Operative delivery and postnatal depression: a cohort study

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Operative delivery and postnatal depression: a cohort study

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Abstract

Objectives To assess the association between elective caesarean section and postnatal depression compared with planned vaginal delivery and whether emergency caesarean section or assisted vaginal delivery is associated with postnatal depression compared with spontaneous vaginal delivery.

Design Prospective population based cohort study.

Setting ALSPAC (the Avon longitudinal study of parents and children).

Participants 14 663 women recruited antenatally with a due date between 1 April 1991 and 31 December 1992.

Main outcome measure Edinburgh postnatal depression scale score ≥ 13 at eight weeks postnatal on self completed questionnaire.

Results Albeit with wide confidence intervals, there was no evidence that elective caesarean section altered the odds of postnatal depression compared with planned vaginal delivery (adjusted odds ratio 1.06, 95% confidence interval 0.66 to 1.70, P = 0.80). Among planned vaginal deliveries there was similarly little evidence of a difference between women who have emergency caesarean section or assisted vaginal delivery and those who have spontaneous vaginal delivery (1.17, 0.77 to 1.79, P = 0.46, and 0.89, 0.68 to 1.18, P = 0.42, respectively).

Conclusions There is no reason for women at risk of postnatal depression to be managed differently with regard to mode of delivery. Elective caesarean section does not protect against postnatal depression. Women who plan vaginal delivery and require emergency caesarean section or assisted vaginal delivery can be reassured that there is no reason to believe that they are at increased risk of postnatal depression.

Introduction

Depression is a major source of morbidity in Great Britain and a common cause for consultation in primary care.[1] The prevalence of depression in the postnatal period is similar to background population rates of depression and affects about 8-15% of women.[2] Postnatal depression is similar to depression occurring at other times in life and only distinguishable by the timing of onset. Depression at any time is associated with negative sequelae. What makes postnatal depression of particular concern is its possible detrimental long term effects on subsequent child development. Infants of depressed mothers have been found to perform less well on object concept tasks and be more insecurely attached to their mothers.[3] Other studies have found higher rates of intellectual deficits at 4 years of age,[4 5] behavioural disturbances up to 5 years,[5 6] and increased rates of special educational needs at 11 years.[7] If labour is complicated and the delivery unexpectedly performed as an emergency procedure it could potentially be stressful to the mother. In such sce-

narios there may be an association between emergency operative delivery and postnatal depression. Several studies have investigated this association, though the current evidence is conflicting, with some studies reporting an association[8–10] and others not.[11–14] Conversely there may be an association between elective caesarean section and a reduced risk of postnatal depression.
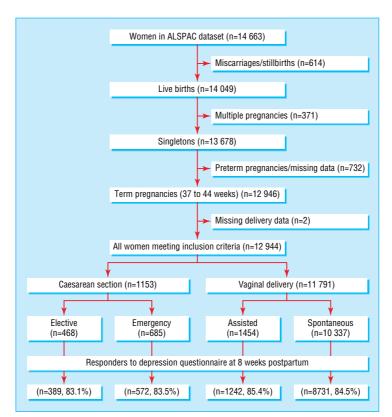
The Edinburgh postnatal depression scale was initially developed as a screening tool and focuses on the cognitive and functional effects of depression to facilitate detection of women with postnatal depression in the months immediately postpartum.[15] The scale cannot be used as a diagnostic tool alone but a score of ≥ 13 is highly predictive of postnatal depression in a UK population and warrants further clinical assessment. In a large community study it was found to have a sensitivity of 88% and a specificity of 92.5%.[16]

We compared the rates of postnatal depression in women who had an elective caesarean section and those who had a planned vaginal delivery (this included emergency caesarean section and assisted or spontaneous vaginal delivery).

