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Burden of mental health problems among pregnant and postpartum women in sub-Saharan Africa: systematic review and meta-analysis protocol

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ABSTRACT

Introduction Pregnancy and postpartum-related mental health problems pose serious public health threat to the society, but worryingly, neglected in sub-Saharan Africa (SSA). This review will assess the burden and distribution of maternal mental health (MMH) problems in SSA, with the aim to inform the implementation of context sensitive interventions and policies.

Methods and analysis All relevant databases, grey literature and non-database sources will be searched. PubMed, LILAC, CINAHL, SCOPUS and PsycINFO, Google Scholar, African Index Medicus, HINARI, *African Journals Online* and IMSEAR will be searched from inception to 31 May 2023, without language restriction. The reference lists of articles will be reviewed, and experts contacted for additional studies missed by our searches. Study selection, data extraction and risk of bias assessment will be done independently by at least two reviewers and any discrepancies will be resolved through discussion between the reviewers. Binary outcomes (prevalence and incidence) of MMH problems will be assessed using pooled proportions, OR or risk ratio and mean difference for continuous outcomes; all will be presented with their 95% CIs. Heterogeneity will be investigated graphically for overlapping CIs and statistically using the I^2 statistic and where necessary subgroup analyses will be performed. Random-effects model meta-analysis will be conducted when heterogeneity is appreciable, otherwise fixed-effect model will be used. The overall level of evidence will be assessed using Grading of Recommendations Assessment, Development and Evaluation.

Ethics and dissemination Although no ethical clearance or exemption is needed for a systematic review, this review is part of a larger study on maternal mental health which has received ethical clearance from the Ethics Review Committee of the Ghana Health Service (GHS-ERC 012/03/20). Findings of this study will be disseminated through stakeholder forums, conferences and peer review publications.

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STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study uses robust methods, best practices and reporting guidelines to attempt to synthesise evidence on the burden of maternal mental health problems in sub-Saharan Africa to provide country and regional-specific estimates.
⇒ Screening of articles, data extraction and quality assessment will be done using validated tools by at least two independent reviewers to minimise bias.
⇒ The study uses comprehensive search terms and strategy, and involves relevant electronic databases and non-database sources to attempt to retrieve all potentially relevant studies.
⇒ A possible limitation is, there were no previous data to compare our systematic review to.

INTRODUCTION

Maternal mental health (MMH) problems, occurring during pregnancy and postpartum constitute a serious public health problem globally, affecting about 10% of pregnant women and 13% of postpartum mothers.[1–3] A systematic review on global depression among postpartum women estimated prevalence of 17.2% worldwide.[4] In high-income countries, prevalence of postpartum depression ranged from 5% to 20%.[5] Data from 2010 to 2015 Northern Ireland Maternity System indicated that 18.9% of pregnant women reported a history of at least one mental disorder.[6] In the USA, 10% depression in mothers was reported over 12 months.[7] Analysis of Claims data from January to December 2008 involving 38 174 pregnant women in Germany identified at least one mental health problem from four main mental health disorders in 16 639 of the women[8] with somatoform/dissociative

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disorder being 24.2%, anxiety 16.9%, stress reactions 11.7% and depression 9.3% . While reliable data are not readily available, existing estimates suggest that the burden of MMH problems is relatively higher in low-income and middle-income countries (LMICs) with one in four women reporting depression during pregnancy and 1 in five after delivery.[9] A review of evidence from LMICs on prenatal and postnatal depression reported prevalence of 4.9%–50%,[10] whereas a systematic review involving prenatal and postnatal women living in Africa reported prevalence of depression during pregnancy at 11.3% and 18.3% after delivery.[11] Another review in sub-Saharan Africa (SSA) reported 18.6% postpartum depression,[12] with a range from 7% to 50.3%.

