Incidence of Postpartum Depression After Cesarean Section Versus Normal Delivery

Megan Lucic

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Abstract

**Background:** Postpartum depression (PPD) has a complex and multifactorial etiology and it affects a mother, her child, and her family. Although rates of depression in the postpartum period are not significantly different than for the rest of the population, the risk of compromised parental bonding, child abuse, neglect and infanticide are cause for increased concern over PPD. The childbirth experience has been proposed to have a strong effect on the health of the mother and child. For years, researchers have been searching for a correlation between obstetric method of delivery and incidence of PPD. How does the incidence of PPD vary after cesarean section versus normal delivery?

**Methods:** An exhaustive search of medical literature was conducted using Medline-OVID, Web of Science, CINAHL, Evidence-based Medicine Review Multifile, and PsycINFO with keywords: postpartum depression, cesarean section, obstetric delivery, and birth. Articles were screened for relevance and assessed for quality using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) scale.

**Results:** Five studies were included in this systematic review after being screened for relevance and inclusion criteria. A case control study of 10,535 women showed that the risk of PPD increases after cesarean section. A case control study with 335 subjects showed no significant increase in PPD in those who had cesarean sections. A prospective cohort study with 2560 participants found that method of delivery did not impact PPD rates. A prospective study of 55,814 women showed that method of delivery does not affect likelihood of depression. A longitudinal prospective study of 753 women showed that method of delivery had no impact on PPD.

**Conclusion:** Results of this systematic review vary, with 4 studies showing no significant correlation between method of delivery and incidence of PPD. One study demonstrates an increase in PPD rates in those who delivered by cesarean when compared to normal delivery. Method of delivery should be chosen based off of many important factors discussed by the woman and her clinician. A concern over PPD may prompt them to more strongly consider normal delivery, especially if the woman has a history of mental illness.

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Incidence of Postpartum Depression After Cesarean Section Versus Normal Delivery

Megan Lucic

A Clinical Graduate Project Submitted to the Faculty of the
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Clinical Graduate Project Coordinator: Annjanette Sommers, PA-C, MS
Biography

[Redacted for privacy]
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Acknowledgements

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Table I…………………………………………………………..Characteristics of Reviewed Studies

List of Abbreviations

DSM………………………………Diagnostic and Statistical Manual of Mental Disorders
EPDS………………………………………………………….Edinburgh Postnatal Depression Scale
FRAMES………………………………Franconian Maternal Health Evaluation Studies
GRADE…………Grading of Recommendations, Assessment, Development and Evaluation
SCL-8………………………………………………………………………Hopkins Symptom Checklist-8
Incidence of Postpartum Depression After Cesarean Section Versus Normal Delivery

BACKGROUND

The Diagnostic and Statistical Manual of Mental Disorders IV (DSM)\(^1\) does not publish postpartum depression as a distinct diagnosis. It is instead placed under the diagnosis of major depressive disorder with a postpartum onset specifier. DSM-IV defines postpartum onset as the first episode of a disorder that occurs within 4 weeks postpartum.\(^2\)

In a study conducted by O’Hara et al\(^3\) in 1990, it was found that the prevalence of nonpsychotic mental disorders does not increase in the postpartum period as compared to the general population. In that study, the incidence of postpartum depression was found to be 10.4%, which is not significantly higher than the rate of depression experienced by non-childbearing women. O’Hara et al summarize studies that have investigated the prevalence of depression across the general population and it ranges from 8% to 23%.\(^3\)

Although the prevalence of depression is similar whether in the postpartum period or not, it is a mental health issue that significantly impacts our population and thus deserves ongoing attention and research. It is important to consider that the consequences of postpartum depression differ from those of depression in the general population.

The potential effects of postpartum depression involve the physical, mental, and social health of the mother, child, and family. The financial healthcare burden of treating postpartum depression and its sequelae is significant. Research done by Dagher et al\(^4\) shows that health care spending is considerably higher in depressed women than non-depressed women. Postpartum depression can contribute to poor mother-child bonding, difficulty with breastfeeding, and child abuse or neglect. One of the most concerning
consequences of postpartum depression is the risk of suicide and infanticide. As described in the DSM-IV,\textsuperscript{2} “symptoms that are common in postpartum-onset episodes . . . include fluctuation in mood, mood lability, and preoccupation with infant well-being, the intensity of which may range from overconcern to frank delusions. The presence of severe ruminations or delusional thoughts about the infant is associated with a significantly increased risk of harm to the infant”.