Methods

The Avon longitudinal study of parents and children (ALSPAC) is a cohort study of over 14 000 women recruited antenatally in 1990-2. Full details of the study are available elsewhere.[17 18] There were 14 663 women in the cohort, of whom 14 051 reached 20 weeks' gestation and completed at least one questionnaire. In these analyses we have included all women with singleton, live born infants and term pregnancies (37 to 44 weeks) who completed the eight week postnatal questionnaire. Elective caesarean sections were those with prior planning, and emergency caesarean sections were those without prior planning or that took place after labour started. Assisted vaginal delivery comprised both forceps deliveries and vacuum extraction.

We calculated the mean (SD) depression score and the proportion of scores ≥ 13 for each mode of delivery. We then used univariable analyses to calculate crude odds ratios, 95% confidence intervals, and likelihood ratio P values for the association between mode of delivery and postnatal depression using logistic regression. Adjusted odds ratios were calculated by the addition of confounders associated with mode of delivery into the statistical model. Details of the approach used in deriving these potential confounders are available elsewhere.[19] We used continuous variables (maternal age, gestational age at delivery, parity, neonatal head circumference, and birth weight), binary (yes/no) variables (previous caesarean section, epidural in labour, previous miscarriage/termination, antenatal class attendance), and categorical variables (diabetes mellitus, fetal presentation, outcome of last pregnancy, preferred labour position, perceived loss of control in labour. We also investigated history of depression (yes/no) and considered additional variables that

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Exclusion algorithm for study cohort

were identified by a literature search as being associated with postnatal depression in other populations—namely, housing status (categorical) and antenatal depression score at 18 and 32 weeks (<13 or ≥ 13). Stata 8.0 software was used for all analyses.

Results

Of the 12 944 women who met the study criteria, 10 934 (84.5%) completed the depression scale at eight weeks postnatally. The response rate was similar for all delivery groups. Of these women, 8731 (79.9%) had a spontaneous vaginal delivery and 1242 (11.4%) had an assisted vaginal delivery. Of the 961 responders who had a caesarean section, 572 had an emergency operation (5.2%) and 389 (3.6%) had an elective procedure (figure).

Elective caesarean section v *planned vaginal delivery*—A higher proportion of the women who had an elective caesarean section had a depression score ≥ 13 compared with women who planned a vaginal delivery (table 1), although the mean scores were similar. The unadjusted odds ratio of score ≥ 13 in women who had elective caesarean section compared with women who

planned vaginal delivery was 1.31 (95% confidence interval 0.96 to 1.78). Adjustment for the prenatal factors identified as being associated with elective caesarean section (see table 1) and housing status caused a fall in the odds ratio (1.06, 0.66 to 1.70). Neither a history of depression nor antenatal depression at 18 and 32 weeks was associated with elective caesarean section in this dataset.

Emergency caesarean section v *spontaneous vaginal delivery*— About 10% of women in both delivery groups had a depression score ≥ 13 (table 2). The unadjusted odds ratio of the association between emergency caesarean section and depression score ≥ 13 was 0.99 (0.74 to 1.32). Adjustment for the nine prenatal variables found to be associated with emergency caesarean section from the previous analyses of this dataset (see table 2) and housing status increased the odds ratio to 1.17 (0.77 to 1.79), but still with no strong evidence of an association. Omission of neonatal head circumference, which was missing in a large number of cases, also had a minimal effect on the results (1.14, 0.75 to 1.73, n = 7999). History of depression or depression during pregnancy was not associated with emergency caesarean section.

Table 1 Association between elective caesarean section and Edinburgh postnatal depression score* compared with planned vaginal delivery

Delivery	No of women	Mean (SD) score	No (%) who scored <13	No (%) who scored ≥13	Odds ratio (95% CI)
Unadjusted					
Vaginal	10 934	6.0 (4.7)	9520 (90.3)	1025 (9.7)	1.00
Elective caesarean		6.1 (5.3)	341 (87.7)	48 (12.3)	1.31 (0.96 to 1.78), P=0.10
Adjusted†					
Vaginal	9502	5.9 (4.7)	8369 (90.7)	857 (9.3)	1.00
Elective caesarean		5.8 (5.1)	248 (89.9)	28 (10.1)	1.06 (0.66 to 1.70), P= 0.80

*Score of ≥13 warrants further investigation.
†Adjusted for variables associated with elective caesarean section (maternal age, previous caesarean section, diabetes mellitus, gestational age at delivery, non-cephalic presentation) and variables identified from literature search to be associated with postnatal depression and eliminated in multivariable modelling in identification of variables associated with elective caesarean section (housing).

