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Maternal age and factors associated with perinatal outcomes

Idade materna e fatores associados a resultados perinatais

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Keywords
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Descritores
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Abstract

Objective: To analyze and compare perinatal outcomes of pregnant adolescent women and pregnant women in later age (between 20 and 34 years old) from data of a Live Born Information System.

Methods: A cross-sectional study was carried out with data collected retrospectively of 18,009 live born infants from consults of data of a Live Born Information System. Registers of live born infants were distributed in three groups: group I (adolescents) – 10 to 19 years old; group II – 20 to 34 years old; and group III (later age) – 35 years or older.

Results: Findings showed that perinatal risks were related to prematurity (OR 1,35) and five-minute Apgar scores of less than seven (OR 1,44) among infants born to adolescent mothers.

Conclusion: Results pointed out high indexes of preterm birth in low-birth-weight infants and five-minute Apgar scores of less than seven in pregnancies that occurred in adolescents and in women 35 years and older.

Resumo

Objetivo: Analisar e comparar os resultados perinatais de gestantes adolescentes e em idade tardia com mulheres entre 20 a 34 anos, a partir dos dados do Sistema de Informação de Nascidos Vivos.

Métodos: Foi realizado um estudo transversal, com coleta de dados retrospectiva de 18009 nascidos vivos a partir de consultas aos dados do Sistema de Informação de Nascidos Vivos. Os registros dos nascidos vivos foram distribuídos em três grupos: grupo I (adolescentes) – 10 a 19 anos; grupo II - 20 a 34 anos e grupo III (idade tardia) – 35 anos ou mais.

Resultados: Os resultados mostraram riscos perinatais relacionados à prematuridade (OR 1,35) e Apgar quinto minuto menor que sete (OR 1,44) em mães adolescentes. O baixo peso ao nascer apresentou risco de 1,22 e 1,24 vezes entre as gestantes do grupo I e III.

Conclusão: Os resultados apontaram elevados índices de nascimento pré-termo, baixo peso ao nascer e Apgar no quinto minuto menor que sete nas gestações ocorridas em adolescentes e em mulheres com idade igual ou superior aos 35 anos.

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Introduction

It is estimated that one in four births in Brazil occurs among adolescents 15 to 19 years old.[1] International studies report that one third of all American girls will become pregnant by the time they are 20 years old.[2] Data indicate that besides the relative increase in pregnancy among adolescent women, the same increase occurs among women older than 30 years.[3]

Studies have suggested that adolescents and women 35 years or older are often vulnerable to perinatal adverse results and maternal morbidity and mortality.[4-6] Among women between 15 and 19 years old, the risk for death related to pregnancy or delivery complications is two times higher than in women older than 20 years.[7]

Adolescent pregnancy, especially in early adolescence (< 15 years old), requires special attention to possible injuries to maternal and fetal health. Increased risks for low-birth-weight newborns, micronutrient deficiencies, and intrauterine growth restrictions are related to early pregnancy. Such facts have led to changes in the evolution of gestation and in fetal growth and may also result in premature labor (ie, < 37 weeks of gestation).[4]

Prematurity has been studied as a cause of death among children. Premature newborns have incomplete development of organs such as the brain and lungs; in addition, they present with limited renal and hepatic function, which could cause serious compromising adverse outcomes.[8]

In women with late gestation, more spontaneous and induced abortions have been seen, as well as increased risks for perinatal mortality, low vitality of the newborn, low birth weight, preterm delivery, and a small-for-gestational-age fetus.[9] Gestation of women with advanced maternal age has been considered a high risk factor, mainly for the growing incidence of hypertensive syndromes, premature rupture of membranes, diabetes, and a higher risk for a five-minute Apgar score of less than seven.[10]

This study analyzed and compared perinatal results of pregnancy in adolescent women and in women between 20 and 34 years old from data collected from a Live Born Information System.

