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## **Supplementary Material**

**Article Title:** Prevalence of Bipolar Disorder in Perinatal Women: A Systematic Review and Meta-Analysis

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## Appendix 1 – Search string(s)/strategy

### **Database: PubMed (1,110 results)**

Search: ("Bipolar Disorder"[Mesh] OR "bipolar disorder"[All Fields] OR "manic depression"[All Fields] OR "manic depressive"[All Fields] OR "mood disorder"[All Fields] OR "affective disorder"[All Fields]) AND ("Perinatal Care"[Mesh] OR perinatal[All Fields] OR "Postnatal Care"[Mesh] OR postnatal[All Fields] OR "Postpartum Period"[Mesh] OR ("postpartum period"[MeSH Terms] OR ("postpartum"[All Fields] AND "period"[All Fields]) OR "postpartum period"[All Fields] OR "postpartum"[All Fields]) OR obstetric[All Fields] OR ("parturition"[MeSH Terms] OR "parturition"[All Fields] OR "delivery, obstetric"[MeSH Terms] OR ("delivery"[All Fields] AND "obstetric"[All Fields]) OR "obstetric delivery"[All Fields]) OR "Pregnancy"[Mesh] OR ("pregnancy"[MeSH Terms] OR "pregnancy"[All Fields]) OR "Prenatal Care"[Mesh] OR prenatal[All Fields] OR antepartum[All Fields] OR ("postpartum period"[MeSH Terms] OR ("postpartum"[All Fields] AND "period"[All Fields]) OR "postpartum period"[All Fields] OR "puerperal"[All Fields]) OR ("postpartum period"[MeSH Terms] OR ("postpartum"[All Fields] AND "period"[All Fields]) OR "postpartum period"[All Fields] OR "puerperium"[All Fields])) AND (("mass screening"[MeSH Terms] OR ("mass"[All Fields] AND "screening"[All Fields]) OR "mass screening"[All Fields] OR "screen"[All Fields] OR "early detection of cancer"[MeSH Terms] OR ("early"[All Fields] AND "detection"[All Fields] AND "cancer"[All Fields]) OR "early detection of cancer"[All Fields]) OR identify[All Fields] OR ("J Rehabil Assist Technol Eng"[Journal] OR "rate"[All Fields]) OR detect[All Fields] OR ("diagnosis"[MeSH Terms] OR "diagnosis"[All Fields] OR "diagnose"[All Fields]) OR "diagnosis"[Mesh] OR ("epidemiology"[Subheading] OR "epidemiology"[All Fields] OR "prevalence"[All Fields] OR "prevalence"[MeSH Terms]) OR ("epidemiology"[Subheading] OR "epidemiology"[All Fields] OR "incidence"[All Fields] OR "incidence"[MeSH Terms]))

Sort by: Most recent

### **Database: Scopus (1,954 results)**

Search: ( TITLE-ABS-KEY ( "Bipolar Disorder" [mesh] ) OR TITLE-ABS-KEY ( "bipolar disorder" ) OR TITLE-ABS-KEY ( "manic depression" ) OR TITLE-ABS-KEY ( "manic depressive" ) OR TITLE-ABS-KEY ( "mood disorder" ) OR TITLE-ABS-KEY ( "affective disorder" ) ) AND ( TITLE-ABS-KEY ( "Perinatal Care" [mesh] ) OR TITLE-ABS-KEY ( perinatal ) OR TITLE-ABS-KEY ( "Postnatal Care" [mesh] ) OR TITLE-ABS-KEY ( postnatal ) OR TITLE-ABS-KEY ( "Postpartum Period" [mesh] ) OR TITLE-ABS-KEY ( postpartum ) OR TITLE-ABS-KEY ( obstetric ) OR TITLE-ABS-KEY ( parturition ) OR TITLE-ABS-KEY ( "Pregnancy" [mesh] ) OR TITLE-ABS-KEY ( pregnancy ) OR TITLE-ABS-KEY ( "Prenatal Care" [mesh] ) OR TITLE-ABS-KEY ( prenatal ) OR TITLE-ABS-KEY ( antepartum ) OR TITLE-ABS-KEY ( puerperal ) OR TITLE-ABS-KEY ( puerperium ) ) AND ( TITLE-ABS-KEY ( screen ) OR TITLE-ABS-KEY ( identify ) OR TITLE-ABS-KEY ( detect ) OR TITLE-ABS-KEY ( rate ) OR TITLE-ABS-KEY ( diagnose ) OR TITLE-ABS-KEY ( diagnosis ) OR TITLE-ABS-KEY ( prevalence ) OR TITLE-ABS-KEY ( incidence ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) OR LIMIT-TO ( DOCTYPE , "re" ) OR LIMIT-TO ( DOCTYPE , "cp" ) OR LIMIT-TO ( DOCTYPE , "ip" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) )