The etiology of postpartum depression is likely always multifactorial. As also identified by O’Hara et al.,\textsuperscript{3} the DSM-IV explains that the “risk factors, recurrence rates, and symptoms of postpartum onset mood episodes are similar to those of non-postpartum mood episodes”. The DSM-IV states that the risk of postpartum depression increases for those with a past medical or family history of mood disorders.\textsuperscript{2} Additional contributing factors of postpartum depression include, but are not limited to, young maternal age, maternal hospital readmission, difficulty with breastfeeding, poor postpartum health, urinary or fecal incontinence, multiparity, poor mental health, low social status, dissatisfaction with hospital experience, low social support, life stress, marital stress, low self-esteem, and unplanned or unwanted pregnancy.\textsuperscript{5} Another factor that must be considered in the overall health of the mother is the experience that she has during the delivery period, particularly the method by which she delivers. The most common categories of delivery methods are cesarean section and normal vaginal delivery. There are more specific subsets of these methods, which include elective cesarean, emergency cesarean, spontaneous vaginal delivery, and instrumental vaginal delivery. The birth experience can be a very significant event in the life of a woman and her child, and can affect the mother’s self-esteem, sense of success, emotional connection to the child, and
the health of the family. Over the years people have proposed that cesarean section may either cause or prevent mental health problems and maternal distress. This paper aims to summarize the studies that have explored the connection between method of delivery and postpartum depression. How does the incidence of postpartum depression vary after cesarean section versus normal delivery?

METHODS

An extensive search of current medical literature was conducted using Medline-OVID, Web of Science, CINAHL, Evidence-based Medicine Reviews Multifile, and PsycINFO using the keywords: postpartum depression, cesarean section, obstetric delivery, and birth. The search was narrowed to include only studies done on humans and articles in the English language. Cultural standards and the safety of medical practices constantly evolve and are recognized as factors that may influence research results. Thus, the search was further narrowed to include only studies published in the last five years in an effort to reduce potential variability caused by these cultural and medical changes. Furthermore, the reference sections of the articles were extensively searched for relevant sources. All of the chosen articles were assessed for quality using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) scale.6

RESULTS

The database search initially yielded 385 results. These results were screened for relevance, studies done on humans, and published in the English language. They were then filtered by date to include studies published only within the past 5 years. There were
5 final articles meeting all these criteria. There were 2 case control studies\textsuperscript{7,8} and 3 prospective studies.\textsuperscript{5,9,10}

**Yang et al**

This case control study\textsuperscript{7} was performed with an intention to support other research that shows a correlation between mode of delivery and postpartum depression. The Taiwan National Health Insurance Research Database was searched to obtain medical records from 2005 and selection was based on diagnosis of postpartum depression. The case group consists of 2107 women who were diagnosed with postpartum depression within 6 months of delivery. The control group consists of 8428 mothers who were within the 6-month postpartum period in 2005 but were not diagnosed with postpartum depression. Method of delivery was divided into the following subsets: emergency cesarean section, elective cesarean section, instrumental vaginal delivery, and normal vaginal delivery. Adjustments were made for confounding variables including comorbidities and birth complications.\textsuperscript{7}

For the purpose of this systematic review, the study’s data were arranged so that all cesarean sections were grouped together, and all vaginal deliveries were grouped together. The results demonstrate a higher incidence of postpartum depression after cesarean section as compared to vaginal delivery (RR=1.300, 95% CI 1.227-1.378). The article investigates more detailed correlations as well. For example, it found a lower incidence of postpartum depression in women after normal vaginal delivery (whether unassisted or instrumental) when compared to emergency cesarean section (OR=0.67, \(p<0.0001\); OR=0.56, \(p<0.0001\)). Also of note is that elective cesarean sections carried a
higher incidence of postpartum depression than emergency cesarean sections (OR=1.48, p=0.0168).  

A strength of this study is that women were chosen based off of a clinical diagnosis of postpartum depression made by a psychiatrist in addition to the prescription of antidepressant medications. Limitations cited include the potential for inaccurate diagnosis made by the clinician. Additionally, all records were obtained from an insurance claim database and thus, no actual medical records were verified. The inclusion was based on diagnosis codes and insurance claims.

