

# **The Impacts of COVID-19 Related Mental Health Factors on Birth Outcomes - A Scoping Review Protocol**

## **Introduction**

In order to address both COVID-19 related mental health issues among pregnant women, as well as the potential adverse birth outcomes, there is a need to understand COVID-19 related mental health factors on birth outcomes. It is important to assess and map the current literature and apply the result of this scoping review to inform future research and policy development that is related to COVID-19 related mental health factors on birth outcomes.

**Objectives of the Scoping Review:** To assess the state of the literature related to the impacts of COVID-19 related stress, anxiety and depressive symptoms during pregnancy on adverse birth outcomes, including preterm birth, low birth weight, small for gestational age, macrosomia, neonatal death and congenital anomaly among pregnant women during the COVID-19 pandemic.

## **Review Question**

The guiding question for the scoping review is: **What are the impacts of COVID-19 related mental health factors on birth outcomes?**

## **Methods**

This scoping review will be conducted using the methodologies proposed by Arksey and O'Malley's (2005) and Joanna Briggs Institute (JBI) (Peters et al., 2020). The scoping review methodologies recommendations by Levac, Colquhoun and O'Brien (2010) will also be reviewed to guide the process.

Furthermore, PRISMA-ScR (an extension of the PRISMA) will be used to guide the writing of the scoping review (Appendix 2). This scoping review protocol will also be published on the Open Science Framework site.

## **Inclusion Criteria and Restrictions**

**Types of Participants:** This review will consider studies that discuss the prenatal COVID-19 related stress, anxiety and depressive symptoms, on adverse birth outcomes, including preterm birth, low birth weight, small for gestational age, macrosomia, neonatal death and congenital anomaly among mothers who have given birth during the COVID-19 pandemic.

**Concept:** This scoping review will include studies assessing prenatal COVID-19 related mental health issues and factors that had impacts on the birth outcomes among mothers who have given birth during the COVID-19 pandemic.

**Types of Evidence Sources:** This scoping review will include systematic reviews, analytical studies and descriptive studies. As for analytical observational studies, the review will include the following study designs: cohort studies (prospective, retrospective and mixed cohort studies), case-control studies and cross-sectional studies. As for descriptive studies, this review will include ecological studies. Additionally, qualitative studies and mixed methods studies which meet the inclusion criteria will also be included. Case studies or case reports will not be included as those are less likely to be generalizable. Additionally, evidence sources such as comments, editorials, letters, books, articles without peer-reviews, and other grey literature will not be included.

**Language and Time Frame Restrictions:** This review will be restricted to 2019 (initial identification of Covid 19 virus) to current. No language restrictions will be applied.

## **Searching Strategy**

This scoping review will implement a 3-step searching strategy that was recommended by JBI (Peters et al., 2020):

**Step 1:** An initial limited search relevant to the topic was conducted in two online databases, which were Ovid Medline and EBSCOhost CINAHL. This step aims to identify and analyze the text words from titles, abstracts and keywords used to describe the articles from the initial limited search results. These text words were used to develop full searching strategies for this scoping review. In this step, the searching terms for the initial search were 'COVID-19', 'mental health' and 'adverse birth outcomes'.

**Step 2:** The search will be executed by an expert searcher/librarian (SC) on the following databases: PROSPERO, Cochrane Library (CDSR and Central Register of Controlled Trials), OVID Medline, Ovid EMBASE, OVID PsycInfo, EBSCO CINAHL, and SCOPUS, using controlled vocabulary (eg: MeSH, Emtree, etc) and key words representing the concepts “COVID19” and “mental health” and “birth outcomes”. All searches will be adjusted appropriately for different databases. Searches will be limited to late 2019 to present. The search includes variants of search filters from the John W. Scott Health Sciences Search Filters(Campbell, 2021a, Campbell, 2021b). No other limits will be applied. Results will be exported to the COVIDENCE systematic review program. Duplicates will be removed. Detailed search strategies are available in Appendix 1.

**Step 3:** A snowball search on the reference lists of the identified articles will be conducted to capture the missing articles from previous steps.