**Database: PsycINFO (389 results)**

Search (in title/abstract/key concepts categories: (bipolar disorder OR manic depression OR manic depressive OR mood disorder OR affective disorder) AND (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium) AND (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence))

**Database: Cochrane (231 results)**

Search: ("bipolar disorder" OR "manic depression" OR "manic depressive" OR "mood disorder" OR "affective disorder") AND (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium) AND (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence)

**Database: CINAHL (127 results)**

Search: S1 AND S2 AND S3

S1) TI ("bipolar disorder" OR "manic depression" OR "manic depressive" OR "mood disorder" OR "affective disorder") OR AB ("bipolar disorder" OR "manic depression" OR "manic depressive" OR "mood disorder" OR "affective disorder") OR SU ("bipolar disorder" OR "manic depression" OR "manic depressive" OR "mood disorder" OR "affective disorder")

S2) TI (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium) OR AB (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium) OR SU (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium)

S3) TI (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence) OR AB (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence) OR SU (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence)

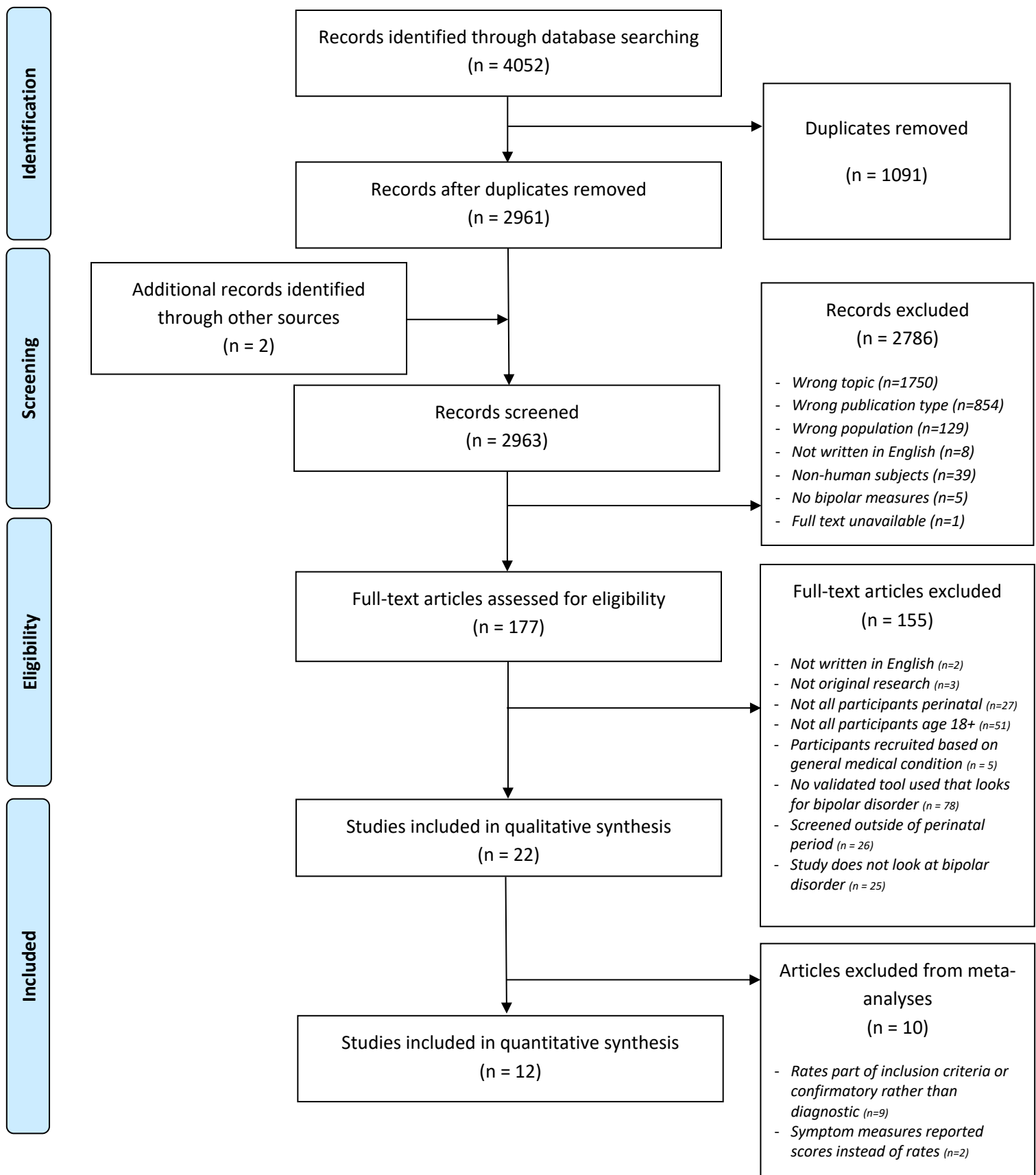
Sort by: Newest

Limit to: English, Peer reviewed, Research articles, Human

**Database: Clinicaltrials.gov (241 results)**

Search: (bipolar disorder OR manic depression OR manic depressive OR mood disorder OR affective disorder) AND (perinatal OR postnatal OR postpartum OR obstetric OR pregnancy OR prenatal OR antepartum) AND (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence)

