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Outcomes in late-age pregnancies

RESULTADOS PERINATAIS EM GESTAÇÕES TARDIAS

RESULTADOS PERINATALES EN GESTACIONES TARDÍAS

Angela Andréia França Gravena¹, Arethúza Sass², Sonia Silva Marcon³, Sandra Marisa Pelloso⁴

ABSTRACT

The objective of the present study was to compare perinatal outcomes in women aged 35 or older with women aged 20 to 34 years. This retrospective study was performed by reviewing the obstetric records of 1255 mothers who gave birth at the only hospital in Sarandi-PR, from January 2007 to December 2008. The analyzed variables were: marital status, education, gestational age at birth, type of delivery, newborn birth weight, Apgar score at one and five minutes and stillbirths. Logistic regression showed that advanced maternal age was significantly associated with adverse outcomes such as cesareans (OR 1.23, 95% CI 0.19-0.44) and 5-minute Apgar scores below 7 (OR 5.78 95% CI 0.74-0.76). These results are important to show the risk of complications in pregnant women aged 35 years or older, and the need to provide guidance to women who wish to postpone pregnancy.

DESCRIPTORS

Maternal age
Pregnant women
Pregnancy complications
Obstetrical nursing

RESUMO

O objetivo do estudo foi comparar resultados perinatais de mulheres com idade igual ou superior a 35 anos com os de mulheres entre 20 e 34 anos. O estudo é retrospectivo e foi realizado a partir da consulta às fichas obstétricas de 1.255 puérperas que tiveram partos no único hospital de Sarandi-PR, no período de janeiro de 2007 a dezembro de 2008. As variáveis analisadas foram: estado civil, escolaridade, idade gestacional, tipo de parto, peso ao nascer, índice de Apgar no 1º e 5º minutos e óbitos fetais. Na regressão logística, a idade materna avançada esteve associada significativamente à cesariana (OR 1,23, IC 95% 0,19-0,44) e a um índice de Apgar menor que 7 no 5º minuto de vida (OR 5,78, IC 95% 0,74-2,76). Esses resultados evidenciam os riscos de complicações em gestantes com idade igual ou superior a 35 anos e a necessidade de que o aconselhamento às mulheres que pretendam postergar a gestação seja realizado.

DESCRIPTORES

Idade materna
Gestantes
Complicações na gravidez
Enfermagem obstétrica

RESUMEN

Estudio que objetivó comparar resultados perinatales de mujeres de edad igual o mayor a 35 años con los de mujeres entre 20 y 34 años. De carácter retrospectivo, realizado mediante consulta de fichas obstétricas de 1.255 puérperas que dieron a luz en hospital de Sarandi-PR, entre enero 2007 y diciembre 2008. Las variables analizadas fueron: estado civil, escolaridad, edad gestacional, tipo de parto, peso al nacer, índice de Apgar en 1º y 5º minutos y muertes fetales. En la regresión logística, la edad materna avanzada se asoció significativamente a la cesárea (OR 1,23, IC 95% 0,19-0,44) y a un índice de Apgar menor a 7 en 5º minuto de vida (OR 5,78, IC 95% 0,74-2,76). Tales resultados evidencian los riesgos y complicaciones en gestantes con edad igual o superior a 35 años y la necesidad de aconsejar a aquellas mujeres que pretendan postergar la gestación.

DESCRIPTORES

Edad materna
Mujeres embarazadas
Complicaciones del embarazo
Enfermería obstétrica

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INTRODUCTION

A pregnancy in a woman older than 35 years old is termed a late pregnancy and women older than 45 years old are considered to be at a very advanced maternal age⁽¹⁾. Pregnancies among women older than 35 years old have increased considerably, a fact seen in various Brazilian⁽²⁻³⁾ and international studies⁽¹⁻⁴⁾. Reasons vary, including the desire of women to invest in their education and professional career, postpone marriage, remarriage, the large and diversified availability of contraceptive methods, and infertility problems.

The percentage of primiparous women aged from 35 to 39 years old and from 40 to 44 years old increased 36% and 70%, respectively⁽⁵⁾, between 1991 and 2001 in the United States. Statistical data show that birth rates in women aged from 40 to 44 years old continued to grow in 2005 and in 2006, reaching a rate of 9.4/1,000⁽⁶⁾.

