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Research Article

**MATERNAL SERUM URIC ACID LEVELS AT DELIVERY IN  
GESTATIONAL HYPERTENSIVE WOMEN**Dr Shabana<sup>1</sup>, Dr Silwana Taroni<sup>2</sup>, Dr Gul Nazar<sup>3</sup><sup>1</sup>Rawalpindi Medical College<sup>2</sup>Fatima Jinnah Medical University Lahore<sup>3</sup>Allama Iqbal Medical College Lahore

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**Abstract:**

**Background and objectives:** The most common reason for such a high maternal and perinatal morbidity and mortality associated with HDP is the unavailability of precise and specific test that can identify pregnant women at risk of developing HDP. The basic aim of the study is to analyze the maternal serum uric acid levels at delivery among gestational hypertensive women and its effect on fetal growth. **Material and methods:** This descriptive study was conducted in Rawalpindi Medical College during June 2019 to January 2020. The data were collected from 100 pregnant female patients with gestational age above 32 weeks. The selected participants were divided into 2 groups, one with GH and second group with NP. All the participants were age matched. GH is defined as denovo hypertension with systolic blood pressure (SBP)  $\geq 140$  mmHg and diastolic blood pressure (DBP)  $\geq 90$  mmHg after 20 weeks of gestation. PE is GH with proteinuria – 1+ on dipstick or  $\geq 300$  mg/day or Pr:Cr ratio as  $\geq 3.0$  mg/g. **Results:** The data was collected from 100 randomly selected participants. The mean age for NP were  $23.2 \pm 2.9$  and for GH  $22.9 \pm 3.0$ . The mean age and gestational age among both groups were not statistically significant. SBP, DBP, and urinary proteins were significantly different in the both groups. The mean serum uric acid and creatinine levels were significantly elevated in GH ( $4.27 \pm 1.0$  mg/dL;  $0.66 \pm 0.19$  mg/dL) and NP ( $4.25 \pm 0.8$  mg/dL;  $0.63 \pm 0.13$  mg/dL). In NP group, 67% women had full-term normal vaginal delivery (FTNVD). **Conclusion:** It is concluded that Serum uric acid and creatinine are elevated in GH whereas no significant difference was observed between PE and NP.

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**INTRODUCTION:**

Worldwide Hypertensive disorder of pregnancy (HDP) is a major cause of maternal and perinatal morbidity and mortality and complicates around 2-10% of all pregnancies. The most common reason for such a high maternal and perinatal morbidity and mortality associated with HDP is the unavailability of precise and specific test that can identify pregnant women at risk of developing HDP. Gestational hypertension (GH), preeclampsia (PE), and eclampsia are a part of a spectrum of hypertensive disorders that complicate pregnancy as specified by the National High Blood Pressure Education Program (NHBPEP) working group [1]. Though studies have mentioned various parameters in etiopathogenesis of hypertensive disorders of pregnancy, still it remains obscure [2]. Serum uric acid and creatinine levels are a part of work up for the pregnant women with hypertension. The elevated levels of these parameters were due to decreased urinary clearance secondary to reduced GFR and increased reabsorption. Serum uric acid is not only a marker of severity of disease but also contributes to the pathology of disorder [3].

During pregnancy, circulating uric acid levels are regulated by alterations in renal handling. Maternal serum uric acid levels decrease by 25–35% during the first trimester due to an increase in glomerular filtration rate and a decrease in reabsorption in the proximal tubule. There is a subsequent rise to pre-pregnancy levels near term, which is related to a decrease in uric acid clearance due to postsecretory reabsorption [4].

Hyperuricemia in pregnancy is associated with adverse fetal outcome and preeclampsia. Uric acid directly inhibits amino acid transfer in the placenta and suppresses fetal growth [5]. Elevated levels of uric acid may have a proliferative and pro-inflammatory effect on the small blood vessels of the placenta, resulting in small-for-gestational-age (SGA) fetuses [6]. Uric acid stimulates the production of vasoconstrictors and inflammatory agents, reduces nitric oxide production, and increases thromboxane generation in vascular smooth muscle cells [7]. Thus, hyperuricemia is strongly associated with endothelial cell dysfunction, and elevated serum uric acid levels usually precede hypertension.

