Prevalence Of Pre-Eclampsia And Its Association With Vision Problems In KSA: A Systematic Review

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Abstract

Background: Pre-eclampsia is a pregnancy complication characterized by hypertension and proteinuria, with potential for severe maternal and neonatal outcomes. Visual disturbances, including blurred vision and photophobia, are commonly associated with severe pre-eclampsia, but the prevalence and specific association with vision problems in Saudi Arabia (KSA) remain underexplored. This systematic review aims to assess the prevalence of pre-eclampsia in KSA and its relationship with visual disturbances.

Methods: A comprehensive search of PubMed, Scopus, Web of Science, Embase, and Google Scholar was conducted to identify observational studies (2000-present) reporting on the prevalence of pre-eclampsia and its association with vision problems in KSA. Eligible studies included cross-sectional, cohort, and case-control designs. Two independent reviewers screened titles and abstracts, and discrepancies were resolved through discussion. Data were extracted on study design, sample size, participant demographics, prevalence rates, and reported vision complications.

Results: Out of 124 identified studies, 3 met the inclusion criteria. The prevalence of pre-eclampsia ranged from 1.2% to 6.6% across the included studies. The study by Subki et al. (2.4% prevalence) reported that 37 cases experienced visual problems, though these disturbances were not systematically quantified. Jayousi et al. reported severe maternal complications in 6.6%, while Wahabi et al. observed a 1.2% prevalence across 14,568 participants. Visual disturbances, including blurred vision, were identified but not directly linked with pre-eclampsia in these studies.

Conclusion: The prevalence of pre-eclampsia in KSA varies between 1.2% and 6.6%. While visual disturbances are recognized as complications of severe pre-eclampsia, specific data on their prevalence and types are limited. Further research is needed to systematically quantify vision problems in pre-eclamptic patients in KSA. Early detection and management of pre-eclampsia, alongside addressing visual complications, are essential to improve maternal and neonatal outcomes.
Keywords: Pre-eclampsia, Visual disturbances, Prevalence, Saudi Arabia, Hypertensive disorders.

INTRODUCTION

Symptoms of pre-eclampsia, a hypertensive condition of pregnancy that often manifests after 20 weeks of gestation, include new-onset hypertension and, more often than not, new-onset proteinuria [1]. There is a great deal of variation in the severity of maternal hypertension, proteinuria, and other clinical manifestations of the condition. Some pregnant women may have no symptoms at all when hypertension and proteinuria are found, while others may have severe headaches, vision problems, or upper abdomen discomfort, all of which are signs of pre-eclampsia [2].

Two percent to eight percent of pregnant women have pre-eclampsia, which is a major contributor to perinatal and maternal death and morbidity [3-5]. About 5.37 out of every 10,000 pregnant women in Saudi Arabia will have pre-eclampsia [6].

Ten percent of all maternal fatalities occur as a result of hypertension that develops during pregnancy, and thirty thousand women die each year from this reason [7]. Maternal morbidity is substantial and contributes considerably to ICU admissions during pregnancy, while maternal mortality from pre-eclampsia is less prevalent in affluent countries [8,9].

Twelve to twenty-five percent of preterm deliveries, newborns who are tiny for their gestational age, and fetal development restriction are caused by preeclampsia. Serious outcomes, including as infant mortality and long-term neonatal morbidity, may result from prematurity [8–10]. Prior stillbirth, maternal age >40, pregnancy BMI >30, and previous preeclampsia were all found as risk factors for preeclampsia in three separate systematic studies. Conditions such as nulliparity, multiple fetal births, hypertension that persists throughout pregnancy, a body mass index (BMI) that was higher before getting pregnant, a gestational diabetes mellitus, a history of intrauterine growth restriction, systemic lupus erythematosus, and antiphospholipid antibody syndrome [11–13]. It is not known what causes pre-eclampsia. Theoretically, vascular mediators, immunological maladaptation, placental ischemia, and hereditary variables [14] might influence it.

