

**Conceptualization of pregnancy-associated maternal morbidity in research Studies: A systematic review protocol**

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**Review question / Objective** The overarching aim of this research is to determine how pregnancy-associated morbidity has been conceptualized in published literature. To this end, we have the following specific objectives:

- (a) To determine what terms have been used to describe pregnancy-associated morbidity and how the use of these terms vary over time and by country income level.
- (b) To ascertain inconsistencies in definitions based on duration of pregnancy and post pregnancy period.

- (c) To demonstrate variations in the use of indicators of morbidity by professional organizations and by researchers.

- (d) To explore the accuracy of the use of established terminology such as 'severe maternal morbidity' and 'maternal near miss' in terms of included component indicators.

**Rationale** Maternal Mortality has been used historically as an indicator of maternal health globally. Although maternal mortality remains an important measure, it only represents the most severe end of the spectrum of adverse pregnancy-related outcomes. Many individuals have severe pregnancy related morbidity that does not result in death but could still have consequences for their

functioning and well-being. Currently, there are several definitions and frameworks being used to describe maternal morbidity. For example, the World Health Organization (WHO) has defined potentially life-threatening conditions and maternal near miss events, while the United States' Centers for Disease Control and Prevention and the Canadian Perinatal Surveillance System have included different sets of indicators to define the concept of Severe Maternal Morbidity. These inconsistencies and the lack of universally recognized terminology to describe the severity of non-fatal pregnancy complications has resulted in considerable variation in the use of terminology in the published literature, which makes it challenging to compare the burden of pregnancy-related morbidity across studies, health systems, and countries. The aim of this study is to map how maternal morbidity has been described in literature and examine patterns in terms and use. These findings could inform future efforts to develop/adopt a standardized definition of maternal morbidity.

**Condition being studied** Pregnancy-related adverse events such as severe maternal morbidity, maternal near miss, severe acute maternal morbidity, and adverse pregnancy outcomes.

## METHODS

**Search strategy** A comprehensive search strategy combining database specific controlled vocabulary and keywords was developed in collaboration with a medical information specialist. The following terms were included in the search: severe maternal morbidity, SMM, severe acute maternal morbidity, maternal near death, maternal morbidity, perinatal morbidity, obstetric outcome, life-threatening, serious unwanted event, maternal mortality, and maternal death. These were combined with terms related to definitions, terminology, indicator, outcome, condition, characteristic, criteria, guideline, classification, organization, and association. These concepts were then combined with pregnancy-related subject headings and text-words. The search strategy was adapted for each database by using the appropriate controlled vocabulary and database-specific syntax.

**Participant or population** Pregnant Individuals in any clinical, community, or health system setting.

**Intervention** Not applicable.

**Comparator** Not applicable.

**Study designs to be included** We will include any study presenting original data on pregnancy-related morbidity or Pregnancy-related adverse events that report a term to describe maternal morbidity and list included indicators. We will exclude case series reporting <5 pregnancies, conference abstracts, editorials and commentaries with insufficient data.

**Eligibility criteria** Inclusion Criteria: Studies will be eligible if they describe maternal morbidity or a related term describing pregnancy-related adverse maternal events and published in English Language.

Exclusion Criteria: Studies that focus only on a particular condition such as 'venous thromboembolism related morbidity'; will be excluded.

**Information sources** The following four bibliographic databases were searched from inception to August 20, 2025: Ovid MEDLINE, Ovid Embase, EBSCO Cumulative Index to Nursing and Allied Health Literature (CINAHL), and VHL Latin American and Caribbean Literature on Health Sciences (LILACS). Additional searches will be done through Google and Google Scholar to capture articles that are not available in the aforementioned databases.

**Main outcome(s)** The outcomes will include describing (i) the original terms used by study authors to describe maternal morbidity or pregnancy-related adverse maternal events and how the use of these terms vary over time and by country income level; (ii) the time period of pregnancy and post pregnancy period within each definition (iii) the variations in the use of maternal conditions or indicators included within each definition and (iv) the accuracy of the use of established terminology such as 'severe maternal morbidity' and 'maternal near miss' in terms of included component indicators.

**Additional outcome(s)** Not applicable.

**Data management** Records identified through the search will be imported into DistillerSR Software. Two reviewers will screen Titles/ abstracts and full texts independently according to eligibility criteria. Any discrepancies between reviewers will be resolved through discussion and when necessary, consultation with a senior reviewer. The selection process will be depicted using a Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) Flow Diagram.

**Quality assessment / Risk of bias analysis** We will not perform risk-of-bias assessment of the included studies as the aim of the study is to include all published terms, indicators and definitions describing maternal morbidity, with inclusion of studies with various study designs, regardless of study quality.

**Strategy of data synthesis** We will extract data using a pre-piloted data extraction form on study title, study design, study period, year of publication, country or region, study scope, country income classification, duration of follow-up, use of established versus researcher-defined definitions, and whether fetal or neonatal outcomes are included within definitions of maternal morbidity. For researcher-defined terms, the number of included conditions or indicators will be recorded. For all terms, individual maternal outcomes will be extracted separately and verbatim as reported by the study authors. into a separate field exactly as reported by the researchers. Ten percent of the studies will be extracted by two reviewers in duplicate to ensure consistency and accuracy.

A descriptive synthesis will be conducted. Extracted data will be summarized using 1) frequencies and percentages to describe the terms used /types of definitions applied, 2) a visual component of outcomes, and 3) a world cloud of different terms used to describe maternal morbidity. Trends in terminology over time will be assessed using publication year. Trends will also be examined by country/region, and by country income classification. The use of different definitions (WHO maternal near miss criteria, Centers for Disease control and Prevention Severe Maternal Morbidity Indicators, and researcher defined definitions) will be summarized by study period, and country income classification. The findings will be presented based on the PRISMA guidelines.

**Subgroup analysis** No Subgroup analysis is planned.

**Sensitivity analysis** Not applicable.

**Language restriction** No language restrictions were imposed in the search strategy. However, since terminology varies considerably across different languages, only articles published in English will be included.

**Country(ies) involved** Canada and India.

**Other relevant information** Not applicable.

**Keywords** Maternal morbidity; severe maternal morbidity; maternal near miss; pregnancy complications; adverse pregnancy outcomes; maternal health; terminology; scoping review.

**Dissemination plans** The findings of this review will be disseminated through publication in a peer-reviewed journal and will also be shared through academic conferences, presentations, and stakeholder discussions related to maternal health measurement and standardization.

#### **Contributions of each author**

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