Petrosyan et al

This case-control study was conducted in Armenia to investigate factors that contribute to postpartum depression. Participants were recruited from 7 Primary Health Care facilities and had to be between the age of 18 and 45 and be 1 to 3 months postpartum. There were 335 total participants, 63 of which were cases that were found to have an elevated Edinburgh Postnatal Depression Scale (EPDS) score suggesting possible postpartum depression. The remaining 272 subjects made up the control group and were the ones found not to have postpartum depression as defined by their EPDS scores. Exclusion criteria were as follows: located outside of capital city, no contact information, and non-Armenian speakers. The study focused on the correlation between maternal age, mode of delivery, and postpartum depression rates. Although the article’s qualitative analysis contained confounding data (maternal age), it was included in this paper because raw data were given which allowed for sole analysis of mode of delivery and its association with postpartum depression.
All participants were contacted via telephone sometime during the period in which they were 1 to 3 months postpartum. During the phone interview, the EPDS was performed in addition to a questionnaire created by the authors that explored other variables surrounding the outcome of interest. 

Results showed that 21% of the women who had cesarean sections experienced postpartum depression and 18% of women who had vaginal deliveries experienced postpartum depression (RR=1.164, 95% CI 0.686-1.977), thus demonstrating no significant difference in incidence of postpartum depression between the two groups.

This study has several limitations. It was confined to women that were 1 to 3 months postpartum but does not account for depression that could occur after this time period. It does not adjust the statistics to account for past history of depression. Additionally, the EPDS has not been officially translated in Armenian. It was translated by the authors and tested prior to being used in the study. A strength of this study is that the phone interviewers were blinded in regards to whether the woman was part of the case group or control group. This eliminates, or at least decreases, the risk of interviewer bias.

Sword et al

This prospective cohort study investigated the correlation between method of delivery and postpartum depression. The study enrolled 2560 women from 11 community or teaching hospitals in Ontario, Canada. Participants were recruited during their hospital stay for delivery and the study was limited to women over 16 years of age that delivered singleton, live infants at term. The primary outcome being investigated was depression, as measured by a score of greater than or equal to 12 on the EPDS.
Eligibility criteria were as follows: greater than or equal to 16 years of age, delivery of live singleton infant, greater than or equal to 37 weeks gestation, assuming care of the infant when discharged, able to give consent, and to be contacted by telephone. There were 3 components to the study. First, the participants completed questionnaires at the hospital before being discharged that included information regarding their past medical history and their labor experience. Second, research assistants gathered medical records from the hospitals regarding medical details of the delivery. Third, participants were contacted 6 weeks after discharge via phone and were surveyed using the EPDS tool. Generalized estimating equations were used to adjust for confounding variables that would skew the results. Of the population that completed the hospital questionnaires, 74% of them participated in the 6-week postpartum interview process. It was noted that statistically significant differences existed between those who completed the study and those who did not, which suggests an attrition bias. Those who completed the 6-week interview were found to be women who were older, partnered, born in Canada, spoke English or French at home, attained education above high school, and had higher family incomes.5

The results demonstrate that the incidence of postpartum depression was not significantly associated with the method of delivery (OR 1.10, p=0.6586). However, there were 11 other variables that were significantly associated with an increased risk of postpartum depression and were determined to be predictor variables. Of note, when the results were analyzed more closely, it was found that women born in Canada were more likely to experience postpartum depression after cesarean section than women born elsewhere.5
The authors cite limitations to the study including a potential selection bias and attrition bias. Selection bias may have occurred since women with healthy babies that assumed custody were the only ones recruited. Attrition bias is clearly suggested by the authors as noted above. Another limitation of this study is that it evaluates women at 6 weeks postpartum but does not account for depression that could occur later in the postpartum period. The authors recommend future studies to further investigate the reasons behind why certain populations are more prone to postpartum depression after cesarean section than others.\textsuperscript{5}

**Adams et al**

This prospective study\textsuperscript{9} searches for a correlation between mode of delivery and maternal distress and how it changes throughout pregnancy and the postpartum period. Participants were recruited between 1998-2008 from 50 Norwegian hospitals. There were no exclusion criteria. All pregnant women at those hospitals were invited to participate beginning at 17 weeks gestation. Forty one percent of all women giving birth at those hospitals during the 10-year study timeframe participated and 84.8\% completed all surveys fully. The total study population was 55 814 women.\textsuperscript{9}

