



Mode of birth and maternal depression/severe anxiety: Findings from the Millennium Cohort Study

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26th Thursday, September 2024

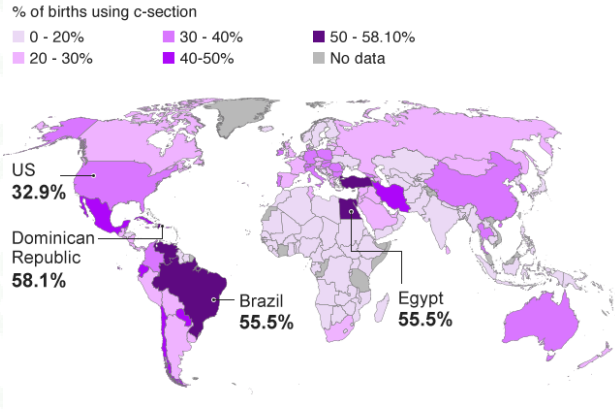
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Background

Caesarean section rates



Source: The Lancet (Data is latest available for each country)

Notable increase of caesarean sections over the past three decades.

- Variations across countries

Life-saving procedure

- Pregnancy and birth complications.
- Not free of risk.

Specific modes of birth have been found to associate with increased in mental health difficulties in the mothers.



Beyond the customary postpartum period



Rationale

DOI: 10.1111/1471-0528.17889

SYSTEMATIC REVIEW

BJOG An International Journal of Obstetrics and Gynaecology

Pregnancy and birth complications and long-term maternal mental health outcomes: A systematic review and meta-analysis

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Abstract

Background: Few studies have examined the associations between pregnancy and birth complications and long-term (>12 months) maternal mental health outcomes.

Objectives: To review the published literature on pregnancy and birth complications and long-term maternal mental health outcomes.

Search strategy: Systematic search of Cumulative Index to Nursing and Allied Health Literature (CINAHL), Excerpta Medica Database (Embase), PsycInfo*, PubMed* and Web of Science from inception until August 2022.

Selection criteria: Three reviewers independently reviewed titles, abstracts and full texts.

Data collection and analysis: Two reviewers independently extracted data and appraised study quality. Random-effects meta-analyses were used to calculate pooled estimates. The Meta-analyses of Observational Studies in Epidemiology (MOOSE) guidelines were followed. The protocol was prospectively registered on the International Prospective Register of Systematic Reviews (PROSPERO: CRD42022359017).

Main results: Of the 16310 articles identified, 33 studies were included (3973631 participants). Termination of pregnancy was associated with depression (pooled adjusted odds ratio, aOR 1.49, 95% CI 1.20–1.83) and anxiety disorder (pooled aOR 1.43, 95% CI 1.20–1.71). Miscarriage was associated with depression (pooled aOR 1.97, 95% CI 1.38–2.82) and anxiety disorder (pooled aOR 1.24, 95% CI 1.11–1.39). Sensitivity analyses excluding early pregnancy loss and termination reported similar results. Preterm birth was associated with depression (pooled aOR 1.37, 95% CI 1.32–1.42), anxiety disorder (pooled aOR 0.97, 95% CI 0.41–2.27) and post-traumatic stress disorder (PTSD) (pooled aOR 1.75, 95% CI 0.52–5.89). Caesarean section was not significantly associated with PTSD (pooled aOR 2.51, 95% CI 0.75–8.37). There were few studies on other mental disorders and therefore it was not possible to perform meta-analyses.

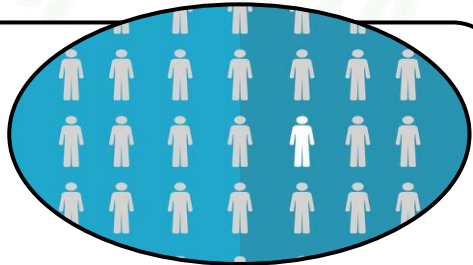
Bodunde EO, Buckley D, O'Neill E, Al Khalaf S, Maher GM, O'Connor K, et al. Pregnancy and birth complications and long-term maternal mental health outcomes: A systematic review and meta-analysis. BJOG. 2024;00:1–12. <https://doi.org/10.1111/1471-0528.17889>

Aims of current study

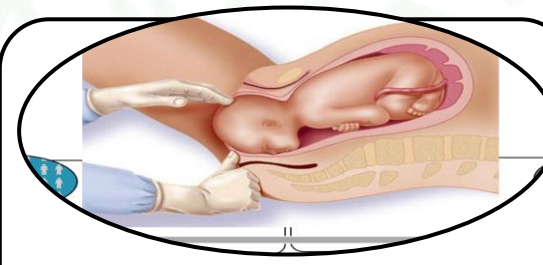
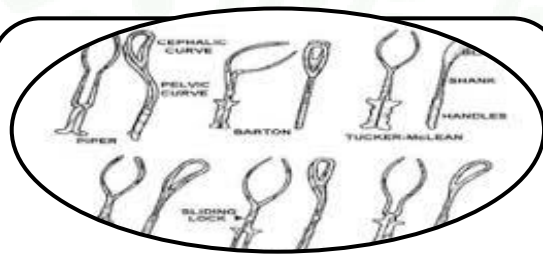


To examine the association between mode of birth and depression/severe anxiety by 14 years postpartum.