## Appendix 2 – PRISMA flow diagram



### Appendix 3 – Summary of studies included in the systematic review

Article identifier	Location, time frame, & study design	Objective	Study sample	Downs & Black quality rating
Celik (2016) <sup>51</sup>	<b>Location:</b> Batman, Turkey <b>Setting:</b> Family medicine practice <b>Time period:</b> February 2016 <b>Study design:</b> Cross-sectional	To screen for postpartum depression and bipolar disorder and determine proportion of bipolarity and mixed depression	<b>Sample size:</b> 63 <b>Age, years (mean, SD):</b> 30.1 (5.2) <b>Study participants:</b> Postpartum women <b>Pertinent inclusion criteria:</b> none	76.9%
Clark (2015) <sup>30</sup>	<b>Location:</b> Pittsburgh, PA, USA <b>Setting:</b> Labor & delivery unit <b>Time period:</b> Oct 2011 – March 2012 <b>Study design:</b> Cross-sectional	To use the MDQ & EPDS to identify depression and history of hypomania/mania in postpartum women	<b>Sample size:</b> 1,279 <b>Age:</b> differed by group <b>Study participants:</b> Postpartum women <b>Pertinent inclusion criteria:</b> none	85.7%
Driscoll (2017) <sup>45</sup>	<b>Location:</b> Pittsburgh, PA, USA <b>Setting:</b> Specialized women's mental health center <b>Time period:</b> July 2006 – March 2011 <b>Study design:</b> Prospective	To explore course of bipolar disorder and impact of pharmacotherapy on symptoms, characterize depression and mania in perinatal period, and compare symptom levels of treated women to untreated women	<b>Sample size:</b> 159 <b>Age, years (mean, SD):</b> 26.3 (6.2) <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> Bipolar disorder diagnosis	85.7%
Dudek (2014) <sup>31</sup>	<b>Location:</b> Krakow & Tarnow, Poland <b>Setting:</b> Obstetric clinic <b>Time period:</b> February 2010 - April 2012 <b>Study design:</b> Cross-sectional	To investigate whether presumed postpartum depression with bipolar features differs from the unipolar postpartum depression	<b>Sample size:</b> 344 <b>Age, years (mean, SD):</b> 30.2 (4.3) <b>Study participants:</b> Postpartum women <b>Pertinent inclusion criteria:</b> No prior history of psychiatric illness or treatment	73.3%
Giardinelli (2012) <sup>32</sup>	<b>Location:</b> Florence, Italy <b>Setting:</b> Obstetric clinic <b>Time period:</b> April 2007 - April 2008 <b>Study design:</b> Prospective	To analyze prevalence of anxiety and mood disorders, risk factors, and sociodemographic features in perinatal women	<b>Sample size:</b> 590 <b>Age, years (mean, SD):</b> 34.3 (4.2) <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> none	64.3%
Jaeschke (2017) <sup>33</sup>	<b>Location:</b> Krakow & Tarnow, Poland <b>Setting:</b> Labor & delivery units <b>Time period:</b> Nov 2009 – Feb 2013 <b>Study design:</b> Cross-sectional	To analyze the prevalence, correlation, and associated characteristics of bipolar symptoms in women with or without postpartum depression	<b>Sample size:</b> 434 <b>Age, years (mean, SD):</b> 30.2 (4.3) <b>Study participants:</b> Postpartum women <b>Pertinent inclusion criteria:</b> No prior history of psychiatric illness	76.9%
Kim (2006) <sup>34</sup>	<b>Location:</b> Minneapolis, MN, USA <b>Setting:</b> Obstetric clinic <b>Time period:</b> Feb – Oct 2002 <b>Study design:</b> Cross-sectional	To assess prevalence of psychiatric illness in Spanish- and English-speaking obstetric women with lower incomes in and examine associations between diagnoses and prenatal care utilization	<b>Sample size:</b> 154 <b>Age, years (mean, SD):</b> 25 (5.7) <b>Study participants:</b> Pregnant women <b>Pertinent inclusion criteria:</b> none	61.5%
Kimmel (2015) <sup>46</sup>	<b>Location:</b> Baltimore, MD, USA <b>Setting:</b> Mood disorders center <b>Time period:</b> not reported <b>Study design:</b> Prospective	To associate depression during pregnancy and use of medications, and clinical risk factors for postpartum depression	<b>Sample size:</b> 93 <b>Age, years (mean, SD):</b> 30.5 (6.2) <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> History of a mood disorder	71.4%
Kumar (2016) <sup>35</sup>	<b>Location:</b> Mysore, India <b>Setting:</b> Labor & delivery unit <b>Time period:</b> Jun – Dec 2011 <b>Study design:</b> Cross-sectional	To assess psychiatric morbidity and correlates in postpartum women	<b>Sample size:</b> 152 <b>Age, years (mean, SD):</b> 23 (4.8) <b>Study participants:</b> Postpartum women <b>Pertinent inclusion criteria:</b> none	69.2%

