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The Prevalence and Risk Factors of Postpartum Depression among Saudi Arabian Women – A Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

Support - N/A.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 21 May 2025 and was last updated on 21 May 2025.

INTRODUCTION

Review question / Objective Research question: What is the prevalence of postpartum depression among Saudi Arabian women and what are the associated risk factors?

Research objective: The prevalence of postpartum depression among women in Saudi Arabia. The risk factors associated with the development of postpartum depression in this population.

Rationale Postpartum depression (PPD) is a critical public health issue with profound consequences for maternal and infant well-being. In Saudi Arabia, individual studies have reported varied prevalence rates and identified diverse risk factors, yet no systematic synthesis exists. The absence of a comprehensive review limits the ability to inform policy, clinical practice, and future research. This systematic review and meta-analysis aims to estimate the pooled prevalence

and identify risk factors of PPD among Saudi women using validated screening tools.

Condition being studied Postpartum Depression (PPD) is a serious and common mood disorder that affects women after childbirth. Unlike the short-lived "baby blues," PPD can persist for months, impairing a mother's ability to function and bond with her infant. It is marked by symptoms such as sadness, anxiety, sleep disturbances, fatigue, and in severe cases, suicidal thoughts. Symptoms usually begin in the early postpartum period but can develop anytime within the first year after delivery.

PPD arises from a combination of hormonal, psychological, social, and obstetric factors. Risk factors commonly reported in the literature include a prior history of depression or anxiety, lack of social support, unplanned pregnancy, intimate partner violence, and birth complications.

Globally, the prevalence of PPD varies widely. High-income countries report prevalence rates between 10%–20%, while rates are often higher in low- and middle-income settings. In the Middle East and North Africa (MENA) region, including Saudi Arabia, stigma and cultural norms may contribute to underreporting and underdiagnosis.

Although several studies in Saudi Arabia have assessed PPD, findings are inconsistent, with wide variation in prevalence and risk factors. This variability stems from differences in regional populations, study designs, screening tools (e.g., EPDS, BDI, DSM criteria), and diagnostic cut-offs. As a result, there is currently no nationally representative prevalence estimate or unified understanding of PPD risk factors in the country.

This systematic review and meta-analysis aims to address this evidence gap by synthesizing data from existing studies to determine the pooled prevalence of PPD and identify its associated risk factors among women in Saudi Arabia. The review will apply rigorous eligibility criteria and validated screening tools. The findings will support healthcare professionals and policymakers in improving screening, prevention, and intervention strategies to enhance maternal mental health services nationwide.

METHODS

Search strategy The following electronic databases were searched for peer-reviewed articles published up to March 30th, 2025:

PubMed/MEDLINE Web of Science ProQuest EBSCOHost

The search strategy was designed using a combination of Medical Subject Headings (MeSH) and free-text keywords related to postpartum depression, prevalence, risk factors, and Saudi Arabia. Boolean operators ("AND," "OR") were used to combine search terms to generate search strings used in each database: "mothers", "females", "women", "postpartum", "puerperium", "post-birth", "postnatal", "post birth", "depressive", "depression", "PPD", "depressed", "prevalence", "spread", "risk factors", "factor", "risk", "screening", "Saudi Arabia", and "Saudi". The identified articles were subjected to a study selection process, as per the PRISMA guidelines, and as specified by predefined inclusion and exclusion criteria.

Participant or population Postpartum women residing in Saudi Arabia, regardless of age, parity, or region.

Intervention N/A.

Comparator N/A.

Study designs to be included Original observational studies—including cross-sectional, case-control, and cohort designs—that report on the prevalence and/or risk factors of postpartum depression among women in Saudi Arabia using validated screening tools will be included. Non-original works and studies not isolating PPD as a distinct condition will be excluded.

Eligibility criteria (i) include postpartum women residing in Saudi Arabia, regardless of age, parity, or region; (ii) include studies assessing risk factors potentially associated with postpartum depression; (iii) include studies reporting on the prevalence of postpartum depression and/or identifying risk factors associated with PPD using validated screening tools (e.g., Edinburgh Postnatal Depression Scale, Beck Depression Inventory, DSM criteria); (iv) be written in the English language.