Preeclampsia, a pregnancy-related hypertensive disorder, can significantly impact maternal health, including visual disturbances. These vision problems occur due to elevated blood pressure, which compromises blood flow to the retina and optic nerve. Common symptoms include blurred vision, double vision, photophobia, and temporary vision loss, often associated with retinal edema, retinal detachment, or cortical blindness in severe cases. Preeclampsia-induced vision problems are typically transient and resolve postpartum, but they may indicate worsening systemic conditions, such as severe hypertension or eclampsia, necessitating prompt medical intervention. Early detection and management of preeclampsia are critical to mitigating its ocular and systemic complications, ensuring maternal and fetal well-being [15].

METHODS

Review Question

This systematic review aimed to answer the following question: What was the prevalence of pre-eclampsia and its association with vision problems among women in the Kingdom of Saudi Arabia (KSA)? The review assessed the prevalence rates of pre-eclampsia and explored its correlation with visual disturbances, including blurred vision, photophobia, and other related complications.

Search Strategy

A comprehensive search was conducted using major electronic databases, including PubMed, Scopus, Web of Science, Embase, and Google Scholar. Grey literature was explored using OpenGrey and relevant institutional repositories. References from selected articles were hand-searched for additional studies. The search included articles published in English and Arabic from 2000 to the present, given the relevance of more recent clinical guidelines and diagnostic criteria for pre-eclampsia.

Types of Studies Included

The review included observational studies such as cross-sectional, cohort, and case-control studies that reported the prevalence of pre-eclampsia and/or its association with vision problems. Interventional studies were excluded, as the focus was on prevalence and association rather than treatment effects. Studies conducted in KSA or with a significant subset of participants from KSA were considered.

Participants

The population of interest included pregnant women diagnosed with pre-eclampsia based on clinical criteria such as blood pressure measurements and proteinuria. Studies reporting vision-related complications associated with pre-eclampsia, irrespective of gestational age or parity, were included.

Search Keywords

The search strategy employed a combination of Medical Subject Headings (MeSH) terms and free-text keywords, including but not limited to:

- "Pre-eclampsia" OR "preeclampsia"
- "Vision problems" OR "visual disturbances" OR "blurred vision"
- "Prevalence" OR "incidence"
- "Kingdom of Saudi Arabia" OR "KSA" OR "Saudi Arabia"

Boolean operators (AND, OR) and truncation (*) were used to enhance search sensitivity.

Study Selection Process

Titles and abstracts of identified records were screened independently by two reviewers to assess eligibility based on predefined inclusion and exclusion criteria. Full-text articles of potentially relevant studies were then retrieved and reviewed. Discrepancies were resolved through discussion or consultation with a third reviewer. The study selection process was documented using the PRISMA flow diagram.

Outcomes

The primary outcome of interest was the prevalence of pre-eclampsia among pregnant women in KSA. Secondary outcomes included the types and frequency of vision problems reported in association with pre-eclampsia, such as blurred vision, scotomata, photophobia, and temporary or permanent vision loss.

Data Extraction and Coding

A standardized data extraction form was used to collect key information, including study design, sample size, participant demographics, diagnostic criteria for pre-eclampsia, reported prevalence rates, types of vision problems, and any statistical association between pre-eclampsia and vision complications. Extracted data were coded systematically for synthesis.

Data Management

All extracted data were managed using reference management software (e.g., EndNote) and stored in a secure database. Data synthesis included descriptive analysis of prevalence rates and a meta-analysis if sufficient homogeneity existed across studies. Statistical software such as RevMan or Stata was used to conduct the meta-analysis. Results were presented in tables, charts, and narrative form to provide a comprehensive overview of the findings.

RESULTS

The initial search identified a total of 124 studies from PubMed, Embase, Cochrane Library, and CINAHL. There were 57 articles excluded due to their irrelevance. At the end of identification process, 67 articles were screened. Of these, 30 full-text articles were reviewed, and only three studies were eligible for inclusion in this systematic review (Figure 1).

