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Variation in and factors associated with timing of low risk, pre-labour repeat caesarean sections in NSW, 2008-2011

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Running head: Variation in low risk caesarean section timing

Abstract

In April 2007, the New South Wales (NSW) Ministry of Health released an evidence-based policy directive requiring that 'where there are no compelling medical indications, elective or pre-labour caesarean section does not occur prior to 39 completed week's gestation'. This study describes variation in and factors associated with hospital rates of early (37-38 weeks gestation), low risk pre-labour repeat caesarean section at term.

Linked birth and hospital data for low-risk, pre-labour repeat caesarean sections in NSW in 2008-2011 were analysed using multi-level regression modelling. Rates were adjusted for casemix and hospital factors.

In 2008-2011, there were 15,163 pre-labour repeat caesarean sections among low risk women in NSW. Overall, 34.7% of low risk pre-labour repeat caesarean sections occurred before 39 weeks gestation. Casemix and hospital factor adjusted NSW public hospital rates of early (37-38 weeks gestation), low risk, pre-labour repeat caesarean section at term varied widely (16.3%-67.5%). Smoking, private health care, assisted reproductive technology, higher parity, a non-caesarean uterine scar and delivering in a hospital with CPAP facilities were associated with higher odds of early delivery.

Hospitals with higher rates of low risk deliveries and higher propensity for vaginal birth after caesarean rates had lower odds of early delivery.

The findings suggest poor uptake of the policy for pre-labour caesarean from 39 weeks. Large between-hospital variation persisted following adjustment, suggesting that non-medical factors are related to timing of low risk, pre-labour caesarean section. Further strategies are needed to enhance adherence to evidence-based policy.

Introduction

In April 2007, the New South Wales (NSW) Ministry of Health released a policy directive requiring that 'where there are no compelling medical indications, elective or pre-labour caesarean section does not occur prior to 39 completed weeks gestation'.¹ The delivery timing for low risk pre-labour caesarean sections was recommended due to increased risk of respiratory morbidity in infants born before 39 weeks gestation.²

Although a slight change in timing of pre-labour caesarean sections has been observed since 2008³, policy implementation has not been evaluated, variation in hospital uptake is unknown and so is the relationship between hospital and patient factors and timing of low risk caesarean sections. This study aimed to explore variation in hospital rates of early (37-38 weeks) pre-labour repeat caesarean section among low risk women at term in NSW, 2008-2011.

Methods

This study examined NSW hospital data from 2008-2011, following introduction of the policy. The NSW Perinatal Data Collection (PDC) and the Admitted Patient Data Collection (APDC) were used, linked by the NSW Centre for Health Record Linkage. The study population included all low risk, pre-labour caesarean births among women with prior caesarean section (i.e. indication for caesarean section is elective repeat). Low risk pregnancies were defined as singleton, live birth at term (37-42 weeks) by women without diabetes, hypertension, other chronic disease or placental conditions, with no previous perinatal death or classical caesarean and with no medical indication

for caesarean section. Private hospitals and hospitals with less than 50 births per annum were excluded.

Using methods detailed elsewhere⁴, multi-level regression modelling with the outcome 'timing of low risk pre-labour caesarean section' (before 37-38 weeks 'early delivery' vs. 39-42 weeks 'later delivery') was conducted. The model was adjusted for casemix and hospital factors, and final risk-adjusted hospital rates with 95% confidence intervals were plotted. The relative contributions of casemix and hospital factors to the overall reduction in variation were quantified.

Casemix variables included maternal age, country of birth, smoking, socio-economic status, body mass index, private health care, number of previous caesarean sections, number of previous vaginal births, assisted reproductive technology use, previous non-caesarean uterine scar and infant size for gestational age. Hospital factors included obstetric training provision, level of perinatal care (neonatal intensive care unit; continuous positive airways pressure (CPAP) facilities and CPAP-trained staff; other), location and birth volume. Hospital rates of obstetric transfusions, anaesthetic services and low risk births were also used as was the rate of vaginal birth after primary caesarean section for breech presentation as an indicator of hospital propensity for vaginal birth after caesarean.