Information sources Electronic Databases: A comprehensive search was conducted in four major databases—PubMed/MEDLINE, Web of Science, ProQuest, and EBSCOHost.

Manual Reference Screening: The reference lists of all included studies and relevant reviews were manually screened to identify additional studies not captured through database searches.

Language and Publication Restrictions: Only studies published in English were considered. Grey literature—including dissertations, conference abstracts, commentaries, and editorials—was excluded to ensure methodological rigor and data reliability.

Author Contact: If key data were missing or unclear in eligible articles, attempts were made to contact study authors to request clarification or additional information.

Main outcome(s) The primary outcome of this review was the prevalence of postpartum depression (PPD) among women residing in Saudi Arabia. This was measured as a pooled proportion (%) with corresponding 95% confidence intervals (Cls), using a random-effects meta-analysis model to account for between-study heterogeneity.

Timing of assessment varied across studies but generally occurred within the first year postpartum.

The secondary outcome was the identification of risk factors associated with PPD. These were extracted and synthesized from eligible studies that used validated screening tools such as the Edinburgh Postnatal Depression Scale (EPDS), Beck Depression Inventory (BDI), and DSM criteria. Risk factors were reported using effect estimates where available (e.g., odds ratios, adjusted odds ratios) and described in terms of frequency and consistency across studies. Key risk factors identified included poor social support, young maternal age, cesarean delivery, and a personal or family history of depression.

Subgroup analyses were conducted based on geographical regions and EPDS cut-off scores, revealing significant regional variations in prevalence. The findings underscore the heterogeneity of PPD burden within Saudi Arabia and support the need for context-specific prevention and intervention strategies.

Additional outcome(s) Outcome: Statistically significant variation in PPD prevalence across regions in Saudi Arabia (Eastern: 16%, Western: 26%, Central: 37%, Southern: 62%).

Outcome: 32 distinct risk factors were identified, some of which appeared more frequently or consistently across studies.

Data management To ensure accuracy, transparency, and reproducibility throughout the review process, a structured data and records management system were implemented using Microsoft Excel.

All records retrieved from the database searches (PubMed, Web of Science, ProQuest, and EBSCOHost) were exported into Microsoft Excel to facilitate citation organization and automatic removal of duplicates. Once deduplicated, the unique set of references were exported into Microsoft Excel, where the screening, selection, and data extraction processes were managed. Data files were stored on secure cloud storage, with regular backups to prevent data loss.

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During the screening phase, two independent reviewers will use Excel to review titles and abstracts according to the pre-established eligibility criteria. Each entry will be marked as "include," "exclude," or "uncertain." For full-text screening, reasons for exclusion were documented in a designated column. Discrepancies were resolved through discussion or with the involvement of a third reviewer. A PRISMA flow diagram was used to document the number of records at each stage of the review.

For data extraction, a standardized form was created and piloted in Excel. This form captured key variables, including study characteristics, population demographics, prevalence of postpartum depression (PPD), screening tools and cut-off scores used, risk factors, and effect measures (e.g., odds ratios, confidence intervals). Two reviewers extracted data independently, and all extracted data were cross-verified for consistency and accuracy.

Data files were stored on secure cloud storage, with regular backups to prevent data loss. All data management procedures were documented to ensure traceability and facilitate reproducibility. The final dataset were archived and can be made available upon request after publication.

Quality assessment / Risk of bias analysis To ensure the credibility and transparency of the findings in this systematic review and metaanalysis, the methodological quality and risk of bias of all included studies were assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Tools.

Strategy of data synthesis A random-effects meta-analysis was conducted using R (v4.4.2) to calculate the pooled prevalence of postpartum depression (PPD) with 95% confidence intervals. Proportions were logit-transformed before pooling and back-transformed for reporting. Heterogeneity was assessed using I² and Cochran's Q. Risk factors were synthesized narratively and pooled when appropriate. Subgroup analyses (e.g., by region, screening tool, EPDS cut-off) and sensitivity analyses (excluding high-risk studies) were conducted. Publication bias was assessed if \geq 10 studies were included.