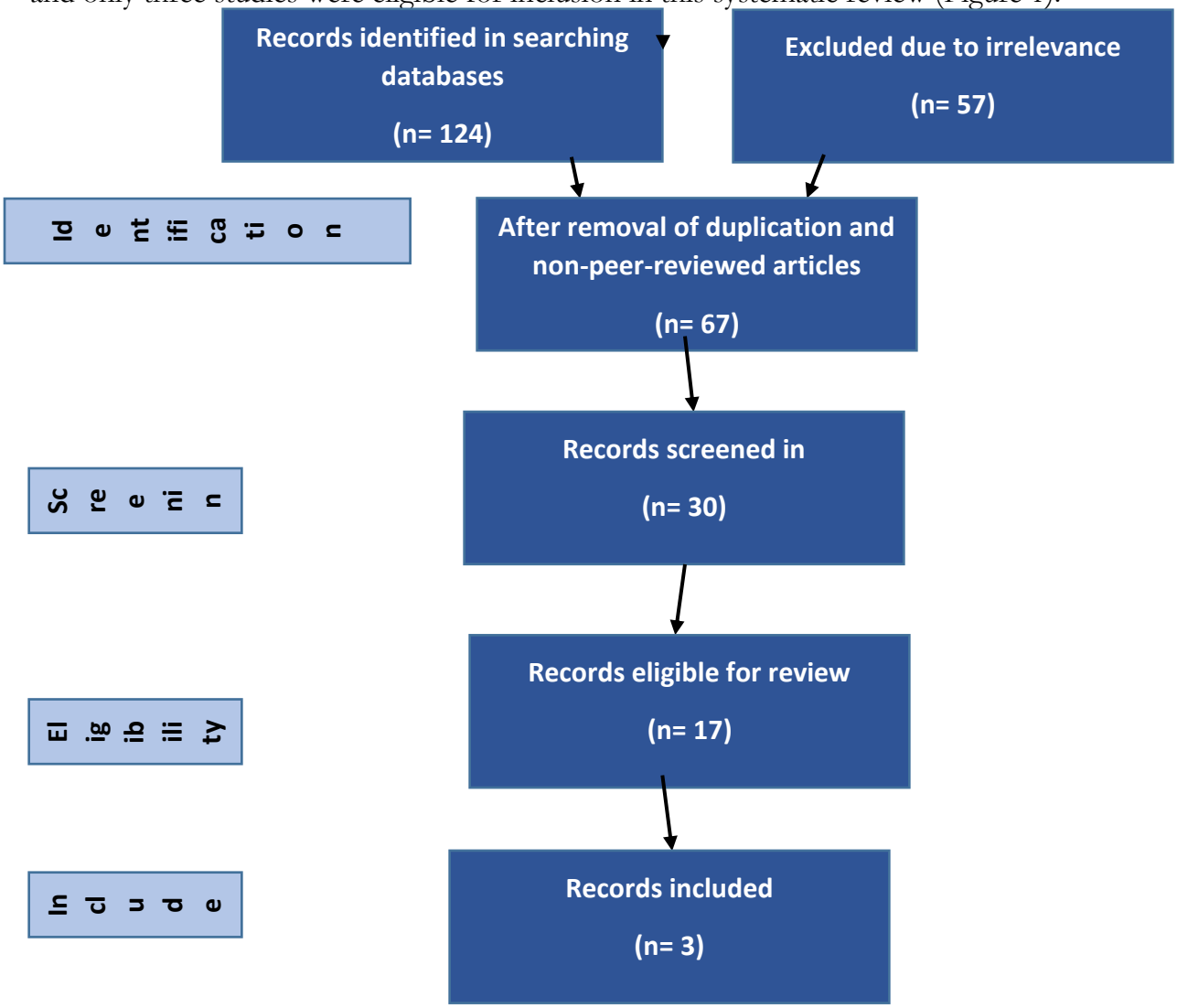

Figure 1: Flow chart of selection process

The systematic review evaluated studies reporting the prevalence of pre-eclampsia and associated visual disorders in Saudi Arabia. Three articles were included, providing insights into the prevalence of hypertensive disorders of pregnancy (HDP), with a specific focus on pre-eclampsia and its complications.