Table 2 Association between emergency caesarean section and Edinburgh postnatal depression score* compared with spontaneous vaginal delivery

Delivery	No of women	Mean (SD) score	No (%) who scored <13	No (%) who scored ≥13	Odds ratio (95% CI)
Unadjusted					
Spontaneous vaginal	9303	6.0 (4.7)	7868 (90.1)	863 (9.9)	1.00
Emergency caesarean		5.9 (4.8)	516 (90.2)	56 (9.8)	0.99 (0.74 to 1.32), P=0.94
Adjusted†					
Spontaneous vaginal	6295	6.2 (4.9)	5331 (88.5)	694 (11.5)	1.00
Emergency caesarean		6.2 (4.9)	239 (88.5)	31 (11.5)	1.17 (0.77 to 1.79), P=0.46

*Score ≥13 warrants further investigation.
†Adjusted for variables associated with emergency caesarean section (maternal age, previous caesarean section, outcome of last pregnancy, parity, neonatal birth weight, neonatal head circumference, non-cephalic presentation, in preferred position in labour, epidural in labour) and variables identified from literature search to be associated with postnatal depression, and eliminated in multivariable modelling in identification of variables associated with elective caesarean section (housing)

Assisted vaginal delivery v *spontaneous vaginal delivery*—A lower proportion of women who had an assisted vaginal delivery had depression scores ≥13 compared with women who delivered spontaneously. Their mean scores, however, were the same (table 3). The unadjusted odds ratios between assisted vaginal delivery and depression score ≥13 was 0.85 (0.69 to 1.05). Adjustment for the factors identified as being associated with assisted vaginal delivery in this dataset (see table 3) had minimal effect on the results and suggested little evidence of an association. Omission of neonatal head circumference from the model again had minimal effect (0.84, 0.64 to 1.10, n=8712), and neither history of depression nor depression during pregnancy was associated with assisted vaginal delivery in this dataset.

Discussion

Though our results had wide confidence intervals, we could find no association between postnatal depression at eight weeks and elective caesarean section compared with planned vaginal delivery. Exploration of planned vaginal delivery similarly found little evidence of an association between emergency caesarean section or assisted vaginal delivery and postnatal depression compared with spontaneous vaginal delivery.

Strengths of study

Our research had several advantages over other studies in this specialty. We used prospectively collected data to evaluate the association between postnatal depression and operative delivery in a British cohort, which is important to clinical practice given the high prevalence of both mental illness and operative delivery in the UK population. Our cohort was also much larger than in most other similar studies. The Edinburgh postnatal depression scale was developed and validated in the United Kingdom and as such is an appropriate screening tool for postnatal depression in this population. Research has shown, however, that self reported screening tools for postnatal depression yield a higher rate of positive cases than clinical interview methods.[20] Antenatal depression is known to be associated with postpartum depression[2] [11] and must therefore be considered in any exploration of risk factors of postnatal depression. Many of the

published studies are limited by the absence of data on antenatal depression, which were available in our research. Data were also available on all types of operative delivery, which allowed us to examine more specific comparisons. Finally, we minimised confounding by incorporating factors previously identified to be associated with each delivery method studied.

These analyses were based on observational data and are therefore potentially subject to bias. There was a high follow up rate (85%), though one concern is that women with postnatal depression were less likely to complete the questionnaire. This may be particularly relevant to women suffering from severe depression, especially if they were resident in a psychiatric unit.

