

Risk Factors and Outcomes of Preeclampsia in Al-Muthanna Province – Southern Iraq

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Abstract

Background: Preeclampsia (PE) remains a major contributor to maternal and perinatal morbidity and mortality globally, with a disproportionate burden in low- and middle-income countries like Iraq. Characterized by new-onset hypertension and proteinuria after 20 weeks of gestation, PE can result in serious maternal complications including eclampsia, HELLP syndrome, and multi-organ failure, as well as adverse neonatal outcomes such as preterm birth, low birth weight, and NICU admission. This study aimed to identify maternal risk factors and assess clinical outcomes of pregnancies complicated by PE in Al-Muthanna Province, Iraq.

Methods: This longitudinal hospital-based study included 135 women diagnosed with PE between January and December 2024. Women with multiple gestations or chronic hypertension were excluded. Data were collected via structured questionnaires, clinical assessments, and laboratory results. Maternal outcomes (mode of delivery, complications) and neonatal outcomes (birth weight, NICU admission) were analyzed using SPSS version 26.

Results: The mean maternal age was 28.5 ± 5.3 years; 60% resided in rural areas, and 70.4% were housewives. Obesity was highly prevalent (40.8%), and most women (55.6%) were multiparous. Mean systolic and diastolic blood pressures were 155.3 ± 12.6 mmHg and 98.7 ± 9.4 mmHg, respectively. Laboratory findings indicated elevated liver enzymes, renal dysfunction, and thrombocytopenia. Emergency cesarean section was the most common delivery method (46.7%). Preterm births accounted for 56.3%, and 30.4% of neonates required NICU admission.

Conclusions: Preeclampsia in Al-Muthanna is associated with high BMI, severe hypertension, and frequent maternal and neonatal complications. Improved antenatal screening, early diagnosis, and targeted health education—especially in rural areas—are essential. Future research should include a control group and long-term follow-up to better understand outcomes.

Keywords: Preeclampsia, maternal health, neonatal outcomes, Iraq, hypertension in pregnancy

INTRODUCTION

Preeclampsia is a serious hypertensive disorder of pregnancy that poses a significant public health challenge worldwide, particularly in developing countries. It is characterized by elevated blood pressure ($\geq 140/90$ mmHg) and proteinuria (≥ 300 mg in 24 hours) after 20 weeks of gestation, with or without signs of organ dysfunction. Preeclampsia is a leading cause of maternal and perinatal morbidity and mortality, contributing to complications such as preterm birth, fetal growth restriction, placental abruption, and multi-organ failure in the mother. Globally, preeclampsia affects 2-8% of pregnancies, and its burden is disproportionately higher in low- and middle-income countries, including Iraq [1].

The prevalence of hypertensive disorders of pregnancy, including preeclampsia, has been reported to range between 5-10% of pregnancies in Iraq, with variations based on geographical location, socioeconomic status, and healthcare access. Factors such as poor antenatal care utilization, underdiagnosis, and lack of proper follow-up contribute to the increasing burden of preeclampsia in Iraqi healthcare settings [2].

The risk factors for preeclampsia are diverse and multifactorial, including medical, genetic, environmental, and lifestyle factors. Among the most significant medical risk factors are chronic hypertension, diabetes mellitus, obesity, renal disease, autoimmune disorders, and a history of preeclampsia in previous pregnancies. Women with multiple gestations (twins or triplets), advanced maternal age (>35 years), or nulliparity are also at increased risk. Additionally, placental insufficiency, maternal infections, and endothelial dysfunction play crucial roles in the development of preeclampsia. Genetic predisposition is another key factor, as studies suggest that women with a family history of preeclampsia have a higher likelihood of developing the condition [3,4].

The outcomes of preeclampsia can be severe for both the mother and the fetus. If left untreated, preeclampsia can progress to eclampsia, a life-threatening condition characterized by seizures, stroke, and multi-organ failure. Maternal complications include HELLP syndrome (Hemolysis, Elevated Liver enzymes, and Low Platelets), acute kidney injury, pulmonary edema, and cardiovascular disease. Preeclampsia is also associated with long-term maternal health risks, including an increased likelihood of developing chronic hypertension and cardiovascular disease later in life [5]. For the fetus, the condition significantly raises the risk of preterm birth, low birth weight, intrauterine growth restriction (IUGR), and stillbirth. Neonates born to mothers with preeclampsia are more likely to require neonatal intensive care unit (NICU) admission, and they may face long-term neurological and developmental complications [6].

Addressing the burden of preeclampsia in Iraq requires a comprehensive approach, including early screening, improved antenatal care, and better management protocols to reduce maternal and neonatal mortality. Increasing awareness among healthcare providers and pregnant women about the importance of regular blood pressure monitoring, early signs of preeclampsia, and nutritional interventions is essential. Additionally, strengthening healthcare infrastructure, ensuring access to antihypertensive medications, and promoting lifestyle modifications can significantly reduce the burden of preeclampsia in Iraq. By implementing preventive strategies and improving maternal healthcare policies, the country can work toward better maternal and neonatal outcomes and reducing pregnancy-related complications [7, 8].