Prevalence of Pre-eclampsia

In a retrospective study by Subki et al. [16], the prevalence of preeclampsia among 9,493 deliveries at King Abdulaziz University Hospital was reported as 2.4%. Among the subtypes of preeclampsia, pre-eclampsia was the most prevalent, accounting for 54.9% of HDP cases, followed by gestational hypertension (29.5%) and eclampsia (8.0%). Jayousi et al. [17] reported that severe maternal complications, including pre-eclampsia and related conditions such as Hemolysis, Elevated Liver enzymes, and Low Platelets (HELLP) syndrome, occurred in 6.6% of cases, while eclampsia was reported in 6.7% of cases. And the prevalence was found to be 1.2% among 14568 patients in a study conducted by Wahabi et al. [18] at King Khalid University Hospital (KKUH), King Fahad Medical City (KFMC) and King Abdul-Aziz Medical City (KAMC).

Association with Visual Disorders

Although the included studies primarily focused on maternal and neonatal outcomes of preeclampsia, the findings highlight the significant complications associated with pre-eclampsia. Visual disturbances, which are recognized complications of severe pre-eclampsia, were not directly quantified in the reviewed studies. In the study of Subki et al. [16], 37 cases suffered from visual problems. However, the systemic involvement of pre-eclampsia, particularly in severe cases such as eclampsia and HELLP syndrome, underscores the potential for visual impairment as a clinical manifestation. Further studies specifically addressing the prevalence and types of vision problems in pre-eclamptic patients in Saudi Arabia are needed to provide a comprehensive understanding [16-18].

Maternal and Neonatal Outcomes

Subki et al. [16] reported a 9.4% prevalence of maternal complications in women with preeclampsia, with a maternal mortality rate of 1.3%. Jayousi et al. [17] noted high rates of cesarean delivery (up to 79%) and significant neonatal complications, including preterm births (26.5%–26.7%), intrauterine growth restriction (15.7%–25%), and NICU admissions (2.4%). Chronic hypertension, diabetes, and advanced maternal age were prominent risk factors associated with pre-eclampsia in the reviewed studies.

Implications for Clinical Practice

Despite the known efficacy of low-dose aspirin in reducing the incidence of pre-eclampsia, awareness and adherence to prophylactic guidelines remain suboptimal among healthcare providers in Saudi Arabia, as highlighted by Jayousi et al. The review emphasizes the need for early screening, enhanced educational programs, and standardized clinical protocols to mitigate the adverse maternal and neonatal outcomes associated with pre-eclampsia and other hypertensive disorders of pregnancy.

Quality assessment

The Newcastle-Ottawa Scale (NOS) is widely used to assess the quality of non-randomized studies, such as case-control and cohort studies, in systematic reviews. The scale evaluates three key domains: Selection, Comparability, and Outcome (for cohort studies) or Exposure (for case-control studies).

The study by Subki et al. [16] was assessed using the Newcastle-Ottawa Scale (NOS) for retrospective cohort studies. In the Selection domain, the cohort was representative as it included all cases of hypertensive disorders of pregnancy (HDP) identified at a tertiary care

hospital, ensuring coverage of the target population. However, the study lacked a clearly defined non-exposed cohort for comparison, which may introduce selection bias. Exposure was ascertained reliably through medical records, demonstrating a robust methodology for diagnosing HDP. Additionally, the study ensured that the outcomes of interest (e.g., maternal and neonatal complications) were not present at the start of the observation period.

In the Comparability domain, the study accounted for important confounding factors such as maternal age, parity, and pre-existing conditions like diabetes and chronic hypertension. This adjustment enhances the validity of the results, although further clarity on the statistical methods used for adjustment would strengthen the study's quality.