The Brazilian Survey of Children's and Women's Demography and Health (PNDS), conducted with 15,000 women from all Brazilian regions, showed that the average number of live births is 1.5 among women 15 to 49 years old and 2.6 among women 45 to 49 years old⁽⁷⁾. According to this study, the average age of Brazilian mothers decreased from 25.6 years old in 1991 to 24.8 years old in 2000. Only women aged from 15 to 19 years old experienced a positive variation of 25.4% in fertility rate in the same period, while all the remaining experienced a negative variation, especially women 35 to 39 years old, 40 to 44 and 45 to 49 years old, that is, 28.0%, 47.8% and 63.3%, respectively⁽⁸⁾.

Despite this decline, the number of women who become pregnant at a more advanced age is significant and of concern since various studies show an important association between maternal age of 35 years or older and adverse perinatal outcomes^(2,9); that is, a greater risk of maternal, fetal and newborn complications exists. Women 35 to 39 years old, for instance, are at a risk two to three times greater of maternal death than are women around 20 years of age and this risk is even greater for women 40 years old or older⁽¹⁰⁾.

In comparison with younger women, 35 year old women experience more spontaneous and induced abortions, a greater risk of perinatal death, low newborn vitality, low birth weight, preterm delivery, and newborns small for their gestational age⁽¹¹⁾. It is worth noting that more frequent alterations of newborn's weight in these women involve cases of both macrosomia and low weight for gestational age⁽¹²⁾.

Advanced age pregnancies have traditionally been considered high-risk pregnancies mainly due to the growing incidence of hypertensive syndrome, greater weight gain, obesity, fibroids, diabetes, abortions and C-sections⁽¹³⁾.

Many studies^(1-3,11) have investigated the adverse outcomes of pregnancies at extreme reproductive ages, though it is extremely important to investigate the adverse results of late pregnancies to minimize harm, since women have postponed maternity due to many factors, such as postponed marriages, remarriage, investment in education and professional careers, greater use of contraceptive methods and infertility problems.

The assumption that women of advanced age are more likely to experience complications during pregnancy and adverse perinatal outcomes in comparison with women at an ideal reproductive age encouraged the development of this study intended to compare the perinatal outcomes of women 35 years old or older with those of women 20 to 34 years old.

METHOD

This cross-sectional study conducted retrospective data collection based on obstetrical files of women who delivered their children in the Metropolitan Hospital of Sarandi, PR, Brazil from January 1st 2007 to December 31st 2008.

Sarandi is one of the 13 cities that integrate the Metropolitan Region of East Maringá with a total area of 104.04 km² and an estimated population of 88,747 inhabitants in 2006. This city concentrates the highest population density of the metropolitan area with 692 inhabitants per km². Its urban rate is 97.3% and in 2000 its Human Development Index (HDI) was 0.768⁽¹⁴⁾.

In terms of health care, the city has an emergency department and a private general hospital linked to the Unified Health System (SUS) with 140 beds, 15 of which are in the Intensive Care Unit (ICU). The primary health care network has seven private health units and two teams from the Family Health Strategy that cover 8.87% of the city's population. The University Hospital of Maringá is a referral center for high-risk pregnancies, while all remaining pregnant women are cared for in the studied institution.

A total of 1,883 women delivered their children in this institution during the study's data collection period, though 628 (33.3%) were excluded from the study: 626 were younger than 20 years old and two were pregnant with twins. The sample effectively studied was composed of 1,255 women distributed into two groups according to age: group I with 1,117 women aged from 20 to 34 years old and group II with 138 women aged 35 years old or older.

The study's variables include information available in the women's obstetrical files categorized by: maternal age (20 to 34 years old and 35 years old or older), marital

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status (single, married, widowed or divorced), education (up to seven years of schooling and eight or more years of schooling), type of delivery (normal or C-section), gestational age (preterm=less than 37 weeks; at term=between 37 and 42 weeks and post term=more than 42 weeks)⁽¹⁵⁾, birth weight (low weight=less than 2,500g; normal=2,500g to 3,999g; and macrosomia=equal to 4,000g or above)⁽¹⁶⁾, Apgar index in the 1st and 5th minutes (less than seven and equal or above seven)⁽⁴⁾ and fetal deaths (yes or no). It is worth noting that the file does not provide information concerning the women's parity.

Data were collected from January to February 2009 and directly recorded in an Excel spread sheet.

Association among risk or protection factors with maternal age was analyzed through the Chi-square or Fisher's exact test, which were considered significant when $p < 0.05$. To evaluate the joint effect of risk factors on age, multiple regression analysis was used. The variables with $p = 0.20$ in the univariate analysis were included in the multivariate model. Odds Ratio (OR) and its respective confidence interval at 95% were computed in the final model. Epi Info 3.1 and Statistica 7.1 were used.

