

Maternal and Paternal Birthplace and Risk of Stillbirth

Emily Bartsch,¹ Alison L. Park, MSc,² Ariel J. Pulver, MSc,³ Marcelo L. Urquia, PhD,³ Joel G. Ray, MD, MSc, FRCPC³

¹Undergraduate Studies, Western University, London ON

²Institute for Clinical Evaluative Sciences, Toronto ON

³St. Michael's Hospital, University of Toronto, Toronto ON

Abstract

Objective: To evaluate the influence of maternal and paternal country of origin on stillbirth risk.

Methods: We conducted a retrospective case-control study of all deliveries in Ontario between 2002 and 2011. We included 1373 stillbirths and 1 166 097 live births that had a documented country of origin for both parents. All newborns were singleton, born at between 20 and 42 weeks' gestation, and weighed 250 g to 7000 g. We computed adjusted odds ratios (aOR) and 95% confidence intervals for the risk of stillbirth associated with parental country of origin. Models were adjusted for infant sex, maternal age, parity, marital status, and residential income quintile.

Results: Compared with parent pairs in which both parents were Canadian-born, the aOR of stillbirth was higher whether immigrant parents came from the same country (aOR 1.32, 95% CI 1.16 to 1.51) or from different countries (aOR 1.34, 95% CI 1.08 to 1.65). The risk of stillbirth was highest for immigrant parents coming from the same country if that country had a high domestic stillbirth rate (aOR 1.60, 95% CI 1.30 to 1.97).

Conclusion: Maternal and paternal country of origin influences stillbirth risk. Foreign-born couples, especially those originating from a country with a high stillbirth rate, are at greater risk. Attention should focus on identifying genetic and environmental risk factors for stillbirth among specific immigrant groups, including developing prevention strategies for high-risk couples.

Résumé

Objectif : Évaluer l'influence du pays d'origine de la mère et du père sur le risque de mortinaissance.

Méthodes : Nous avons mené une étude cas-témoins rétrospective portant sur tous les accouchements ayant eu lieu en Ontario entre 2002 et 2011. Nous avons inclus 1 373 mortinaissances et 1 166 097 naissances vivantes pour lesquelles le pays d'origine des deux parents avait été documenté. Tous les enfants visés étaient issus d'une grossesse monofœtale, étaient nés entre 20 et 42 semaines de gestation, et présentaient un poids se situant entre 250 g et 7 000 g. Nous avons calculé des rapports de cotes corrigés (RCc) et des intervalles de confiance à 95 % pour ce qui est du risque de mortinaissance associé au pays d'origine parental. Les effets exercés sur les modèles par le sexe du nouveau-né, l'âge maternel, la parité, l'état matrimonial et le quintile de revenu résidentiel ont été neutralisés.

Résultats : Par comparaison avec des paires de parents comptant deux personnes nées au Canada, le RCc de la mortinaissance était plus élevé lorsque les parents immigrants provenaient du même pays (RCc, 1,32; IC à 95 %, 1,16 - 1,51) ou de pays différents (RCc, 1,34; IC à 95 %, 1,08 - 1,65). Le risque de mortinaissance atteignait son apogée lorsque les parents immigrants provenaient d'un même pays au sein duquel le taux domestique de mortinaissance était élevé (RCc, 1,60; IC à 95 %, 1,30 - 1,97).

Conclusion : Le pays d'origine de la mère et du père exerce une influence sur le risque de mortinaissance. Les couples nés à l'étranger, particulièrement ceux qui proviennent d'un pays comptant un taux élevé de mortinaissance, sont exposés à un risque accru. Nous devrions nous centrer sur l'identification des facteurs de risque génétiques et environnementaux de mortinaissance au sein de groupes particuliers d'immigrants, ainsi que sur l'élaboration de stratégies de prévention à l'intention des couples exposés à des risques élevés.

