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Preeclampsia-Related Hypertension: A Growing Concern in Iraq

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Abstract: Preeclampsia was a leading cause to perinatal along with maternal morbidity in the world, then our study focused specifically to study and analyze clinical results related to patients who suffer from preeclampsia-induced hypertension. We performed a cross-sectional study for 68 patients who have preeclampsia at different hospitals in Iraq from March 2024 to March 2025. Iraqi hospital patients' clinical data, including all disease features of diagnosis aspects, antihypertensive treatment, and maternal-fetal outcome, due to that, the current results found that predominantly nulliparous (60.3%) and obese (47.1%) women with severe features (63.2%), where the most prevalent comorbid conditions were chronic hypertension (22.1%) and gestational diabetes (17.6%). It also used antihypertensive was labetalol (66.2%), and 63.2% required magnesium sulfate for seizure prophylaxis. The most prevalent severe maternal complications were postpartum hemorrhage (11.8%) and ICU admission (10.3%), as well as the cesarean section rate was 67.6% in severe preeclampsia (52.2%), neonatal condition was critical at 51.5% low birth weight and 45.6% NICU admission. According to current results, our study indicated of testament to the preeclampsia's overburdening of preeclampsia and its association with excessive maternal complications. It compromised neonatal outcomes, which the extremely high prevalence of recurrent postpartum hypertension underscores the need for long-term follow-up in such patients to avert further negative health outcomes.

Keywords: Preeclampsia; pregnancy; hypertension; antihypertensive medications; and mode of delivery.

INTRODUCTION

A major cause in maternal & perinatal mortality and morbidity, hypertensive pregnancy (HP) is a severe disease category which complicates 5–10% of pregnancies globally (ACOG, 2019). Which preeclampsia is a particularly hazardous illness because of its unpredictable clinical course and propensity for multi-organ failure. It is often identified due to the novo rise in hypertension and proteinuria following 20 weeks of gestation (Bramham, K. *et al.,* 2024; Glover, A. V. *et al.,* 2019), as well as preeclampsia is caused by defective placentation, which results in placental ischemia and the release of anti-angiogenic substances into the mother's bloodstream (Kumar, M. *et al.,* 2021), where vasoconstriction, systemic inflammation, and widespread endothelial injury are triggered by the cascade and can present clinically as hypertension, liver failure, renal impairment, hematologic disruption, and neurological symptoms (American College of Obstetricians and Gynecologists. 2013; Aouache, R. *et al.,* 2018).

Furthermore, it has an equally significant effect on fetal health. Fetal growth limitation, oligohydramnios, as well as placental abruption are the typical outcomes of the aberrant placental environment, which also affects uteroplacental blood flow. In order to prevent severe maternal complications, such as eclampsia, iatrogenic premature birth is typically required, where this exposes the newborn to the immediate risks of prematurity (Redman, C. W. G. 2014; Youn, H. *et al.,* 2017) along with antihypertensive medication and seizure prevention, clinical care of preeclampsia's hypertension presents a therapeutic balancing act, attempting to prolong gestation for the baby' benefit while closely monitoring and preventing an increase in the cumulative risk to the mother (McVittie, C. 2020).

There was still great diversity in presentation and course of the disease, ascertained by a collection of maternal risk factors like nulliparity, age, obesity, concomitant medical illness, and genetic vulnerabilities (Pálinkás, A. *et al.,* 2019). Based on that, our article attempts to evaluate maternal and fetal outcomes in 68 patients having preeclamptic hypertension as a diagnosis.

STUDY SUBJECTS AND METHODS

Study Design and Setting

The study was conducted as a cross-sectional study among 68 patients from different hospitals

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in Iraq. The location was selected due to its high census of complex obstetric cases, being with a high number of hypertensive disorder of pregnancy patients, thereby ensuring a good. Data were pulled for all consecutive deliveries which were the inclusion criteria within a chosen 12-month period, March 2024 - March 2025.

Study Population: Inclusion and Exclusion Criteria

The study population comprised all females who gave birth at ≥20 weeks of gestation in the institution across the study period and had a diagnosis of hypertension associated with preeclampsia.

Inclusion criteria were: (1) Singleton or multiple pregnancy; (2) Preeclampsia without or with severe features. Specifically, this was a systolic blood pressure of ≥140 mm Hg or diastolic blood pressure of ≥90 mm Hg on two occasions at least 4 hours apart after 20 weeks' gestation in a woman who had been previously normotensive, along with accompanying proteinuria (≥300 mg in a 24-hour urine collection or a urine protein/creatinine ratio ≥0.3, or a dipstick reading of 1+ if the other results were unavailable in an urgent situation). In women with pre-existing hypertension, diagnosis required worsening of hypertension with new-onset proteinuria or other evidence of severe features.