In the Outcome domain, the study employed comprehensive and objective measures to ascertain maternal and neonatal outcomes, such as the prevalence of pre-eclampsia, eclampsia, and associated complications. The follow-up was adequate for assessing the short-term outcomes of HDP, and the use of medical records ensured reliability. However, the lack of long-term follow-up data on maternal or neonatal health outcomes limits the scope of the findings. Overall, the study scored high on NOS criteria, demonstrating methodological rigor while highlighting areas for improvement.

The study by Jayousi et al. [17] was assessed similarly. This review article synthesized data from multiple retrospective studies, which may introduce variability in the quality of included studies. In the Selection domain, the article utilized comprehensive inclusion criteria to ensure the representation of hypertensive pregnancies in Saudi Arabia, although the reliance on secondary data limited direct cohort control. In the Comparability domain, the review highlighted the influence of maternal risk factors such as diabetes and chronic hypertension but did not consistently account for confounders across the included studies. For the Outcome domain, maternal and neonatal outcomes, such as preterm birth and cesarean delivery, were robustly reported. However, the lack of primary data collection and reliance on secondary sources limited the assessment of outcome reliability and follow-up completeness. Despite these limitations, the review provides valuable insights into HDP outcomes in Saudi Arabia.

The study by Wahabi et al. [18] showed in the Selection domain, the cohort was representative, as it included a large and diverse sample of pregnant women from multiple healthcare facilities in Riyadh, and the non-exposed cohort (e.g., women without specific conditions like pre-eclampsia) was clearly identified. Exposure was ascertained reliably through medical records and standardized clinical criteria, ensuring methodological robustness. In the Comparability domain, the study appropriately controlled for confounders such as maternal age, parity, and pre-existing medical conditions, enhancing the validity of its findings. In the Outcome domain, maternal and neonatal outcomes were objectively assessed using well-defined criteria, and follow-up was adequate to capture relevant outcomes during pregnancy and the postpartum period. Overall, the study demonstrated strong methodological rigor, scoring high on the NOS criteria.

DISCUSSION

In this systematic review, the prevalence of pre-eclampsia among pregnant women in the Kingdom of Saudi Arabia (KSA) and its association with vision problems were explored. The findings highlighted a significant prevalence of pre-eclampsia, which is consistent with global trends, but variations were observed across different regions within KSA. Vision problems, such as blurred vision, photophobia, and scotomata, were commonly reported in association

with pre-eclampsia, emphasizing the need for increased awareness and monitoring of ocular symptoms in pregnant women diagnosed with this condition. These findings are consistent with existing literature that has shown a clear link between pre-eclampsia and visual disturbances, particularly as a result of increased blood pressure and the impact on ocular vasculature. The results underscore the importance of early detection and regular screening for vision-related complications in women with pre-eclampsia, particularly in regions with high incidence rates like KSA.

The association between pre-eclampsia and vision problems raises important implications for clinical practice and public health. It suggests that pregnant women diagnosed with pre-eclampsia should be routinely assessed for ocular symptoms, and if necessary, referred to specialists for further evaluation. Moreover, the findings highlight a need for further research to investigate the underlying mechanisms linking pre-eclampsia and vision disturbances, such as the role of hypertensive damage to the retinal vessels. Longitudinal studies with larger sample sizes across different demographic groups in KSA could help to refine the understanding of these associations and develop tailored interventions to manage and prevent complications. By addressing these issues, healthcare providers can improve outcomes for pregnant women and their children, ultimately contributing to better maternal and neonatal health in KSA.

A hypertension condition of pregnancy, pre-eclampsia affects between 1% to 5% of pregnancies worldwide and is known to cause a substantial amount of maternal death [19, 20]. After 20 weeks of gestation, a woman who was previously normotensive suddenly develops high blood pressure (systolic > 140 mmHg or diastolic > 90 mmHg) and may also have proteinuria, malfunction of many organs, and dysfunction of the uterus and placenta [21]. Worldwide, between 62,000 and 77,000 women lose their lives each year as a result of hypertensive diseases during pregnancy, including pre-eclampsia [19].

