Recent Changes in Maternal Characteristics by Socioeconomic Status

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Abstract

Objective: To describe changes in maternal characteristics by socioeconomic status, in order to provide a context for recent changes in the frequency of obstetric procedures and outcomes, and information for health planning purposes.

Methods: All NS residents who delivered between 1988 and 2007 were included in the study. Information on maternal characteristics was obtained from the Nova Scotia Atlee Perinatal Database, and socioeconomic status information was obtained through a confidential link with federal income tax T1 Family Files (1988 to 2003).

Results: Total births to women <20 years of age were high (31.5% in 2003) and increased in the lowest family income group between 1988 and 2003, while rates were low (0.7% in 2003) and decreased in the highest family income group. Total births to women ≥ 35 years increased by 136% (95% CI 122, 150) between 1988–89 and 2006–07. Births to women with a weight ≥ 90 kg also increased, while those to smokers decreased in all socioeconomic groups. The proportion of births to multiparous women with a previous low birth weight infant did not change (–5 %, 95% CI –14, 6), although births to women with a previous perinatal death declined by 52% (95% CI –60,–42).

Conclusion: Large secular changes have occurred in maternal characteristics over the past two decades, and the magnitude of these changes has differed by socioeconomic status.

Résumé

Objectif : Décrire les modifications des caractéristiques maternelles en fonction du statut socio-économique, de façon à établir le contexte des récentes modifications constatées en matière de fréquence des interventions obstétricales et d'issues, ainsi que de façon à fournir des renseignements aux fins de la planification sanitaire.

Méthodes : Toutes les résidentes de la N.-É. qui ont accouché entre 1988 et 2007 ont été admises à l'étude. Les renseignements quant aux caractéristiques maternelles ont été tirés de la *Nova Scotia Atlee Perinatal Database*, tandis que les renseignements quant au statut socio-économique ont été obtenus par l'intermédiaire d'un lien confidentiel menant aux dossiers familiaux T1 de l'impôt fédéral sur le revenu (1988 - 2003).

Résultats : Le nombre total des accouchements chez les femmes <20 ans était élevé (31,5 % en 2003) et connaissait une hausse au sein du groupe présentant les revenus familiaux les plus faibles entre 1988 et 2003, tandis que les taux étaient faibles (0,7 % en 2003) et connaissaient une baisse au sein du groupe présentant les revenus familiaux les plus élevés. Le nombre total des accouchements chez les femmes = 35 ans a connu une hausse de 136 % (IC à 95 %, 122, 150) entre 1988–89 et 2006–07. Les naissances chez les femmes dont le poids était = 90 kg ont également connu une hausse, tandis que les naissances chez les fumeuses ont connu une baisse au sein de tous les groupes socio-économiques. La proportion des accouchements chez les femmes multipares qui ont déjà donné naissance à un enfant présentant une insuffisance de poids à la naissance n'a pas changé (–5 %, IC à 95 %, 14, 6); cependant, les accouchements chez les femmes qui ont déjà connu un décès périnatal ont connu une baisse de 52 % (IC à 95 %, 60,–42).

Conclusion : D'importantes modifications séculaires ont été constatées en matière de caractéristiques maternelles au cours des deux dernières décennies; l'ampleur de ces modifications a été modulée par le statut socio-économique.

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INTRODUCTION

Changes in obstetric processes and outcomes have attracted considerable public attention in recent years. The medical literature has also focused on these issues, and reactions to increases in labour induction and delivery by Caesarean section reveal profoundly divergent positions regarding the values that surround childbirth and related phenomena.[1–5] In fact, changes in obstetric practice have occurred in response to several factors, including new research findings, safety concerns, litigation fears, patient

preference and autonomy issues, and changes in maternal characteristics.[6–13]