Comparison with other studies

Our results support the current review of evidence by the National Institute for Clinical Excellence that postnatal depression is not a sequelae of caesarean section.[21] Several other studies have also not found evidence of an association between planned mode of delivery and postnatal depression. One prospective cohort found a weak association between some complications in pregnancy and postnatal depression but none with mode of delivery.[12] Saisto et al adjusted for antenatal depression and found that mode of delivery did not predict postnatal depression at 8 to 12 weeks.[11] Each of these studies comprised fewer than 500 women. Two larger prospective studies found no association between delivery complications and depression scores ≥13, though this was assessed at four months postpartum.[13] [14] One study found some evidence of higher rates of raised depression scores at three months postpartum in women who had an emergency caesarean section compared with those who had a spontaneous vaginal delivery.[10] This study, however, involved only 21 women who had an emergency caesarean section. An Australian study found that both elective and emergency caesarean delivery were associated with a small but not significant increased risk of postnatal depression at eight weeks postpartum.[22]

Our results differ from those of a small retrospective cohort study in Malaysia. Higher depression scores were found among women who had an emergency delivery compared with non-emergency delivery, although the former group included

Table 3 Association between assisted vaginal delivery and Edinburgh depression score* compared with spontaneous vaginal delivery

Delivery	No of women	Mean (SD) score	No (%) who scored <13	No (%) who scored ≥13	Odds ratio (95% CI)
Unadjusted					
Spontaneous vaginal	9973	6.0 (4.8)	7868 (90.1)	863 (9.9)	1.00
Assisted vaginal		6.0 (4.7)	1136 (91.5)	106 (8.5)	0.85 (0.69 to 1.05), P=0.13
Adjusted†					
Spontaneous vaginal	6888	6.2 (4.9)	5295 (88.6)	683 (11.4)	1.00
Assisted vaginal		5.8 (4.6)	826 (90.8)	84 (9.2)	0.89 (0.68 to 1.18), P=0.42

*Score ≥13 warrants further investigation.
†Adjusted for variables associated with assisted vaginal delivery (previous miscarriage/termination, previous caesarean section, outcome of last pregnancy, parity, housing, antenatal class attendance, neonatal head circumference, non-cephalic presentation, in preferred position in labour, loss of control in labour, and epidural in labour).

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What is already known on this topic

Postnatal depression affects 8-15% of women and may have long term effects on child development

Rates of caesarean section are increasing worldwide and it is important to identify any long term risks associated with the procedure

The conflicting evidence regarding operative delivery and postnatal depression is based on small observational studies

What this study adds

Elective caesarean section does not protect women from postnatal depression

Neither emergency caesarean section nor assisted vaginal delivery is associated with an increased risk of postnatal depression

Understanding the association between postnatal depression and caesarean section helps women to make informed choices about mode of delivery

emergency caesarean section and vacuum delivery. The Edinburgh scale, however, has not been validated in a Malaysian population.[9] Lydon-Rochelle also found evidence of an association between caesarean delivery and lower mental health scores compared with spontaneous vaginal delivery, although this study used a different self reported questionnaire and did not separate emergency and elective procedures.[8] Unlike our research, these studies had samples of fewer than 1000 women each.[8 9 22]

Regarding assisted vaginal delivery our results support other studies that have not found an association with postnatal depression.[10 22] One small study of 142 women found a non-significant association at six weeks postpartum among women who did not deliver spontaneously.[23]

Conclusions

Our work adds an important component to the counselling of women who are planning mode of delivery. It is especially relevant for women considering elective caesarean section and in keeping with NICE guidelines helps "women to make informed decisions about childbirth."[21]

There is no reason for women with a history of depression or those at high risk of depression to be managed differently with regard to mode of delivery. Furthermore, even if emergency caesarean section or assisted vaginal delivery is required, women can be reassured that there is no reason to believe that they are more likely to experience postnatal depression.

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