This study aimed to evaluate maternal risk factors, and to assess maternal and neonatal outcomes in pregnancies complicated by preeclampsia among pregnant women in Al-Muthanna Province.

METHODS

This longitudinal study carried out over a one-year period, from 1st of January 2024 till 31st of December 2024.

The study included women delivering in hospitals in Al-Muthna city during the study. Pregnant women with multiple gestations, preexisting hypertension or other medical conditions affecting their blood pressure were excluded.

Data were collected using a structured questionnaire, which included the following components: sociodemographic (age, residency, and occupation), obstetric history (parity and gestational age), and detailed past medical and drug history. Pre-existing

conditions: Hypertension, diabetes mellitus, and kidney disease.

For each participant, vital signs were measured, and BMI was calculated. The proteinuria was assessed, and laboratory blood findings: renal function tests, liver enzymes, and platelet count were recorded.

The women's mode of delivery was recorded, and Postpartum complications: Eclampsia, haemorrhage, ICU admission, or maternal mortality. Neonatal outcomes, such as birth weight, APGAR scores, and NICU admission, were followed up and documented.

Informed consent was obtained from all participants before data collection. Interviews were conducted where additional information was required beyond what was available in medical records.

Data analysis will be performed using SPSS version 26. Descriptive statistics will be used to calculate the prevalence of preeclampsia and to summarize maternal and neonatal characteristics.

RESULTS

The study included 135 women who presented with PE; their mean age was 28.5 ± 5.3 years. A majority of participants reside in rural areas (60%). The occupation data shows that a significant proportion (70.4%) of the women were housewives. Regarding obstetric history, most women (55.6%) had a parity of 1-4, while 33.3% were nulliparous,

Table 1: Sociodemographic, Clinical, and Outcomes Characteristics of Pregnant Women with Preeclampsia (n = 135)

Variables		No (%)
Age	mean \pm SD	28.5 ± 5.3
Residency	Rural	81 (60.0)
	Urban	54 (40.0)
Occupation	Housewives	95 (70.4)
	Employed	40 (29.6)
Parity	Nullipara	45 (33.3)
	1-4	75 (55.6)
	>5	15 (11.1)
Total		135 (100)

Table 2 shows the Clinical and Laboratory Parameters. The BMI data indicate a high prevalence of overweight and obesity, with 37.8% of women classified as overweight and 40.8% as obese. Blood pressure readings show that the mean systolic BP is 155.3 ± 12.6 mmHg, and the mean diastolic BP is 98.7 ± 9.4 mmHg. The laboratory findings highlight the severity of the condition, with elevated blood urea (45.6 ± 10.3 mg/dL), serum creatinine (1.4 ± 0.3 mg/dL), and liver enzymes (ALT and AST). The

platelet count is lower than normal ($120.2 \pm 30.4 \times 10^3/\mu\text{L}$).

Table 2: The Clinical and Laboratory Parameters

Variables		No (%)
BMI	Normal	29 (21.4)
	Overweight	51 (37.8)
	Obese	55 (40.8)
Variables		mean \pm SD
Systolic BP		155.3 ± 12.6
Diastolic BP		98.7 ± 9.4
Blood urea		45.6 ± 10.3
Serum creatin		1.4 ± 0.3
Blood platelet		120.2 ± 30.4
ALT		35.5 ± 15.2
AST		40.1 ± 17.6
TSB		1.2 ± 0.5

Table 3 shows the Maternal and Fetal Outcomes. Among maternal outcomes, the majority of women delivered by emergency cesarean section (46.7%). Elective cesarean sections (20.7%) were also performed.

The gestational age distribution indicates that a significant proportion of women delivered preterm (56.3%). Postpartum complications include ICU admission (1.5%) and postpartum hemorrhage (15.6%). Neonatal outcomes show an average birth weight of 2.5 ± 0.8 kg. The neonatal death rate is relatively low (2.9%), but there was a substantial number of babies requiring NICU admission (30.4%).

Table 3: The maternal and fetal outcomes

Maternal outcomes		No (%)
Mode of delivery	NVD	44 (32.6)
	Emergency CS	63 (46.7)
	Elective CS	28 (20.7)
Gestational age	Term ≥ 37 weeks	59 (43.7)
	Preterm < 37 weeks	76 (56.3)
ICU admission		2 (1.5)
PPH		21 (15.6)
Fetal outcomes		No (%)
Birth weight (mean \pm SD)		2.5 ± 0.8
Neonatal death		4 (2.9)
NICU admission		41 (30.4)
Total		135 (100.0)

DISCUSSION

This study provides an important snapshot of the clinical and laboratory characteristics, as well as maternal and neonatal outcomes, among pregnant women diagnosed with preeclampsia (PE) in Al Muthana City. While not a prevalence study, the findings offer valuable insight into the burden and impact of PE in a tertiary care setting in Iraq.