There were 4 components of the study. At 17 weeks gestation, participants completed a sociodemographic questionnaire. At 30 weeks gestation, they completed a questionnaire about their health status during the pregnancy. At 6 months postpartum they completed a questionnaire about their current health status, which included the Hopkins Symptom Checklist-8 (SCL-8) questions. The final component of the study involved obtaining medical records from the Medical Birth Registry of Norway in order to assess details regarding the method of delivery. The authors compared the SCL-8 score
at 30 weeks gestation to the score at 6 months postpartum and analyzed that data based off of mode of delivery. Adjustments were made to account for pre-delivery distress.9

After adjustment for confounding factors, SCL-8 scores did not differ based on mode of delivery suggesting that mode of delivery does not correlate with postpartum distress. On the other hand, it was found that the strongest predictor of postpartum distress is a high level of distress during pregnancy (adjusted OR 14.09, 95% CI 12.77-15.55).9

Limitations of this study involve the concept of questionnaire-based research. The gold standard for investigation of mental illness is an in-person, clinical interview. This questionnaire-based study allowed for research of a very large population, and thus more powerful statistics, but the authors recognize limitations. Another potential limitation is the fact that the SCL-8 tool has not been validated for use in specifically assessing distress during pregnancy or the postpartum period.9

Rauh et al

This was a longitudinal prospective study10 investigating depression before and after delivery and how it varies based on mode of delivery. Participants were selected from a larger cohort group: the Franconian Maternal Health Evaluation Studies (FRAMES). Rauh et al10 analyzed 753 participants enrolled between 2005-2007 in Germany. Inclusion criteria were as follows: women greater than 18 years old, intact singleton pregnancy, at least 30 weeks gestation, and method of delivery and EPDS information were available from the FRAMES records.10 The EPDS has been translated to German and its use has been validated.11 Personal EPDS interviews were conducted at
30 weeks gestation and at 48-72 hours postpartum. Phone EPDS interviews were then conducted at 6-8 months postpartum.\(^{10}\)

Based off of the prenatal interviews there was one significant finding. Prenatal depression scores are higher for those who plan to undergo cesarean section deliveries compared to vaginal delivery (p=0.04, 5.1 vs 6.3). Postnatal statistics demonstrate that at 48-72 hours postpartum there are significant differences between the EPDS score based off of mode of delivery. Women that underwent cesarean section had the highest EPDS scores at this time point and those with spontaneous vaginal delivery had the lowest EPDS scores (p<0.0001). At the 6-8 month postpartum evaluations, no significant differences were found in EPDS scores based off of mode of delivery (p=0.54).\(^{10}\)

The authors recognize that a limitation exists because it is unknown how many of the women were aware that they were going to undergo cesarean section while they were taking the pre-delivery questionnaire. There is the potential that their distress and anxiety levels would be increased in anticipation of their delivery method. The authors also cite the phone interview method to be a limitation, as they have potentially decreased reliability as compared to personal interviews. Additionally, of the women who participated at the beginning of the study, 72% completed all 3 questionnaires, suggesting a risk of attrition bias.\(^{10}\)

**DISCUSSION**

Researchers have been conducting studies for decades to find a correlation between method of delivery and postpartum health including depression. Results of studies have varied greatly over the years. Some studies with the most extreme results have been made when investigating a subpopulation of women within a small
geographical area, and one may postulate that this is due to social and cultural standards. Multiple observational studies have been conducted in the past 5 years, some of them quite large.

Four studies show that method of delivery has no significant impact on postpartum depression rates.\(^5,8-10\) One study shows an increase in postpartum depression rates in women who had cesarean section as compared to those who had vaginal deliveries.\(^7\) These studies do not demonstrate a consensus on the degree of correlation between method of delivery and postpartum depression rates. The fact that 4 studies\(^5,8-10\) show no correlation and 1 study\(^7\) shows an increased risk of depression after cesarean section affirm that there are many factors that contribute to postnatal maternal health and a definitive correlation is yet to be proven. The clinical implications of these results suggest that method of delivery certainly should not be chosen solely based off of a concern for postpartum depression, but that it could be a factor that the mother and clinician consider when choosing the method of delivery.