Key Words: Stillbirth, ethnicity, birthplace, perinatal

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INTRODUCTION

The devastating nature and high global prevalence of stillbirths necessitates a better understanding of associated risk factors.¹ There is a considerable body of evidence about maternal risk factors for stillbirth,^{2,3} including obesity, smoking, diabetes mellitus, and hypertension.^{4,5} Additional factors include maternal unemployment and low education,⁶ ethnicity, and immigration status.^{7–9} For example, among Pakistani women living in Norway, those who migrated to Norway or who were born in Norway had a higher risk of stillbirth than women of Norwegian ancestry.⁷ In other studies, some non-immigrant racial groups, including African-Americans, have higher stillbirth rates, worsened by significant life events.¹⁰ Higher perinatal mortality has also been observed among non-European migrants to Europe.¹¹

The influence of paternal factors on stillbirth risk is much less studied.² Among women over 30 years, older paternal age slightly increased the risk of stillbirth.² Other research suggests an indirect mechanism, whereby better paternal health and involvement in the pregnancy positively influences maternal health and in turn lessens the risk of stillbirth.^{3,12} The effect of consanguinity among first cousins originating from the same country region may also affect stillbirth risk.¹³ This is important in countries in which a large proportion of births are now to immigrants who originate from the same country.

Given the potential common genetic and social factors shared by the parents of a fetus, the influence of maternal and paternal factors on stillbirth risk are best studied together. Accordingly, we evaluated the influence of paternal and maternal country of origin on stillbirth risk among more than 1.1 million deliveries in Ontario, including stillbirths with and without anomalies and those born preterm or at term. Additionally, we explored whether the risk of stillbirth among immigrant couples differs by the stillbirth rate in their country of birth.

METHODS

We completed a population-based, case-control study of all registered singleton births in Ontario between 2002 and 2011. Births were identified using Vital Statistics birth records and were eligible for inclusion if there was complete information on parental birthplace, the birth occurred at between 20 and 42 weeks' gestation, and the newborn weighed between 250 g and 7000 g. A birth record requires that two documents be submitted to the Office of the Registrar General, which is part of the Ministry of Government Services of Ontario. The first

document is from the attendant/certifier (e.g., physician or midwife) and the second is from a parent. Because all records were stripped of parental and child identifiers, an individual woman could not be identified, and she may therefore have contributed more than one birth during the study period. We categorized each newborn as a stillbirth case or live birth control according to the birth record, and all available births were included.

The main exposure—maternal and paternal country of origin (i.e., country of birth)—was self-reported on the child's birth record. Hence, we excluded births without country of origin for both parents, as this was the main exposure of interest. Covariates included maternal age, parity, marital status, infant sex, and residential income quintile. Income quintile was derived for maternal area of residence using Statistics Canada's Postal Code Conversion File Plus (PCCF+).¹⁴ The primary cause of each stillbirth was listed on the stillbirth record according to the International Statistical Classification of Diseases and Related Health Problems, 10th version (ICD-10).

We anticipated that many stillbirth cases would lack information about parental country of origin, and would therefore be excluded. To evaluate whether included and excluded cases differed in some characteristics, they were compared using standardized mean differences (SMD) and 95% confidence intervals.¹⁵ The SMD is independent of sample size, and a value of 0.20 represents a small difference and a value of 0.50 a moderate difference.

In our main model, we specified five groups based on parents' country of origin:

1. both parents were Canadian-born,
2. the mother was Canadian and the father foreign-born,
3. the father was Canadian and the mother foreign-born,
4. both parents were foreign-born and of different countries of origin, and
5. both parents were foreign-born and of the same country of origin.

Using multivariable logistic regression analysis, adjusted odds ratios (aORs) and 95% CIs were calculated to estimate the odds of stillbirth associated with the five possible combinations of the parents' country of origin, with both parents Canadian-born serving as the reference. Models were adjusted for infant sex, maternal age (< 20, 20 to 34, ≥ 35 years, or unknown), parity (0, 1, 2, 3, ≥ 4, or unknown), marital status (married/common-law, unmarried, or unknown), and residential income quintile (Q1 to Q5, or unknown).

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