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Clinical signs and symptoms preceding eclampsia: A systematic review of associated warning features

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ABSTRACT

Eclampsia is a life-threatening complication of pregnancy that may occur without previously recognized hypertension, and early recognition of women at imminent risk remains difficult. An earlier systematic review found that no single symptom accurately predicted eclampsia, but newer studies have since been published. This systematic review aimed to synthesize evidence on clinical signs and symptoms preceding eclampsia while distinguishing symptom frequency, association, and predictive accuracy. Following PRISMA 2020, PubMed and SagePub were searched on July 6, 2026 for original studies published in English between 2013 and 2026, with eligibility defined using the PICOS framework. Two reviewers independently screened records and extracted data, and risk of bias was assessed with the Joanna Briggs Institute checklists. Seven observational studies from Ethiopia, Ghana, Italy, the United States, South Africa, and Pakistan were included; five were at moderate and two at high risk of bias. Among women with eclampsia, headache (75–88%), visual disturbances (47–65%), and epigastric or right upper quadrant pain (18–46%) were the most frequent manifestations. In the only comparative study of symptoms, these were associated with eclampsia compared with preeclampsia (odds ratio [OR] = 2.56, 5.73, and 2.25, respectively), whereas limb jerking, altered mental state, impaired speech, and confusion showed stronger associations (OR = 20.5–42.0). Younger maternal age, multiple pregnancy, and assisted reproductive technology were also associated with eclampsia. No study reported sensitivity, specificity, or discrimination, and the certainty of evidence for associations was low to very low. These symptoms are warning signs associated with eclampsia rather than validated stand-alone predictors and should prompt assessment of blood pressure, laboratory findings, and maternal risk factors.

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INTRODUCTION

Eclampsia is a life-threatening obstetric complication characterized by new-onset seizures in association with preeclampsia, although seizures may occur without previously recognized hypertension or classical manifestations of preeclampsia (Rabi et al., 2020). Hypertensive disorders of pregnancy remain a major global cause of maternal morbidity and mortality, accounting for approximately 16% of maternal deaths worldwide, equivalent to around 42,000 deaths in 2023 (ACOG, 2020b; Sun et al., 2025). Preeclampsia affects approximately 3–8% of pregnancies globally, while a recent systematic review and meta-analysis estimated the pooled prevalence of eclampsia at 0.43% (95% CI, 0.19–0.76%), with substantial variation between geographical regions and a higher burden in low-income settings (Akre et al., 2022; Vera-Ponce et al., 2025).

The central clinical problem is that eclampsia is difficult to anticipate. In a recent individual-participant-data meta-analysis of multicountry surveillance cohorts, only 42% of women with eclampsia had been diagnosed with preeclampsia before the first seizure, and approximately one-third had their first seizure postpartum (MacDonald et al., 2022; Salvi et al., 2026). In a Ghanaian tertiary hospital, only 12.9% of women with eclampsia had a prior diagnosis of preeclampsia (Beyuo et al., 2022). Magnesium sulfate more than halves the risk of eclampsia among women with preeclampsia (Phipps E et al., 2016), but this benefit depends on identifying women at imminent risk early enough to treat them (Laskowska, 2023). In practice, clinicians therefore rely heavily on prodromal symptoms, most commonly headache, visual disturbances, and epigastric or right upper quadrant pain, as warning signs (American College of Obstetricians & Gynecologists, 2022; Magee et al., 2022).

What is already known about these symptoms comes mainly from two systematic reviews. Headache, visual disturbances, and epigastric pain had low sensitivity and poor discrimination for adverse maternal outcomes of preeclampsia (area under the curve 0.58–0.74), but eclampsia was not analysed as a separate outcome (Thangaratinam et al., 2011). Hastie et al. (2019) pooled 11 mostly retrospective studies (5,829 women, 1,018 with eclampsia) and concluded that none of the commonly reported symptoms accurately predicted imminent eclampsia or ruled it out when absent; most included studies were at high risk of bias and were limited to the classic symptoms. What remains unknown is whether more recent studies, including prospective comparative data that evaluated a broader range of neurological symptoms and studies from low- and middle-income countries where the burden of eclampsia is highest, change this conclusion, and whether any study has progressed from reporting how often symptoms occur to reporting genuine predictive performance (An et al., 2016).