Results

In 2008-2011, there were 15,163 pre-labour repeat caesarean sections among low risk women in NSW. Among 61 public hospitals, 40 (65.6%) were regional and 33 (54.1%)

provided primary or secondary obstetric training (primary referring to tertiary obstetric training hospitals, secondary referring to large district and rural hospitals that host obstetric registrars). Overall, 34.7% of low risk pre-labour repeat caesarean sections occurred before 39 weeks gestation. The low risk pre-labour repeat caesarean section rate decreased from 35.6% in 2008 to 34.1% in 2011. However, crude hospital rates of low risk pre-labour repeat caesarean section before 39 weeks gestation varied widely (6.1% to 76.6%). Adjusting for casemix factors increased the between-hospital variation by 4.3% and adjusting for hospital factors reduced variation by 20.0%. The final adjusted hospital rates demonstrated considerable variation (16.3% to 67.5%) and 20 (32.8%) hospitals had an adjusted rate significantly different from the adjusted mean of 35.4% (Figure 1).

Smoking, private health care, assisted reproductive technology, higher parity, a non-caesarean uterine scar and delivering in a hospital with CPAP facilities were associated with higher odds of early delivery. Having small for gestational age infants was associated with lower odds of early delivery. Hospitals with higher rates of low risk deliveries and higher propensity for vaginal birth after caesarean rates had lower odds of early delivery. A sensitivity analysis including additional data from 15 private hospitals found similar results, but private hospitals had higher odds of early delivery than public hospitals.

Discussion

The findings suggest poor uptake of the policy for pre-labour caesarean from 39 weeks, as hospital rates of early delivery were generally high with an adjusted average of 35.4%. Despite adjustment for casemix and hospital characteristics, large between-hospital variation persisted, suggesting that non-medical factors are related to timing of low risk, pre-labour caesarean section. Similarly, predictors such as propensity for vaginal birth after caesarean and delivering in a hospital with CPAP facilities suggest some hospital factors are related to timing.

Despite comprehensive, validated population data⁵, the analysis is limited by the availability of clinical information. Reporting practices between hospitals may differ and confounding by unmeasured clinical and non-medical factors is possible. Further strategies are needed to enhance adherence to evidence-based policy.

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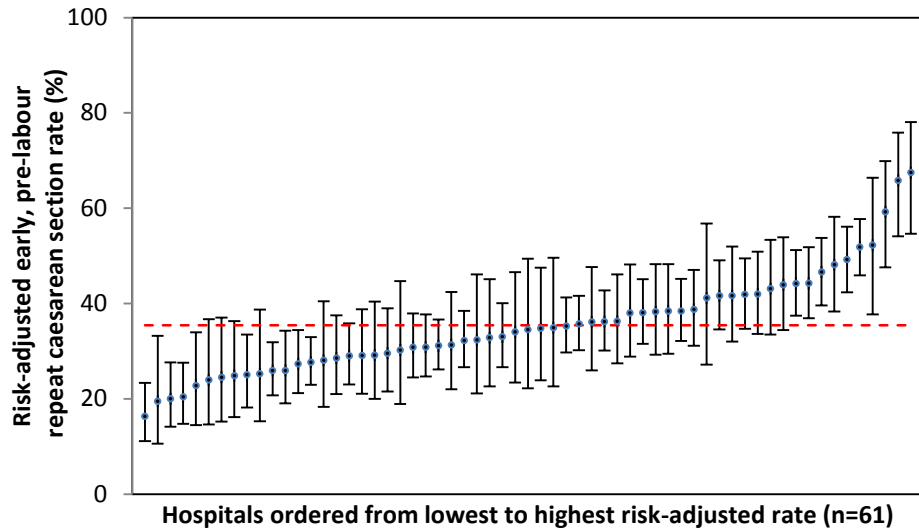


Figure 1: Risk-adjusted hospital rates of early (37-38 weeks) low risk pre-labour repeat caesarean section. The vertical error bars indicate the 95% confidence intervals for each hospital rate. The dashed, horizontal line indicates the adjusted state average rate.