The common mental health problems experienced by pregnant and postpartum women are depression and anxiety.[13–16] Depression can be mild, moderate or severe. Mild depression will normally not affect the individual's ability to undertake their day-to-day activities such as self-care and interpersonal relationships, whereas moderate to severe episodes can render the mother less capable of undertaking their basic self-care and that of their newborn babies which could impact on breastfeeding and bonding.[17] Other MMH disorders are postpartum psychosis, pregnancy and postpartum obsessive–compulsive disorder (OCD), birth-related post-traumatic stress disorder (PTSD), intrusive thoughts and mania, schizophrenia, infanticide, substance use disorder, anorexia nervosa, bulimia, suicidal ideation, bipolar affective disorder, paranoia, psychopathy, neurotic disorders and self-harm.[18 19] These disorders may develop as a result of experiences associated with childbirth, foetal loss, congenital malformations, intimate partner violence during pregnancy, lack of partner support, history of abuse, unplanned pregnancy, complications in previous pregnancy, higher perceived stress, lower self-esteem[20–24] and many more. Individuals with predisposition to bipolar affective disorders may develop manic episodes from pregnancy-related stress.[20] Severity of MMH disorders can potentially progresses from mild or moderate to severe forms if not identified early and appropriate intervention instituted.[25 26]

Rationale for this systematic review

Mothers with mental health problems may not be able to realise their abilities, work productively or cope with the normal stresses of life.[3] MMH disorders can have negative effects on both the mother and the child.[27] In severe cases, depressed mothers may have symptoms of a psychosis.[4] Affected mothers often cannot function properly, with some having suicidal tendencies.[3] Evidence shows that MMH problems are associated with negative birth outcomes and may adversely affect cognitive development of the infant,[28 29] nutritional status of their infants[30] and early child well-being.[31] There is, however, limited knowledge to inform policy makers on the burden of MMH disorder in SSA to inform on the selection and implementation of locally relevant, feasible and effective interventions. MMH is an important health problem which should be given the needed attention but this has often been neglected as a health priority.[32–34] There is much evidence that in LMICs, the vast majority of women who experience mental health problems during and after pregnancy do not receive the needed treatment.[1 35] Although few systematic reviews have investigated mental health problems in SSA, none focused specifically on MMH.[36 37] The only review that assessed risk factors for antenatal depression, included only studies conducted in Ethiopia,[36] and although a systematic review protocol has been registered in PROSPERO,[37] it intends to explore the role of MMH disorders and stillbirths.

This review will assess the burden of MMH problems among pregnant and postpartum women in SSA and attempts to provide robust country and regional estimates of the burden of disease across countries in SSA. Specifically, it will determine the prevalence and incidence and describe the sociodemographic characteristics, general obstetric histories and characteristics of women with MMH problems; assess effects of MMH problems on birth outcomes and analyse for differences in the burden of mental health problems among pregnant and postpartum women between rural and urban settings. The review will answer the following specific questions: (1) What is the magnitude of MMH problems among pregnant and postpartum women living in SSA? (2) What are the sociodemographic characteristics of pregnant and postpartum women with mental health problems in SSA? (3) What are the general obstetric histories and characteristics of pregnant and postpartum women in SSA with mental health problems? (4) Is there any difference in the burden of pregnant and postpartum women with mental health problems between rural and urban settings? and (5) Are there any documented effects of birth outcomes of pregnant women with mental health problems?

Review methods

This review protocol has been prepared following the Preferred Reporting Items for Systematic Review and Meta-Analysis extension for protocols (PRISMA-P)[38] (online supplemental file 1) and the PRISMA flow diagram (online supplemental file 2). The full review will be prepared in line with the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA). The full review is expected to start on 1 May 2023, analysis 1 September and completed by 30 November 2023.

Patient and public involvement

The review questions and outcome measures have been developed collaboratively with the relevant patient and consumer involvement and informed by their priorities, experience and preferences in line with GRIPP2 reporting checklists. The review findings will be shared with relevant wider patient communities who will also be involved in the results dissemination.