Masters (2019) <sup>36</sup>	<b>Location:</b> Multiple cities in MA, USA <b>Setting:</b> Obstetric clinics <b>Time period:</b> May 2016 – Jun 2018 <b>Study design:</b> Cross-sectional	To describe proportion of perinatal women who screen positive for bipolar disorder in the obstetric setting and associations with characteristics and healthcare utilization	<b>Sample size:</b> 574 <b>Age, years (mean, SD):</b> 31.5 (5.3) <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> none	85.7%
Pingo (2017) <sup>37</sup>	<b>Location:</b> Cape Town, South Africa <b>Setting:</b> Obstetric clinic <b>Time period:</b> Feb 2005 - July 2010 <b>Study design:</b> Prospective	To evaluate frequency and factors associated with probable postpartum hypomania and postpartum depression	<b>Sample size:</b> 57 <b>Age, years (mean, SD):</b> 25.1 (6.4) <b>Study participants:</b> Postpartum women <b>Pertinent inclusion criteria:</b> none	60.0%
Pope (2013) <sup>38</sup>	<b>Location:</b> London, ON, Canada <b>Setting:</b> Obstetric clinic <b>Time period:</b> Jun 2005 - Mar 2010 <b>Study design:</b> Prospective	To explore prevalence of suicidal ideation in perinatal period in women with history of major depression or bipolar disorder II and associated characteristics	<b>Sample size:</b> 147 <b>Age, years (mean, SD):</b> 29.0 (5.5) <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> Mood disorder diagnosis (MDD or BDII)	71.4%
Robakis (2015) <sup>39</sup>	<b>Location:</b> Palo Alto, CA, USA <b>Setting:</b> Obstetric clinic <b>Time period:</b> Sept 2011 - March 2014 <b>Study design:</b> Prospective	To explore relationship between antenatal optimism and depressive symptoms, attitudes toward maternity, and mother-to-infant bonding postnatally	<b>Sample size:</b> 98 <b>Age, years (mean, SD):</b> 32.2 (4.9) <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> 30% of recruited sample had mood disorder	61.5%
Sharma (2011) <sup>40</sup>	<b>Location:</b> London, ON, Canada <b>Setting:</b> Perinatal clinic in a psychiatric hospital <b>Time period:</b> 2005 – 2009 <b>Study design:</b> Cross-sectional	To study performance of the MDQ during the postpartum period among women with bipolar disorder	<b>Sample size:</b> 125 <b>Age, years (mean, SD):</b> 28 (5.2) <b>Study participants:</b> Postpartum women <b>Pertinent inclusion criteria:</b> Mood disorder diagnosis (MDD or BD)	61.5%