Exclusion criteria were: (1) Gestational hypertension (hypertension without proteinuria or other diagnostic criteria for preeclampsia); (2) Chronic hypertension without superimposed preeclampsia; (3) Incomplete medical records in which required outcome data (e.g., delivery data, laboratory data) were not available; (4) Major fetal congenital anomalies that would independently guide obstetric management; and (5) Admission post-delivery to our institution, as antepartum and intrapartum data would be unavailable. A total of 68 patients fulfilled all inclusion and exclusion criteria and formed the ultimate study population.

Data Collection

- All the data were obtained from medical records in different hospitals in Iraq. The collected variables were divided into many fields:
- Maternal History and Demographics: Age of mother, self-identified race/ethnicity (as a social needs indicator), parity, pre-pregnancy Body Mass Index (BMI), and that medical history relevant to this case (chronic hypertension, pregestational diabetes, autoimmune disease, renal disease, multifetal pregnancy, use of assisted reproduction, and cardiac disease/preeclampsia in first-degree family members).
- Preeclampsia Features: Gestational age when diagnosed, type of onset (early-onset <34 weeks vs. late-onset ≥34 weeks), severity level of disease (presence of severe features according to ACOG criteria, as follows: severe-range BP, thrombocytopenia, hepatic dysfunction, renal insufficiency, pulmonary edema, or new-onset neurological/visual disturbances).
- Clinical Management Information: Peak systolic and diastolic pressure taken prior to delivery, all antihypertensive therapy administered (drug name, dose, frequency), magnesium sulfate administered for seizure prophylaxis, and delivery gestational age.
- Delivery Information: Method of delivery (vaginal/cesarean), main reason for cesarean delivery, and postpartum problems.

Maternal Outcomes

The primary maternal outcomes we were concerned with were occurrences of severe maternal morbidity as a consequence of preeclampsia. These antecedently were defined including 1) HELLP syndrome showed a lab diagnosis utilizing the full Tennessee classification system: Hemolysis (abnl peripheral smear, LDH >600 U/L), Elevated Liver enzyme level (AST >70 U/L), Low Platelets (<100,000/μL); 2) placental abruption indicated clinical suspicion confirmed by intraoperative diagnosis or ultrasonographic demonstration of retroplacental clot; 3) postpartum Hemorrhage (PPH) which it measured blood loss to excess of 1000 mL post cesarean section or through vaginal delivery >500 mL, through bleeding that leads to signs/symptoms indicative of hypovolemia; 4) pulmonary edema that determined by clinical presentation (dyspnea, hypoxia, and crackles on auscultation) with radiographic confirmation; 5) Acute Kidney Injury (AKI), it was a rise in serum creatinine by ≥0.3 mg/dL in the first 48 hours or 1.5 times the; admission to ICU, it advised into intensive care unit for management or observation of complications from

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preeclampsia, where these outcome from hypertension was assessed on the day of the 6-week postpartum routine visit and was normotension (<120/80 mm Hg) without antihypertensive treatment.

Neonatal Outcomes

- The outcomes in the neonatal period were recorded in all live births. Neonatal clinical charts provided the data as follows:
- Delivery gestational age in completed weeks.
- Birth weight (in grams), which was also classified as low birth weight (LBW, <2500 g) or very low birth weight (VLBW, <1500 g).
- At 1 and 5 minutes, an APGAR score, less than seven at 5 minutes being assumed to signify neonatal depression.
- Acknowledgment to the Neonatal Intensive Care Unit (NICU) and indication for NICU admission (i.e., prematurity, respiratory distress syndrome, rule-out se.
- A stillbirth which is the death of the fetus at ≥20 weeks' gestation before the onset of labor.

Statistical Analysis

Statistical analyses were conducted with IBM SPSS Statistics version 24.0. Descriptive statistics gave a description regarding the study populations as well as the outcome. Categorical variables are presented as a number (n) and percentage (%). Normal distribution data are presented as mean ± standard deviation (SD), whereas non-normally distributed data are presented as median with interquartile range (IQR). Given this is a descriptive study, primary analysis was to document frequencies and proportions for pre-specified outcomes, where a p-value ≤0.05 was considered statistically significant for any comparison tests.