Methods

This cross-sectional and retrospective study is composed of 18,009 records of the Live Born Information System (SINASC, acronym in Portuguese). The study was carried out in Maringa, Parana, south of Brazil, from January 2007 to December 31, 2009. Records classified as "ignored" and "not informed" were excluded, which totaled 58 records.

Information concerning gestational age was divided into groups: group I (adolescents between 10 and 19 years old), group II (young adults between 20 and 34 years old), and group III (adults ≥35 years; late age).

Maternal variables analyzed were maternal age, marital status, years of formal education, and the number of prenatal and parity visits.

Concerning perinatal results, the following variables were analyzed: type of delivery (vaginal vs cesarean section), gestational age, newborn weight, and five-minute Apgar index.[11-12]

The frequencies of variables in the adolescent group (group I) and the advanced age group (group III) were compared with the respective frequencies in the group composed of women between 20 and 34 years old (group II).

For data analysis, we applied the x^2 test using the statistical program 7.1. To determine association strength, we calculated an odds ratio (OR) and a confidence level of 95% (CI 95%) using the Epi Info 3.5.1. Significance level was placed in $P<0.05$.

Development of this study followed national and international ethical and legal aspects of research on human subjects.

Results

Of 18,009 records that comprised the study population, 2,161 infants (12,0%) were born alive from adolescent women; 13,394 (74.4%) from young adult women; and 2,454 (13.5%) from late-age women.

Regarding maternal characteristics, we observed that between adolescents and advanced-age wom-

en (women ≥35 years old), the proportion of those who had seven years of formal education was higher compared with group II (Table 1).

Table 1. Distribution of maternal characteristics and perinatal results according to maternal age

Characteristics	Maternal age (years)		
	10-19 n(%)	20-34 n(%)	≥ 35 n(%)
Years of formal education (*)**			
Up to 7 years	660(30.6)	1539(11.5)	396(16.1)
≥ 8 years	1497(69.4)	11852(88.5)	2057(83.9)
Marital status (*)***			
Single	1730(80.1)	4964(37.1)	664(27.1)
Marriage	429(19.9)	8426(62.9)	1790(72.9)
Number of children****			
None	1880(87.0)	6927(51.7)	646(26.3)
1-3	281(13.0)	6278(46.9)	1730(70.5)
≥ 4	-	189(1.4)	78(3.2)
Prenatal visit (*)*****			
< 4	138(6.4)	355(2.6)	50(2.0)
4-6	572(26.5)	1950(14.6)	325(13.3)
≥ 7	1449(67.1)	11069(82.8)	2078(84.7)
Gestational age(*)******			
Preterm	319(14.7)	1523(11.4)	314(12.8)
Term	1834(84.9)	11848(88.5)	2135(87.0)
Post-term	7(0.4)	21(0.1)	4(0.2)
Delivery(*)*******			
Cesarean section	1300(60.2)	10800(80.7)	2147(87.5)
Vaginal	861(39.8)	2591(19.3)	307(12.5)
Born weight********			
Low birth weight	266(12.3)	1385(10.3)	306(12.5)
Normal	1895(87.7)	12009(89.7)	2148(87.5)
Five-minute Apgar index *********			
Low	66(3.1)	266(2.0)	54(2.2)
Normal	2092(96.9)	13118(98.0)	2399(97.8)

Source: SINASC, Maringá, PR, 2007-2009
Legenda: (*) Variable information classified as "ignored" and "not informed" were excluded, which was implicated in minor losses of 10% for each variable; **n=18001; ***n= 18003; ****n=18009; *****n=17986; ******n=18005; *******n=18006; ********n=18009; (*)*********n=17995

We also observed that the rate of cesarean deliveries increased with advancing maternal age, which showed a higher proportion of low-birth-weight newborns and premature infants born to adolescent women and to women with advanced maternal age.