This study complied with Resolution 196/96, National Council of Health and was approved by the Committee for Research Ethics Concerning Human Subjects at the State University of Maringá (Process n.º 207/2009). Free and informed consent forms were not required since data were collected from secondary sources.

RESULTS

Of the 1,255 women composing the study's sample, 89.0% were 20 to 34 years old. The age of women ranged from 20 to 46 years old, and the average ages in groups I and II were 24.8 (SD=3.6) years old and 37.6 (SD=3.2) years old respectively.

Some of the maternal characteristics and gestational results from both groups are described in Table 1. In relation to maternal characteristics, the number of women with eight or more years of education was higher among younger women. In relation to marital status, the proportion of single women was higher among those aged 20 to 34 years old, while widowed or divorced women predominated among those 35 years old.

In regard to perinatal outcomes, C-sections were three times more frequent among women from group II. The fact that all the remaining negative outcomes were more frequently observed among women from group II draws one's attention. There was a greater proportion of low

weight newborns (18.1%) and macrosomia (12.5%), preterm (11.6%) and post term infants (25.0%), with Apgar index below seven in the 1st (13.2%) and 5th (35.0%) minutes of life, in addition to fetal deaths, which occurred only within this group. The average newborn weight among older women was 3,192g (SD=591) and 3,204g (SD=439) ($p=0.81$) among younger women.

Table 1 – Characterization and perinatal outcomes in women 20 to 34 years old and women 35 years old or older – Sarandi, PR, Brazil - 2009

Variables	GROUP I Women 20 to 34		GROUP II Women ≥ 35	
	N	%	N	%
Education (n=1255)				
Up to 7 years	372	84.4	69	15.6
8 or more	745	91.5	69	8.5
Marital status (n=1252) ^a				
Single	741	92.7	58	7.3
Married	367	84.2	69	15.8
Widowed	1	20.0	4	80.0
Divorced	5	41.7	7	58.3
Type of delivery (n=1255)				
Normal	583	93.9	38	6.1
C-section	534	84.2	100	15.8
Birth weight (n=1255)				
Low weight	50	81.9	11	18.1
Normal	1025	89.4	121	10.6
Macrosomia	42	87.5	6	12.5
Gestacional age (n=1242) ^a				
Preterm	539	88.4	71	11.6
At term	562	89.5	66	10.5
Post term	3	75.0	1	25.0
Apgar 1st minute (n=1255)				
Below 7	92	86.7	14	13.2
Above 7	1025	89.2	124	10.8
Apgar 5th minute (n=1255)				
Below 7	13	65.0	7	35.0
Above 7	1117	89.3	134	10.6
Fetal death (n=1255)				
Yes	-	-	4	100.0
No	1117	89.3	134	10.7

^aunknown (marital status=3, gestational age=13), loss less than 10%

The univariate analysis revealed significant data in relation to the type of delivery and Apgar below seven in the fifth minute in women older than 35 years of age when compared to those 20 to 34 years old (Table 2).

Table 2 – Univariate analysis of adverse perinatal outcomes in women 20 to 34 years old and women 35 years old or older – Sarandi, PR, Brazil - 2009

Variables	GROUP I Women 20 to 24	GROUP II Women ≥35	OR Raw	p
Type of delivery				<0.01 ^b
C-section	534	100	2.87	
Normal	583	38	1	
Birth weight				
Low weight	50	11	1.86	0.10 ^b
Normal	1025	121	1	
Macrosomia	42	6	1.21	0.85 ^b
Gestacional age				
Preterm	539	71	1.12	0.58 ^b
At term	562	66	1	
Post term	3	1	2.84	0.36 ^c
Apgar 1st minute				0.54 ^b
Below 7	92	14	1.26	
Above 7	1025	124	1	
Apgar 5th minute				<0.01 ^b
Below 7	13	7	4.54	
Above 7	1104	131	1	
Fetal death^a				
Yes	-	4	NA	
No	1117	134	1	

OR = Odds Ratio; NA = not applicable

^a OR does not apply given the lack of fetal death among women 20 to 34 years old

^b Chi-square test

^c Fischer's exact test

The results obtained in the logistic regression show that older women are 1.23 times more likely to experience a C-section and their children have 5.78 times more at risk of presenting an Apgar index below seven in the 5th minute (Table 3).