This systematic review therefore aimed to synthesize evidence published from 2013 to 2026 on clinical signs and symptoms occurring before eclampsia, explicitly distinguishing between (i) the frequency of symptoms among women with eclampsia, (ii) their association with eclampsia compared with women without eclampsia, and (iii) their predictive accuracy. The year 2013 was chosen as the starting point because the American College of Obstetricians and Gynecologists Task Force on Hypertension in Pregnancy revised the diagnostic criteria for preeclampsia in that year, removing the requirement for proteinuria and recognizing new-onset cerebral or visual disturbances as severe features (ACOG, 2013); studies published after this point therefore share a more comparable diagnostic framework. By separating frequency, association, and predictive value and by appraising the risk of bias of each study, this review clarifies what the current evidence can and cannot support in clinical practice and identifies the gaps that future prediction research must address.

RESEARCH METHOD

Design and Registration

This systematic review was conducted and reported in accordance with the PRISMA 2020 statement (Page et al., 2021). The review protocol was not prospectively registered in PROSPERO or another registry; the eligibility criteria, search strategy, and synthesis plan were defined before the search was conducted, and the absence of registration is acknowledged as a limitation.

Review Question and Eligibility Criteria

The review question was: among pregnant or postpartum women, which clinical signs and symptoms occur before eclampsia, how strongly are they associated with eclampsia, and what is their reported predictive accuracy? Eligibility was defined using the PICOS framework. *Population:* pregnant or postpartum women with preeclampsia, eclampsia, or other hypertensive disorders of pregnancy, or obstetric populations in which eclampsia was ascertained. *Index factors (exposures):* clinical signs or symptoms present before the first seizure (e.g., headache, visual disturbances, epigastric or right upper quadrant pain, neurological symptoms, and blood pressure) and maternal clinical characteristics. *Comparator:* women without eclampsia (with preeclampsia or normotensive) where available; descriptive studies of women with eclampsia without a comparator were also eligible. *Outcomes:* eclampsia, reported as the frequency of preceding signs and symptoms, measures of association (odds ratio [OR], risk ratio [RR], or adjusted estimates with 95% confidence intervals [CI]), or measures of predictive accuracy (sensitivity, specificity, likelihood ratios, or area under the curve). *Study design:* original observational studies (cohort, case-control, or cross-sectional) published in English between January 2013 and July 2026. Studies were excluded if they were reviews, editorials, letters, case reports, or conference abstracts; did not contain original data on women with eclampsia or severe hypertensive disease; did not report signs, symptoms, or clinical characteristics present before seizure onset; lacked sufficient data to extract frequencies or effect estimates; were duplicate publications; or had no identifiable DOI (to ensure traceability).

Information Sources and Search Strategy

PubMed and SagePub (SAGE Journals) were searched on July 6, 2026. The PubMed search used the following string: ("predictive" OR "prediction" OR "predictability") AND ("value" OR "values") AND ("signs" OR "diagnosis") AND ("symptoms" OR "symptom") AND ("preceding" OR "preceded") AND ("eclampsia"). The same keyword combination was adapted to the SagePub search interface. Filters were applied for publication period (2013–2026), English language, and original research articles. No other databases, grey literature sources, or trial registries were searched. The full strategy is reported to allow replication.

Study Selection

Records from each database were exported to EndNote. Two reviewers independently screened titles and abstracts against the PICOS criteria, and potentially eligible records were retrieved and assessed in full text independently by the same reviewers. Records from both databases were pooled after title and abstract screening, and duplicates were then removed in EndNote. Disagreements at any stage were resolved by discussion, with a third reviewer consulted when consensus could not be reached. As shown in Figure 1, 347 records were identified (PubMed n = 271; SagePub n = 76). After the publication-period, language, and article-type filters were applied, 86 records remained (65 and 21, respectively), and 24 were retained after title and abstract screening (17 and 7). After removal of 6 duplicates, 18 full-text reports were assessed, of which 11 were excluded because they did not meet the eligibility criteria, leaving 7 studies for inclusion.