Analysis of maternal characteristics and perinatal adverse results using the OR verified that pregnant adolescents were more likely to be single. Pregnant women from 10 to 19 years old and those of advanced age were more likely to have up to seven years of formal education. Compared with the other groups, more mothers in the adolescent group engaged in less than four prenatal visits (Table 2).

Pregnant adolescents also had increased risks for delivery of a premature infant and delivery of an infant with low five-minute Apgar index. Women 35 years or older had a high probability of cesarean section delivery than adult women. Adolescent and advanced-age mothers were more likely to deliver low-birth-weight newborns (Table 2).

Discussion

Our study had some limitations. These limitations involved a standardized public system that is deficient in information on formal education, marital status, number of prenatal visits, gestational age, type of delivery, and value of five-minute Apgar index, in which information on these variables is represented as ignored and not informed. Data about pregnancy complications such as abortion and fetal death, factors related to maternal age, and inadequacy of prenatal care were not studied because the system does not include such data.

Despite several technological advances in medicine to reduce perinatal adverse outcomes, it is important to highlight that data found in this study could be used by nursing services to inform and counsel both adolescents who become pregnant and women who intend to postpone pregnancy about the risk for perinatal complications.

The adolescents in this study were characterized as being single young women. Other researchers have shown that a small proportion of adolescents were married.[13] Published data have confirmed the

Table 2. Comparison of ratio of chance in studied population*

Characteristics	10 - 19			p-value	20 - 34		≥ 35			p-value
	f	OR	IC 95%		f	OR	f	OR	IC 95%	
Up to 7 years of formal education	660	3.4	3.05-3.78	<0.001	1539	1.0	396	1.48	1.31-1.67	<0.001
	1497				11852		2057			
Single mothers	1730	6.85	6.11-7.66	<0.001	4964	1.0	664	0.46	0.41-0.50	<0.001
	429				8426		1790			
Less than 4 visits	138	2.5	2.04-3.08	<0.001	355	1.0	50	0.76	0.56-1.04	0.080
Prenatal	2021				13019		2403			
Preterm	319	1.35	1.18-1.54	<0.001	1523	1.0	314	1.14	1.00-1.31	0.057
	1841				11869		2139			
Cesarean section	1300	0.36	0.33-0.44	<0.001	10800	1.0	2147	1.68	1.47-1.91	<0.001
	861				2591		307			
Low birth weight	266	1.22	1.06-1.40	0.006	1385	1.0	306	1.24	1.08-1.41	0.001
	1895				12009		2148			
Five-minute Apgar index lower than 7	66	1.44	1.08-190	0.010	266	1.0	54	1.11	0.82-1.51	0.532
	2092				13118		2399			

Source: SINASC, Maringá, Pr, 2007-2009
Legend: f - frequency; OR - odds ratio; CI – confidence interval of 95%; *ratio of chances comparing cited groups such as pregnant women between 20 and 34 years old

prevalence of single women living without a partner during adolescence.[5,14]

Adolescent pregnant women and women in advanced age had up to seven years of formal education. Maternal age and a lower level of formal education are associated with stillbirth and are assumed special relevance because of their interrelationship with other factors associated with fetal death. An investigation carried out in Recife showed a risk of 2.3 of fetal deaths in newborns in women with less than eight years of education.[15] In pregnant adolescents, early maternity is identified as a distancing factor and is difficult to obtain in continuing studies. Research shows a rate of 25.8% of adolescents who did not complete high school, which represents a social problem in Brazil.[3]

The number of prenatal visits in our study was in accordance with other similar studies done in Brazilian regions that pointed out an association (OR=2.03) between adolescents with a low number of prenatal visits.[3,8] A study that identified pregnant adolescents' behavior regarding prenatal visits indicated "forgetting" as the main reason for not following up with prenatal visits.[13] The number of late first visits and irregular visits suggests the need of the healthcare team to stimulate and motivate these young mothers to keep up with prenatal visits.

