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Original article

Maternal and neonatal outcomes in multiple pregnancy: A multicentre study in the Beijing population

Ri-Na Su [a], Wei-Wei Zhu [b], Yu-Mei Wei [a], Chen Wang [a], Hui Feng [a], Li Lin [a], Hui-Xia Yang [a,*]

[a] *Department of Obstetrics and Gynecology, Peking University First Hospital, Beijing 100034, China*
[b] *National Institute of Hospital Administration, Beijing 100191, China*

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Abstract

Objective: To compare the adverse maternal and neonatal outcomes of multiple pregnancy and singleton pregnancy from multiple medical centers in Beijing.

Methods: Data concerning maternal and neonatal adverse outcomes in multiple and singleton pregnancies were collected from 15 hospitals in Beijing by a systemic cluster sampling survey conducted from 20 June to 30 November 2013. The SPSS software (version 20.0) was used for data analysis. The χ^2 test was used for statistical analyses.

Results: The rate of caesarean deliveries was much higher in women with multiple pregnancies (85.8%) than that in women with singleton pregnancies (42.6%, $\chi^2 = 190.8$, $P < 0.001$). The incidences of anemia ($\chi^2 = 40.023$, $P < 0.001$), preterm labor ($\chi^2 = 1021.172$, $P < 0.001$), gestational diabetes mellitus ($\chi^2 = 9.311$, $P < 0.01$), hypertensive disorders ($\chi^2 = 122.708$, $P < 0.001$) and post-partum hemorrhage ($\chi^2 = 48.550$, $P < 0.001$) was significantly increased with multiple pregnancy. In addition, multiple pregnancy was associated with a significantly higher rate of small-for-gestational-age infants ($\chi^2 = 92.602$, $P < 0.001$), low birth weight ($\chi^2 = 1141.713$, $P < 0.001$), and neonatal intensive care unit (NICU) admission ($\chi^2 = 340.129$, $P < 0.001$).

Conclusions: Multiple pregnancy is a significant risk factor for adverse maternal and neonatal outcomes in Beijing. Improving obstetric care for multiple pregnancy, particularly in reducing preterm labor, is required to reduce the risk to mothers and infants.

Keywords: Multiple pregnancy; Perinatal outcomes; Systemic cluster sampling survey; Multicenter; Beijing

* Corresponding author. Tel.: +86 13601165721.
E-mail address: yanghuixia@bjmu.edu.cn (H.-X. Yang).
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Introduction

A number of previous studies have shown that multiple pregnancy is associated with a higher risk of maternal and neonatal complications compared to singleton pregnancy.[1–4] The increased risk of preterm delivery, post-partum hemorrhage and hypertensive disorders in multiple pregnancy is a well-known issue.[1,4–6] Additionally, low birth weight and small-for-gestational-age (SGA) status were reported at higher rates in infants conceived in multiple pregnancy than with singleton pregnancy, and these are known risk factors for prenatal mortality and morbidity.[7–9] Because multiple pregnancy can contribute significantly to adverse maternal and perinatal outcomes, it is important to comprehensively investigate the risks involved in multiple pregnancy in China. The adverse outcomes of multiple pregnancy across medical centers in China have not been extensively investigated. Clarifying the perinatal consequences of multiple pregnancy becomes increasingly helpful in facilitating resource allocation and closer developmental surveillance for infants at risk of dysplasia. Thus, in this study we performed a multi-centre analysis to determine the severity of maternal and neonatal complications of multiple pregnancy in comparison to those of singleton pregnancy in the Beijing population.

Methods

Study population and variables

The study was based on the data obtained from a system sampling survey conducted in 15 hospitals in Beijing. Medical records of 15,194 pregnant women who delivered between 20 June 2013 and 30 November 2013 were collected. Sorted by the number of fetuses, there were 253 multiple pregnancies and 14,941 singleton pregnancies.

Independent variables included maternal characteristics, such as maternal age (<25, 25–35, and >35 years), maternal height (centimeters), pre-pregnancy weight (grams), parity (primiparous vs. multiparous), gestational age (weeks) and mode of delivery (vaginal vs. caesarean); in addition to maternal complications, which included anemia, preterm labor (<37 completed weeks of gestation), gestational diabetes mellitus (GDM), hypertensive disorders (including preeclampsia, eclampsia, pregnancy-induced hypertension, and hemolysis, elevated liver enzymes and low platelet syndrome, HELLP), post-partum hemorrhage, and premature rupture of membrane (PROM, including preterm premature rupture of membranes, PPROM); and infant complications, such as low birth weight (<2500 g), SGA, neonatal intensive care unit (NICU) admission and congenital malformations. The whole study was approved by the ethics review board of Peking University First Hospital (resolution 2013, 578). Informed written consent was obtained from the pregnant women before enrollment.

Definitions

Multiple pregnancy was defined as twins or triplets. Anemia was defined by hemoglobin levels <110 g/L during pregnancy. Gestational age was based on the number of days between the first day of an expectant mothers' last menstrual period (LMP) and date of delivery and was expressed in completed weeks after the LMP. The SGA was defined as a birth weight below the 10th percentile for gestational age. The GDM was diagnosed by a diagnostic 2-h 75 g OGTT at the 24th–28th week of gestation by the Chinese MOH 2011 criteria when one of the following plasma glucose values was met or exceeded: 0 h, 5.1 mmol/L; 1 h, 10.0 mmol/L; and 2 h, 8.5 mmol/L.

Statistical analysis

The SPSS software version 20.0 (SPSS Inc. Chicago, IL) was used for all statistical analyses. Univariate associations between multiple pregnancy and maternal and neonatal complications were explored with Pearson's χ^2. Categorical variables were expressed as frequencies and percentages. Continuous variables are presented as the mean ± standard deviation (SD), and two groups were compared using a one-way analysis of variance (ANOVA). A *P*-value less than 0.05 was considered statistically significant.

Results

We reviewed the medical records of 253 multiple deliveries and 14,941 singletons from 15 hospitals in Beijing. Table 1 shows the maternal characteristics of multiple versus singleton pregnancies. Mothers with multiple pregnancy were significantly more likely to be age 35 years or older ($\chi^2 = 31.557$, $P < 0.001$). Pre-pregnancy weight ($F = 15.958$, $P < 0.001$) and the rate of caesarean delivery ($\chi^2 = 190.80$, $P < 0.001$) significantly increased in these cases and gestational age was observed to significantly decrease ($F = 1043.28$, $P < 0.001$). There were no significant