Changes in maternal characteristics in particular have had a profound effect on obstetric practice. The rapid pace of change in maternal age,[11,12] pre-pregnancy weight,[12,13] and other obstetric determinants is arguably unprecedented, and the effect of these changes on obstetric practice is acknowledged.[14] Nevertheless, there are aspects of the observed change that have not been adequately described. Specifically, there has not been a detailed examination of how the rates of specific maternal characteristics, and potentially the degree of change in these characteristics, are dependent on socioeconomic status. The importance of understanding such relationships is highlighted by the fact that perinatal and infant outcomes and some obstetric procedures (such as use of epidural anaesthesia) differ by socioeconomic status, despite free access to obstetric services within the Canadian health care system.[15,16]

We carried out a study examining how maternal characteristics in Nova Scotia have changed in different socioeconomic categories, with a view to providing a context for interpreting recent changes in obstetric processes and outcomes.

METHODS

The study included all women residing in Nova Scotia who delivered between 1988 and 2007. Information for the study was obtained from the Nova Scotia Atlee Perinatal Database, a population-based database that contains detailed information on maternal characteristics, labour and delivery events, and neonatal diagnoses and procedures. Information in the database is collated from antenatal and medical charts by trained personnel using standardized forms. An ongoing data quality assurance program, which conducts periodic abstraction studies, and validation studies[17,18] have shown that the data are accurate and reliable.

We excluded stillbirths and live births with a birth weight < 500 g or a gestational age < 20 weeks in order to avoid potential bias due to changes in the registration of births at the borderline of viability.[19,20] Live births and stillbirths constituted the unit of analysis. In order to obtain socioeconomic status information for women delivering in Nova Scotia, we carried out a confidential linkage between the Nova Scotia Atlee Perinatal Database (1988 to 2003) and federal income tax (T1 Family File) records (1988 to 2003). The T1 Family Files, maintained by the Small Area and Administrative Data Division of Statistics Canada in Ottawa, were created from several administrative data sources, with income tax returns serving as the central source.[21] The linkage between the two databases was carried out using deterministic and probabilistic methods and resulted in a successful linkage of 135 945 of 167 187 (81.3%) of the births in the Nova Scotia Atlee Perinatal Database that occurred between 1988 and 2003. All linkages and analyses were carried out by Small Area and Administrative Data Division personnel in secure offices, and study investigators did not have access to individual information on income at any point. Tabular analyses involving income and related information that resulted in cells with fewer than 15 were suppressed, and all tabulated counts were rounded to the nearest 10. Regression analyses were carried out without any such restrictions.

Annual after-tax family income for each woman (in the year of delivery) was based on the T1 Family Files and adjusted for family size by dividing total family income by the number of members (oldest adult received a weight of 1, other members 16 years or older and the first child in a single parent family received a weight of 0.4, and children under 16 years received a weight of 0.3[22]). Family income was also adjusted for inflation (expressed in 1988 Canadian dollars) and categorized to yield five approximately equal groups. The quintile with the lowest family income was then further subdivided (in order to obtain a potentially more vulnerable group) and this resulted in a total of six family income categories (< $4430, $4430–$6529, $6530–$11 914, $11 915–$17 584, $17 585–$24 949, and ≥ $24 950). Note that the family income of a couple with a three-year-old child and an infant, who earned an after tax total of $35 000 in 2007, would be $11 175 after the above adjustments (one 1988 dollar = $1.57 in 2007). Contribution to a Registered Retirement Savings Plan (RRSP, a tax-deductible investment) made in the year of delivery was also examined as a second measure of socioeconomic status. This alternative measure of socioeconomic status (a gauge of behaviour related to tax-planning and long-term saving) was expected to reflect a dimension of socioeconomic status that was distinct from family income.[23]

Changes over time were expressed as overall percent change and also as the mean change per year, along with 95% confidence intervals. The significance of linear trends in proportions by year was assessed using a chi-square test (1 degree of freedom). Logistic regression with indicator variables was used to obtain probabilities (rates) of specific maternal characteristics (e.g., percent of women aged ≥ 35 years) by year in order to avoid the need for rounding of cell counts.

The study was approved by the IWK Health Centre Research Ethics Board.

RESULTS

There were 197 396 total births in Nova Scotia between 1988 and 2007 (excluding those with a birth weight < 500 g