Table 3 – Independent variables associated with maternal age 35 years old or older with respective OR adjustment, confidence interval at 95% and p-value – Sarandi, PR, Brazil - 2009

Variables	OR adjusted	CI (95%)	P
C-section	1.23	0.19-0.44	<0.01
Low birth weight	1.71	0.82-1.26	0.14
Apgar index in the 5 th minute below 7	5.78	0.74-2.76	<0.01

OR = Odds Ratio; CI = Confidence Interval

DISCUSSION

Pregnancy among women 35 years old or older has been increasingly observed in obstetrical practice due to social, educational, economic and cultural factors that enable the absence, reduction, or even control of the number of children. In this context, higher educational levels

are a stimulus to postpone the first pregnancy. There is a tendency, among women with higher educational levels, for the first occurrence of sexual intercourse to be with appropriate protection, marriage to be postponed, greater use of contraceptive methods and valorization of smaller families⁽¹⁶⁾.

Additionally, women using modern contraceptive methods in a more systematic manner tend to postpone the birth of the first child⁽¹⁶⁾. Information from the 2006 PNDS report revealed that 81.6% of women 15 to 44 years old with a partner used some type of contraceptive method⁽⁷⁾.

Recent advancements in reproductive technologies offered to couples have increased the number of successful pregnancies in women who otherwise experience difficulty becoming pregnant. One study showed that pregnancies resulting from assisted reproduction predominated among women older than 33 years of age, with 54.2% of pregnancies⁽¹⁷⁾. However, opting for late pregnancy may cause problems both for the mother and child.

This study's results revealed that women older than 35 years of age more frequently experience adverse perinatal outcomes when compared to women 20 to 34 years old, mainly low birth weight and macrosomia, preterm and post term, and an Apgar index below seven in the first and fifth minutes of life in addition to fetal death.

Women 20 to 44 years old had more years of schooling than women older than 35 years of age. A multi-center study conducted with 36,056 women in the United States found contradictory data concerning education; a higher educational level (about 15 years) was observed among older women (≥ 35 years old)⁽¹³⁾. The low educational level among older women found in this study may be related to the unfavorable socioeconomic conditions of the studied women.

The incidence of 15.8% C-sections in older women and 84.2% in women in the ideal reproductive age exceeds the 15% recommended by the World Health Organization⁽¹⁷⁾. The incidence of C-sections in older women has been reported in other studies^(4,13,18-19). The chance of C-section among women older than 35 years of age was 1.23 greater than among women 20 to 34 years old. A retrospective study conducted in Taiwan with 39,763 women provided evidence that the chance of C-section was 1.6 and 2.6 times greater in women 35 years old and 39 to 40 years old or older, respectively⁽¹⁵⁾.

Other reasons such as diseases, obstetrical indications and fetal complications can explain the greater incidence of C-sections among older women. Deterioration of the function of the myometrium caused by aging is another factor accounting for some disorders during delivery that contribute to an increased number of C-sections. Concern over C-sections is due to its link with maternal morbidity during the perinatal period, that it doubles the risk of neonatal mortality and increases placental complications in

subsequent pregnancies, including placenta praevia and placental abruption⁽¹⁸⁻¹⁹⁾.

In relation to the Apgar index, women older than 35 years of age have a 5.78 greater chance of having children with Apgar score below seven in the fifth minute of life. This index is a good indicator for perinatal outcomes in the long term⁽⁴⁾. The analysis of vitality through Apgar in the fifth minute is the most relevant measure to evaluate birth prognosis.

It is important to note that children of older women in this study had twice the risk of presenting an Apgar score below seven in the fifth minute compared to what is observed in the literature. An international study reported an increased risk of 2.05 for Apgar below seven in the fifth minute among women 40 years old or older⁽⁴⁾. A Brazilian study conducted in the University Hospital of Maranhão reported a risk 2.90 times greater for children of women older than 35 years of age in regard to presenting an Apgar score below seven in the fifth minute of life⁽²⁰⁾.

Comparison among gestational ages showed that both preterm and post term births were observed among older women. In relation to prematurity, data obtained in this study corroborate the results of a study conducted in Maranhão, which did not find a significant association between prematurity and advanced age pregnancy⁽²⁰⁾. International studies show that prematurity has been more frequently observed among women older than 35 years of age^(11,19). A study conducted in Lebanon reported that the difference in the rate of preterm deliveries remained significantly higher among older women, even when women who had a medical or obstetrical indication to induce labor were excluded, indicating the inherent risk of preterm delivery among older women⁽²¹⁾.