PECO Criteria

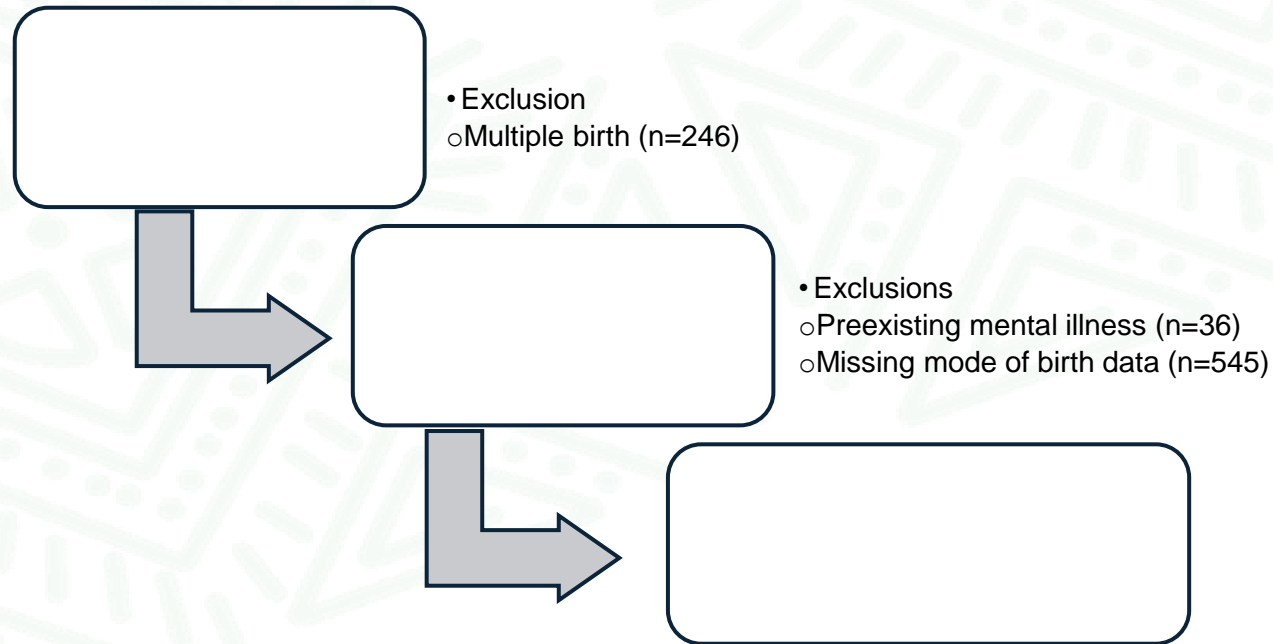


Women who have at least one childbirth.



Methods: Sample

- MCS – Nationally representative longitudinal cohort study - commenced in early 2000's.
- 9 months up to 17 years postpartum, 18,552 families included in the first wave.



Methods: Variables

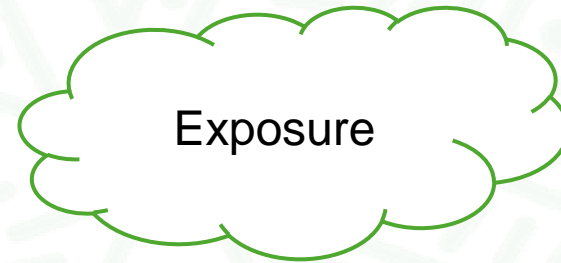
At baseline - 9 months

- Maternal demographic data, maternal lifestyle, parental health, pregnancy, and birth including mode of birth.

What type of delivery did you have? Was it.....

CODE ALL THAT APPLY

1.a normal delivery
2. Assisted with forceps
3. Assisted vacuum extraction,
4. Assisted breach,
5. A planned caesarian,
6. An emergency caesarian,
7. Or another type of delivery?

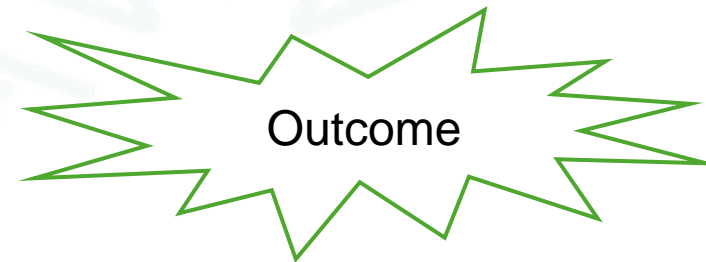


At 9 months, 3, 5, 7, 11, and 14 years postpartum

- Depression/severe anxiety diagnosis by 14 years postpartum.
- New variable: Cumulative outcome measure.

Has a doctor ever told you that you suffer from depression or serious anxiety?

1. Yes
2. No



Methods: Statistical Analysis

Five horizontal grey bars with rounded ends, serving as a template for text input.

