

**POST-PARTUM EVALUATION OF RENAL FUNCTION IN PRE-ECLAMPSIA- A  
PROSPECTIVE STUDY**

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**Abstract**

**Introduction:** Hypertensive disorders complicating pregnancy is the most common complication that occurs in pregnancy. The incidence varies in different populations, different races and is affected by the definitions used. Mostly hypertensive disorders are seen in nulliparous women, teenage pregnancy or elderly women and race.

**Materials and methods:** This was a prospective study. This study was conducted for 1 year from January 2024 to December 2024. Patients included were those diagnosed to have preeclampsia attending in department of obstetrics and gynecology, Tagore Medical College, Chennai. Blood pressure more than 140/90 mmHg and proteinuria >300 mg/24 hour after 20 weeks of pregnancy was included in this study. After fulfilling the inclusion exclusion criteria 236 patients were taken as study sample. In this observational study 236 women with preeclampsia who were evaluated and managed at Tagore Medical college, Chennai were recruited. An informed consent form was obtained from the subjects. For each eligible participant, authors collected clinical and laboratory data from third trimester of antenatal period (one day before delivery and 6 weeks and three months after delivery). Clinical data include age, BMI, systolic and diastolic blood pressure, pregnancy characteristics (gravidity, parity, gestational age, mode of delivery, gestational age at preeclampsia detected, gestational age of delivery, socioeconomic status, educational status of patient, birth weight and outcome, sex of the baby).

**Results:** A total of 236 patients were followed up in this 1-year long study. The following variables were studied. A total 94.9% of patients were taking antihypertensives. Maximum number of patients were from the age group of 21-30 years, amounts to 67.8% and mean age was 26. Mean BMI in non-severe preeclampsia was 24.56, severe preeclampsia group was 25.67 which was significant. Mean gestational age at detection of preeclampsia and delivery were 32.6 and 36.1 respectively (Table 1). Mean birth weight was 2.17 kg and on comparing birth weight

between non severe preeclampsia and severe preeclampsia group, birth weight was 2.23 and 2.05 respectively which was statistically significant. Majority of patients delivered vaginally (55.9% term deliveries and 27.1% preterm deliveries), 16.9% ended in LSCS. Blood urea levels were normal after post-partum in both groups. By postpartum, creatinine values became normal in both the groups. By postpartum, GFR values became normal in both the groups. In severe preeclampsia group, proteinuria was persisting even after 3 months whereas proteinuria resolved completely in non-severe pre-eclampsia group. Systolic BP came to normal value by 6 weeks postpartum for non-severe preeclampsia group, where as in severe preeclampsia group it took 3 months.

**Conclusion:** For most of the women, hypertension will resolve within the 1st week after delivery. Hypertension that persists more than 6 weeks postpartum usually represents a pathology not directly associated with pregnancy such as essential hypertension or underlying endocrine, neurological, or renal disease. These women should have their hypertension confirmed with ambulatory monitoring and referred for investigation for a secondary cause for their hypertension. Proteinuria that persists beyond 6-12 weeks postpartum may also warrant further investigation, particularly in early onset preeclampsia, the group of women most likely to have underlying renal disease.

**Key Words:** Hypertensive disorders complicating pregnancy, proteinuria, BMI, postpartum.

## INTRODUCTION

Hypertensive disorders complicating pregnancy is the most common complication that occurs in pregnancy. The incidence varies in different populations, different races and is affected by the definitions used. Mostly hypertensive disorders are seen in nulliparous women, teenage pregnancy or elderly women and race.<sup>1</sup>

In India in 2006 to 2007, the incidence of hypertensive disorders in pregnancy was 5.38%, while the incidence accounted for preeclampsia is 44%, eclampsia is 40% and HELLP syndrome is about 7% of complications respectively. Maternal and perinatal deaths have been reported in 5.5% and 37.5% deliveries. Hypertensive disorders in pregnancy comprises of preeclampsia and eclampsia. Preeclampsia is a multisystem disorder of unknown aetiology that affects 4%-5% of pregnancies, whereas the incidence of eclampsia is 0.3%-0.9% and it has maternal mortality rate of 0.5%-10%.<sup>2</sup>

