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A Study on the Prevalence of Pre-Eclampsia and the Effect of Serum Uric Acid Levels on Pregnancy Outcomes in Pre-Eclamptic Women: An observational study

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ABSTRACT

Background: Pre-eclampsia remains a major contributor to maternal and perinatal morbidity and mortality worldwide. Serum uric acid has been proposed as a marker for disease severity and poor pregnancy outcomes. Objective: To assess the prevalence of pre-eclampsia and evaluate the impact of elevated serum uric acid levels on pregnancy outcomes among women diagnosed with pre-eclampsia. Methods: This observational study involved 42 pregnant women diagnosed with pre-eclampsia. Serum uric acid levels were measured and correlated with maternal and fetal outcomes. Demographic profiles and risk factors were recorded. Results: Among the 42 pre-eclamptic women, 59.5% had elevated serum uric acid levels. Adverse maternal and fetal outcomes such as preterm labor, intrauterine growth restriction (IUGR), and caesarean section were significantly associated with higher uric acid levels. Conclusion: Elevated serum uric acid is associated with poor maternal and fetal outcomes in pre-eclampsia. Routine monitoring may help in early identification and better management of high-risk pregnancies.

KEYWORDS: Pre-Eclampsia, Serum Uric acid.

INTRODUCTION

Pre-eclampsia is a pregnancy-specific hypertensive disorder usually occurring after 20 weeks of gestation and is characterized by high blood pressure and proteinuria. It affects 5–8% of pregnancies globally. Despite advances in obstetric care, it remains a leading cause of maternal and perinatal mortality, especially in developing countries. Several biochemical markers have been studied for early detection and prognosis of pre-eclampsia. Among these, serum uric acid has gained attention for its potential role in reflecting placental dysfunction and oxidative stress[1].

The prevalence of preeclampsia in India is estimated to be between 8% and 10% of all pregnancies. It's a significant cause of maternal and perinatal morbidity and mortality, often contributing to preterm births. Preeclampsia is also the second leading cause of maternal death in India after haemorrhage[2].

Prevalence: Studies indicate that preeclampsia affects approximately 8-10% of pregnancies in India. Some studies have reported a higher prevalence, such as 10%. Impact: Preeclampsia is a major contributor to maternal and infant mortality and morbidity. It is a leading cause of preterm births and can lead to complications like

HELLP syndrome, fluid in the lungs, bleeding problems, and liver or kidney damage. Maternal Mortality: Preeclampsia and eclampsia are responsible for a substantial percentage of maternal deaths in India. Risk Factors: Factors such as chronic hypertension, pregestational diabetes, and a history of preeclampsia in previous pregnancies increase the risk of developing the condition[3]. Regional Variations: The prevalence of preeclampsia can vary across different regions of India. Management: Early detection and timely intervention are crucial for managing preeclampsia and reducing maternal complications.

In summary: Preeclampsia is a serious health concern in India, affecting a significant number of pregnancies and contributing to maternal and infant mortality. Early diagnosis and appropriate management are essential for improving outcomes

This study investigates the prevalence of pre-eclampsia in a hospital-based population and evaluates the relationship between serum uric acid levels and pregnancy outcomes.

METHODOLOGY

This study was conducted in a tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 42 patients in the department of Obstetrics & Gynaecology, at a tertiary care centre, from April / 2015 to October/2015

Total 42 participant were approached to project among them No one were excluded in this study and Total 42 Confirmed cases were included on the basis of fulfilling of the eligibility criteria.

The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination.

Study Design and Setting:

A prospective observational study conducted at a tertiary care hospital in Eastern India over 12 months.

Sample Size:

42 pre-eclamptic pregnant women aged 18–40 years.

Inclusion Criteria:

- Singleton pregnancy
- Diagnosed with pre-eclampsia (BP ≥140/90 mmHg and proteinuria ≥300 mg/24h)
- Gestational age ≥20 weeks

Exclusion Criteria:

- Chronic hypertension
- Renal or metabolic diseases
- Multiple pregnancies

Data Collection:

- Detailed history and clinical examination
- Serum uric acid level estimation
- Monitoring maternal and fetal outcomes

Flowchart: Methodology of Study

Pregnant Women Attending ANC Clinic

↓

Screened for Pre-Eclampsia

↓

42 Patients Enrolled

↓

Blood Pressure & Urine Protein Measured
↓
Serum Uric Acid Level Assessed
↓
Monitored for Pregnancy Outcomes
↓
Data Analysis and Interpretation

RESULT

In this study we found that Pre-Eclampsia is associated with demographic profile of patient. 66.6% patient suffered of Pre-Eclampsia is belongs Urban residence followed by 64.3 % Primigravida.