Results: Characteristics of MCS participants

	Spontaneous VB	Assisted VB	Induced VB	Emergency CS	Planned CS	CS after induction
Total N=10,507 (%)	5152 (49.0)	2032 (19.3)	1046 (10.0)	752 (8.5)	841 (8.0)	684 (6.5)
Maternal age (30+)	2297 (44.6)	883 (43.4)	495 (47.3)	359 (47.7)	523 (62.2)	361 (52.8)
Normal (18.5-24.9 kg/m ²)	3252 (63.12)	1159 (57.0)	707 (67.6)	420 (55.8)	437 (52.0)	345 (50.4)
Infant sex (male)	2641 (51.3)	1008 (49.6)	537 (51.3)	381 (50.7)	433 (51.5)	322 (47.1)
Parity (multipara)	2963 (57.5)	1062 (52.3)	180 (17.2)	272 (36.2)	565 (67.2)	177 (25.9)
Education (diploma/higher)	1431 (27.8)	478 (23.5)	399 (38.2)	255 (33.9)	281 (33.4)	238 (24.8)
Ethnicity (white)	4215 (81.8)	1742 (85.7)	953 (91.1)	611 (81.3)	718 (85.4)	581 (84.9)
Area-level deprivation (least deprived)	817 (15.8)	310 (15.3)	199 (19.0)	134 (17.8)	134 (17.4)	123 (17.0)
Longstanding illness (no)	4200 (81.5)	1532 (75.4)	838 (80.1)	583 (77.5)	619 (73.6)	516 (75.4)
Postnatal psychological distress (no)	4307 (83.6)	1650 (81.2)	903 (86.3)	631 (83.9)	698 (83.0)	564 (82.5)

Results: Associations between mode of birth and cumulative outcome of depression/severe anxiety by 14 years postpartum

	No of exposed cases	Unadjusted model OR (95% CI)	Fully adjusted model OR (95% CI)
Depression/severe anxiety diagnosis by 14 years postpartum			
Spontaneous VB	2367	Ref	Ref
Induced VB	1061	1.29 (1.16-1.42)*	1.11 (1.02-1.24)*
Assisted VB	490	1.04 (0.91-1.18)	1.07 (0.92-1.23)
Emergency CS	359	1.07 (0.92-1.25)	1.08 (0.92-1.27)
Planned CS	408	1.11 (0.96-1.28)	1.10 (0.94-1.29)
CS after Induction	337	1.14 (0.97-1.34)	1.11 (0.94-1.32)

OR: Odd ratio, 95% CI: 95% Confidence Interval, VB: Vaginal Birth, CS: Caesarean Section.

Fully adjusted for maternal age, ethnicity, area deprivation level, maternal education, household income, maternal BMI, preterm birth, HDP, longstanding illness, parity, infant sex.

*P-value <.05

S1: Any CS and depression/severe anxiety by 14 years postpartum

	No of exposed cases	Unadjusted model OR (95% CI)	Fully adjusted model OR (95% CI)
Depression/severe anxiety diagnosis by 14 years postpartum			
Vaginal birth	3918	Ref	Ref
Caesarean birth	1104	1.03 (0.94-1.14)	1.06 (0.96-1.17)

OR: Odd ratio, 95% CI: 95% Confidence Interval, VB: Vaginal Birth, CS: Caesarean Section.
Fully adjusted for maternal age, ethnicity, area deprivation level, maternal education, household income, maternal BMI, preterm birth, HDP, longstanding illness, parity, infant sex.
*P-value <.05

S2: Any induction and depression/severe anxiety by 14 years postpartum

	No of exposed cases	Unadjusted model OR (95% CI)	Fully adjusted model OR (95% CI)
Depression/severe anxiety diagnosis by 14 years postpartum			
No Induction	3624	Ref	Ref
Birth by induction	1398	1.22 (1.12-1.33)*	1.08 (0.99-1.19)

OR: Odd ratio, 95% CI: 95% Confidence Interval, VB: Vaginal Birth, CS: Caesarean Section.
Fully adjusted for maternal age, ethnicity, area deprivation level, maternal education, household income, maternal BMI, preterm birth, HDP, longstanding illness, parity, infant sex.
*P-value <.05

Conclusion and implications

- 65% of women had at least one diagnosis of depression/severe anxiety by 14 years postpartum.
- Induced birth was associated with long-term depression/severe anxiety by 14 years postpartum.
- There is limited evidence to support the association between other modes of birth and long-term depression/severe anxiety.
- Self-reported measures of depression/ severe anxiety – subject to recall and/or misclassification bias. The role of unmeasured residual confounding.
- Additional research is warranted to better understand the underlying mechanisms of these associations.

Acknowledgements

Millennium Cohort Study Families

UK Data Services

Health Research Board – SPHeRE Programme



CHILD OF THE
NEW CENTURY 



- Prof Ali Khashan, University College Cork
- Dr Karen O'Connor, Cork University Hospital
- Dr Karen Matvienko-Sikar, University College Cork
- Dr Fergus McCarthy, Cork University Maternity Hospital
- Dr Gillian Maher, University College Cork
- Dr Farzana Ferdous, University College Cork



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Thank you for your attention.



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