Preeclampsia accounts for a third of acute kidney injury occurring in advanced pregnancy, with high risks of progression to end-stage renal disease (ESRD). The renal involvement in preeclampsia resulting in glomerular endotheliosis which is characterized by proteinuria and renal failure. After delivery, hypertension, proteinuria and renal failure are expected to resolve progressively.<sup>3</sup> However, hypertension and proteinuria can persist for years after delivery, necessitating further investigations for possible underlying renal disease. Meanwhile, renal

failure highly correlates with blood pressure levels and renal function usually assumes the normal range within postpartum. Follow-up of women after delivery has been less-than-optimal in most of the studies.<sup>4</sup> Therefore, knowledge of the long-term outcomes of preeclampsia among Indian women remains limited. However, microalbuminuria without impairment of renal function has been found several years after pregnancies complicated by preeclampsia suggesting persistent endothelial damage at least in some cases.<sup>5</sup>

This study was conducted to monitor the time-trend in blood pressure levels, renal function and proteinuria from antenatal period, six weeks postpartum and three months postpartum in women with preeclampsia delivering in department of obstetrics and gynecology, Tagore Medical College, Chennai. The presence of proteinuria after pregnancy complicated by preeclampsia have value in predicting future development of chronic hypertension, residual renal abnormality or underlying vascular disease.

### **MATERIALS AND METHODS**

This was a prospective study. This study was conducted for 1 year from January 2024 to December 2024. Patients included were those diagnosed to have preeclampsia attending in department of obstetrics and gynecology, Tagore Medical College, Chennai.

**Inclusion criteria:** Blood pressure more than 140/90 mmHg and proteinuria >300 mg/24 hour after 20 weeks of pregnancy was included in this study.

**Exclusion criteria:** Patients with preexisting kidney or liver disease, patients diagnosed to have multiple pregnancy, patients with any preexisting malignancies, patients with preexisting autoimmune or connective tissue disorders, patients who were lost to follow-up, not willing to give consent were excluded from the study.

**Sample size:** After fulfilling the inclusion exclusion criteria 236 patients were taken as study sample. In this observational study 236 women with preeclampsia who were evaluated and managed at Tagore Medical college, Chennai were recruited. An informed consent form was obtained from the subjects. For each eligible participant, authors collected clinical and laboratory data from third trimester of antenatal period (one day before delivery and 6 weeks and three months after delivery). Clinical data include age, BMI, systolic and diastolic blood pressure, pregnancy characteristics (gravidity, parity, gestational age, mode of delivery, gestational age at preeclampsia detected, gestational age of delivery, socioeconomic status, educational status of patient, birth weight and outcome, sex of the baby. Laboratory data included blood urea and serum creatinine, urine PC ratio. Secondary variables were derived from primary variables using validated formulas. Estimated glomerular filtration rate (eGFR) was based on the Cockcroft-Gault formula.

**Statistical analysis:** The collected data was coded and entered in MS excel and analysed using appropriate statistical procedure (SPSS software). The statistical significance was ascertained by p value <0.05

## RESULTS

A total of 236 patients were followed up in this 1-year long study. The following variables were studied. A total 94.9% of patients were taking antihypertensives. Maximum number of patients were from the age group of 21-30 years, amounts to 67.8% and mean age was 26. Mean BMI in non-severe preeclampsia was 24.56, severe preeclampsia group was 25.67 which was significant. Mean gestational age at detection of preeclampsia and delivery were 32.6 and 36.1 respectively (Table 1).

<b>Characteristic</b>	<b>Groups</b>	<b>Mean</b>	<b>SD</b>
Age (years)	Non-severe	26.9	5.1
	Severe	25.8	4.9
	Overall	26.5	5.1
Weight (kg)	Non-severe	61.84	9.06
	Severe	63.68	9.14
	Overall	62.42	9.08
<b>BMI</b>	Non-severe	24.56	1.10
	Severe	25.67	1.65
	Overall	24.91	1.39
GA (weeks) when preeclampsia detected	Non-severe	32.7	2.8
	Severe	32.4	3.0
	Overall	32.6	2.8
GA (weeks) at delivery	Non-severe	37.0	0.0
	Severe	34.2	0.8
	Overall	36.1	1.4

**Table 1: Patient demographics**

<b>Period</b>	<b>Groups</b>			<b>P value</b>
	Overall (%)	Non-severe (%)	severe (%)	
Antenatal	30.1(8.3)	28.9(7.6)	32.8(9.2)	0.001
6 weeks postpartum	25.5(2.5)	25.2(2.2)	26.1(2.9)	0.001
3 months postpartum	24.6(2.3)	24.8(2.3)	24.2(2.2)	0.001