## Screening

Following the search, all identified articles will be exported to COVIDENCE review management software. Titles and abstracts will be screened by two independent reviewers by using the inclusion criteria and the following screening questions:

1. Does the research focus on pregnant women and/or mothers who gave birth during COVID-19 pandemic?  
Yes/No/Maybe
2. Does the research focus on COVID-19 related stress, anxiety and depressive symptoms during prenatal period?  
Yes/No/Maybe
3. Does the research focus on adverse birth outcomes?  
Yes/No/Maybe

*If the articles meet the inclusion criteria and ‘Yes’ or ‘Maybe’ are selected from the screening questions, these articles shall be kept for further full-text analysis.*

Following the screening on titles and abstracts, the remaining articles will be taken for full-text analysis. The following questions will be used as a guide:

1. Does the research focus on COVID-19 related stress, anxiety and depressive symptoms during pregnancy or prenatal period?  
Yes/No
2. Does the research focus on pregnant women and/or mothers who gave birth during COVID-19 pandemic?  
Yes/No
3. Does the research focus on adverse birth outcomes?  
Yes/No
4. Does the research focus on the impacts of COVID-19 related stress, anxiety and depressive symptoms on adverse birth outcomes?  
Yes/No

*Only the articles that provide a 'Yes' answer for all four questions will be included in the review.*

The results of the search will be presented in a PRISMA diagram and will also be reported in full in the final report. Any disagreements between the two reviewers will be discussed and resolved. A third reviewer will be involved if there is a lack of consensus.

## **Data Extraction**

For data extraction process, the following information need to be captured according to the JBI recommendation (Peters et al., 2020):

1. Author(s)
2. Year of publication
3. Origin/country of origin (where the source was published or conducted)
4. Aims/purpose
5. Population and sample size within the source of evidence (if applicable)
6. Methodology / methods
7. Outcomes and details of these (e.g., how measured) (if applicable)
8. Key findings that relate to the scoping review question/s.

All the data will be extracted using the template data extraction instrument recommended by JBI (Appendix 3) (Peters et al., 2020). However, this instrument will be modified and revised as necessary.

## **Data Presentation**

The extracted data will be presented in a table that aligns with the scoping review objectives. A narrative summary will also be provided to describe the result and to address the scoping review questions.

## **Conclusion**

In conclusion, this scoping review will be used to inform a broad view of COVID-19 related mental health factors on adverse birth outcomes in China. This information will also be used to inform future research and policy development that is related to COVID-19 related mental health factors on adverse birth outcomes.

## Reference List

- Arksey, H. & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19-32, DOI: [10.1080/1364557032000119616](https://doi.org/10.1080/1364557032000119616)
- Campbell, S. (2021a). COVID19 and Variants OVID MEDLINE\_07\_26\_2021. Retrieved July 26, 2021, from University of Alberta, John Scott Health Sciences Library: [https://docs.google.com/document/d/1VQnOBmBAwAT5fkqQfxtQgvmCbXqC3ZpDt\\_xo-v24yvIQ/edit](https://docs.google.com/document/d/1VQnOBmBAwAT5fkqQfxtQgvmCbXqC3ZpDt_xo-v24yvIQ/edit)
- Campbell, S. (2021b). COVID-19\_EBSCO CINAHL\_07\_26\_2021. Retrieved July 26, 2021, from University of Alberta, John Scott Health Sciences Library: <https://docs.google.com/document/d/17w4RulQkUjJnAeIVyvLalCHPudBqobIIE8QhtlI5qTA/edit>
- Levac, D., Colquhoun, H., & O'Brien, K. K. (2010). Scoping studies: advancing the methodology. *Implementation Science*, 5(1). <https://doi.org/10.1186/1748-5908-5-69>
- Peters, MDJ., Godfrey, C., McInerney, P., Munn, Z., Tricco, AC., & Khalil, H. Chapter 11: Scoping Reviews (2020). In: Aromataris E, Munn Z (Editors). *JBIM Manual for Evidence Synthesis*, JBI, 2020. Available from <https://synthesismanual.jbi.global>. <https://doi.org/10.46658/JBIMES-20-12>

