ORIGINAL ARTICLE

Adverse perinatal outcomes for advanced maternal age: a cross-sectional study of Brazilian births☆

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Núbia Karla O. Almeida[a], Renan M.V.R. Almeida[b,*], Carlos Eduardo Pedreira[c,d,e]

[a] *Department of Statistics, Universidade Federal Fluminense (UFF), Niterói, RJ, Brazil*
[b] *Biomedical Engineering Program, Instituto Alberto Luiz Coimbra de Pós-Graduação e Pesquisa de Engenharia (COPPE), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil*
[c] *Electrical Engineering Program, Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil*
[d] *Medicine Scholl, Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil*
[e] *Programa de Engenharia de Sistemas e Computação (PESC), Instituto Alberto Luiz Coimbra de Pós-Graduação e Pesquisa de Engenharia (COPPE), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil*

Abstract

Objectives: To investigate the risk of adverse perinatal outcomes in women aged ≥41 years relatively to those aged 21–34.

Methods: Approximately 8.5 million records of singleton births in Brazilian hospitals in the period 2004–2009 were investigated. Odds ratios were estimated for preterm and post-term births, for low Apgar scores at 1 min and at 5 min, for asphyxia, for low birth weight, and for macrosomia.

Results: For pregnant women ≥41, increased risks were identified for preterm births, for post-term births (except for primiparous women with schooling ≥12 years), and for low birth weight. When comparing older *vs.* younger women, higher educational levels ensure similar risks of low Apgar score at 1 min (for primiparous mothers and term births), of low Apgar score at 5 min (for term births), of macrosomia (for non-primiparous women), and of asphyxia.

Conclusion: As a rule, older mothers are at higher risk of adverse perinatal outcomes, which, however, may be mitigated or eliminated, depending on gestational age, parity, and, especially, on the education level of the pregnant woman.

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Resultados perinatais adversos em mulheres com idade materna avançada: estudo transversal com nascimentos brasileiros

Resumo

Objetivos: Investigar o risco de resultados perinatais adversos em mulheres ≥ 41 anos de idade relativamente àquelas com idade 21-34.

Métodos: Cerca de 8,5 milhões de registros de nascimentos únicos em hospitais brasileiros no período 2004-2009 foram investigados. *Odds ratios* foram estimados para nascimentos prematuros e pós-termo, baixos índices de Apgar no 1° e 5° minutos, asfixia, baixo peso ao nascer e macrossomia.

Resultados: Para as mulheres grávidas ≥ 41, aumento de riscos foram identificados para nascimentos prematuros, partos pós-termo (com exceção de primíparas com escolaridade ≥ 12 anos) e baixo peso ao nascer. Relativamente a mulheres mais velhas *vs.* mais jovens, maiores níveis de escolaridade garantem riscos semelhantes de baixo índice de Apgar no 1° minuto (para primíparas e nascimentos a termo), de baixo índice de Apgar no 5° minuto (para nascimentos a termo), de macrossomia (para não primíparas) e de asfixia.

Conclusão: Em geral, mães mais velhas estão sob maiores riscos de desfechos perinatais adversos, mas estes são minimizados ou eliminados dependendo da idade gestacional, da paridade e, em especial, da escolaridade da gestante.

Introduction

For a number of social and medical reasons, such as career-related delays and the possibility of assisted fertilization, an increasing number of women wait until age 40 or greater before motherhood.[1,2] For instance in Brazil, births among women ≥41 years old accounted for 1.75% of the live births in 1994, while, in 2009, this number was 2.22% – a relative increase of 27%.[3] Therefore, the risks to the newborn associated with older age have been a matter of growing interest. However, the effects of advanced maternal age on newborn vitality and weight and on gestational age are still not well determined, with sometimes conflicting reports.[4–14]

Adverse perinatal outcomes can compromise the health and/or development of the newborn. The Apgar score at 5 min, for example, is considered a predictor of neurological health and cognitive development of a child,[15–17] and the association of low score (≤6 out of 10 points) with perinatal mortality, cerebral palsy, mental retardation, epilepsy, and low school performance has also been reported.[15–21]

The objective of the present work was to investigate the risk of adverse perinatal outcomes in women ≥41 years old relatively to those between 21 and 34 years, according to gestational age, primiparity, and the educational level of the mother. The analyzed outcomes were: birth in a gestation shorter than 37 weeks and longer than 41 weeks, low Apgar score at 1 min, asphyxia, low Apgar at 5 min, low birth weight, and macrosomia. To this end, a population-based cross-sectional study was performed using data from births in Brazil, 2004–2009.

Materials and methods

Data comprised records of live births in Brazilian hospitals, 2004 to 2009. Only singleton pregnancies were studied, with mothers between 21 and 34 years or ≥41 years old. Data were obtained from the Information System (SINASC) of the Brazilian Ministry of Health,[3,22] which makes available information on pregnant women, pregnancy, newborn care, and childbirth for all live births in the country. The analyzed characteristics were: age, maternal education level (years of education), number of previous live births and stillbirths, number of prenatal visits, gestational age (weeks), Apgar score at 1 and 5 min, and weight at birth (grams). Based on the number of previous children (living and/or dead), a ''primiparity'' variable was created, indicating whether the pregnancy was the mother's first. Variables were categorized as: (i) age: 21–34 and ≥41 years; (ii) primiparity: yes or no; (iii) education level: <12 and ≥12 years; (iv) number of prenatal visits: 0–6 and ≥7; (v) gestational age: <37 (preterm), 37–41 (term) and >41 (post-term); (vi) Apgar score at 1 min: 0–3 (low Apgar score at 1 min) and ≥4; (vii) Apgar score at 5 min: 0–4 (asphyxia) and ≥5; and 0–6 (low Apgar score at 5 min) and ≥7; (viii) newborn weight: <2500 g (low birth weight), 2500–4000 g, and >4000 g (macrosomia).

To quantify the risks associated with each perinatal outcome, odds ratios (OR) were estimated, together with their 95% confidence intervals (95% CIs).[23] Different scenarios for risk assessment were considered, taking into account the gestational age, the primiparity, number of prenatal visits, and the educational level of the mother. With regard to the preterm and post-term outcomes, the reference category for the ORs was term births (gestational period 37–41 weeks); with regard to low birth weight and macrosomia, the reference was 2500–4000 g. The study was analyzed and approved by the Escola de Enfermagem Anna Nery/Universidade Federal do Rio de Janeiro (EEAN/UFRJ) Institutional Review Board in 2010/April, under protocol 027/2010.