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Original Research – Quantitative

Perinatal and social factors predicting caesarean birth in a 2004 Australian birth cohort

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ABSTRACT

Background: The proportion of babies born by caesarean section in Australia has almost doubled over the last 25 years. Factors known to contribute to caesarean such as higher maternal age, mothers being overweight or obese, or having had a previous caesarean do not completely account for the increased rate and it is clear that other influences exist.
Aim: To identify previously unsuspected risk factors associated with caesarean using nationally-representative data from the Longitudinal Study of Australian Children.
Methods: Data were from the birth cohort, a long-term prospective study of approximately 5000 children that includes richly-detailed data regarding maternal health and exposures during pregnancy. Logistic regression was used to examine the contribution of a wide range of pregnancy, birth and social factors to caesarean.
Findings: 28% of 4862 mothers were delivered by caesarean. The final adjusted analyses revealed that use of diabetes medication (OR = 3.1, 95% CI = 1.7–5.5, $p < 0.001$) and maternal mental health problems during pregnancy (OR = 1.3, CI = 1.1–1.6, $p = 0.003$) were associated with increased odds of caesarean. Young maternal age (OR = 0.6, CI = 0.5–0.7, $p < 0.001$), having two or more children (OR = 0.7, CI = 0.6–0.9, $p < 0.001$), and fathers having an unskilled occupation (OR = 0.7, CI = 0.6–1.0, $p = 0.036$) were associated with reduced odds of caesarean.
Conclusion: Our findings raise the prospect that the effect of additional screening and support for maternal mental health on caesarean rate should be subject of prospective study.

Statement of significance

Problem or issue
The rate of caesarean birth in Australia is increasing and remains over 30%, with no obvious reduction in recent years.

What is already known
Increases in the caesarean birth rate have been associated with factors such as advancing maternal age, maternal overweight and obesity, and private insurance.

What this paper adds
Maternal psychological conditions may be an independent risk factor for caesarean birth. Early screening for, and treatment of, these conditions should be subject to prospective study as a possible way of helping reduce women's risk of caesarean birth.

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1. Introduction

The proportion of babies delivered by caesarean section (CS) in Australia currently exceeds 30%, a rate that has almost doubled over the last 25 years, although now appears to be reaching a plateau.[1] A similar trend has been noted around the world, in both developed and developing countries.[2] There remains a consensus that the number of CS performed should represent a minimum commensurate with safety for mother and baby in both the short and long term.[3–8] Unfortunately, strategies aimed at reducing the rate of CS have had only modest success at best.[6]

A number of factors have been associated with increased rates of CS. The strongest of these include increased maternal age, particularly at the time of first birth,[9–12] as well as the mother being overweight or obese.[8,13] In addition, once CS has been performed, the most likely mode of delivery in subsequent pregnancy is CS.[14–17] Higher socio-economic status and possession of private health insurance are also associated with higher rates of CS.[18,19]

While maternal mental health status is not often examined as a predictor of CS, findings from two recent studies provide evidence that a history of prior psychiatric conditions or mental health problems reported during pregnancy are associated with increased rates of CS.[20,21] Although anxiety and fear of childbirth were commonly reported reasons for women requesting elective caesarean delivery in several international studies,[16,22] fears of 'loss of control' and pain were found to be less commonly-reported motivating factors in Australia and maternal requests for CS probably represent only a small proportion of CS overall.[23]

Even taking these risk factors into account, it is likely that other influences exist and are affecting the rate of CS.[24] Given that factors such as increased maternal age, obesity, and previous CS are difficult if not impossible to modify, it is important to be alert to other potentially-modifiable factors that might affect rates of CS. The aim of this study was to examine the importance of a range of pregnancy, birth, and family risk factors in predicting CS in Australia. This study used data from the Longitudinal Study of Australian Children (LSAC), a data-rich prospective cohort study of approximately 5000 Australian children and their families, in order to broaden evidence around CS in Australia.

2. Participants, ethics, and methods

2.1. Dataset

The LSAC is a nationally-representative prospective cohort study of Australian children and their families.[25] Children were selected from Australia's universal health insurance database (Medicare) using a two-stage cluster sampling design. Detailed information about the study and assessment can be found online

Table 1
Pregnancy, birth and social characteristics for children born via caesarean section (CS) ($N = 1,374$) and children born via vaginal birth (non-CS) ($N = 3,488$).

	CS %	Non-CS %	OR (95% CI)	p
Pregnancy factors				
Maternal smoking in pregnancy	17	21	0.76 (0.62, 0.94)	0.011
Maternal alcohol use in pregnancy	34	37	0.90 (0.78, 1.04)	0.152
Use of any prescribed medication	34	29	1.26 (1.10, 1.46)	0.001
Use of antidepressant medication	3	2	1.26 (0.80, 1.96)	0.315
Use of antibiotic medication	11	10	1.00 (0.79, 1.27)	0.980
Use of asthma medication	4	4	0.94 (0.66, 1.34)	0.726
Use of diabetes medication	3	1	3.87 (2.30, 6.51)	<0.001
Use of nausea/sickness tablets	5	5	1.11 (0.81, 1.52)	0.501
Use of blood pressure tablets	3	2	1.87 (1.21, 2.89)	0.005
Use of iron tablets	6	7	0.88 (0.68, 1.13)	0.310
Use of heartburn medication	4	3	1.67 (1.22, 2.29)	0.001
Use of thyroid tablets	2	1	1.38 (0.82, 2.34)	0.227
Use of over-the-counter medication	86	83	1.24 (1.02, 1.50)	0.033
Maternal mental health problems in pregnancy	22	18	1.26 (1.06, 1.50)	0.008
Maternal diabetes in pregnancy	8	5	1.64 (1.23, 2.20)	0.001
Maternal high blood pressure in pregnancy	11	7	1.56 (1.19, 2.04)	0.001
Birth factors				
Child born preterm (<37 weeks)	7	5	1.49 (1.14, 1.94)	0.003
Child born with low birth weight (<2500 g)	6	4	1.53 (1.14, 2.06)	0.005
Child admitted to intensive care	23	14	1.91 (1.60, 2.27)	<0.001
Child needed ventilator support	7	4	1.84 (1.37, 2.46)	<0.001
Social factors				
Annual household income $10K AUD, mean (sd)	3.18 (0.08)	2.82 (0.05)	1.11 (1.07, 1.16)	<0.001
Language other than English	15	18	0.78 (0.63, 0.95)	0.014
Maternal age, mean (sd)	32.1 (0.2)	30.5 (0.2)	1.05 (1.04, 1.07)	<0.001
Mother less than 30 years	28	41	0.60 (0.51, 0.70)	<0.001
Mother 30–35 years	46	41	Reference	
Mother older than 35 years	26	18	1.22 (1.04, 1.43)	0.014
Single parent family	9	11	0.79 (0.61, 1.03)	0.081
2 or more children in household	57	61	0.82 (0.72, 0.94)	0.003
Primary parent born overseas	19	20	0.93 (0.78, 1.11)	0.432
Remote/very remote location	3	4	0.91 (0.52, 1.58)	0.730
Indigenous status	4	5	0.77 (0.53, 1.11)	0.162
Mother's education less than Year 12	42	43	0.96 (0.84, 1.10)	0.566
Father's education less than Year 12	43	48	0.82 (0.71, 0.95)	0.008
Mother unskilled occupation	21	25	0.81 (0.69, 0.97)	0.019
Father unskilled occupation	13	19	0.62 (0.48, 0.80)	<0.001

Note: OR (95% confidence interval) denotes odds ratio from unadjusted logistic regression analysis, with CS as the dependent variable.

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