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Criteria for considering studies for this review

Types of studies

Any study (cohort, case–control and cross-sectional studies) conducted in SSA that assessed burden of MMH problems among pregnant and postpartum women will be eligible for inclusion. This review is not an intervention effectiveness review and randomised controlled trials (RCTs) are not the focus but if a RCT reported baseline number of cases and used a well-defined sample to serve as the denominator to allow the calculation of proportion/prevalence/incidence in pregnant or postpartum women, such an RCT will be eligible for inclusion. Reviews will not be eligible for inclusion. However, we will go through the reviews to identify potentially eligible studies missed by our searches. If the study is a global review having, for example, SSA or subregional subset, we will extract the studies conducted in SSA for inclusion in this review. If the study reported a country or regional estimate without a well-defined sample (representative sample or subsample of the source population), it will not be eligible for inclusion. In cases where the results of a multicountry study have been lumped together and there is no way of disaggregating the data, such studies will not be included. Case studies and case series (these are atypical and not representative of the source population), commentaries or opinions, will not be eligible for inclusion.

Participants

Pregnant and postpartum (postpartum is defined as up to 12 months after delivery) women living in SSA, diagnosed of any mental health disorder (depression, anxiety, postpartum psychosis, bipolar disorders, substance misuse disorders, dysthymia, OCD, PTSD, schizophrenia, infanticide, suicidal ideation, paranoia, psychopathy, neurosis/neurotic disorders, self-harm, anorexia nervosa, bulimia, etc.) will be eligible for inclusion. The tool or criteria for diagnosis should be stated, for example, standard operational diagnostic criteria such as Research Diagnostic Criteria (RDC),[39] the 10th edition of the International Classification of Diseases (ICD-10)[40] or Diagnostic and Statistical Manual of Mental Disorders (DSM-V).[41] Pregnant or postpartum women whose diagnosis of mental health disorder could not be confirmed will be excluded.

Interventions

This systematic review is not intervention review.

Comparison

This is non-comparative review but where outcomes or variables permit comparison, we will attempt to compare.

Outcomes

Primary outcomes

- Burden of MMH problems measured as prevalence, incidence, etc.
- Birth outcomes (maternal and foetal outcomes) up to 12 months postpartum
- Type of MMH conditions (for diagnosed cases)

Secondary outcomes

- Proportion of MMH conditions captured in the community
- Predisposition socio-demographic characteristics of pregnant and postpartum women with mental health problems
- Predisposition obstetric histories and characteristics of pregnant and postpartum women in SSA with mental health problems
- Psychiatric predisposition (pre-existing mental health issues triggered during or after pregnancy).
- Burden of mental health problems among pregnant and post-partum women between rural and urban settings

Search strategy

We will search the following electronic databases: PubMed, PsycINFO, LILAC and CINAHL from inception to 31 May 2023 without language restriction and using the search terms in table 1. We will also search Google Scholar, African Index Medicus, HINARI, *African Journals Online*, IMSEAR and relevant preprint repositories. Grey literature including dissertations and conference proceedings will be searched. Reference list of retrieved articles will be reviewed, and experts in the field of MMH will be contacted for studies not captured by our searches (see table 1 for search strategy developed for PubMed).

The search strategy will be adapted as appropriate for other databases. All searches will be rerun just before the final analyses and any further eligible studies identified will be included.

Study selection

The search output will be managed, collated and deduplicated using EndNote. The deduplicated articles will be exported to Rayyan[42] for screening and selection. At least two reviewers will screen titles and abstracts of identified studies independently using prespecified and piloted eligibility flowchart (figure 1). The full text of potentially relevant studies will also be reviewed independently for inclusion. The PRISMA flow diagram will be used to document the flow of studies and reasons for exclusion. Discrepancies will be resolved through discussion between the reviewers.

