

## Original Article

# Fetal Outcome in Women of Pre-Eclampsia with High Serum Uric Acid Levels

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## Abstract

**Objectives:** To determine the fetal out come in pre-eclamptic women with high serum uric acid levels.

**Methodology** The descriptive, cross section study was conducted at obstetrics and gynaecology department liaquat university hospital Hyderabad from 21th march 19-20th September 2015. All the patient of age 15-45 years of pre eclampsia with serum uric acid level >6mg/dl, gestational age 32 weeks were enrolled. Information regarding fetal outcome was collected by self-made proforma. Data was analyzed by SPSS version 20.

**Results:** Total 130 women of pre-eclampsia were enrolled. 43(33.0%) were booked and 87 (66.9%) were un-booked. Over the half of the study participants i.e. 56.6% had 7.1-8 mg/dl and 12 (9.2%) had serum uric acid > 8 mg/dl. The mean serum uric + SD was 7.09 + 0.60 mg/dl. Intra uterine death was occurred in 19 (14.6%) neonates, low Apgar score ( >7) was in 25 (19.2%) preterm birth was 35 (26%) and intrauterine growth restriction was in 37 (28.5%).

**Conclusion:** Pre-eclamptic women with uric acid level >7mg/dl having more risk of adverse fetal outcome.

**Key words:** Pre-eclampsia, Serum Uric Acid, Fetal outcome.

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## Introduction

Preeclampsia with the prevalence of 10.5% is a blood pressure disorder. It is a multi-systemic disease with unknown etiology. It is indicated by >140/90 mm Hg blood pressure with or without proteinuria after 20 weeks of gestation. Hypertension during pregnancy is associated with maternal and neonatal complications.<sup>1,2</sup> In developed countries, 16% of maternal deaths are caused by high blood pressure which is higher than other factors such as bleeding (13%), abortion (8%) and sepsis (2%).<sup>3</sup> In Iran, the prevalence of hypertensive disorders during pregnancy is reported as 8.1%.<sup>4,5</sup> Up to

now, there is no reliable, valid, and cost-effective screening test for the early detection of preeclampsia. It seems that measuring the blood level of uric acid is one of the available and cheap screening tests that have already been taken into account. Uric acid is the final product of purine metabolism oxidation which is mainly excreted in the urine. Since increased uric acid is the first and earliest laboratory presentation of preeclampsia as a result of reduced clearance of uric acid due to decreased glomerular filtration clearance, increased tubular reabsorption, and reduced secretion, some

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investigators use serum uric acid as a criterion for preeclampsia.<sup>3</sup> It has been indicated that uric acid might not only have a predictive role in preeclampsia but also play a significant role in the maternal and fetal pathogenesis and presentations.<sup>3</sup> However, previous studies mentioned inconsistent results.<sup>6, 7</sup> Some previous investigations mentioned a higher level of uric acid in patients with preeclampsia compared to healthy subjects.<sup>8,9</sup> However, other studies mentioned that changes in uric acid levels in preeclampsia might be as a result of associated diseases. They noted no important predictive value for uric acid.<sup>10, 11</sup> Also, epidemiological studies on non-pregnant individuals showed that hyperuremia could be associated with hypertension, metabolic syndrome, coronary artery disease, cardiovascular disease and chronic kidney disease.<sup>12, 13</sup> Given the importance of preeclampsia in maternal and neonatal complications, in this study, we aimed to investigate the relationship between the level of uric acid with neonatal complications in women with preeclampsia. Knowing the effect of uric acid on the severity of preeclampsia and maternal and neonatal complications can help early diagnosis, control, and treatment. Results can be used for clinical decision-making and prevent from maternal and neonatal complications.