Data Extraction

Two reviewers independently extracted data using a standardized form, and discrepancies were resolved by discussion. Extracted items were first author, publication year, country, setting, study design, study period, population and sample size, comparison group, method and timing of

symptom ascertainment, signs and symptoms reported, effect measures (OR, adjusted OR [aOR], or RR with 95% CI), covariates included in adjusted analyses, and any measures of predictive accuracy. Where an estimate or confidence interval was not reported in the published article, it was recorded as not reported (NR).

Risk of Bias and Certainty of Evidence

Risk of bias was assessed independently by two reviewers using the Joanna Briggs Institute (JBI) critical appraisal checklists appropriate to each design (analytical cross-sectional, cohort, and case-control) (Moola et al., 2020). Judgements were summarized across five domains relevant to the review question: selection of participants, ascertainment of signs and symptoms (including whether they were recorded before or after the seizure), identification of and adjustment for confounders, measurement of the outcome and completeness of data, and an overall judgement of low, moderate, or high risk of bias. The certainty of the evidence for each main finding was appraised using the principles of the GRADE approach (Guyatt et al., 2008), starting at low certainty for observational evidence and downgrading for risk of bias, inconsistency, indirectness, and imprecision.

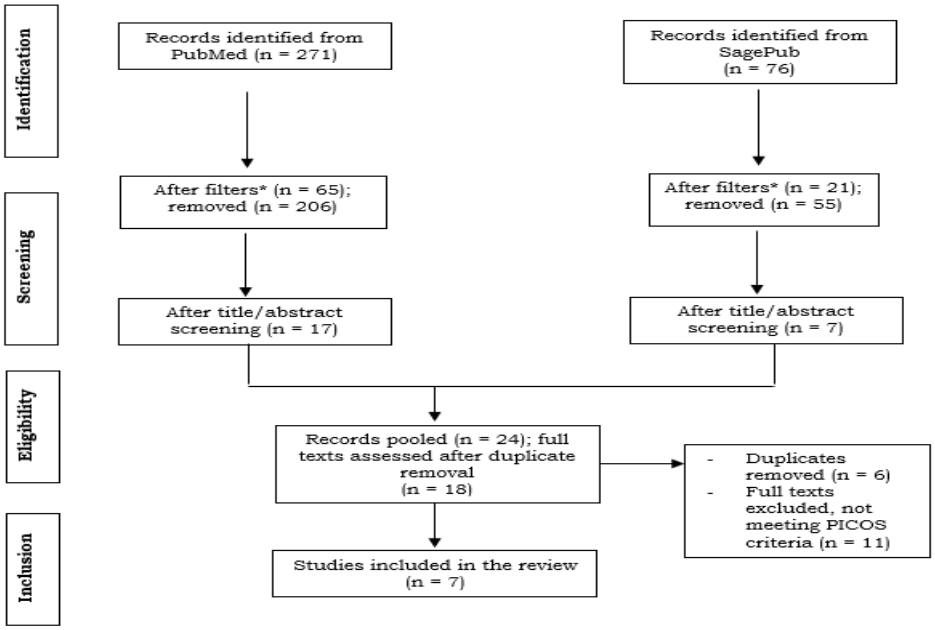


Figure 1. PRISMA 2020 flow diagram of study selection. *Filters: publication period 2013–2026, English language, and original research articles

Synthesis

Because the included studies differed in population, design, comparison group, outcome definition, and effect measure (proportion, OR, aOR, and RR), and because no two studies reported the same effect estimate for the same symptom against a comparable control group, a meta-analysis was not appropriate. Findings were therefore synthesized narratively following the Synthesis Without Meta-analysis (SWiM) guideline (Campbell et al., 2020) and grouped into three levels of evidence: (1) frequency of symptoms among women with eclampsia, (2) association between symptoms or maternal characteristics and eclampsia, and (3) predictive accuracy. The term "predictor" was reserved for factors with reported predictive performance; factors supported only by frequency or association data are described as associated clinical features or warning signs.