## Appendix 1:

### Ovid MEDLINE(R) ALL <1946 to July 26, 2021>

#	Search Statement	Results
1	exp Coronavirus/	85818
2	exp Coronavirus Infections/	104836
3	(coronavirus* or corona virus* or OC43 or NL63 or 229E or HKU1 or HCoV* or ncov* or covid* or sars-cov* or sarscov* or Sars-coronavirus* or Severe Acute Respiratory Syndrome Coronavirus*).mp.	176694
4	(or/1-3) and 20200601:20301231.(ep).	115200
5	4 not (SARS or SARS-CoV or MERS or MERS-CoV or Middle East respiratory syndrome or camel* or dromedar* or equine or coronary or coronal or covidence* or covidien or influenza virus or HIV or bovine or calves or TGEV or feline or porcine or BCoV or PED or PEDV or PDCoV or FIPV or FCoV or SADS-CoV or canine or CCoV or zoonotic or avian influenza or H1N1 or H5N1 or H5N6 or IBV or murine corona*).mp.	46230
6	((pneumonia or covid* or coronavirus* or corona virus* or ncov* or 2019-ncov or sars*).mp. or exp pneumonia/) and Wuhan.mp.	5588
7	(2019-ncov or ncov19 or ncov-19 or 2019-novel CoV or sars-cov2 or sars-cov-2 or sarscov2 or sarscov-2 or Sars-coronavirus2 or Sars-coronavirus-2 or SARS-like coronavirus* or coronavirus-19 or covid19 or covid-19 or covid 2019 or ((novel or new or nouveau) adj2 (CoV on nCoV or covid or coronavirus* or corona virus or Pandemi*2)) or ((covid or covid19 or covid-19) and pandemic*2) or (coronavirus* and pneumonia)).mp.	161412
8	COVID-19.rx,px,ox. or severe acute respiratory syndrome coronavirus 2.os.	4645
9	Covid-19/	94250
10	(variant* adj2 (India* or "South Africa*" or UK or English or Brazil* or alpha or beta or delta or gamma or kappa or lambda or "P.1" or "C.37")).mp.	4449
11	("B.1.1.7" or "B.1.351" or "B.1.617.1" or "B.1.617.2").mp.	530
12	or/5-11	167457
13	12 and 20191101:20301231.(dt).	161454
14	exp Pregnancy Complications/	442678
15	exp Pregnancy Outcome/	77812
16	exp Obstetric Labor Complications/	72047
17	exp Obstetric Labor, Premature/	28601
18	exp Fetal Death/	29935
19	"congenital, hereditary, and neonatal diseases and abnormalities"/	890
20	("adverse birth outcome*" or stillbirth* or "low birthweight*" or "low birth weigh" or "small for gestational age" or SGA or macrosomia or "neonatal death" or "congenital anomal*").mp.	66064
21	("spontaneous abortion*" or "postpartum hemorrhage" or "post partum	10894

	hemorrhage").mp.	
22	((labor or labour or deliver* or childbirth* or birth*) adj3 (prematu* or pre-mature* or preterm or pre-term or early or difficult*)).mp.	70898
23	or/14-22	527852
24	exp Mental Health/	45210
25	exp Psychology/	68604
26	exp Psychiatry/	106292
27	Anxiety/	89498
28	Depression/	130306
29	(mental* adj3 (ill* or well* or disorder* or disease* or health* or unwell*)).mp.	403543
30	anxiety disorders/ or agoraphobia/ or anxiety, separation/ or neurocirculatory asthenia/ or neurotic disorders/ or obsessive-compulsive disorder/ or hoarding disorder/ or panic disorder/ or phobic disorders/ or phobia, social/	82771
31	((((anxiety or depression or depressive or hypervigilance or agoraphobia or neuroses or neurosis or neurotic or paranoi* or catastrophiz* or catastrophis*or) and obsessive-compulsive) or panic or phobia or stress or ptsd or psycho* or "internalising symptom*" or "internalizing symptom*" or wellness or "seasonal affective disorder*" or psychiatr*).mp.	2890504
32	(dysthymic disorder* or "use disorder" or "psychotropic drug*" or "brain disease*" or "neurotransmitter agent*" or cognitive or "social problems" or "alcohol abuse*" or "drug abuse*").mp.	594133
33	("seasonal affective disorder*" or "internalizing symptoms" or "common mental disorders" or cmd or cmds).ti,ab.	8063
34	or/24-33	3387821
35	13 and 23 and 34	231

CINAHL Plus with Full Text

Limiters/Expanders

Search Modes - Find all my search terms

#	Query	Results
S1	((((MH "Coronavirus+") OR (MH "Coronavirus Infections+") or (coronavirus* or corona virus* or OC43 or NL63 or 229E or HKU1 or HCoV* or ncov* or covid* or sars-cov* or sarscov* or Sars-coronavirus* or Severe Acute Respiratory Syndrome Coronavirus*)) NOT ( (SARS or SARS-CoV or MERS or MERS-CoV or Middle East respiratory syndrome or camel* or dromedar* or equine or coronary or coronal or covidence* or covidien or influenza virus or HIV or bovine or calves or TGEV or feline or porcine or BCoV or PED or PEDV or PDCoV or	61,878