Sharma (2013) <sup>41</sup>	<b>Location:</b> London, ON, Canada <b>Setting:</b> Obstetric clinic <b>Time period:</b> not reported <b>Study design:</b> Prospective	To report on psychotropic drug use in bipolar disorder II in perinatal period risk of recurrence	<b>Sample size:</b> 53 <b>Age, years (mean, SD):</b> 27.7 (5.4) <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> BDII diagnosis	92.9%
Sharma (2014) <sup>47</sup>	<b>Location:</b> London, ON, Canada <b>Setting:</b> Perinatal clinic in a psychiatric hospital <b>Time period:</b> 2005 – 2009 <b>Study design:</b> Prospective	To investigate rate and risk factors for diagnostic conversion from major depression to bipolar disorder & from bipolar disorder II to bipolar disorder I during perinatal period	<b>Sample size:</b> 146 <b>Age:</b> differed by group <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> Mood disorder diagnosis (MDD or BDII)	57.1%
Sit (2014) <sup>42</sup>	<b>Location:</b> Pittsburgh, PA, USA <b>Setting:</b> Obstetric hospital (not specified if inpatient or outpatient) <b>Time period:</b> not specified <b>Study design:</b> Prospective	To investigate relationship between having a maternal mood disorder and adverse pregnancy outcomes	<b>Sample size:</b> 192 <b>Age, years (mean, SD):</b> 28.7 (6.0) <b>Study participants:</b> Pregnant women <b>Pertinent inclusion criteria:</b> Diagnosis of MDD, BD, or women without history of psychiatric illness	92.9%
Sole (2019) <sup>48</sup>	<b>Location:</b> Barcelona, Spain <b>Setting:</b> Perinatal Psychiatry Program <b>Time period:</b> Jan 2005 - March 2017 <b>Study design:</b> Prospective	To evaluate obstetric outcomes and labor type in pregnant women with bipolar disorder compared with pregnant women without any psychiatric disorder, and possible risk factors associated	<b>Sample size:</b> 200 <b>Age, years (mean, SD):</b> 34.9 (4.3) <b>Study participants:</b> Pregnant women <b>Pertinent inclusion criteria:</b> Diagnosis of BD or participants without history of psychiatric illness	45.5%
Uguz (2019) <sup>43</sup>	<b>Location:</b> Konya, Turkey <b>Setting:</b> Labor & Delivery unit <b>Time period:</b> not reported <b>Study design:</b> Cross-sectional	To compare prevalence of mood and anxiety disorders in pregnant and non-pregnant women	<b>Sample size:</b> 1,154 <b>Age, years (mean, SD):</b> 28.3 (5.7) <b>Study participants:</b> Postpartum women <b>Pertinent inclusion criteria:</b> none	66.7%