Overall, these studies displayed a very low quality of evidence, four studies\(^4,7-9\) being very low and 1 study\(^7\) being low (Table I). Petrosyan et al\(^8\) failed to control for past history of depression, a potential confounding variable. Sword et al\(^5\) and Rauh et al\(^10\) had a large percentage of participants who did not complete all aspects of the study. This presents a risk of attrition bias particularly in the Sword et al study,\(^5\) which cites statistically significant differences between those who did and did not complete the study. The study done by Adams et al\(^9\) was also of very low quality due to the fact that their questionnaire tool was not one that is validated for evaluating depression in pregnant or postpartum women.
Of the studies included in this paper, 4 of the 5 adjust for prepartum mental health status. The fact that 1 study did not, and also the methods by which each author adjusted for this variable, are potential limitations of these articles. Only 1 of the 5 studies included in this paper mentions interviewer blinding. This pertains to the person conducting patient interviews and whether they were blinded to the patient’s method of delivery (case vs control group). The 4 remaining studies make no mention of interviewer blinding so one may assume that it was not ensured.

All of the studies included in this paper have the potential for selection bias. Researchers selected participants from hospitals and health insurance databases and thus may have overlooked populations that could significantly affect the results. For example, the studies may not have included uninsured mothers, mothers of a very low socioeconomic status, or mothers who chose homebirths. It is important to consider the fact that socioeconomic status may have a significant impact on perinatal health and follow-up rates and thus the exclusion of certain populations may significantly alter the outcome of studies. Variables such as household income or socioeconomic status could also affect depression rates so again, the exclusion of certain populations could affect the results of the studies.

The Edinburgh Postnatal Depression Scale is a simple screening tool developed to help primary care providers screen for depression. It is the most commonly used tool for this purpose and has been translated into 50 languages. It takes about 5 minutes for the patient to complete and it does not require psychiatric expertise to score or interpret. The tool consists of 10 questions that are each rated by severity. Maximum score is 30. There is not a clear consensus regarding what score is considered positive. Bergink et al have
studied the scoring system but protocol still appears to be largely up to the provider or institution. A score of greater than or equal to 12 was considered to be positive in all studies included in this paper that used this tool. A positive result on the EPDS indicates that the patient is likely to be depressed and thus requires further assessment by a mental health specialist. A score of less than 12 should not assure the provider of an absence of depression but rather lowers the likelihood. EPDS sensitivity for detecting depression is 86%, specificity is 78%, and positive predictive value is 73%.

The SCL-8 is an abbreviated version of the Hopkins Symptom Checklist-25 and was used as the screening tool for depression in the Adams et al study. It is a questionnaire filled out by the patient consisting of 8 questions that are each rated by severity. Like the EPDS, there is a standard score (greater than or equal to 2) that is considered a positive test and thus indicates a high likelihood of depression. It is not a diagnostic tool but a screening tool that can help determine the likelihood of depression. It cannot be used to rule out or diagnose depression but is instead intended as a tool for guidance in the primary care setting. In a study conducted by Veijola et al, it was found that the SCL-8 questionnaire is moderately successful in screening for DSM-III psychiatric conditions, though this is not specific to the use in pregnant or postpartum women.

In regards to variability across the studies discussed in this paper, they have been done in 5 different countries, and none in the United States. Database searches of the key terms did not yield any studies from the United States that fit the criteria of this paper. An additional limitation across these studies is the relative inconsistency in the definition of the postpartum period. The DSM-IV defines postpartum onset of a disorder as
beginning with 4 weeks postpartum. Over the years, however, the postpartum period has been considered to be anywhere up to 1 year after delivery. The range of time that these studies conduct their research is between 4 weeks and 8 months postpartum, which shows a wide variability across the studies, and could thus compromise the strength of the results.

A potential major limitation that should be recognized across these studies is the difficulty of evaluating a complex disorder like postpartum depression. Although these studies show certain results, it may be impossible to establish a direct causal relationship between method of delivery and postpartum depression. As an example of this complexity, women are sometimes treated differently based on their method of delivery and the type of attention they receive may have an effect on their postpartum health. Another limitation across these studies is based on the fact that cesarean section alone is a broad variable. Perhaps factors such as type of anesthesia, the operating room experience, or emergency versus elective cesarean are better and more specific variables compared to just investigating the outcome of cesarean sections alone.

