 9 years	2746 (96,93)	11533 (97,42)	1755 (97,39)
Ignored	57 (2,01)	186 (1,57)	18 (1,00)
Marital status			
Single	1109 (39,15)	2987 (25,23)	408 (22,64)
Married	155 (5,47)	3084 (26,05)	707 (39,23)
Widow	4 (0,14)	14 (0,12)	4 (0,22)
Separated/divorced	2 (0,07)	37 (0,31)	12 (0,67)
Stable Union	1511 (53,33)	5482 (46,31)	647 (35,91)
Ignored	52 (1,84)	235 (1,98)	24 (1,33)
Previous pregnancies			
Nulligravida	2086 (73,63)	4706 (39,75)	393 (21,81)
Primigravida	555 (19,59)	3462 (29,24)	542 (30,08)
Secundigravida	155 (5,47)	2004 (16,93)	374 (20,75)
Multigravida	37 (1,31)	1667 (14,08)	493 (27,36)

Characteristics	Maternal age		
	10-19 yrs n (%)	20-34 yrs n (%)	35 yrs or more n (%)
Prenatal consultation			
0 to 5 visits	1609 (56,79)	4565 (38,56)	456 (25,31)
6 or more visits	1224 (43,21)	7274 (61,44)	1346 (74,69)
Gestational age			
Preterm	394 (13,91)	1313 (11,09)	233 (12,93)
Term	1933 (68,23)	8848 (74,73)	1353 (75,09)
Post Term	136 (4,80)	550 (4,65)	57 (3,16)
Ignored	370 (13,06)	1128 (9,53)	159 (8,82)
Type of delivery			
Vaginal	1943 (68,58)	5417 (45,76)	500 (27,75)
Cesarean	877 (30,96)	6371 (53,81)	1293 (71,75)
Ignored	13 (0,46)	51 (0,43)	9 (0,50)
Apgar 5th minute score			
Low	73 (2,58)	304 (2,57)	50 (2,77)
Suitable	2714 (95,80)	11334 (95,73)	1734 (96,23)
Ignored	46 (1,62)	201 (1,70)	18 (1,00)
Birth weight			
100 to 2499 g	270 (9,53)	972 (8,21)	175 (9,71)
2500 to 3999 g	2476 (87,29)	10094 (85,26)	1490 (82,69)
≥ 4000 g	90 (3,18)	773 (6,53)	137 (7,60)

Source: SINASC, São Luís, MA, 2014

In terms of association between maternal age and perinatal outcomes, we found that adolescents were more likely to have preterm birth (OR = 1.37; p-value = 0.001). Women aged 35 years and older were at higher risk for cesarean delivery (OR = 0.45; p-value = 0.000) and low birth weight (OR = 1.22; p-value = 0.022). Regarding the number of prenatal consultations, both adolescents and older women are more likely to have less than six prenatal consultations (OR = 2.09; p-value = 0.001 and OR = 1.85). p-value = 0.001, respectively) (Table 2).

Table 2 - Comparison of ratios of women at the extremes of reproductive age compared with young adults. São Luís, MA, 2014.

Variables	Maternal age									
	10-19 yrs			p*	20-34 yrs		35 yrs or more			p*
	F	OR	IC 95%		f	OR	f	OR	IC 95%	
Less than 9 years of school	30	1,05	0,70-1,57	0,812	120	1,0	29	0,62	0,42-0,94	0,025
Partnered	1666	0,53	0,49-0,58	<0,001	8566	1,0	1354	0,88	0,78-0,99	0,036
Less than 6 prenatal consultations	1609	2.09	1,92-2,27	<0,001	4565	1,0	456	1,85	1,65-2,07	<0,001
Pre-term	394	1,37	1,21-1,55	<0,001	1313	1,0	233	0,86	0,74-1,00	0,053

Variables	Maternal age									
	10-19 yrs			p*	20-34 yrs		35 yrs or more			p*
	F	OR	IC 95%		f	OR	f	OR	IC 95%	
Cesarian	877	0,38	0,35-0,42	<0,001	6371	1,0	1293	0,45	0,41-0,51	<0,001
Low birth weight	270	0,88	0,76-1,02	0,089	972	1,0	175	1,22	1,03-1,44	0,022
Low 5th minute Apgar score	73	0,99	1,29-0,77	0,983	304	1,0	50	1,07	0,79-1,46	0,640

Source: SINASC, São Luís, MA, 2014

Legend: f - frequency; OR - Odds Ratio; CI - 95% confidence interval; * p - Chi-square test;

** All data with ignored information were excluded from the analysis.

In this study, we sought to investigate the maternal and perinatal factors associated with the extremes of the reproductive age of women in São Luís/MA. After statistical analysis, the associations of maternal age with the variables marital status, number of prenatal consultations, type of delivery, gestational age and birth weight were statistically significant.