Subgroup analysis Subgroup analyses were conducted to explore potential sources of heterogeneity in the prevalence estimates of postpartum depression (PPD) across studies. Specifically, two key subgroup variables were examined: geographical region within Saudi Arabia and the cut-off score used in the Edinburgh Postnatal Depression Scale (EPDS).

For the regional subgroup analysis, studies were categorized based on the location where data were collected: Central, Western, Eastern, and Southern regions of Saudi Arabia. The purpose of this analysis was to determine whether differences in cultural norms, healthcare infrastructure, or social support systems across regions might contribute to variations in reported PPD prevalence. Separate meta-analyses were performed for each region using a random-effects model to calculate regionspecific pooled prevalence estimates. Notable differences in prevalence were observed across regions, indicating that location may be an important moderating factor.

A second subgroup analysis was performed based on the EPDS cut-off scores were used in the included studies. Since different studies adopted different thresholds (primarily cut-offs of \geq 10 and \geq 13) to identify probable cases of PPD, this analysis assessed whether the choice of cut-off influenced prevalence rates. Pooled estimates were calculated separately for each cut-off subgroup. The results demonstrated that studies using a lower cut-off tended to report higher prevalence, reflecting increased sensitivity at the expense of specificity.

These subgroup analyses provided insight into methodological and contextual factors that may account for variability across studies and enhanced the interpretability of the pooled findings.

To assess publication bias, funnel plots were generated for visual inspection of symmetry. These methods helped determine whether smaller studies with non-significant or low-prevalence findings were underrepresented in the published literature, which could lead to overestimation of pooled prevalence.

All subgroup and publication bias analyses were conducted using R software (version 4.4.2). Results from these analyses were used to guide sensitivity testing and interpretation of heterogeneity in the final meta-analytic outcomes.

Sensitivity analysis Sensitivity analyses were conducted to assess the robustness of the pooled prevalence estimates of postpartum depression (PPD) and the consistency of identified risk factors. The primary analysis involved excluding studies rated as having a high risk of bias, defined as

meeting less than 50% of the Joanna Briggs Institute (JBI) quality appraisal criteria.

Language restriction Data published in English was used in the study.

Country(ies) involved Saudi Arabia.

Other relevant information n/a.

Keywords Prevalence, Risk factors, Postpartum depression (PPD), Saudi Arabia.

Dissemination plans The findings will be published as a systematic review and metaanalysis in peer-reviewed journal.

Contributions of each author

Author 1 - Mohamed Zarroug - Mohammed Zarroug led the conceptualization of the study, contributed to the methodology development and was responsible for implementing the software used in the analysis. He also participated in the validation of the data and results, contributed to data visualisation, and assisted in reviewing and editing the manuscript.

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Author 2 - Mohammed F. Altaf - Mohamed F. Afzal contributed to the development of the study methodology, participated in the validation of included data and findings, and was actively involved in the investigation process. He also reviewed and confirmed the accuracy of the formal analysis.

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Author 3 - Safwaan Shaikh - Safwaan Shaikh contributed to the study methodology, participated in the validation of findings, and was involved in the investigation of included studies. He supported the review's design and contributed to ensuring the accuracy and integrity of the data and analysis. Email: smshaikh@alfaisal.edu

Author 4 - Abdousabour Tidjani - Abdousabour Tidjani contributed to the study methodology and participated in the validation of extracted data and findings. He was actively involved in the investigation process, supporting the identification and analysis of relevant studies.

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Author 5 - Omnia Bashir - Omnia Bashir contributed to the development of the methodology, participated in the validation of study data and findings, and was involved in the investigation of included studies.

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Author 7 - Hana K Abdalla - Hana K. Abdalla contributed to the study methodology, participated in the validation of results, and was actively involved in the investigation of included studies. She also contributed to the review and editing of the manuscript.

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Author 8 - Samah H. O. Zarroug - Samah H. O. Zarroug led the conceptualization of the study, contributed to the development of the methodology, and participated in formal analysis, data curation, and validation. She was responsible for the original draft preparation, contributed to writing—review and editing, and assisted in data visualization. She also supervised the project and. Email: szarroug@alfaisal.edu