RESULTS AND DISCUSSIONS

Study Characteristics

Seven observational studies published between 2017 and 2026 were included (Table 1): three from Ethiopia (Bekele & Melese, 2023; Gudu, 2017; Kidanemariam et al., 2025), one each from Ghana (Beyuo et al., 2022), Italy (Maraschini et al., 2022), and the United States (Dongarwar et al., 2021), and one two-country study from South Africa and Pakistan (Hastie et al., 2026). Designs comprised four cross-sectional studies (one based on retrospective chart review), one prospective case-control study, one prospective population-based cohort, and one retrospective cohort using national birth data. Sample sizes ranged from 93 women with eclampsia to national birth populations. Only one study compared a broad range of symptoms between women with and without eclampsia (Hastie et al., 2026); two described symptoms only among women who had already had eclampsia (Kidanemariam et al., 2025); three reported maternal or obstetric characteristics associated with eclampsia (Maraschini et al., 2022); and one examined factors associated with adverse perinatal outcomes among women with severe preeclampsia or eclampsia and therefore provides only indirect evidence (Melese et al., 2019).

Table 1. Characteristics and main quantitative findings of the included studies

Study (country)	Design; setting	Population (n)	Comparator	Main quantitative findings	Adjusted analysis
Gudu, 2017 (Ethiopia)	Prospective cross-sectional; one general hospital, 2014–2015	93 women with eclampsia	None	≥1 prodromal symptom 79.0% (73/93): headache 75%, visual disturbance 47%, epigastric/RUQ pain 18%. Only 26% (19/73) sought care before the seizure; rural residence OR 12.0 (95% CI 3.6–42) and illiteracy OR 3.5 (1.1–11) for not seeking care	Yes, for care-seeking only
Melese et al., 2019 (Ethiopia)	Cross-sectional; three referral hospitals, 2018	456 women with severe preeclampsia or eclampsia	Not applicable (outcome: perinatal)	Adverse perinatal outcome 46.5% (95% CI 42.2–51.1). Unable to read/write aOR 6.6 (1.32–10.03); nulliparity aOR 8.3 (6.27–27.02); gestational age 20–27 weeks aOR 9.6 (2.00–18.65); late drug administration aOR 3.8 (1.81–8.07)	Yes (multivariable logistic regression)
Dongarwar et al., 2021 (United States)	Retrospective cohort; national birth data, 1989–2018	US births, singleton and multiple gestations	Singleton gestations	Multiple gestation associated with approximately threefold higher odds of eclampsia; maternal age, BMI, and race/ethnicity also associated (95% CI NR in accessible text)	Yes (multivariable)
Maraschini et al., 2022 (Italy)	Prospective population-based cohort (national surveillance), 2017–2020	109 eclampsia cases among 741,516 births	Births without eclampsia	Incidence 1.5 per 10,000 births (95% CI 1.2–1.8). Multiple pregnancy RR 4.51 ($p < 0.001$); assisted reproductive technology RR 3.03 ($p < 0.001$); 95% CI NR	No (crude RR)