The need for further research in this field is apparent due to the variability and complexity of results presented in this paper. Societal attitudes and perceptions surrounding the birthing process are continually changing and evolving within our country and throughout the world. As medical standards of safety and public perception of motherhood change, potential postpartum complications change too. These issues all suggest the need for ongoing research.

Researchers have studied the association between method of delivery and postpartum depression, and some studies have added an investigation of prenatal
mental health and how it affects prognosis. It is yet to be found whether prenatal mental health influences choice of method of delivery (in the absence of medical indications). Petrosyan et al\(^8\) suggest that those with poor gestational mood tend to elect for cesarean sections more than other methods. Further study is needed to sort through the variables and gain additional understanding of the many factors that contribute to postpartum depression.

**CONCLUSION**

The results of this systematic review show no general consensus regarding the impact of method of delivery on the incidence of postpartum depression. There is data showing that postpartum depression rates are higher after cesarean section\(^7\) but 4 studies show no correlation.\(^5,8-10\) Despite these varied results, it is important to remember that depression is a prevalent issue and its effects can be substantial. Further research is needed to explore the variables that contribute to postpartum depression.

There are many factors that need to be accounted for when making the decision about method of delivery. After thorough consideration of physical and mental health risk factors, in addition to personal and cultural preferences, the clinician and the woman should make the decision together about what the delivery experience should entail. It can often be advantageous for the woman’s partner or other support person to be involved in this discussion as well. When a mother asks about risks of cesarean section versus normal delivery, these studies suggest that postpartum mental health may be a consideration even though research studies have not consistently demonstrated a correlation. Regardless of method of delivery, it is clear that there are advantages to reducing emotional distress during all stages of the pregnancy and postpartum period.
This should be a strong component of the medical care of the mother, as it is an integral component of the health of the infant. Healthcare providers should be proactive in ensuring that the mother is in control of her labor and delivery experience, and she is allowed to make decisions with the medical guidance of her obstetrician. Allowing her to feel empowered during her birthing experience improves the likelihood of good mental health outcomes.

Screening and identification of depression is an essential component of postpartum care and proper referrals should always be readily available. A mother’s needs are often overlooked, as concern over the newborn is likely to take priority. Early detection and treatment of postpartum depression is key to shortening the course of the disorder and preventing potential dangerous side effects. Healthcare providers can help spread awareness about what mothers can expect in the postpartum period, they can work with the mothers to set realistic expectations, and ensure that the mother has easy access to healthcare when needed.
References


Table I. Characteristics of Reviewed Studies

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<thead>
<tr>
<th>Quality Assessment</th>
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<td></td>
<td>Design Limitations</td>
<td>Indirectness</td>
<td>Imprecision</td>
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<tr>
<td>Yang et al&lt;sup&gt;7&lt;/sup&gt;</td>
<td>Case control</td>
<td>No serious limitations</td>
<td>No serious indirectness</td>
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<tr>
<td>Petrosyan et al&lt;sup&gt;8&lt;/sup&gt;</td>
<td>Case control</td>
<td>Serious limitations&lt;sup&gt;A&lt;/sup&gt;</td>
<td>No serious indirectness</td>
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<tr>
<td>Sword et al&lt;sup&gt;5&lt;/sup&gt;</td>
<td>Prospective cohort</td>
<td>Serious limitations&lt;sup&gt;B&lt;/sup&gt;</td>
<td>No serious indirectness</td>
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<tr>
<td>Adams et al&lt;sup&gt;9&lt;/sup&gt;</td>
<td>Prospective</td>
<td>Serious limitations&lt;sup&gt;C&lt;/sup&gt;</td>
<td>No serious indirectness</td>
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<tr>
<td>Rauh et al&lt;sup&gt;10&lt;/sup&gt;</td>
<td>Prospective</td>
<td>Serious limitations&lt;sup&gt;D&lt;/sup&gt;</td>
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A. Petrosyan et al fail to control for confounding variable (history of depression before or during pregnancy)
B. Sword et al report 26% of participants lost to follow up with statistically significant demographic characteristics amongst those lost, leading to potential attrition bias
C. Adams used SCL-8 tool that has not been validated for use during pregnancy, which presents the risk of flawed measure of outcome
D. Rauh et al report 27% of participants did not complete all surveys, which suggests potential attrition bias. Authors present no data about population that was lost to follow up