**Table 2: Severity and blood urea levels**

<b>Period</b>	<b>Groups</b>			<b>P value</b>
	Overall (%)	Non-severe (%)	severe (%)	
Antenatal	<b>1.21 (0.57)</b>	<b>1.03 (0.33)</b>	1.60(0.75)	0.001
6 weeks postpartum	<b>0.82(0.30)</b>	0.71(0.06)	1.07(0.44)	0.001

3 months postpartum	<b>0.75 (0.18)</b>	0.70(0.04)	0.85(0.29)	0.001
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**Table 3: Severity and serum creatinine**

Mean birth weight was 2.17 kg and on comparing birth weight between non severe preeclampsia and severe preeclampsia group, birth weight was 2.23 and 2.05 respectively which was statistically significant. Majority of patients delivered vaginally (55.9% term deliveries and 27.1% preterm deliveries), 16.9% ended in LSCS. Blood urea levels were normal after postpartum in both groups. By postpartum, creatinine values became normal in both the groups. By postpartum, GFR values became normal in both the groups. In severe preeclampsia group, proteinuria was persisting even after 3 months whereas proteinuria resolved completely in non-severe pre-eclampsia group. Systolic BP came to normal value by 6 weeks postpartum for non-severe preeclampsia group, where as in severe preeclampsia group it took 3 months.

Period	Groups			P Value
	Overall (%)	Non-severe (%)	Severe (%)	
Antenatal	155.0 (21.2)	141.7 (3.8)	184.3 (12.3)	0.001
6 weeks postpartum	140.1(20.4)	132.4 (12.9)	156.9 (23.8)	0.001
3 months postpartum	125.5 (10.9)	122.2 (6.5)	132.8 (14.7)	0.001

**Table 4: Severity and BP-systolic**

### DISCUSSION

Majority of the patients were in the age group 21-30 and constituted 67.8%. Mean age was 26.9 and 25.8 for non-severe and severe preeclampsia respectively. This is similar to study of Saini et al which was 26.3 and 27.2.<sup>6</sup>

Mean BMI of the study was 24.5 kg/m<sup>2</sup> and 25.6 kg/m<sup>2</sup> respectively for non-severe and severe preeclampsia. BMI in severe preeclampsia group is slightly less than the study of Saini et al which was 27.6 kg/m<sup>2</sup>. Mean gestational age at which preeclampsia diagnosis made were 32.7 weeks and 32.4 weeks respectively for non-severe and severe preeclampsia.<sup>7</sup>

In this study, preeclampsia was more common in primigravida's accounts to 57.6%. The present finding of increased incidence of pre-eclampsia in primigravida's was in agreement with the study conducted by Kumar P et al and Sajith et al study, where 61% and 53.8% of preeclampsia cases were of primigravida's. Patients those who were on antihypertensives was 94.9%, which may be because of better health accessibility in Kerala. Mean birth weight found in this study was 2.23 kg and 2.05 kg respectively in two groups. Most of the patients had a term vaginal delivery (55.9%), 27.1% delivered preterm and 16.9% underwent LSCS.<sup>8</sup>

Proteinuria resolved completely in non-severe preeclampsia patients by 6 weeks postpartum itself. In severe preeclampsia group, 65% and 25% of patients had persisting proteinuria after 6 weeks and 3 months postpartum. This result is different from other studies. In a study by Kaleta et al, proteinuria was persisting 58% of preeclampsia patients at 1 year postpartum, in an another study by Durkberk et al proteinuria persisted in 21% and 14% patients after 6 weeks and 3 months postpartum. In a study by Kaze et al 48.1%, 31.5% and 1.8% patients had persisting proteinuria at 6 weeks, 3 months and 6 months post-delivery respectively.<sup>9</sup>

In this study, 14.4% and 6.77% of patients had abnormal GFR values after 6 weeks and 3 months postpartum. These results were different from other studies where in 40% of patients had abnormal GFR after 1 year in a study by Kaleta et al.<sup>10</sup>

### **CONCLUSION**

For most of the women, hypertension will resolve within the 1st week after delivery. Hypertension that persists more than 6 weeks postpartum usually represents a pathology not directly associated with pregnancy such as essential hypertension or underlying endocrine, neurological, or renal disease. These women should have their hypertension confirmed with ambulatory monitoring and referred for investigation for a secondary cause for their hypertension. Proteinuria that persists beyond 6-12 weeks postpartum may also warrant further investigation, particularly in early onset preeclampsia, the group of women most likely to have underlying renal disease.

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