## Methodology

This descriptive, cross sectional study was carried out in the department of obstetrics and gynaecology wards if Liaquat university hospital Hyderabad, from 20<sup>th</sup> march 2015 to 19<sup>th</sup> September 2015. Pregnant woman with BP >140/90 and protein urea > + 1 on dipstick or >300mg/1 in 24 hours urinary specimen with gestational age 32 weeks or more and serum uric acid level >6mg/dl were included. Woman with glucose intolerance, renal disease, multiple pregnancy, congenitally abnormal fetus and use of drugs affecting uric acid levels were the excluded. Patients were carefully evaluated by detail history, clinical examination pulse, BP, edema and obstetrical examination performed after taking informed consent. Relevant history physical examination and investigation serum uric acid were noted on a structured proforma and fetal outcome will be noted at a time of delivery in terms of preterm birth, intrauterine growth restriction, Apgar score and intrauterine death. These data were collected by self-made proforma and analyzed by SPSS version 20.

## Results

Total 130 women of pre-eclampsia were enrolled; their mean age was 25.18±5.95 years (18 to 41 years). 43 (33.0%) women were booked and 87(66.9%) were un-booked. Most of the women (46.9%) were primiparous followed by 57(43.8%) having parity of 2-4 and 12(9.2%) were grand multiparous (para 5 to 7). Mean gestational age was 35.88±1.66 weeks (ranging from 32-39 weeks). 52.3% women were delivered by cesarean section, 35.4% had spontaneous vaginal delivery and 13.1% underwent instrumental. Over the half of the study participants i.e. 56.6% had their serum acid uric level 6.1-7 mg/dl followed by 44 (33.3%) had 7.1-8 mg/dl and 12 (9.2%) had serum uric acid > 8 mg/ dl. The mean serum uric ± SD was 7.09 ± 0.60 mg/dl. **Table I**

Variables	Frequency	%
<b>Booking status</b>		
Booked	43	33.0%
Un-booked	87	66.9%
<b>Parity</b>		
Primiparous	61	46.9%
2 to 4	57	43.8%
5 to 7	12	9.2%
<b>Mode of delivery</b>		
NVD	47	35.4%
C-section	69	52.3%
Instrumental	14	13.1%
<b>Uric acid level</b>		
6.1-7 mg/dl	94	56.6%
7.1-8 mg/dl	44	33.3%
> 8 mg/ dl	12	09.2%
Age (mean±SD)	25.18±5.95 years	
Gestational age (mean±SD)	35.88±1.66 weeks	

Intra uterine death was occurred in 19(14.6%) neonates, low Apgar score (< 7) was in 25(19.2%), preterm birth was 35(26.9%) and intrauterine growth restriction was in 37 (28.5%) **Table II**

Fetal outcome	Frequency	%
IUD	19	14.6%
Apgar score <7	25	19.2%
Pre-term birth	35	26.9%
IUGR	37	28.5%

Majority of IUGR was found in the maternal age 15-25 years (26.5%) followed by 20% in 26-35 years and 8.3% in 36-45 years. The proportion of intrauterine death was higher in the age group 36-45 years where the proportion of IUD was 25% followed by age group 26-35 years (20%) and 10.8% IUDs in the age group 15-25 years. The proportion of preterm birth was higher in the

age group 36-45 years where the proportion of preterm birth was 30.1% followed by age group 15-25 years (30.1%) and 17.1% preterm birth in the age group 26-35 years (Table-2). The proportion of low Apgar score (score < 6) was found in age group 15-25 years followed by 17.1% in age group 26-35 years and 16.7% in the age group 36-45 years. **Table III**

<b>Table-3. Fetal outcome according to serum uric acid level, parity and gestational age (n=130)</b>				
<b>Variables</b>	<b>Fetal outcome</b>			
	<b>IUGR</b>	<b>IUD</b>	<b>Pre-term birth</b>	<b>apgar score &lt;7)</b>
<b>Serum uric acid level</b>				
6.1-7	12	04	24	18
7.1-8	23	08	11	04
>8	02	07	0	03
<b>Parity</b>				
Primi	21	10	13	08
2-4	14	08	20	04
5-7	02	01	02	03
<b>Gestational age</b>				
32-33	04	19	13	03
34-35	02	11	06	0
36-37	16	12	04	02
38-39	03	08	07	03