Study (country)	Design; setting	Population (n)	Comparator	Main quantitative findings	Adjusted analysis
Beyuo et al., 2022 (Ghana)	Cross-sectional with prospective clinical data; one tertiary hospital	1,176 women with severe preeclampsia or eclampsia; 116 (9.9%) with eclampsia	Severe preeclampsia without eclampsia	68.7% antepartum; 12.9% previously diagnosed with preeclampsia. Age < 20 years aOR 2.75 (1.10–6.89); twin pregnancy aOR 2.59 (1.26–5.32); age ≥ 35 years aOR 0.32 (0.15–0.67); obesity aOR 0.44 (0.25–0.77); chronic hypertension aOR 0.38 (0.17–0.86)	Yes (multivariable logistic regression)
Kidanemariam et al., 2025 (Ethiopia)	Retrospective cross-sectional (chart review); one tertiary hospital, 2017–2021	240 women with eclampsia	None	Prevalence 1.1% (95% CI 1.0–1.2). Headache 77.5%, visual disturbance 53.8%, epigastric/RUQ pain 46.3%; 63.8% antepartum, 26.7% postpartum; 20.4% normotensive at presentation	Yes, for maternal and perinatal outcomes only
Hastie et al., 2026 (South Africa and Pakistan)	Prospective case-control; three tertiary hospitals, 2018–2023	341 eclampsia; 1,355 preeclampsia; 389 normotensive	Preeclampsia (primary); normotensive (secondary)	Eclampsia vs preeclampsia, OR (95% CI): headache 2.56 (1.81–3.62); visual disturbance 5.73 (4.44–7.39); epigastric pain 2.25 (1.76–2.89); limb jerking 42.03 (23.66–74.68); altered mental state 33.60 (21.39–52.78); impaired speech 33.12 (19.46–54.37); confusion 20.52 (14.22–29.63). Sensitivity, specificity, and AUC not reported	Post hoc only (age, BMI, country): aOR 1.8–6.3 for classic and 9.33–40.98 for novel symptoms

aOR, adjusted odds ratio; AUC, area under the curve; BMI, body mass index; CI, confidence interval; NR, not reported; OR, odds ratio; RR, risk ratio; RUQ, right upper quadrant

Risk of Bias and Certainty of Evidence

Risk-of-bias judgements are summarized in Table 2. Five studies were judged to be at moderate and two at high overall risk of bias; none was at low risk. The most common concerns were ascertainment of symptoms after the seizure had occurred, which introduces recall and ascertainment bias and prevents confirmation that symptoms truly preceded the seizure (Gudu, 2017; Hastie et al., 2026; Kidanemariam et al., 2025); the absence of a comparison group without eclampsia in the two descriptive studies; and reliance on unadjusted estimates (Hastie et al., 2022; Maraschini et al., 2022). Applying GRADE principles, the certainty of evidence was low to very low for the associations of symptoms and maternal characteristics with eclampsia (observational designs, risk of bias, and, for symptoms, a single comparative study). Certainty for predictive accuracy could not be rated because no included study reported it.

Table 2. Risk-of-bias assessment of the included studies (JBI critical appraisal checklists)

Study	JBI checklist	Selection	Symptom/ exposure ascertainment	Confounding	Outcome/ data completeness	Overall	Main concern
Gudu, 2017	Analytical cross-sectional	Moderate	High	High	Low	High	Symptoms elicited after seizure; no non-eclampsia comparator

Study	JBI checklist	Selection	Symptom/ exposure ascertainment	Confounding	Outcome/ data completeness	Overall	Main concern
Melese et al., 2019	Analytical cross-sectional	Low	Not applicable	Low	Moderate	Moderate	Outcome is perinatal; indirect to review question
Dongarwar et al., 2021	Cohort	Low	Moderate	Moderate	Moderate	Moderate	Birth-certificate data; possible misclassification of eclampsia
Maraschini et al., 2022	Cohort	Low	Low	High	Low	Moderate	Crude risk ratios without adjustment
Beyuo et al., 2022	Analytical cross-sectional	Moderate	Moderate	Low	Low	Moderate	Single tertiary referral population
Kidanemariam et al., 2025	Analytical cross-sectional	Moderate	High	High	Moderate	High	Retrospective charts; missing records; no comparator
Hastie et al., 2026	Case-control	Moderate	Moderate	Moderate	Low	Moderate	Recall after seizure; differential recall periods; mainly unadjusted

JBI, Joanna Briggs Institute. Overall judgement: low, moderate, or high risk of bias

Frequency of Signs and Symptoms Among Women with Eclampsia

Prodromal symptoms were common among women with eclampsia. Gudu (2017) reported at least one prodromal symptom in 79.0% of 93 women, most often headache (75%), visual disturbance (47%), and epigastric or right upper quadrant pain (18%); only 26% of symptomatic women sought care before the seizure. Kidanemariam et al. (2025) reported headache in 77.5%, visual disturbance in 53.8%, and epigastric or right upper quadrant pain in 46.3% of 240 women, and Hastie et al. (2026) reported corresponding frequencies of 88.0%, 65.1%, and 41.9% among 341 women with eclampsia. These proportions describe how often symptoms occur in women who have already had eclampsia; they do not indicate how often women with the same symptoms go on to develop eclampsia and therefore cannot be interpreted as predictive values. Indeed, the same symptoms were also common among women with preeclampsia who did not develop eclampsia (headache 74.1%, visual disturbance 24.6%, and epigastric pain 24.3%) (Hastie et al., 2026).