The fertility pattern of Brazilian women was concentrated in the age group of 25 to 29 years and 30 to 34 years in the 1970s and 20 to 24 years, until the late 1990s. From 2000 to 2006, there was a slight reversal of the fertility rate among adolescent and young women based on the SINASC registry, with a decline in births among mothers aged 15-19 and 20 - 24 years. During this same period, the proportion of live births of mothers aged 10 to 14 years was found to be stable, and there was a slight fluctuation between the live births of mothers aged 24 and over.¹¹

The high number of teenage mothers identified in the survey may be justified by the early onset of sexual activity of these women and, in this sense, official data show that, of the total live births in the country, about 20% are children of teenage mothers. The same is true for stillbirths, with the proportion of mothers aged 10-19 at 16% in this category.¹²

Pregnancy in the age group 10-19 years is a public health problem and considered at risk because these mothers are more likely to develop hypertensive syndromes, anemia, impaired nutritional status, fetal-pelvic disproportion, premature births and problems arising from unattended abortions. Notably among women from 15 to 19 years old, the chance of death due to problems resulting from pregnancy or childbirth is twice as high as among those over 20 years old, and five times higher in children under 15 years old.¹³ In prenatal care for pregnant adolescents, nurses play an important role in the development of effective actions, considering cultural and socioeconomic aspects of pregnant women, aiming to reduce complications inherent to pregnancy in this age group.

In the research, most of the adolescent pregnant women reported more than nine years of study. Contrary to the study conducted in the city of Maringá/PR, which compared the perinatal results of pregnant women at the extremes of

reproductive age with women between 20 and 34 years old and found that a larger proportion of women at the extremes of reproductive age had less than seven years of study.⁷ It is important to highlight that maternal age and low education have been associated with stillbirth and also inadequate prenatal care, and that low education may be related to unfavorable socioeconomic conditions.

Formal marriages and stable union were more frequent among both older women and adolescents than single marital status. Differing from the results found in studies in the state of Paraná, in the municipalities of Sarandi (2011) and Maringá (2013), where 87.7% and 80.1% of teenage mothers were single, respectively.^{5,7}

A study conducted in Singapore in 2015 found that women who lived with their partners had advantages over single women because they were better assisted during prenatal care and their children had better perinatal outcomes.¹⁴ Worse pre-natal care by single women may be justified by the absence of someone who shares the expectations and responsibilities of this stage of life, favoring adverse outcomes. In this condition, the nurse is responsible for promoting a good professional-mother interpersonal relationship, providing the bond of trust, acceptance and emotional support, which favors the suitability of prenatal care for single women.

Contrary to what was observed among women aged 35 and over, most of the adolescents were nulligravidae. Diverging from the study conducted in Rio de Janeiro in 2012, where most teenage mothers were primigravida (68.6%). This same study points out that adolescents with recurrent pregnancies are more likely to have adverse perinatal outcomes, such as prematurity.⁹

Most of the adolescents did not attend the minimum of six appointments defined by the Ministry of Health. Women aged 35 or older, in contrast, mostly attended six or more prenatal consultations. In the municipalities of São Luís/MA and Maringá/PR, the same situation was observed, where the proportions of older mothers who had an adequate number of consultations were, respectively, 44% and 84.7%. Risks of age-related obstetric and perinatal complications higher as well as education and family support.

In the association between maternal age and perinatal outcomes, we found that both adolescents and older women had an increased chance of having less than six prenatal visits. Findings corroborate a study conducted in São Luís/MA, in 2009, with the objective of analyzing the association between maternal age, perinatal outcomes and the mode of delivery, where data indicated that adolescents and women with advanced age were da a probability of 2.03 and 1.56, respectively, of having inadequate prenatal consultations.¹⁵

Prenatal care is one of the essential factors for a healthy evolution of pregnancy, since they allow early identification of risk situations and enable efficient and early interventions, thus preventing obstetric and neonatal complications.⁴ Studies link prenatal inadequacy and adverse perinatal outcomes, including prematurity.¹⁶⁻¹⁷

It is important to emphasize, however, that the quality of prenatal care should go beyond quantitative aspects, because even if prenatal care is initiated early and with an adequate number of consultations, there is still the possibility of unfavorable pregnancy outcomes.¹³ It should be reinforced to pregnant women that, even with these risks, prenatal care should be performed properly, as this practice ensures that they are minimized.

In this study, we observed that maternal age influences the occurrence of preterm birth, indicating that teenage pregnancy is associated with a higher chance of preterm birth. This result corroborates the findings of a cross-sectional, observational and analytical study conducted at the Obstetrics and Gynecology Service of the University Hospital of the Federal University of Maranhão (HU-UFMA) in São Luís/MA, in 2009, where a 1.46 ratio was identified.¹⁵

In a study conducted in São Luís, with the objective of analyzing adolescent pregnancy with prematurity, an incidence of 21.4% of prematurity among children of adolescent mothers was identified and a chance of 1.4.¹⁸ This result is similar to the findings in Singapore, where an association between teenage pregnancy and higher risk of prematurity (OR = 1.70, 95% CI 1.182.43, $p < 0.01$), congenital malformations and perinatal mortality.¹⁴

Preterm birth represents a public health challenge because premature and low birth weight children are at a higher risk of mortality than preterm children and those with adequate weight.¹⁷ The cause of preterm birth is multifactorial. Factors related to its occurrence include: maternal infections of the genitourinary tract, low maternal height, lack of prenatal care and nutritional deficiency.¹⁶ In the prenatal nursing consultation in primary care, a qualified nurse has scientific knowledge necessary for identifying nutrition, hydration and elimination needs that may indicate preterm birth, therefore findings essential for reducing mortality.