Data extraction and management

A validated data extraction sheet adapted from the Cochrane Collaboration (online supplemental file 3) will be used by the reviewers to independently extract relevant data. Data to be extracted include characteristics of the studies such as year study was conducted, year study was published (for published studies), country where study was conducted, study design and sample size; sociodemographic characteristics of the participants (age, setting, socioeconomic status, level of education and occupation); obstetric factors (parity, maternal age, age at first delivery, history of miscarriage and history of stillbirth), mental health conditions (depression, anxiety,

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Table 1 Search strategy for PubMed (to be adapted for the other databases)

Search	Query	Results
#1	Search: ((((((((((((((((((((((((((‘mental health’(Title/Abstract)) OR (‘mental disorder’(Title/Abstract))) OR (‘mental illness’(Title/Abstract))) OR (‘mental problem’(Title/Abstract))) OR (‘chronic mental illness’(Title/Abstract))) OR (‘psychiatric illness’(Title/Abstract))) OR (‘chronic psychiatric illness’(Title/Abstract))) OR (‘chronic insanity’(Title/Abstract))) OR (insanity(Title/Abstract))) OR (‘chronic mental disorder’(Title/Abstract))) OR (‘dementia praecox’(Title/Abstract))) OR (schizophrenia(Title/Abstract))) OR (psychoses(Title/Abstract))) OR (psychosis(Title/Abstract))) OR (‘schizophrenic psychosis’(Title/Abstract))) OR (depression(Title/Abstract))) OR (‘mental sickness’(Title/Abstract))) OR (‘mental disease’(Title/Abstract))) OR (maladjustment(Title/Abstract))) OR (‘emotional disorder’(Title/Abstract))) OR (‘nervous disorder’(Title/Abstract))) OR (‘nervous breakdown’(Title/Abstract))) OR (neurosis(Title/Abstract))) OR (‘neurotic disorder’(Title/Abstract))) OR (psychopathy(Title/Abstract))) OR (paranoia(Title/Abstract))	
#2	Search: ((((((((((((‘pregnant women’(Title/Abstract)) OR (prepartum(Title/Abstract))) OR (peripartum(Title/Abstract))) OR (perinatal(Title/Abstract))) OR (prenatal(Title/Abstract))) OR (antenatal(Title/Abstract))) OR (‘during pregnancy’(Title/Abstract))) OR (postpartum(Title/Abstract))) OR (maternal(Title/Abstract))) OR (maternity(Title/Abstract))) OR (parturient(Title/Abstract))) OR (antepartum(Title/Abstract))) OR (‘post-delivery’(Title/Abstract))) OR (puerperium(Title/Abstract))	
#3	Search: (#1) AND (#2)	
#4	Search: ((‘sub-Saharan Africa’) OR (SSA)) OR (Angola)) OR (Benin)) OR (Botswana)) OR (‘Burkina Faso’)) OR (Burundi)) OR (Cameroon)) OR (‘Cape Verde’)) OR (‘Central African Republic’)) OR (Chad)) OR (Comoros)) OR (Congo)) OR (‘Cote d'Ivoire’)) OR (Djibouti)) OR (‘Equatorial Guinea’)) OR (Ethiopia)) OR (Gabon)) OR (‘The Gambia’)) OR (Ghana)) OR (Guinea)) OR (‘Guinea-Bissau’)) OR (Kenya)) OR (Lesotho)) OR (Liberia)) OR (Madagascar)) OR (Malawi)) OR (Mali)) OR (Mauritania)) OR (Mauritius)) OR (Mozambique)) OR (Namibia)) OR (Niger)) OR (Nigeria)) OR (Rwanda)) OR (‘Sao Tome and Principe’)) OR (Senegal)) OR (Seychelles)) OR (‘Sierra Leone’)) OR (Somalia)) OR (‘South Africa’)) OR (Sudan)) OR (Swaziland)) OR (Tanzania)) OR (Togo)) OR (Uganda)) OR (Zaire)) OR (Zambia)) OR (Zimbabwe)	
#5	Search: (#3) AND (#4)	

postpartum psychosis, dysthymia/persistent depressive disorder, pregnancy and postpartum OCD, birth-related PTSD, intrusive thoughts and mania, schizophrenia, infanticide, substance use disorder, anorexia nervosa, bulimia, suicidal ideation, bipolar affective disorder, paranoia, psychopathy, neurotic disorders and self-harm) and quality domains for the assessment of quality of the included studies for risk of bias (ROB). Data on burden of the disease (such as prevalence, incidence and duration of the MMH problem) will be extracted. The corresponding authors of the primary studies will be contacted for missing data or unclear information. Where it is not possible to obtain the missing information, data will be analysed based on those with complete outcome data and the amount of data missing with reasons will be provided. If necessary, data will be coded and recoded before use in the analysis. The extracted data will be verified independently and any disagreement will be resolved through discussion.