## Discussion

Eclampsia is a multi-system disorder and mainly involves kidneys. Due to endothelial damage in the kidneys, it causes proteinuria, hypertension and derangement of renal function.<sup>6</sup> Studies reveal equal prevalence of preeclampsia among nulliparous and multiparous women.<sup>9-11</sup> Whenever defining preeclampsia, hyperuricemia is not a commonly used criteria, but many studies have suggested that hyperuricemia during pregnancy suggests gestational hypertension and can lead to an untoward outcome.<sup>12,13</sup>

In our study, mean age was 25.18±5.95 years (18 to 41 years). Over the half of the study participants i.e. 56.6% had their serum acid uric level 6.1-7 mg/dl followed by 44 (33.3%) had 7.1-8 mg/dl and 12 (9.2%) had serum uric acid > 8 mg/ dl. The mean serum uric ± SD was 7.09 ± 0.60 mg/dl.

In comparison to our results, study conducted by et al<sup>14</sup> reported mean gestational age was 36.85 ± 0.59 weeks. The mean uric acid level of the patients at presentation was 5.067 ± 1.74 mg/dl. The mean uric acid level in group A was 3.64 ± 0.73 mg/dl and in group B was 7.98 ± 0.85 mg/dl. In group A, 9.3% newborns were found small-for-gestational-age (SGA), whereas in Group B, 23.3% newborns were found having SGA. The relative

risk was calculated for development of SGA in hyperuricemia and was found significant (RR=2.5; 95% CI: 1.40- 4.45)

In our study, Intra uterine death was occurred in 19(14.6%) neonates, low Apgar score (<7) was in 25(19.2%), preterm birth was 35(26.9%) and intrauterine growth restriction was in 37 (28.5%). In comparison to our results, study conducted by Hussain S et al<sup>15</sup> mentioned significant increased number of low birth weight fetuses was observed in babies born to hyperuricemic pre-eclamptic mothers in comparison with babies born to normo-uricemic pre-eclamptic mothers.

Another study conducted by Hosna A et al<sup>16</sup> reported that out of 100 cases, there were 20 preterm baby and others such as stillbirth and IUD. So, these entire abnormal fetal outcomes were in the hyperuricaemic group and 5.37 times higher as compared to low serum uric acid group. Mean birth weight of preeclampsia and eclampsia were 2.31kg and 2.30kg respectively compared with 2.5kg in chronic hypertension group.

Similar results are also observed by Akter S et al<sup>17</sup> who reported that in eclamptic group patients, 39 (86%) had adverse perinatal outcome (preterm, IUGR, stillbirth), and 6 (13.3%) term and healthy deliveries when serum uric acid level was >6 mg/dl.

Uric acid is a terminal metabolite of the degradation of nucleotides. It is influenced by diet (i.e. high protein and fructose), alcohol consumption, increased cell turnover, enzymatic defects in purine metabolism or altered kidney function. In pregnancy uric acid concentrations initially fall 25-35% due to the effects of estrogen, expanded blood volume and increased glomerular filtration rate. However, concentrations slowly rise to those observed in nonpregnant women by term gestation (4-6mg/dl).

In our study, the proportion of preterm birth was higher in the age group 36-45 years. The proportion of low Apgar score (score < 6) was found in age group 15-25 years. In comparison to our results, study conducted by Andrew L et al<sup>18</sup> reported that perinatal mortality was observed in 25 (25.1%) cases, out of these 19(76%) were stillbirths and 06(24%) were neonatal deaths. Out of the 25 perinatal deaths 18(72%) had uric acid level >5.5mg/dl.

## Conclusion

Pre eclampsia is a high risk pregnancy still is a major obstetrical and perinatal challenge. Intra uterine growth

restriction and preterm birth are common. Pre-eclamptic women with uric acid level >7mg/dl having more risk of adverse fetal outcome.

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