Association with Eclampsia

Only Hastie et al. (2026) estimated the association between symptoms and eclampsia against a comparison group. Compared with women with preeclampsia, headache (OR 2.56; 95% CI 1.81–3.62), visual disturbance (OR 5.73; 4.44–7.39), and epigastric pain (OR 2.25; 1.76–2.89) were associated with eclampsia. Much larger associations were observed for less commonly assessed neurological symptoms, including limb jerking or twitching (OR 42.03; 23.66–74.68), altered mental state (OR 33.60; 21.39–52.78), impaired speech (OR 33.12; 19.46–54.37), and confusion (OR 20.52; 14.22–29.63). These estimates were largely unadjusted; in a post hoc model adjusted for maternal age, body mass index, and country, the associations persisted (aOR 1.8–6.3 for the classic symptoms and 9.33–40.98 for the novel symptoms). Because symptoms were elicited after the seizure, some neurological features, particularly altered mental state and confusion, may reflect the early ictal or post-ictal phase rather than a true prodrome, and their temporal relationship with seizure onset could not be confirmed. Clinicians may also have started magnesium sulfate in women with classic symptoms, which could have attenuated the observed associations.

For maternal characteristics, younger maternal age (< 20 years; aOR 2.75; 95% CI 1.10–6.89) and twin pregnancy (aOR 2.59; 1.26–5.32) were associated with eclampsia among women with severe hypertensive disease in Ghana, whereas maternal age ≥ 35 years, obesity, and chronic hypertension were inversely associated (Beyuo et al., 2022). Multiple pregnancy was also associated with eclampsia in Italy (RR 4.51) and the United States (approximately threefold higher odds), and conception by assisted reproductive technology was associated with eclampsia in Italy (RR 3.03) (Dongarwar et al., 2021; Maraschini et al., 2022). Melese et al. (2019) examined factors associated with adverse perinatal outcomes rather than with eclampsia itself and therefore contributes only indirect evidence.

Predictive Accuracy

None of the seven studies reported sensitivity, specificity, predictive values, likelihood ratios, or the area under the receiver operating characteristic curve for any sign or symptom, and none developed or validated a multivariable prediction model. Hastie et al. (2026) explicitly stated that their study was not designed as a diagnostic prediction study. The evidence identified in this review therefore supports statements about frequency and association but not about predictive performance.

Heterogeneity Between Studies

Heterogeneity across studies was substantial and occurred at several levels. Populations ranged from women who had already had eclampsia (Gudu, 2017; Kidanemariam et al., 2025) and women with severe hypertensive disease (Beyuo et al., 2022; Melese et al., 2019) to whole birth populations (Dongarwar et al., 2021; Maraschini et al., 2022) and a three-group case-control sample (Hastie et al., 2026). Designs included descriptive cross-sectional, cohort, and case-control studies. Outcomes differed (occurrence of eclampsia, presence of prodromal symptoms, care-seeking, and adverse perinatal outcomes), as did the methods of measurement (structured interview after the seizure, retrospective chart review, birth-certificate data, and active surveillance) and the effect measures reported (proportions, crude OR, aOR, and RR). Settings ranged from national surveillance systems in high-income countries to single referral hospitals in low-resource settings. This clinical and methodological heterogeneity, together with the lack of more than one study reporting the same effect estimate against a comparable control group, was the reason a meta-analysis was not performed.