40 % pre eclamptic patient were belong to 26- 30 years age group(Table 1)

Age is also associated factors for pre eclamptic patient.

61.9% pre eclamptic were associated with Gestational Age ≥34 weeks (Table 1)

Demographic Profile of Pre-Eclamptic Women (n=42)

Demographic Factor	Number (n)	Percentage (%)
Age 18–25 years	15	35.7%
Age 26–30 years	17	40.5%
Age >30 years	10	23.8%
Primigravida	27	64.3%
Multigravida	15	35.7%
Urban residence	28	66.7%
Rural residence	14	33.3%
Gestational Age <34 weeks	16	38.1%
Gestational Age ≥34 weeks	26	61.9%

Risk Factors Identified in Pre-Eclampsia (n=42)

Risk Factor	Number (n)	Percentage (%)
Family history of hypertension	14	33.3%
Obesity (BMI >25)	11	26.2%
Diabetes mellitus	5	11.9%
Advanced maternal age (>30 yrs)	10	23.8%
Nulliparity	27	64.3%
Poor socioeconomic status	18	42.9%

In this study we get to know that Serum Uric Acid Levels: Elevated (>6.0 mg/dL): 25 women (59.5%) Normal (≤6.0 mg/dL): 17 women (40.5%)

Maternal Outcomes: Cesarean delivery: 26 (61.9%)Preterm labor: 18 (42.8%)Eclampsia: 5 (11.9%)Fetal Outcomes: Low birth weight (<2.5 kg): 20 (47.6%)IUGR: 14 (33.3%)NICU admission: 12 (28.6%)Stillbirth: 2 (4.8%)

There was a statistically significant correlation ($p<0.05$) between high uric acid levels and adverse outcomes.

DISCUSSION

Preeclampsia, a pregnancy complication characterized by high blood pressure and organ damage, is influenced by various demographic factors. These include maternal age (both young and older), socioeconomic status, race/ethnicity, and possibly family history of hypertension or diabetes. Specific demographic factors include: Maternal Age: Younger women (under 20) and older women (35 and over) are at increased risk. Socioeconomic Status: Lower socioeconomic status is often linked to a higher prevalence of preeclampsia[4].

Race/Ethnicity: Black women experience higher rates of preeclampsia compared to other racial groups. Family History: A family history of hypertension or diabetes can increase a woman's risk of developing preeclampsia. Other factors: While not strictly demographic, prior history of preeclampsia, obesity, and chronic hypertension are also significant risk factors. These factors can interact with each other, creating a complex picture of preeclampsia risk. For example, a younger woman from a lower socioeconomic background might have a higher risk than an older woman from a higher socioeconomic background[5].

In this study we found that Pre-Eclampsia is associated with demographic profile of patient. 66.6% patient suffered of Pre-Eclampsia is belongs Urban residence followed by 64.3 % Primigravida.40 % pre eclamptic patient were belong to 26- 30 years age group(Table 1)

Age is also associated factors for pre eclamptic patient.61.9% pre eclamptic were associated with Gestational Age ≥34 weeks (Table 1)

This study reaffirms the association of hyperuricemia with poor obstetric outcomes in pre-eclamptic women. Elevated uric acid is believed to reflect placental ischemia, oxidative stress, and endothelial dysfunction. The majority of women with higher uric acid levels had complications such as preterm delivery, IUGR, and cesarean delivery[6].

Preeclampsia, a pregnancy complication characterized by high blood pressure and protein in the urine, has several risk factors. These include prior preeclampsia, chronic hypertension, multiple gestation (carrying more than one baby), and certain pre-existing medical conditions like diabetes, kidney disease, and autoimmune disorders. Other factors like older maternal age, obesity, and family history of preeclampsia also contribute to increased risk. Prior Preeclampsia: Women who have had preeclampsia in a previous pregnancy are at higher risk of developing it again. Chronic Hypertension: Having high blood pressure before pregnancy increases the risk of preeclampsia[7-9].

Multiple Gestation: Carrying twins, triplets, or more increases the likelihood of preeclampsia[10-12].

Pre-existing Medical Conditions: Diabetes (Type 1 and Type 2): Both pre-existing and gestational diabetes are linked to an increased risk. Kidney Disease: Kidney problems before pregnancy can raise the risk. Autoimmune Disorders: Conditions like lupus or rheumatoid arthritis can also contribute to preeclampsia. Maternal Age: Both younger and older mothers (especially those over 35) are at higher risk. Obesity[13-15]

These findings are consistent with several previous studies and suggest the potential of serum uric acid as a prognostic biomarker. However, given the limited sample size, larger studies are warranted.