Vesga-López (2008) <sup>49</sup>	<b>Location:</b> USA <b>Setting:</b> NESARC survey (civilians by census) <b>Time period:</b> 2001-2002 <b>Study design:</b> Cross-sectional	To present prevalence of psychiatric disorders among pregnant women and compare these with the prevalence in non-pregnant women, and identify risk factors and treatment-seeking rates	<b>Sample size:</b> 1,524 <b>Age:</b> differed by group <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> none	85.7%
Wisner (2004) <sup>50</sup>	<b>Location:</b> Pennsylvania, USA <b>Setting:</b> not reported <b>Time period:</b> Aug 1996 - July 2000 <b>Study design:</b> Prospective	To see if valproate immediately postpartum in women with bipolar disorder would prevent episodes and how it affects time to recurrence	<b>Sample size:</b> 37 <b>Age:</b> differed by group <b>Study participants:</b> Pregnant and postpartum women <b>Pertinent inclusion criteria:</b> Diagnosis of bipolar disorder	71.4%
Wisner (2013) <sup>44</sup>	<b>Location:</b> Pittsburgh, PA, USA <b>Setting:</b> Obstetric hospital (not specified if inpatient or outpatient) <b>Time period:</b> not specified <b>Study design:</b> Retrospective	To determine proportion of women with perinatal depression with episode onset postpartum, during pregnancy, or predating pregnancy, to evaluate the rate of self-harm ideation, and define disorders associated with positive screens	<b>Sample size:</b> 826 <b>Age, years (mean, SD):</b> 28.8 (5.9) <b>Study participants:</b> Postpartum women <b>Pertinent inclusion criteria:</b> Postpartum depression (via positive EPDS)	84.6%

EPDS = Edinburgh Postnatal Depression Scale; MDQ = Mood Disorder Questionnaire; MDD = Major Depressive Disorder; BD = Bipolar Disorder

## Appendix 4 – Modifications to the Downs & Black Checklist

Item #	Question	Included in this review
<b>Reporting</b>		
1	Is the hypothesis/aim/objective of the study clearly described?	Yes
2	Are the main outcomes to be measured clearly described in the Introduction or Methods section?	Yes
3	Are the characteristics of the patients included in the study clearly described?	Yes
4	Are the interventions of interest clearly described?	Yes
5	Are the distributions of principal confounders in each group of subjects to be compared clearly described?	Yes
6	Are the main findings of the study clearly described?	Yes
7	Does the study provide estimates of the random variability in the data for the main outcomes?	Yes
8	Have all important adverse events that may be a consequence of the intervention been reported?	Yes
9	Have the characteristics of patients lost to follow-up been described?	Yes
10	Have actual probability values been reported (e.g., 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?	Yes
<b>External validity</b>		
11	Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	No
12	Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	No
13	Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive?	No
<b>Internal validity - bias</b>		
14	Was an attempt made to blind study subjects to the intervention they have received?	No
15	Was an attempt made to blind those measuring the main outcomes of the intervention?	No
16	If any of the results of the study were based on “data dredging”, was this made clear?	Yes
17	In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?	Yes
18	Were the statistical tests used to assess the main outcomes appropriate?	Yes
19	Was compliance with the intervention/s reliable?	Yes
20	Were the main outcome measures used accurate (valid and reliable)?	Yes
<b>Internal validity – confounding/selection bias</b>		
21	Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?	Yes
22	Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?	Yes
23	Were study subjects randomised to intervention groups?	No
24	Was the randomised intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?	No



25	Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	Yes
26	Were losses of patients to follow-up taken into account?	Yes
<b>Power</b>		
27	Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?	Yes