Discussion

This review indicates that headache, visual disturbances, and epigastric or right upper quadrant pain are frequent among women with eclampsia and are associated with eclampsia compared with preeclampsia, but that no study published since 2013 has demonstrated their predictive accuracy. This is consistent with the earlier systematic review by Hastie et al. (2019), in which pooled sensitivities were 56% for headache, 35% for visual disturbances, and 29% for epigastric pain, and with Thangaratinam et al. (2011), who found poor discrimination of maternal symptoms for complications of preeclampsia (Roberts, 2024). The present review adds three points. First, newer comparative data suggest that neurological symptoms beyond the classic triad, such as limb jerking, altered mental state, and impaired speech, show much stronger associations with eclampsia, although they are less common and their temporality is uncertain (Hauspurg & Jeyabalan, 2022). Second, studies from low- and middle-income countries show that most women with eclampsia had no prior diagnosis of preeclampsia and that few symptomatic women sought care before the seizure (Beyuo et al., 2022; Gudu, 2017), indicating that the weakness of symptom-based recognition lies not only in the symptoms themselves but also in timely access to assessment. Third, the transition from symptom frequency to validated prediction has not yet occurred: the evidence base still consists of observational studies at moderate to high risk of bias.

Clinically, these symptoms should be regarded as warning signs that warrant prompt evaluation rather than as stand-alone predictors (ACOG, 2020a). New-onset headache, visual

disturbance, epigastric or right upper quadrant pain, or any neurological symptom in a pregnant or postpartum woman should prompt repeated blood pressure measurement, neurological examination, laboratory assessment (platelet count and renal and liver function), and fetal assessment, consistent with current guidelines (Magee et al., 2022; Rabi et al., 2020). Conversely, the absence of symptoms does not exclude imminent eclampsia, because some women have no recognizable prodrome and many have no prior diagnosis of preeclampsia. Angiogenic markers such as the sFlt-1:PlGF ratio have shown value for the short-term prediction of preeclampsia (Harald et al., 2026), but whether combining such markers with symptoms improves the prediction of eclampsia specifically was not evaluated in any included study.

Limitations

This review has several limitations. Only two databases (PubMed and SagePub) were searched, and the search string combined several concepts with the Boolean operator AND, which may have reduced sensitivity; relevant studies indexed only in Embase, Scopus, CINAHL, Web of Science, or regional databases, as well as grey literature, may have been missed. Restriction to English-language publications may have introduced language bias, and publication bias could not be assessed formally because fewer than ten studies were included and no meta-analysis was performed. The protocol was not prospectively registered, which increases the risk of selective reporting. Risk-of-bias judgements depended on the reporting quality of the included articles, and some confidence intervals were not available in the published text. At the level of the evidence, the included studies were observational, frequently collected symptoms after seizure onset, rarely compared women with and without eclampsia, and did not report predictive accuracy, and one study (Melese et al., 2019) addressed perinatal outcomes rather than eclampsia. The findings should therefore be interpreted as describing associations, not predictive capability.

Implications for future research

Future research should use prospective, multicentre cohorts of women with hypertensive disorders of pregnancy in which symptoms are assessed in a standardized way before any seizure, with documented timing of symptoms, serial blood pressure, laboratory findings, and treatment. Such studies should report sensitivity, specificity, likelihood ratios, and discrimination, and should develop and externally validate multivariable prediction models that integrate symptoms, maternal characteristics, blood pressure, laboratory parameters, and, where feasible, angiogenic biomarkers, particularly in low- and middle-income countries where the burden of eclampsia is highest.

CONCLUSION

Within the limits of seven observational studies at moderate to high risk of bias, with considerable heterogeneity and a search restricted to two databases, headache, visual disturbances, and epigastric or right upper quadrant pain are common among women with eclampsia and are associated with eclampsia compared with preeclampsia, while neurological symptoms such as limb jerking, altered mental state, and impaired speech show stronger associations. However, none of these symptoms has been shown to be an independent or validated predictor, and no included study reported predictive accuracy. These manifestations should therefore be treated as important warning signs that prompt immediate clinical, blood pressure, and laboratory assessment, not as stand-alone tools to predict or exclude eclampsia. A validated prediction model suitable for widespread clinical practice is not yet available, and its development is the main research priority.

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