Some studies have not found significant differences between younger and older women in regard to post term births^(4,12). A study conducted in Rio Grande do Norte, Brazil reported that 1.4% of women 35 years old and 1.5% of women 20 to 34 years old experienced post term deliveries⁽¹²⁾. A study comparing women 40 years old or older with women 20 to 30 years old found higher differences, though not statistically significant, 1.5% and 4.5% experienced post term delivered respectively⁽⁴⁾.

The greatest incidence of low birth weight in older women was also identified in other studies^(3,19). A retrospective study analyzed the records of 9,506 children born in the Liverpool Women's Hospital and showed that 8.85% of women 35 years old or older had low birth weight infants, while this percentage was 6.35% among women 20 to 30 years old⁽¹¹⁾. Concern with low birth weight is related to the fact it is one of the factors implicated in an increased rate of perinatal mortality⁽²⁾.

Risk factors associated with low birth weight are more common among older women such as arthritis, chronic hypertension, depression, cancer and acute myocardial

infarction, which are factors that do not depend on fetal growth restriction⁽¹⁸⁾. All these factors need to be properly monitored during the gestational period. It is known that the incidence of chronic hypertension increases with age and it is possible for vascular impairment inherent to age rendering some women more susceptible to pregnancy-induced hypertension, even those who do not develop clinically recognized hypertension. Additionally, pre-eclampsia is more frequently reported at the extremes of reproductive age especially among older women^(4,20).

The greater incidence of newborns weighing more than 4,000g among women 35 years old or older corroborate data from a study conducted in Taiwan⁽¹⁵⁾ in which 3.9% and 3.7% of women 35 to 39 years old and 40 years old or older had macrosomic newborns. Similar data were also evidenced in a Brazilian study comparing the weight of newborns ($\geq 4,000$ g) of women 35 years old and women 20 to 34 years old⁽¹²⁾.

In relation to the occurrence of fetal death, this study verified that it occurred only among women 35 years old, which agrees with results from other studies^(2,13,22). A study conducted in the United States observed that women older than 40 years of age presented a significant association with perinatal mortality, having a risk 2.2 times greater in comparison to women younger than 35 years old⁽¹³⁾.

The increased occurrence of fetal death among older women may be explained by the greater frequency of adverse complications, including worse Apgar indexes and low birth weight. There is still uncertainty regarding biological mechanism increasing the risk of fetal death with advanced maternal age, though the direct effect of maternal aging may exist. It is probably related to a deficiency of placental perfusion caused by poor uterine vascularization. The increased risk may also be attributed to an association of maternal age and certain risk factors for fetal death such as chronic diseases and obstetrical complications^(1,20).

It is essential to broaden information concerning unfavorable perinatal outcomes so that older women will seek early prenatal care and be monitored by a multidisciplinary health team, minimizing the risk for both mother and child.

CONCLUSION

Some of this study's limitations should be noted. One is related to the fact this is a retrospective study conducted in a hospital, whose data were collected from obstetrical files of pregnant women from low-risk services. Therefore, results cannot be generalized to pregnant women from high-risk services; the latter certainly would present a greater probability of adverse perinatal outcomes.

Another factor is the lack of information in the database related to marital status, gestational age and parity.

Hence, considering that parity is a factor directly related to maternal conditions, these aspects deserve greater attention in future studies to enable greater clarity of results.

This study's results showed high levels of C-sections and an Apgar index below seven at the fifth minute in women older than 35 years of age when compared to the indexes observed among women 20 to 34 years old, in addition to four neonatal deaths among women older than 35 years of age. These facts lead us to reflect on the importance of minimizing adverse perinatal outcomes and on the need for appropriate policies to care for these women, not only due to perinatal risks but also due to their peculiar social, economic and psychological aspects.

Therefore, professionals responsible for caring for these women need to be attentive to the characteristics

of pregnancy at this stage of life and be apt to identify signs and symptoms of complications early and, at the same time, have a support service to ensure care delivery and exams when required. This way, pregnancies can be monitored with greater safety, thus reducing the possibility of complications and unfavorable perinatal outcomes.

It is worth noting that this study's results can be used in the routine of health services aiming to inform and warn women who intend to postpone pregnancy, which has the risk of complications arising in pregnancies in this period of life.

Finally, the results are also evidence of the importance of further research addressing perinatal outcomes among women of advanced age, which would enable better comparison and understanding of the results found in urban centers where studies with a substantially greater number of women are conducted.

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