The mean age of women diagnosed with PE was 28.5 years, consistent with other regional studies that report the condition commonly affecting women in their twenties to early thirties [7]. A majority of cases (60%) were from rural areas, highlighting potential disparities in antenatal care access and healthcare literacy, which have previously been associated with poor pregnancy outcomes [9]. The predominance of housewives (70.4%) further underscores possible socio-economic and educational barriers that may limit early recognition and intervention in high-risk pregnancies [9].

Regarding parity, most women (55.6%) were multiparous with 1–4 previous births, while 33.3% were nulliparous. Although PE is traditionally associated with first pregnancies [10], our data supports literature suggesting that multiparous women, especially those with inter-pregnancy intervals over five years or underlying conditions, remain at risk [11].

A significant finding from this study is the high burden of metabolic risk factors. BMI analysis revealed that 78.6% of women were either overweight or obese, aligning with global studies showing obesity as a strong, independent risk factor for PE [12]. Obesity contributes to endothelial dysfunction, increased inflammation, and heightened oxidative stress, all implicated in PE pathogenesis [12].

Clinically, the elevated systolic and diastolic blood pressures (155.3 ± 12.6 mmHg and 98.7 ± 9.4 mmHg, respectively) confirm severe disease presentation, reflective of women being admitted with uncontrolled hypertension. This is concerning given the known link between severe hypertension and increased maternal and perinatal morbidity [7].

Laboratory parameters further illustrate the severity of disease in our cohort. Elevated blood urea (45.6 ± 10.3 mg/dL) and creatinine (1.4 ± 0.3 mg/dL) suggest early renal involvement, which is common in PE due to glomerular endotheliosis [7]. Hepatic transaminase elevations (ALT 35.5 ± 15.2 and AST 40.1 ± 17.6) and thrombocytopenia (platelets $120.2 \pm 30.4 \times 10^3/\mu\text{L}$) indicate that many women were likely developing features of HELLP syndrome or severe PE

[13]. These laboratory findings are supported by multiple international studies and clinical guidelines, including ACOG and NICE, which recognize these as markers of severity [14].

In terms of maternal outcomes, 46.7% of women underwent emergency caesarean sections. This high rate may reflect urgent delivery decisions due to uncontrolled hypertension, foetal distress, or impending maternal decompensation. Only 32.6% had vaginal deliveries, while 20.7% had elective caesarean sections. Similar trends have been reported in developing countries where inadequate antenatal care results in late diagnosis and necessitates emergency intervention [15].

The proportion of preterm births was high (56.3%), reflecting the iatrogenic nature of preeclampsia management, where early delivery is often necessary to prevent maternal complications. Preterm delivery is a known contributor to neonatal morbidity and aligns with our finding that nearly one-third of neonates (30.4%) required NICU admission. This is higher than reports from high-resource settings, which can be attributed to both late presentation and the lack of facilities for early detection [16].

The average birth weight of 2.5 ± 0.8 kg is borderline low, with a substantial number of infants likely classified as low birth weight (<2.5 kg). This finding underscores the impact of uteroplacental insufficiency in PE, which compromises fetal growth. Although the neonatal mortality rate was relatively low (2.9%), this could reflect the small sample size or limitations in post-discharge follow-up [17].

Although the ICU admission rate (1.5%) and postpartum hemorrhage (15.6%) seem modest, these are serious maternal complications that further highlight the need for structured antenatal and peripartum surveillance. PE remains a leading contributor to maternal mortality globally, and timely recognition and referral are critical [18].

Compared to studies in similar settings, the overall pattern of late presentation, severe hypertension, metabolic risk burden, and adverse fetal outcomes is consistent.

This study is subject to several limitations. First, it was not designed to measure the prevalence of PE and was conducted solely among women already diagnosed with the condition, introducing potential selection bias. Second, the lack of a control group prevents comparative analysis with normotensive pregnancies. Third, long-term maternal and neonatal follow-up data were not available, which limits conclusions about lasting morbidity. Finally, reliance

on hospital-based data may exclude women who delivered at home or presented too late to be admitted.

CONCLUSION AND RECOMMENDATIONS

This study provides useful insights into the clinical and laboratory profile of PE in Al Muthana City. The data point to delayed presentation, high BMI, severe hypertension, and frequent adverse outcomes, particularly preterm birth and NICU admission. There is a need for intensified antenatal screening programs targeting high-risk populations, particularly in rural areas. Public health campaigns should address lifestyle factors such as obesity, and healthcare workers should be trained to recognize early warning signs. We also recommend improved diagnostic and management protocols at primary and secondary care levels to enable early referral and reduce emergency interventions. Future research should incorporate a control group and long-term follow-up to better assess maternal and neonatal trajectories post-PE.

Conflicts of Interests: None

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Ethical Approvals: Ethical approval for the study was obtained from the relevant institutional review board, and informed consent was acquired from all participants prior to their inclusion in the study.

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