When analyzing the type of delivery, we found that the frequency of cesarean section is higher among women in advanced age, exceeding the limit of 15% recommended by the World Health Organization.¹⁹

A study conducted in Sweden, in 2016, found that in 2014, elective and emergency caesarean section rates increased steadily along with maternal age, 35% among nulliparous women of 35 years of age and over, compared with 13% in younger women.²⁰ Among factors related to the increase in these rates are the increase in frequency of hypertensive syndromes, fetal macrosomia, failure of the aged myometrium, and maternal request.⁵

In terms of linking maternal age to the type of delivery, we found that women with advanced age were more likely to have cesarean section. Such findings corroborate the results of a study conducted in Maringá/PR, where it was found that women with advanced age were 1.47 times more likely to have a cesarean section.⁷

Concern with the increase of cesarean deliveries by the health agencies is due to the association between this mode of delivery and higher incidence of maternal and neonatal perinatal mortality, as well as the increase of placental complications in later pregnancies, such as placenta previa and premature detachment of the placenta.⁶

With the advent of the humanization movement of childbirth, Obstetric Nursing has been encouraging the reduction of unnecessary interventions and the promotion of care in the process of pregnancy / childbirth / breastfeeding, leading to the strengthening of the role of women as protagonists.

Similar proportion of low birth weight among adolescent mothers and those with advanced age identified in the research confirms the findings in Sarandi/PR, where the proportions of low birth weight among mothers aged 10-19 years and those aged 35 and over were, respectively, six units and five tenths of a percent and six units and eight tenths of a percent.⁵

In terms of association between maternal age and low birth weight, we found that women aged 35 or older had a higher chance of underweight. The study in Maringá/PR identified that low birth weight is a risk factor present at the extremes of reproductive life, with a prevalence of 12.5% and a 1.24 chance among older women.⁷ Besides being the most important factor related to perinatal morbidity and mortality, low weight is considered an isolated factor of infant morbi-mortality. It may also be associated with further changes such as diabetes mellitus, stroke, obesity, immune dysfunction, and cardiovascular disease.⁵

In this context, the nurse has a leading role in guiding, supporting and instructing the family and, especially, the mother. Which, in turn, is important to ensure continuity of care for children with low birth weight, establishing a link between the hospital and the network of primary care, where the child is accompanied in order to avoid other clinical changes inherent to this condition and even death.

No statistically significant results were observed regarding the association between maternal age and the Apgar index variable in the fifth minute. Differing from what was observed in São Luís, in 2009, where mothers at the

extremes of reproductive age presented higher percentages of low Apgar score in the fifth minute compared to young adults. The following proportions were observed in the above study: 4.1% among adolescents, 2.6% in young adults and 5.7% in older women. In the same study, in terms of association between maternal age and Apgar score, it was found that mothers with advanced age were more likely to have low Apgar score at 5 min (OR = 2.90).¹⁵

The Apgar score is one of the risk indicators for perinatal morbidity and mortality and is widely used to assess newborn vitality. Values lower than seven in the fifth minute are related to increased neonatal encephalopathy due to asphyxia, infections and / or previous neurological impairment.⁶

CONCLUSIONS

The results of this research suggest that pregnancy at the end of reproductive life is associated with less efficient prenatal care, higher incidence of cesarean deliveries, preterm birth and low birth weight. Preterm birth was associated with teenage pregnancy, just as cesarean delivery and low birth weight were associated with pregnancy at an advanced age.

Such results are extremely important for health services, since they indicate that women at the extreme reproductive age are more susceptible to adverse perinatal outcomes, that is, they emphasize the need for proper planning of care to be provided to these women.

Considering nursing practice, the active search of pregnant women who have not yet started prenatal care and those who are absent, is a measure that encourages the beginning of prenatal care in the first trimester of pregnancy and may lead to an adequate number of consultations. Early prenatal care allows identification of risk factors such as maternal age, for example, and facilitates effective interventions to reduce or prevent possible complications, thus improving perinatal outcomes.

The main limitation of this study was the impossibility of conducting a qualitative assessment of the care provided to these women, since the information was collected in secondary databases that contain only quantitative information. Further qualitative evaluation of prenatal care would consider factors beyond the number of consultations and the gestational age at which the pregnant woman initiated prenatal care, such as laboratory tests recommended by the Ministry of Health, vaccination status and the quality of the information provided to these pregnant women, as well as understanding the way pregnant women perceive the care received during the prenatal period, an important condition for improving it.

Collaborators

PC Silva and FBBF Nunes contributed to the study conception and design, collection, analysis and interpretation

of results. TLM Barbosa and RAR Farias contributed to the data collection. MLH Lopes and EL Silva contr contributed to the critical revision of the manuscript content. All authors participated in the writing, approved the final version of the manuscript and declare to be responsible for all aspects of the work, ensuring its accuracy and integrity.

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