We observed, especially among women older than 35 years, a risk for cesarean section of 1.68 times higher than among women between 20 and 34 years old. A retrospective study conducted in Taiwan of 39,763 women showed that the risk for cesarean section was 1.6 times higher in women between 35 and 39 years old and 2.6 times higher in women 40 years or older.[11] It is important to emphasize that the incidence of cesarean section deliveries in advanced-age pregnant women has been reported in other studies.[6,10,12,16,17]

Several reasons may explain the high incidence of cesarean section in women with advanced maternal age such as diseases, obstetric indications, and fetal complications. Deterioration of myometrial function with age is another factor responsible for some delivery complications.[17]

Considering risks of newborns exposed, the occurrence of preterm delivery in the adolescent group in this study was 1.23 times higher. This risk is in accordance with risks reported in other publications.[8,13,18] A Brazilian investigation showed that prematurity was 1.46 times higher among pregnant

adolescents.[10] The risk for preterm delivery in adolescents is related to the increase in subclinical infection and production of prostaglandins because of uterine immaturity or inadequate blood supply to the uterine cervix.[18]

Low birth weight was presented as a risk factor in the extremes of reproductive life, with a prevalence of 12.3% and 12.5% and relative risks of 1.22 and 1.24 among adolescents and women older than 35 years, respectively. A retrospective study carried out in Liverpool, Scotland, that included 9,506 records of births, observed a frequency of low birth weight in pregnant adolescent women and in pregnant late-age women, respectively, which found the presence of low birth weight in the extremes of reproductive life.[19] In an investigation of adolescent mothers, the rates of low-birth-weight deliveries increased consistently with younger maternal age. These rates were higher in newborns of mothers 15 years or younger.[18]

Low birth weight is associated with an increased perinatal mortality index and with a growth index under expectations for adolescent women and women older than 35 years.[20] The incidence of low-birth-weight newborns of women older than 30 years showed that the mean of birth weight decreased and the proportion of low-birth-weight and extremely low-birth-weight infants increased with advanced maternal age.[17]

Delivery of low-birth-weight infants in advanced-age women has also been identified in other studies.[17,21] Among associated maternal factors, the most emphasized are arthritis; chronic blood hypertension; depression; cancer; and acute myocardial infarction, which constitute independent risk factors for fetal growth restriction.[16]

Newborns born to adolescent mothers were 1.44 times more likely to present with an Apgar index of lower than seven in the first five minutes. A research study observed an association of extremely low birth weight and low five-minute Apgar index in children born to women younger than 18 years old.[18] This index is a good indicator for long-term perinatal results; in addition, it is considered an important predictor for assessment of well-being and initial prognosis of the newborn.

Conclusion

Results of our study have revealed high indexes of preterm birth, low birth weight, and five-minute Apgar score of lower than seven in children born to adolescent women and women older than 35 years.

Collaborations

Gravena AAF analyzed and interpreted the data, drafted the paper, and performed critical review of the paper. Paula MG designed the project and drafted the manuscript. Marcon SS; Carvalho MDB and Pelloso SM performed a critical review relevant to the intellectual content of the manuscript. All authors approved the final proofs to be published.