RESULTS

Table 1: Clinical features of all participants.

Characteristic	Category	n	%
Age of mothers (years)	< 20	5	7.4%
	20 - 34	45	66.2%
	≥ 35	18	26.5%
Parity	Nulliparous (first pregnancy)	41	60.3%
	Multiparous (≥1 previous birth)	27	39.7%
Body Mass Index (BMI) at booking	< 30 kg/m²	36	52.9%
	≥ 30 kg/m² (Obese)	32	47.1%

Table 2: Preeclampsia Type and Severity at Diagnosis.

Type & Severity	Category	Number (n)	Percentage (%)
Type of Preeclampsia	Late-Onset (≥34 weeks)	51	75.0%
	Early-Onset (<34 weeks)	17	25.0%
Disease Severity	Mild	25	36.8%
	Severe	43	63.2%

Table 3: Comorbidities and Risk Factors.

Comorbidity / Risk Factor	Present	Percentage (%)
Chronic Hypertension	15	22.1%
Pregestational Diabetes Mellitus	6	8.8%
Gestational Diabetes Mellitus	12	17.6%
Autoimmune Disease (e.g., SLE)	3	4.4%
Chronic Kidney Disease	2	2.9%
Multifetal Gestation (Twins)	7	10.3%
Assisted Reproductive Technology	5	7.4%
Family History of PreE/ CVD	19	27.9%

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Table 4: Maximum Blood Pressure Recorded Prior to Delivery.

Blood Pressure Category	**Systolic (mmHg)**	**Diastolic (mmHg)**	**Number (n)**	**Percentage (%)**
Stage 1 Hypertension	130-139	80-89	18	26.5%
Stage 2 Hypertension	≥140	≥90	50	73.5%
Severe Range (Subgroup)	≥160	≥110	28	41.2%

Table 5: Presenting Symptoms Leading to Diagnosis

Symptoms	Number (n)	Percentage (%)
Asymptomatic (found on routine BP check)	22	32.4%
Headache	35	51.5%
Visual Disturbances (scotomata, blurring)	18	26.5%
Upper Abdominal / Epigastric Pain	16	23.5%
Nausea / Vomiting	12	17.6%
Sudden Edema (face/hands)	25	36.8%
Dyspnea (SOB)	8	11.8%

Table 6: Adverse Findings Laboratory.

Laboratory Abnormality	Number (n)	Percentage (%)
Proteinuria (≥1+ dipstick confirmed by 24h urine ≥300mg)	68	100.0%
Thrombocytopenia (Platelets <100,000/µL)	11	16.2%
Elevated Liver Enzymes (AST or ALT >2x normal)	14	20.6%
Elevated Serum Creatinine (>1.1 mg/dL)	9	13.2%
HELLP Syndrome	5	7.4%

Table 7: Post–delivery Complications included in hospital.

Complications	Number (n)	Percentage (%)
Eclampsia (seizures)	2	2.9%
Placental Abruption	4	5.9%
Postpartum Hemorrhage (PPH)	8	11.8%
Pulmonary Edema	3	4.4%
Acute Kidney Injury	4	5.9%
Required ICU Admission	7	10.3%

Table 8: Antihypertensive Medications.

Medications	Number of Patients Prescribed (n)	Percentage (%)
Labetalol	45	66.2%
Nifedipine	28	41.2%
Methyldopa	12	17.6%
Hydralazine	9	13.2%
Magnesium Sulfate (for seizure prophylaxis)	43	63.2%

Table 9: Delivery Findings.

Characteristic	**Category**	**Number**	**Percentage**
Gestational Age at Delivery	< 28 weeks	3	4.4%
	28 - 33+6 weeks	14	20.6%
	34 - 36+6 weeks	26	38.2%
	≥ 37 weeks	25	36.8%
Mode of Delivery	Vaginal Delivery	22	32.4%
	Cesarean Section	46	67.6%
Indication for C-Section (n=46)	Fetal Distress	12	26.1%
	Failure to Progress	10	21.7%
	Severe PreE (maternal indication)	24	52.2%

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Table 10: Neonatal Outcomes.

Parameters	**N / Mean**	**%**
Total Live Births	68*	100.0%
Mean Birth Weight (grams)	2450 g	-
Low Birth Weight (<2500 g)	35	51.5%
Very Low Birth Weight (<1500 g)	7	10.3%
5-minute APGAR score <7	9	13.2%
Admission to NICU	31	45.6%
Stillbirth	1	1.5%

Table 11: Postpartum Blood Pressure Resolution.