	FIPV or FCoV or SADS-CoV or canine or CCov or zoonotic or avian influenza or H1N1 or H5N1 or H5N6 or IBV or murine corona*) or (MH "COVID-19") OR (MH "COVID-19 Pandemic") OR (MH "SARS-CoV-2") or(covid or 2019-ncov or ncov19 or ncov-19 or 2019-novel CoV or sars-cov2 or sars-cov-2 or sarscov2 or sarscov-2 or Sars-coronavirus2 or Sars-coronavirus-2 or SARS-like coronavirus* or coronavirus-19 or ((novel or new or nouveau) N2 (CoV or nCoV or coronavirus* or "corona virus" or Pandemi*)) or (variant* N2 (India* or "South Africa*" or UK or English or Brazil* or alpha or beta or delta or gamma or kappa or lambda or "P.1" or "C.37")) or ("B.1.1.7" or "B.1.351" or "B.1.617.1" or "B.1.617.2")) and EM 20190601-20301231	
S2	(MH "Pregnancy Outcomes")	25,494
S3	(MH "Pregnancy Complications+")	100,854
S4	(MH "Perinatal Death")	8,709
S5	(MH "Infant, Low Birth Weight+")	15,192
S6	(MH "Infant, Large for Gestational Age") OR (MH "Infant, Postmature") OR (MH "Infant, Premature")	24,902
S7	"adverse birth outcome*" or stillbirth* or "low birthweight*" or "low birth weigh" or "small for gestational age" or SGA or macrosomia or "neonatal death" or "congenital anomal*	25,026
S8	((labor or labour or deliver* or childbirth* or birth*) N3 (prematu* or pre-mature* or preterm or pre-term or early or difficult*)) or "spontaneous abortion*")	31,274
S9	stillbirth* or "still birth*" or stillborn or "still born" or "intrauterine death" or "perinatal death" or "fetus death" or "fetal demise" or "fetal death"	12,791
S10	S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9	163,731
S11	(MH "Mental Health") OR (MH "Behavioral and Mental Disorders+")	897,469
S12	(MH "Psychology, Clinical+")	1,037
S13	((mental* or psychiatric*) N3 (ill* or well* or disorder* or disease* or health* or unwell*))	229,030
S14	(anxiety or depression or depressive or hypervigilance or agoraphobia or neuroses or neurosis or neurotic or paranoi* or catastrophiz* or catastrophis* or and obsessive-compulsive or panic or phobia or stress or ptsd or psycho* or "internalising symptom*" or "internalizing symptom*" or wellness or "seasonal affective disorder*" or psychiatr*)	1,135,565
S15	("dysthymic disorder*" or "use disorder" or "psychotropic drug*" or "brain disease*" or "neurotransmitter agent*" or cognitive or "social problems" or "alcohol abuse*" or "drug abuse*")	200,728
S16	(S11 OR S12 OR S13 OR S14 OR S15)	1,615,363
S17	S1 AND S10 AND S16	105

## Appendix 2: PRISMA-ScR

**Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist**

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>TITLE</b>			
Title	1	Identify the report as a scoping review.	
<b>ABSTRACT</b>			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	
<b>INTRODUCTION</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	
<b>METHODS</b>			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	



SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
<b>RESULTS</b>			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	
<b>DISCUSSION</b>			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	
Limitations	20	Discuss the limitations of the scoping review process.	
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	
<b>FUNDING</b>			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where sources of evidence (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* ;169:467-473. doi: 10.7326/M18-0850



### Appendix 3: JBI template source of evidence details, characteristics and results extraction instrument

<b>Scoping Review Details</b>	
Scoping Review title:	
Review objective/s:	
Review question/s:	
<b>Inclusion/Exclusion Criteria</b>	
Population	
Concept	
Context	
Types of evidence source	
<b>Evidence source Details and Characteristics</b>	
Citation details (e.g. author/s, date, title, journal, volume, issue, pages)	
Country	
Context	
Participants (details e.g. age/sex and number)	
<b>Details/Results extracted from source of evidence</b> (in relation to the concept of the scoping review)	
E.g. Quality of Life Domains assessed	
E.g. Number of items in tool	
E.g. details of psychometric validation of tool	