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CLINICAL AND BIOCHEMICAL PARAMETERS OF PREECLAMPSIA IN A SAMPLE OF IRAQI LADIES

***Sahbaa Gablan Younis**

M.B.Ch.B./D.G.O.

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***Corresponding Author: Sahbaa Gablan Younis**

M.B.Ch.B./D.G.O.

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ABSTRACT

Background: Hypertensive illness during pregnancy creates a major potential risk to both maternal and fetal conditions. Preeclampsia is one of the most well-known gestational hypertensive condition, accounting for one of the most commonly recorded prenatal complications, affecting between 2 to 8% of all pregnancies. **Objectives:** Is to investigate clinical parameters of preeclampsia in a sample of Iraqi ladies. **Methods:** This is a prospective descriptive cross-sectional study conducted at Al-Salam Teaching Hospital from January 2024 to April 2025. The questionnaire consisted from three parts. Section one for sociodemographic information. The second part for the clinical and biochemical parameters such as platelet count (PLT), liver functions (AST, ALT, and ALP), blood sugar levels, and urine protein. The third part for perinatal outcomes, including mode of delivery (vaginal or cesarean), recovery time, previous abortion, maternal complications (infection, gestational diabetes, chronic hypertension, renal disease), neonatal outcomes (stillbirth), and baby weight. **Results:** The study included 500 pregnant ladies, 30 (6%) ladies of them had preeclampsia and 470 (94%) ladies had no preeclampsia. The mean age ± standard deviation of the study participants was 27.21 ± 5.65 years. Statistically significant difference between the two groups regarding their age, details of age categories, and parity. Moreover, statistically significant difference between them regarding their random blood sugar and protein in urine measurements. Additionally, statistically significant difference between them regarding platelet, AST, ALT and ALP. (Additionally, statistically significant difference was shown with regard to gestational diabetes, infection, renal disease, chronic hypertension, pregnancy outcome, delivery mood, and recovery time. Lastly, statistically significant difference was shown with regard to birth weight, number of still birth and preterm birth. (P value <0.001) for all of them. **Conclusion:** Many parameters included in this study are significantly found among patients with preeclampsia. These parameters include; sociodemographic variable (for example advanced maternal age, nulliparity), twin pregnancy, presence of gestational diabetes, protein in urine and elevated liver enzymes. Preeclampsia had higher rate of adverse maternal and fetal outcomes than normal healthy pregnancies warrant more attention and frequent antenatal care visits.

KEYWORDS: Iraq, Outcomes, Preeclampsia.

1- INTRODUCTION

Hypertensive illness during pregnancy creates a major potential risk to both maternal and fetal conditions.[1-2] Preeclampsia is one of the most well-known medical diseases in this disease spectrum, accounting for one of the most commonly recorded prenatal complications, affecting between 2 to 8% of all pregnancies.[3] It is presented as a gestational condition characterized by a hypertensive disorder diagnosed after 20 weeks of gestation, coexisting proteinuria or generalized edema, and certain types of hematologic disorders such as thrombocytopenia or signs of end organ damage such as renal impairment, abnormal liver function, pulmonary edema, and cerebral and visual disturbance.[4-5] Serious or long-term consequences may occur if preeclampsia progresses to a severe stage or is not well managed. In

such circumstances, many organs may be involved, and impaired uteroplacental perfusion may result in gestational difficulties and poor fetal outcomes such as intrauterine fetal growth restriction and premature birth. As the condition worsens, it may become life-threatening for both the mother and the fetus, increasing the risk of death and morbidity.[6-7]

This disease's clinical condition begins with aberrant placental development, resulting in the release of antiangiogenic molecules such soluble endoglin (sEng) and soluble fms-like tyrosine kinase-1.[8] These factors impair endothelial function, cause constriction, and affect the immune system, resulting in serious complications for both the mother and the fetus, including placental abruption, disseminated intravascular coagulation, cerebrovascular and cardiovascular disease, renal and liver failure, hemolysis, elevated liver enzymes, and low platelet levels (HELLP syndrome).[9-10] Placental insufficiency and endothelial dysfunction can cause neonatal morbidity and mortality, including non-reassuring fetal status, oligohydramnios, low birth weight, preterm birth, severe birth asphyxia, intrapartum death, and stillbirth. However, the pathophysiology is not fully understood.[11]

The study was conducted in a resource-limited setting (Iraq) to investigate clinical parameters of preeclampsia, including platelet count, liver enzymes, systolic and diastolic blood pressure, proteinuria, maternal age, parity, type of pregnancy, cesarean section, recovery time, and neonatal outcomes like low birth weight, stillbirth, and preterm birth.

2- PATIENT AND METHODS

This is a prospective descriptive cross-sectional study conducted at Al-Salam Teaching Hospital from January 2024 to April 2025. Informed approval was obtained from the Directorate of Health of Nineveh Governorate. All of the patients sign a written consent. The questionnaire consisted from three parts. Section one for sociodemographic information, such as mother age (year), gestational age (week), number of parities, systolic blood pressure (SBP: mmHg), diastolic blood pressure (DBP: mmHg). The second part for the clinical and biochemical parameters such as platelet count (PLT), liver functions (AST, ALT, and ALP), blood sugar levels, and urine protein. The third part for perinatal outcomes were recorded, including mode of delivery (vaginal or cesarean), recovery time, previous abortion, maternal complications (infection, gestational diabetes, chronic hypertension, renal disease), neonatal outcomes (stillbirth), and baby weight.