CONCLUSION

Pre-eclampsia significantly affects maternal and neonatal health, with serum uric acid levels serving as a useful indicator of severity and prognosis. Regular monitoring and early intervention based on uric acid levels may reduce complications and improve outcomes in affected pregnancies

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Conflict of Interest

The authors report no conflicts of interest

Submission Declaration

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

REFERENCES

1. Determinants of pre-eclampsia: a case-control study in a district hospital in South India. Ganesh KS, Unnikrishnan B, Nagaraj K, Jayaram S. Indian J Community Med. 2010;35:502–505. doi: 10.4103/0970-0218.74360. [DOI] [PMC free article] [PubMed] [Google Scholar]
2. Determinants of preeclampsia among pregnant mothers attending antenatal care (ANC) and delivery service in Gedeo Zone, Southern Ethiopia: case control-study. Mareg M, Molla A, Dires S, Berhanu Mamo Z, Hagos B. Int J Womens Health. 2020;12:567–575. doi: 10.2147/IJWH.S251342. [DOI] [PMC free article] [PubMed] [Google Scholar]
3. Risk factors and impacts of pre-eclampsia: an epidemiological study among pregnant mothers in Cairo, Egypt. El-Moselhy EA, Khalifa HO, Amer SM, Mohammad KI, Abd El-Aal HM. https://www.jofamericanscience.org/journals/am-sci/am0705/43_5303am0705_311_323.pdf J Am Sci. 2011;7:311–323. [Google Scholar]
4. Determination of risk factors for pre-eclampsia and eclampsia in a tertiary hospital of India: a case control study. Bej P, Chhabra P, Sharma AK, Guleria K. J Family Med Prim Care. 2013;2:371–375. doi: 10.4103/2249-4863.123924. [DOI] [PMC free article] [PubMed] [Google Scholar]
5. Prevalence and risk factors associated with severe pre-eclampsia among postpartum women in Zanzibar: a cross-sectional study. Machano MM, Joho AA. https://doi.org/10.1186/s12889-020-09384-z. BMC Public Health. 2020;20:1347. doi: 10.1186/s12889-020-09384-z. [DOI] [PMC free article] [PubMed] [Google Scholar]
6. Socio-demographic and other risk factors of pre eclampsia at a tertiary care hospital, karnataka: case control study. Ramesh K, Gandhi S, Rao V. J Clin Diagn Res. 2014;8:0–4. doi: 10.7860/JCDR/2014/10255.4802. [DOI] [PMC free article] [PubMed] [Google Scholar].
7. Ananth, C. V., Keyes, K. M., & Wapner, R.J. (2013). Pre-eclampsia rates in the United States, 1980-2010: Age-period-cohort analysis. *British Medical Journal, 347,* f6564. Retrieved June 23, 2016, from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3898425
8. Ngoc, N. T., Merialdi, M., Abdel-Aleem, H., Carroli, G., Purwar, M., Zavaleta, N., et al. (2006). Causes of stillbirths and early neonatal deaths: Data from 7993 pregnancies in six developing countries. *Bulletin of the World Health Organization*, *84*(9), 699–705. Retrieved January 4, 2017, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2627466
9. Haram, K., Svendsen, E., & Abildgaard, U. (2009). The HELLP syndrome: Clinical issues and management. A review. *BMC Pregnancy & Childbirth, 9,* 8. Retrieved June 6, 2014 .
10. factors for pre-eclampsia at antenatal booking: Systematic review of controlled studies. *British Medical Journal,330*(7491), 565. Retrieved December 30, 2014,
11. Boghossian, N. S., Yeung, E., Mendola, P., Hinkle, S. N., Laughon, S. K., Zhang, C., & Albert, P. S. (2014). Risk factors differ between recurrent and incident preeclampsia: A hospital-based cohort study. *Annals of Epidemiology,24*(12), 871–877e3. Retrieved December 13, 2013*Preeclampsia*. Retrieved June 6, 2014
12. Sanchez, S. E., Qiu, C., Williams, M. A., Lam, N., & Sorensen, T. K. (2008). Headaches and migraines are associated with an increased risk of preeclampsia in Peruvian women. *American Journal of Hypertension, 21*(3), 360–364.
13. Rosenberg, T. J., Garbers, S., Lipkind, H., & Chiasson, M. A. (2005). Maternal obesity and diabetes as risk factors for adverse pregnancy outcomes: Differences among 4 racial/ethnic groups. *American Journal of Public Health, 95*(9), 1545–1551.
14. Lin, H. C., Chen, S. F., Lin, H. C., & Chen, Y. H. (2010). Increased risk of adverse pregnancy outcomes in women with rheumatoid arthritis: A nationwide population-based study. *Annals of the Rheumatic Disease, 69,* 715–717.
15. Clowse, M. E. B. (2007). Lupus activity in pregnancy. *Rheumatic Disease Clinics of North America*, *33,* 237.