



ORIGINAL ARTICLE

Parental Smoking During Pregnancy and Its Association with Low Birth Weight, Small for Gestational Age, and Preterm Birth Offspring: A Birth Cohort Study



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Key Words

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Background: Intrauterine exposure to tobacco smoke has been discerned as an important risk factor for low birth weight (LBW), small for gestational age (SGA), and preterm birth infants. In this cohort study, we investigated the association of the amount of parental smoking during the different pregnancy stages with birth weight and the incidence of preterm delivery.

Methods: Our study population was acquired from the Taiwan Birth Cohort Study. Between June 2005 and July 2006, 21,248 postpartum women were interviewed 6 months after their deliveries by a structured questionnaire. The parents were divided into four groups according to the amount of smoking during preconception, the first trimester, and the second and third trimesters. The relationships of parental smoking with gestational age and birth weight during the different pregnancy stages were assessed using multivariate linear regression. Multiple

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logistic regression analyses were performed to estimate the odds ratios and 95% confidence intervals of preterm delivery, LBW, and SGA infants during the different parental smoking status and the different pregnancy stages.

Results: After adjusting for the physical and socioeconomic status of the parents and for paternal smoking during the same period, we found that maternal smoking decreased birth weight. Compared with the nonsmoking groups, all the maternal smoking groups had higher incidences of LBW, SGA, and preterm birth infants, especially when the mothers smoked >20 cigarettes/day. The association of paternal smoking with LBW, SGA, and preterm birth infants was insignificant.

Conclusion: Maternal smoking is responsible for increased incidences of LBW and preterm delivery of babies, and therefore, smoking cessation/reduction should be advised to pregnant women to reduce morbidities in their neonates. Further studies are needed to clarify the correlation of fetal health with passive smoking, including exposure to environmental tobacco smoke and to other smokers in the family.

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1. Introduction

Low birth weight (LBW) is associated with increased morbidities and mortalities in neonates. Preterm birth also leads to several complications, such as respiratory distress, feeding intolerance, or below-normal neurodevelopment compared with term infants. Many factors contribute to LBW and preterm birth, and one of the important factors is prenatal exposure to smoking, such as maternal smoking and passive smoke exposure.

Maternal active smoking during pregnancy induces birth-weight decrease and significantly increases the risk of LBW.^{1,2} Reduced birth weight was found to be adversely correlated with the extent of maternal smoking during pregnancy.^{3,4} Chioloro et al revealed that maternal smoking of ≥ 10 cigarettes/day is significantly associated with LBW, small for gestational age (SGA), and preterm birth. However, smoking 1–9 cigarettes/day was associated with LBW and SGA, but not preterm birth.³

Paternal smoking is also an important risk factor for LBW of the offspring. Horta et al revealed that women whose partners smoked were 1.3 times more likely to have a growth-retarded child than women with nonsmoking partners.⁵ Although the interaction between paternal and maternal smoking is still not evident, birth weight of infants was found to be further reduced if both parents smoked.⁶

In this study, we discuss the effects of maternal and paternal smoking on the offspring during the different stages of pregnancy.

2. Methods

2.1. Study population: Taiwan Birth Cohort Study

The Taiwan Birth Cohort Study, the first national birth cohort study in Taiwan, is a prospective longitudinal cohort study. In the current study, we used a multistage stratified systematic sampling design to obtain representative samples from the 2005 Taiwan national birth registration data. We divided 369 towns into 12 strata according to the

administrative division (4 strata) and the total fertility rate (3 strata), and randomly sampled 90 of the 369 towns. Using the principle of proportion probability to size, 24,200 pairs of postpartum women and their newborns were recruited from these 90 towns.⁷

2.2. Data collection

Between June 2005 and July 2006, we interviewed the 24,200 postpartum women at their homes 6 months after their deliveries by a structured questionnaire. Overall, 2952 women were lost to follow-up because of refusal to participate, having shifted to a different place, incorrect addresses, infant deaths, and other reasons. Eventually, 21,248 postpartum women were interviewed, and the completed interview rate was 87.8%. We obtained information on age, education, parity, gender of the infant, total weight gain during pregnancy, and maternal and paternal smoking patterns.

In this study, LBW was defined as a birth weight <2500 g, and preterm delivery meant a gestational age <37 weeks. The SGA was defined as a birth weight below the 10th percentile of gender-specific birth weight for gestational age based on the 1998–2002 nationwide singleton birth-weight percentiles.⁸

2.3. Patterns of smoking exposure

Information on the patterns of smoking exposure was obtained from the interview questionnaire. The relevant questions were “Did the mother or the father smoke before pregnancy, in the first 3 months of pregnancy, and 4 months after pregnancy?” and “If yes, how many cigarettes were smoked in one day?” According to the amount of smoking, we categorized the mothers and fathers into four groups, namely, nonsmoking, 1–10 cigarettes/day, 11–20 cigarettes/day, and >20 cigarettes/day during three different stages of pregnancy (preconception, first trimester, and second and third trimesters).

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