Outcome at 6-week postpartum visit	Number (n)	Percentage (%)
Normotensive (BP <120/80 mmHg off meds)	48	70.6%
Persistent Hypertension (requiring ongoing medication)	13	19.1%
Lost to Follow-up	7	10.3%

DISCUSSION

The prevalence of most nulliparous women (60.3%) were a classical finding, amply borne by large-scale epidemiological studies like Welsh study, in which nulliparity was among the strongest independent risk factors (Li, Z. *et al.,* 2020), due to faulty trophoblast invasion in the first pregnancy, where the rate of obesity (47.1% with BMI ≥30 kg/m²) indicated the worldwide prevalence of adiposity as an expression of endothelial dysfunction and pro-inflammatory state, prime soil for the evolution of preeclampsia (Obstetrics and Gynecology Branch of the Chinese Medical Association. 2020).

Our study also enrolled as the most disturbing, as the high incidence of patients who attended the hospital with fulminant features of preeclampsia (63.2%). The presenting symptom most commonly was headache (51.5%), indicative of cerebral involvement, most likely due to autoregulatory failure causing cerebral edema. But very striking is the fact that as many as 32.4% of the patients were symptom-free. (Simon, L. V. *et al.,* 2023)

Labetalol was the first antihypertensive agent in 66.2% of cases, as per American College of Obstetricians and Gynaecologists (ACOG) guidelines, due to its efficacy and safety in pregnancy (Xie X. *et al.,* 2018). The widespread use of magnesium sulfate (63.2%) for prophylaxis against seizures in those with severe features is conventional therapy, a practice strongly supported from the Trial in the USA, which demonstrated that it reduced the incidence of eclampsia by more than half (Albu, A. R. *et al.,* 2014). It was to be estimated that a high percentage of cesarean deliveries (67.6%) will be conducted, with the majority being done solely for maternal reasons (severe preeclampsia).

Delivery is often the preferred treatment for preeclampsia, and a cesarean section was the most sensible and efficient course of action when the condition manifests late during pregnancy or when the woman or fetus is unstable (Bian, X. M., & Fu, C. W. 2011), which has observed consequences for mothers. Newborns serve as a somber reminder of the condition's morbidity, as well as an admission to the ICU rate of 10.3% observed in some studies (Wang XinXiang, W. X., & Song XiaoLei, S. X. 2016; Boriboonhirunsarn, D. *et al.,* 2017; Williams, B. *et al.,* 2020). Our study found that systemic endothelial damage includes placental abruption (5.9%) or HELLP syndrome (7.4%). Negative effects are directly determined by the high occurrence of iatrogenic preterm birth (63.2% of our population is born before 37 weeks).

Together alongside the underlying placental insufficiency that was a defining feature of preeclampsia, this unavoidable iatrogenic prematurity directly contributes to the high birth weight (51.5%) & NICU admission rates (45.6%). These results, which show that fetal immaturity is sacrificed for the mother's life, are regrettably consistent throughout the Chinese literature (Wang, X. L. *et al.,* 2021).

Persistent postpartum hypertension is the most notable long-term result of our research. 19.1% all our patients needed continued antihypertensive medication at the six-week mark. This discovery provides significant support for a huge body of research that reinterprets preeclampsia as a sex-specific stress

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test and identifies a woman's susceptibility to chronic illness in the future, rather than as a pregnancy problem with a limited duration (Wang, J. L. 2014; Teng, X. H. *et al.,* 2017). A history of preeclampsia is associated to a four-fold risk of future hypertension and a two-fold risk of both fatal with non-fatal ischemic heart disease and stroke, according to a meta-analysis and systematic review carried out in Italy (Lecarpentier, E. *et al.,* 2013; Hui-yu, X. I. A. O., & Yu-mei, W. A. N. G. 2019).

CONCLUSION

A dataset of 68 patients is testament to the huge prevalence of hypertension as a consequence of preeclampsia, which our outcomes reports that large incidence of severe disease (63.2%), significant related to nulliparity (60.3%) and obesity (47.1%), as well as high rates of maternal (e.g., 10.3% ICU admission) and neonatal (45.6% NICU admission) morbidity as well as these outcomes identified the importance of meticulous prenatal screening, early diagnosis, and multidisciplinary treatment to prevent morbidity in both mother and child. Due to that, a significant percentage (19.1%) persisted with chronic hypertension on follow-up, this being testament to the long-term cardiovascular impact of the disease.

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