Assessment of quality of the included studies

At least two reviewers will assess quality of the included studies for ROB (methodology and reporting) independently using the appropriate ROB assessment tools. Since this review is not focusing on randomised controlled trials (RCTs), the domains on the Cochrane ROB tool[43] will not be covered fully. Selective outcome and analysis reporting bias (which occurs when studies with positive and significant results are likely to be reported or published) are the domains to be considered on the Cochrane ROB tool. The Cochrane criteria for reporting ROB in the included studies will be used to assess prespecified outcomes of interest. The ROB will be rated as ‘low’ if protocol of the study is available and all prespecified outcomes of interest as specified in the protocol, or the protocol is not available but it is clear that all prespecified and expected outcomes of interest have been reported. The ROB will be rated as ‘high’ for a study if outcomes are not reported as prespecified or expected and ‘unclear’ when there is not enough information to make clear judgement. Other prespecified biases pertaining to the methods, source of funding, etc, will be assessed and rated. The ROB tool for prevalence studies will be assessed using the tool by Hoy *et al*[44] (online supplemental file 4) on four domains: selection bias, non-response bias, measurement bias and bias related to data analysis for prevalence studies. Each ROB domain will be graded as ‘low risk’, ‘high risk’ and ‘unclear’ ROB. Any disagreements will be resolved through discussion between the reviewers, and if necessary, a third reviewer will be consulted.

Data analysis

Binary outcomes will be assessed using OR or risk ratio (RR), and for continuous data, we will use mean difference (MD) or standardised mean difference (SMD) for means that used different scales. Meta-analysis, the statistical component of systematic review, will be used to combine study outcomes. OR, RR and MD of the individual studies will be pooled and presented with their

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Figure 1 Study selection flowchart.

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95% CI. Random-effects model will be used in the meta-analysis when heterogeneity is high, otherwise fixed-effect model will be used. Descriptive statistics will be used to describe proportions (prevalence and incidence).

Heterogeneity and subgroup analysis

Heterogeneity arises because of variation in the study design, characteristics of participants or outcomes between or within studies.[45] Heterogeneity will be investigated both graphically and statistically. The I^2 statistic which describes the percentage of variability that is due to heterogeneity rather than chance will be estimated. The I^2 is classified into four levels: 0%, 1%–29%, 30%–59% and 60%–100%[46] and I^2>50% indicates significant heterogeneity.[47] Subgroup analysis which is used to estimate an effect of indicator within each subgroup or subset will be used to address heterogeneity due to variation in effects in each subgroup mixed-effect model. Thus, the burden of MMH problems will be estimated separated for urban and rural and for each age group. Subgroup analysis will also be done for gestational age and postpartum period. If we find sufficient number of studies, subgroup analysis will also be based on perinatal mental disorder type, study design, parity and location.

Grading the evidence

The overall evidence of the systematic review will be graded using Grading of Recommendations Assessment, Development and Evaluation (GRADE)[48] (available from guidelinedevelopment.org/handbook). The GRADE system assesses the following domains: ROB, imprecision, inconsistency, indirectness and publication bias, and classifies the quality of evidence as high, moderate, low and very low. If evidence from a study is graded high quality, it implies further research is very unlikely to change the confidence in the estimate of effect while a grading of very low quality implies an estimate of effect is very doubtful.