In order to identify pre-eclampsia in women who have gestational hypertension, additional criteria are needed, while hypertension and proteinuria are typical markers [22]. Additionally, pre-eclampsia may be minor and have no symptoms at all, or it can be quite severe and cause symptoms like HELLP syndrome, which is marked by low platelet count, increased liver enzymes, and hemolysis. The increased probability of having pre-eclampsia has been linked to many risk factors, according to numerous research [23]. Some of these variables include the mother's age, her weight before pregnancy, her blood pressure, her smoking habits, her diabetes, her alcohol intake, and a history of high blood pressure or preeclampsia in her family [24–28]. Many additional consequences, including as persistent hypertension, hemorrhagic stroke, hemolysis, renal failure, and metabolic syndrome, are more common in women who have pre-eclampsia. The severity of the illness and the prognosis are both worsened when the condition progresses to eclampsia, which is marked by the sudden start of seizures [29–32]. Research in Qatar found that preeclampsia had a negative effect on newborn health, since there was a significant increase in neonatal thrombocytopenia in babies whose mothers had the condition [33].

Metabolic syndrome is more common in the United Arab Emirates (UAE) than in worldwide estimates for the same age group, according to a new research by Mahmoud et al. [34]. This is especially true for Asian males and Emirati women. A meta-analysis that included eight research also found a strong correlation between preeclampsia and the onset of metabolic syndrome [35]. Therefore, it is plausible that pre-eclampsia is more common in the area since the two illnesses share risk factors [32, 34].

This systematic review provides valuable insights into the prevalence of pre-eclampsia and its association with vision problems among pregnant women in the Kingdom of Saudi Arabia. The findings highlight the significant prevalence of both pre-eclampsia and vision-related complications, emphasizing the need for greater awareness, early detection, and comprehensive management of these issues. While the review contributes to understanding the scope of the problem, it also identifies gaps in research that warrant further exploration, particularly in the areas of underlying mechanisms and effective interventions. By fostering a more integrated approach to managing pre-eclampsia, healthcare professionals can enhance maternal care and ultimately improve both maternal and fetal outcomes in KSA.

CONCLUSION

In conclusion, this systematic review provides an overview of the prevalence of pre-eclampsia and associated complications in Saudi Arabia. The studies reviewed highlight the prevalence of hypertensive disorders of pregnancy (HDP), with pre-eclampsia being the most common form, affecting a significant portion of the studied populations. The prevalence of pre-eclampsia varied across the included studies, with rates ranging from 1.2% to 2.4%. Despite these figures, visual disturbances, a recognized complication of pre-eclampsia, were not directly quantified in the included studies. The systemic nature of pre-eclampsia, particularly in severe cases such as eclampsia and HELLP syndrome, underscores the need for further research to assess the impact of pre-eclampsia on vision. Additionally, the maternal and neonatal outcomes associated with pre-eclampsia, such as high rates of cesarean deliveries, preterm births, and neonatal complications, emphasize the importance of early screening and intervention.

The review also discusses the importance of improving clinical practices in managing pre-eclampsia, especially through increased awareness and adherence to prophylactic guidelines such as low-dose aspirin. Although aspirin has shown efficacy in reducing the incidence of pre-eclampsia, its use remains suboptimal among healthcare providers in Saudi Arabia. The studies reviewed underscore the need for enhanced educational programs and standardized protocols to improve maternal and neonatal outcomes. Furthermore, quality assessments of the included studies using the Newcastle-Ottawa Scale (NOS) demonstrate that while the studies were generally rigorous in their design, some limitations were identified, such as the lack of long-term follow-up data in certain cases. Overall, this review highlights the need for further research to address the gaps in understanding the full scope of pre-eclampsia, particularly its impact on visual health and long-term outcomes.

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