According to the Gynecological guidelines.[3] The study defines preeclampsia as new-onset hypertension (SBP ≥140 mmHg or DBP ≥90 mmHg on two occasions at least 4 hours apart) after 20 weeks of gestation, with or without proteinuria (≥300 mg per 24-hour urine collection, protein/creatinine ratio ≥.3, or dipstick reading 1+). Preterm birth was defined as the delivery of a live baby before the 37th week of gestation. Low infant weight was defined as less than 2500 g at birth. Maternal ages were divided into three categories: teenagers (≤25 years), younger (26-35 years), and elderly (>35 years).

The Kolmogorov-Smirnoff test was used to assess parameter normality. Independent and paired t-tests to compare continuous variables. Chi square test was used for categorical data. P value of less than 0.05 was considered statistically significant.

3-RESULTS

The study included 500 pregnant ladies, 30 (6%) ladies of them had preeclampsia and 470 (94%) ladies had no preeclampsia. The mean age ± standard deviation of the study participants was 27.21 ± 5.65 years. Statistically significant difference between the two groups regarding their age, details of age categories, and parity (P value <0.001) for all of them. While history of previous abortion found to be statistically not significant (P value = 0.268). As shown in table 1.

Table 1: Comparison between patients with preeclampsia those who with no preeclampsia regarding their demographic information. (number = 500).

Variable	Preeclampsia = 30 Number (Percent)	No preeclampsia 470 Number (Percent)	P value
Mean age ± standard deviation	30.79 ± 5.02	26.79 ± 5.74	**0.009**
Age categories, number (%): -Less than 25 years - 25 to less than 30 years - More than 30 years	 11 (33.33%) 15 (50%) 4 (16.67%)	 255 (54.25%) 203 (43.19%) 12 (2.6%)	**<0.001**
Parity: - Nulliparity - Multiparity	 18 (60%) 12 (40%)	 156 (33.19%) 314 (66.81%)	**<0.001**
Presence of previous abortion:	1 (3.33%)	5 (1.06%)	0.268

Table 2 shows comparison between the two groups regarding their blood pressure, random blood sugar and protein in urine measurements. Statistically significant difference between them regarding their Systolic, diastolic, random blood sugar and protein in urine measurements (P value < 0.001) for all of them.

Table 2: Comparison between the two groups regarding their blood pressure, random blood sugar and protein in urine measurements (number = 500).

Variable	Preeclampsia = 30	No preeclampsia = 470	P value
Systolic blood pressure (mm Hg), mean ± standard deviation	158.27 ± 16.89	120.12 ± 7.79	**<0.001**
Diastolic blood pressure (mm Hg), mean ± standard deviation	100.33 ± 9.40	76.52 ± 5.23	**<0.001**
Random blood sugar (mg/dL), mean ± standard deviation	134.12 ± 12.11	92.45 ± 10.79	**<0.001**
Protein urine, median (interquartile range)	2 (1-4)	0 (0-2)	**<0.001**

Table 3 shows comparison between the two groups regarding their platelets and liver enzymes. Statistically significant difference between them regarding platelet, AST, ALT and ALP (P value < 0.001) for all of them.

Table 3: Comparison between the two groups regarding their platelets and liver enzymes (number = 500).

Variable	Preeclampsia = 30	No preeclampsia = 470	P value
Platelet, 10^9/L, mean ± standard deviation	199.84 ± 58.79	248.27 ± 46.65	**<0.001**
AST, IU/L, mean ± standard deviation	66.22 ± 37.09	20.17 ± 4.91	**<0.001**
ALT, IU/L, mean ± standard deviation	72.55 ± 50.44	39.26 ± 8.16	**<0.001**
ALP, IU/L, mean ± standard deviation	231.76 ± 89.38	59.26 ± 40.89	**<0.001**

Table 4 shows comparison between the study groups regarding their different pregnancy and obstetric variables. Statistically significant difference was shown with regard to gestational diabetes, infection, renal disease, chronic hypertension, pregnancy outcome, delivery mood, and recovery time (P value <0.001) for all of them.

Table 4: Comparison between the two groups regarding their pregnancy and obstetric variables (number = 500).

Variable	Preeclampsia = 30	No preeclampsia = 470	P value
Gestational diabetes, number (%)	13 (43.33%)	7 (1.49%)	**<0.001**
Infection, number (%)	26 (86.67%)	25 (5.31%)	**<0.001**
Renal disease, number (%)	3 (10%)	3 (0.63%)	**<0.001**
Chronic hypertension, number (%)	4 (13.33%)	0 (0%)	**<0.001**
Pregnancy outcome: -Singleton -Twin	 28 (93.33%) 2 (6.67%)	 468 (99.57%) 2 (0.43%)	**<0.001**
Delivery mood, number (%): -Normal vaginal delivery -Cesarean section	 3 (10%) 27 (90%)	 417 (88.72%) 53 (11.28%)	**<0.001**
Recovery time (days), mean ± standard deviation:	2.55 ± 0.691	1.45 ± 0.520	**<0.001**

Table 5 shows comparison between the study groups regarding their natal outcomes. Statistically significant difference was shown with regard to birth weight, number of still birth and preterm birth (P value <0.001) for all of them.