ETHICAL APPROVAL AND DISSEMINATION

Although no ethical clearance or exemption is needed for a systematic review, this review is part of a larger study on MMH that involves primary data collection and which has received ethical clearance from the ethics review committee of the Ghana Health Service (GHS-ERC 012/03/20). The results of the review will be presented to stakeholders (policymakers and practitioners). It will also be disseminated through conferences and peer review publications.

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Contributors Protocol conceptualisation and design: EA, IAA, SK, TM and AD-A. Drafting the work or revising it critically for important intellectual content: EA, IAA, DO, LG, MEA, LY, SGEVA, SA, ACC, SK, TM and AD-A. Acquisition, analysis or interpretation of data: EA, IAA, DO, LG, MEA, LY, SGEVA, SA, ACC, SK, TM and AD-A. Agreement to be accountable for accuracy or integrity of all aspects of the work: EA, IAA, DO, LG, MEA, LY, SGEVA, SA, ACC, SK, TM and AD-A. Final approval of the version to be published: EA, IAA, DO, LG, MEA, LY, SGEVA, SA, ACC, SK, TM and AD-A. Supervised this work: AD-A.

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Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting or dissemination plans of this research. Refer to the Methods section for further details.

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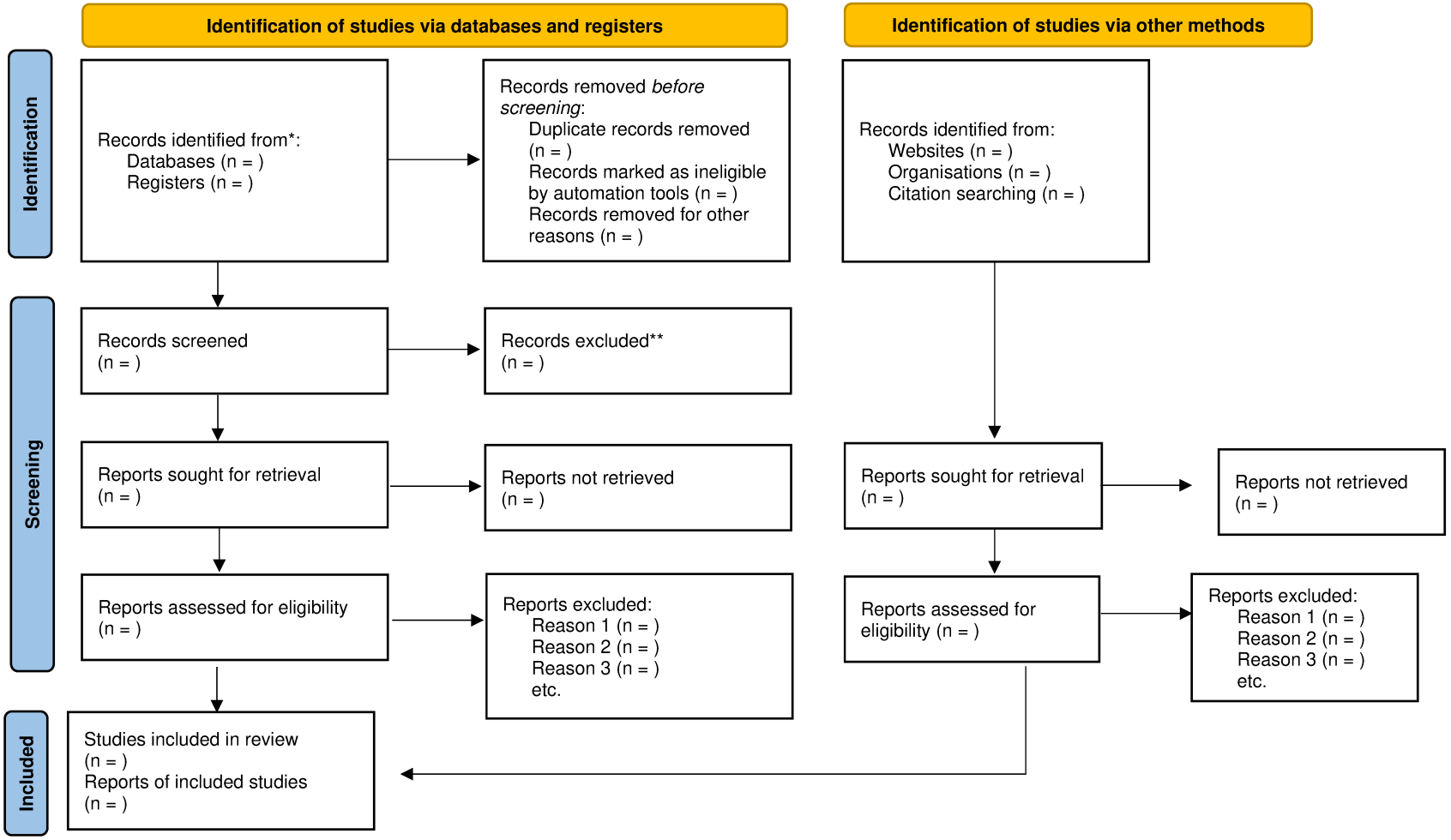
Supplemental file 1 Preferred Reporting Items for Systematic review and Meta-Analysis Protocols (PRISMA-P) checklist*