References

1. Verona APA, Dias Júnior CS. Religião e fecundidade entre adolescentes no Brasil. Rev Panam Salud Publica. 2012;31(1):25-31.
2. Cornelius MD, Goldschmidt L, De Genna NM, Larkby C. Long-term effects of prenatal cigarette smoke exposure on behavior dysregulation among 14-year-old offspring of teenage mothers. Matern Child Health J. 2012;16(3):694-705.
3. Santos GHNS, Martins MG, Sousa MS. Gravidez na adolescência e fatores associados com o baixo peso ao nascer. Rev Bras Ginecol Obstet. 2008;30(5):224-31.
4. Santos MMAS, Baião MR, Barros DC, Pinto AA, Pedrosa PLM, Saunders C. Estado nutricional pré-gestacional, ganho de peso materno, condições da assistência pré-natal e desfechos perinatais adversos entre puérperas adolescentes. Rev Bras de Epidemiol, 2012;15(1):143-54.
5. Sass A, Gravena AAF, Pelloso SM, Marcon SS. Resultados perinatais nos extremos da vida reprodutiva e fatores associados ao baixo peso ao nascer. Rev Gaúcha Enferm. 2011;32(2):352-8.
6. Gravena AAF, Sass A, Marcon SS, Pelloso SM. Resultados perinatais em gestações tardias. Rev Esc Enferm USP. 2012;46(1):15-21
7. Carniel EF, Zanolli ML, Almeida CAA, Morcillo AM. Características das mães adolescentes e de seus recém-nascidos e fatores de risco para a gravidez na adolescência em Campinas, SP, Brasil. Rev Bras Saúde Matern Infant. 2006;6(4):419-26.
8. Ramos HAC e Cuman RKN. Fatores de risco para prematuridade: pesquisa documental. Esc. Anna Nery Rev Enferm. 2009;13(2):297-304.
9. Delpisheh A, Brabin L, Attia E, Brabin BJ. Pregnancy late in life: a hospital-based study of birth outcomes. J Womens Health. 2008;17(6):965-70.
10. Santos GHN, Martins MG, Sousa MS, Batalha SJC. Impacto da idade materna sobre os resultados perinatais e via de parto. Rev Bras Ginecol Obstet. 2009;31(7):326-34.
11. Hsieh TT, Liou JD, Hsu JJ, Lo LM, Chen SF, Hung TH. Advanced maternal age and adverse perinatal outcomes in an Asian population. Eur J of Obstet & Gynecol Reprod Biol. 2010;148:21–6.

12. Jahromi BN, Husseini Z. Pregnancy outcome at maternal age 40 and older. Taiwan J Obstet Gynecol. 2008;47(3):318-21.

13. Chalem E, Mitsuhiro, SS, Ferri CP, Guinsburg MCMB, Laranjeira R. Gravidez na adolescência: perfil sócio-demográfico e comportamental de uma população da periferia de São Paulo, Brasil. Cad Saúde Pública. 2007; 23(1):177-86.

14. Harville EW, Madkour AS, Xie Y. Predictors of birth weight and gestational age among adolescents. Am J Epidemiol. 2012;176(7):150-63.

15. Andrade LG, Amorim MMR, Cunha ASC, Leite SRF, Vital SA. Fatores associados à natimortalidade em uma maternidade escola em Pernambuco: estudo caso-controle. Rev Bras Ginecol Obstet. 2009;31(6):285-92.

16. Diejomaoh MFE, Al-Shamali IA, Al-Kandari F, Al-Qenae M, Mohd AT. The reproductive performance of women at 40 years and over. Eur J Obstet Gynecol Reprod Biol. 2006;126:33-8.

17. Luke B, Brown MB. Elevated risks of pregnancy complications and adverse outcomes with increasing maternal age. Human Reprod. 2007;22(5):1264-72.

18. Chen XK, Wen WS, Fleming N, Demissie K, Rhoads GG, Walker M. Teenage pregnancy and adverse birth outcomes: a large population based retrospective cohort study. Inter J Epidemiol. 2007;36:368-73.

19. Delpisheh A, Brabin L, Attia E, Brabin BJ. Pregnancy Late in Life: A Hospital-Based Study of Birth Outcomes. J Women's Health. 2008;17(6):965-70.

20. Sassá AH, Higarashi IH, Bercini LO, Arruda DC, Marcon SS. Bebê de risco: acompanhando o crescimento infantil no primeiro ano de vida. Acta Paul Enferm. 2011;24(4):541-49.

21. Mathias TAF, Assunção NA, Silva GF. Óbitos infantis investigados pelo Comitê de Prevenção da Mortalidade Infantil em região do Estado do Paraná. Rev Esc Enferm USP. 2008;42(3):445-53.