Table 5: Comparison between the two groups regarding their natal outcomes (number = 500).

Natal outcome	Preeclampsia = 30	No preeclampsia = 470	P value
Birth weight, number (%): -Less than 2500 gram -More than 2500 gram	 13 (43.33%) 17 (56.67%)	 39 (6.38%) 431 (93.62%)	**<0.001**
Still births, number (%):	3 (10%)	7 (1.48%)	**<0.001**
Preterm births, number (%):	20 (66.67%)	37 (7.87%)	**<0.001**

4-DISCUSSION

The study found that the prevalence of preeclampsia was (6%). Which aligns with global prevalence of preeclampsia (2-8%).[3] This percent indicates a significant health challenge, as it is within this widely cited range and the condition is a leading cause of maternal and fetal morbidity and mortality worldwide. Additionally, the study showed that patients with preeclampsia were significantly older than those with no preeclampsia. Suggesting that the advanced maternal age is a risk factor for developing preeclampsia. Comparable findings obtained from numerous studies.[12-

14] In the same way the study found patients with preeclampsia are significantly more likely to be nulliparous than those without preeclampsia, which might due to the fact that nulliparous women had higher levels of the anti-angiogenic protein sFlt and the spiral arteries in nulliparous women have not been previously remodeled by a healthy pregnancy. Bdolah et al showed similar findings.[15]

On the other hand, the study found that patients with preeclampsia found to have significantly higher both systolic, diastolic blood pressure, proteinuria and thrombophilia. As this disparity is a key diagnostic feature of the condition.[3] Additionally, patients with preeclampsia found to have higher random blood sugar and gestational diabetes than normotensive pregnant ladies. This fact might due to the fact that both preeclampsia and gestational diabetes involve insulin resistance, systemic inflammation and problems with blood vessel function (endothelial dysfunction), which are exacerbated by high blood sugar levels and contribute to high blood pressure. Which agrees Ying et al study findings.[16]

The study showed, patients with preeclampsia significantly had elevated liver enzymes compared to healthy pregnant women. This elevation is a key indicator of liver involvement and is used to determine the severity of the condition, which is in agreement with Aldbagh study findings.[17]

The majority of preeclampsia patients enrolled to this study reported history of infection (such as urinary tract infections or periodontal disease) than with normal pregnancies. Which might due to inflammatory effect of this infection resulting in preeclampsia. Minassian et al showed comparable findings.[18] Also, the study illustrates a significant difference between preeclampsia patient and those with normal pregnancy regarding the presence of chronic renal disease and chronic hypertension, which might be hidden and firstly discovered by preeclampsia appearance. As a result, regular monitoring of patients' blood pressure and kidney function (e.g., eGFR and albuminuria) is mandatory in patients having preeclampsia. Which is consistent with a systemic review conducted by Haudiquet et al.[19]

Regarding obstetric outcome, patients with preeclampsia found in the current study to have higher twin pregnancy. This heightened risk is thought to be related to the larger placental size and increased production of anti-angiogenic factors, which harm the maternal vascular endothelium. Furthermore, patients with preeclampsia had higher caesarean section and recovery time than healthy pregnant ladies, due to the severity of the condition, which may necessitate an expedited delivery to ensure the safety of both mother and baby. Associated complications such as fetal distress, restricted fetal growth, and the need for early delivery also contribute to the higher rate of surgical intervention. Wang et al found comparable results.[20]

Concerning natal outcome, the study explored that patient with preeclampsia had higher rate of low-birth-weight fetuses. As preeclampsia impairs placental function, leading to insufficient oxygen and nutrients for the fetus, which can result in restricted growth and low birth weight than healthy pregnant ladies, especially in early-onset disease. Which runs with Zuvarcan et al study findings.[21] Moreover, the study showed that patient with pregnant ladies with preeclampsia had more still birth and preterm babies than uneventful pregnancies, indicating that preeclampsia is a leading cause of neonatal morbidity and mortality. Which is similar to other study findings.[17, 22]

The study limitations are; as the study findings were based solely on the population of Mosul city in Iraq, it is yet unknown whether researchers would find the same outcomes in a different ethnic group. Additionally, the study retrospective design and small sample size. which might affect the study results.

4- CONCLUSION AND RECOMMENDATION

Many parameters included in this study are significantly found among patients with preeclampsia. These parameters include; sociodemographic variable (for example advanced maternal age, nulliparity), twin pregnancy, presence of gestational diabetes, protein in urine and elevated liver enzymes. Preeclampsia had higher rate of adverse maternal and fetal outcomes than normal healthy pregnancies warrant more attention and frequent antenatal care visits.

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Conflict of Intertest

About this study, the authors disclose no conflicts of interest.

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