Section and topic	Item No	Checklist item
ADMINISTRATIVE INFORMATION		
Title:		
Identification	1a	Identify the report as a protocol of a systematic review
Update	1b	If the protocol is for an update of a previous systematic review, identify as such
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number
Authors:		
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments
Support:		
Sources	5a	Indicate sources of financial or other support for the review
Sponsor	5b	Provide name for the review funder and/or sponsor
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol
INTRODUCTION		
Rationale	6	Describe the rationale for the review in the context of what is already known
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)
METHODS		
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated
Study records:		
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale

Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesized
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)

* It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.

Supplemental file 2 PRISMA flow diagram



Supplemental file 3 Data extraction sheet (adapted from Cochrane)

1. General Information		
1. **Date form completed** *(dd/mm/yyyy)*		
2. **Name/ID of person extracting data**		
3. **Report title** *(title of paper/ abstract/ report that data are extracted from)*		
4. **Publication type** *(e.g. full report, abstract, letter)*		
5. **Study ID** *(e.g. 01 plus surname of first author and year first full report of study was published e.g. Adjuik 2018)*		
6. **Country in which the study conducted**		
7. **Study funding source** *(including role of funders)*		
8. **Possible conflicts of interest** *(for study authors e.g. not reported)*		
9. Study Characteristics	**Review Inclusion Criteria** *(as defined in the Protocol)*	**Location in Text** *(page#)*
10. **Type of study**		
11. **Population description**		
12. **Focused diseases / conditions**	*Maternal mental disorders*	
13. **Types of outcome measures**	*Prevalence/incidence/risk ratios, odds ratios/mean difference/proportions*	
14. **Population description** *(from which study participants are drawn)*		
15.. **Source/setting of the population** *(e.g. urban, rural)*		
16. **Method/s of recruitment of participants**		
17. **Aim of study**		
18. **Design** *(e.g. cross-sectional study, cohort study, case-control study etc)*		
19. **Sampling technique** *(e.g. random or convenience)*		
20. **Study start date**		

21. **Study End date/duration** *(if any cohort)*		
22. **Notes:**		
23. **Total number of participants/Sample size**		
24. **Age group**		
25. **Parity**		
26. **Status of mother**	Pregnant, Post-partum	
27. **Outcomes** *(physical/observation examination: who examined?)*		
28. **Self-reported reported outcomes** *(detected by questionnaire/Tools: validated or non-validated?)*		
29. **Outcome names** *(depression, anxiety, psychosis, Birth Related Posttraumatic Stress Disorder, etc)*		
30. **Time points measured** *(report the start month/year/specify whether from start and end of intervention)*		
31. **Time points reported**		
37. **Outcome definition** *(e.g. whether standard case definition used)*		
32. **Type of measurement (***Percentage/Odds ratio/Risk ratio)*		
33. **Is outcome/tool validated?** *(Yes/No/Unclear/Not mentioned)*		
34. **Subgroup** *(if any, e.g. age-specific prevalence reporting)*		
35. **Results**		
36. **Response/non-response rate**		
37. **Any other results reported**		
38. **Unit of analysis** *(e.g. by individuals)*		
39. **Statistical methods used and appropriateness of these methods** *(e.g. proportion/%s, RR/OR)*		