**Aims and objectives**

The basic aim of the study is to analyze the maternal serum uric acid levels at delivery among gestational hypertensive women and its effect on fetal growth.

**MATERIAL AND METHODS:**

This descriptive study was conducted in Rawalpindi Medical College during June 2019 to January 2020. The data were collected from 100 pregnant female patients with gestational age above 32 weeks. The selected participants were divided into 2 groups, one with GH and second group with NP. All the participants were age matched. GH is defined as denovo hypertension with systolic blood pressure (SBP)  $\geq 140$  mmHg and diastolic blood pressure (DBP)  $\geq 90$  mmHg after 20 weeks of gestation. PE is GH with proteinuria – 1+ on dipstick or  $\geq 300$  mg/day or Pr:Cr ratio as  $\geq 3.0$  mg/g.

**Biochemical analysis**

5 mL of blood sample was collected from all the participants by venous puncture, into properly labeled plain polystyrene tubes. For urine protein analysis, 10 mL mid-stream urine was collected. Blood samples were centrifuged at 10,000 rpm for 10 min and the serum was separated. Serum uric acid and creatinine were estimated immediately. Serum uric acid was measured by modified uricase method. The normal serum reference range for females was 2.6–6.0 mg%. Serum creatinine was estimated by modified kinetic Jaffes method.

The data was collected and analyzed using SPSS (version 21.0). All the values were expressed in mean and standard deviation.

**RESULTS:**

The data was collected from 100 randomly selected participants. The mean age for NP were  $23.2 \pm 2.9$  and for GH  $22.9 \pm 3.0$ . The mean age and gestational age among both groups were not statistically significant. SBP, DBP, and urinary proteins were significantly different in the both groups. The mean serum uric acid and creatinine levels were significantly elevated in GH ( $4.27 \pm 1.0$  mg/dL;  $0.66 \pm 0.19$  mg/dL) and NP ( $4.25 \pm 0.8$  mg/dL;  $0.63 \pm 0.13$  mg/dL). In NP group, 67% women had full-term normal vaginal delivery (FTNVD). The fetal birth weight was significantly low in GH ( $2.31 \pm 0.5$  kg) when compared with NP ( $2.74 \pm 0.58$  kg) (9) and PIH ( $2.8 \pm 0.28$  kg) groups.

**Table 01:** Specificity and sensitivity of serum uric acid and creatinine in GH and PE

	Cutoff	Sensitivity (%)	Specificity (%)	AUC(8)	95% CI
GH					
Uric acid (mg%)	≤3.9	36.7	58.1	0.536	0.404–0.665
Creatinine (mg%)	>0.6	70	29.9	0.544	0.412–0.672

**DISCUSSION:**

Elevated uric acid levels were negatively correlated with fetal growth. However, the variations in uric acid levels were within the reference range measured in healthy human serum (0.12–0.39 mmol/l) [8]. Hyperuricemia is associated with components of metabolic syndrome. The difference in serum uric acid levels between patients with metabolic syndrome and controls can be as low as 0.03–0.06 mmol/l, and the average serum uric acid concentration of patients with metabolic syndrome is 0.35 mmol/l. These data indicate that the fluctuations in serum uric acid levels between the SGA (0.29 mmol/l) and the AGA (0.24 mmol/l) group in our study are similar to the difference between metabolic syndrome and normal controls, suggesting that this variation might be significant for fetal growth [9-10].

The present study also observed a significant correlation between poor perinatal outcome and maternal serum uric acid levels. This was supported by various studies which found that high maternal serum uric acid levels were associated with low birth weight and delivery by cesarean section. They found that pregnant women with high serum uric acid ( $\geq 5.88$  mg/dl) were at over 2.93 times the risk of having a cesarean section and poor neonatal outcomes as compared to the pregnant women with low serum uric acid levels. Furthermore, it was observed by a similar study that high maternal serum uric acid levels were significantly associated with adverse perinatal outcome [10-11].

**CONCLUSION:**

It is concluded that Serum uric acid and creatinine are elevated in GH whereas no significant difference was observed between PE and NP. Serum uric acid had better specificity and sensitivity for GH and also correlated negatively with fetal birth weight. Serum uric acid and creatinine levels vary with gestational age.

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