40. **Whether results weighted?** ***(e.g. Yes/No)***		
41. **Any other results reported**		
42. **Unit of analysis** ***(e.g. by individuals)***		
43. **Statistical methods used and appropriateness of these methods** ***(e.g. proportion/%s, RR/OR)***		
44. **All systematic and random error adjusted?** ***(e.g. confounding, effect medication etc.)***		
45. **Strength of study**		
46. **Limitation**		
47. **Strategies to overcome the limitation**		
48. **Key conclusions of study authors**		
49. **Notes:**		

Supplemental file 4 Quality assessment checklist for prevalence studies (adapted from Hoy et al., 2012)

Name of author(s): Year of publication: Study title:		
Risk of bias items	**Risk of bias levels**	**Points scored**
1. Was the study's target population a close representation of the national population in relation to relevant variables, e.g. age, sex, occupation?	**Yes** (**LOW RISK**): The study's target population was a close representation of the national population.	0
	No (**HIGH RISK**): The study's target population was clearly NOT representative of the national population.	1
2. Was the sampling frame a true or close representation of the target population?	**Yes** (**LOW RISK**): The sampling frame was a true or close representation of the target population.	0
	No (**HIGH RISK**): The sampling frame was NOT a true or close representation of the target population.	1
3. Was some form of random selection used to select the sample, OR, was a census undertaken?	**Yes** (**LOW RISK**): A census was undertaken, OR, some form of random selection was used to select the sample (e.g. simple random sampling, stratified random sampling, cluster sampling, systematic sampling).	0
	No (**HIGH RISK**): A census was NOT undertaken, AND some form of random selection was NOT used to select the sample.	1
4. Was the likelihood of non-response bias minimal?	**Yes** (**LOW RISK**): The response rate for the study was ≥75%, OR, an analysis was performed that showed no significant difference in relevant demographic characteristics between responders and non- responders	0
	No (**HIGH RISK**): The response rate was <75%, and if any analysis comparing responders and non-responders was done, it showed a significant difference in relevant demographic characteristics between responders and non-responders	1
5. Were data collected directly from the subjects (as opposed to a proxy)?	**Yes** (**LOW RISK**): All data were collected directly from the subjects.	0
	No (**HIGH RISK**): In some instances, data were collected from a proxy.	1

6.Was an acceptable case definition used in the study?	**Yes** (**LOW RISK**): An acceptable case definition was used.	0
	No (**HIGH RISK**): An acceptable case definition was NOT used	1
7. Was the study instrument that measured the parameter of interest (e.g. prevalence of low back pain) shown to have reliability and validity (if necessary)?	**Yes** (**LOW RISK**): The study instrument had been shown to have reliability and validity (if this was necessary), e.g. test-re- test, piloting, validation in a previous study, etc.	0
	No (**HIGH RISK**): The study instrument had NOT been shown to have reliability or validity (if this was necessary).	1
8. Was the same mode of data collection used for all subjects?	**Yes** (**LOW RISK**): The same mode of data collection was used for all subjects.	0
	No (**HIGH RISK**): The same mode of data collection was NOT used for all subjects.	1
9.Were the numerator(s) and denominator(s) for the parameter of interest appropriate	**Yes** (**LOW RISK**): The paper presented appropriate numerator(s) AND denominator(s) for the parameter of interest (e.g. the prevalence of low back pain).	0
	No (**HIGH RISK**): The paper did present numerator(s) AND denominator(s) for the parameter of interest but one or more of these were inappropriate.	1
10. Summary on the overall risk of study bias	**LOW RISK**	0-3
	MODERATE RISK	4-6
	HIGH RISK	7-9