# **ORIGINAL ARTICLE**

# Serum uric acid as a predictor of gestational diabetes mellitus

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#### ABSTRACT:

**Background:** Gestational diabetes mellitus (GDM) is a relatively common disorder of pregnancy. The present study was conducted to assess the role of serum uric acid as a predictor of gestational diabetes mellitus. **Materials & Methods:** 80 antenatal women in first trimester were selected. A venous blood sample was taken and measured for GDM. **Results:** Age group 20-25 years had 22, 26-30 years had 38, and 31-35 years had 20 patients. Parity was multipara in 45 and primi in 35 patients. GTT result was normal in 68 and positive in 12 patients. The difference was significant (P< 0.05). The serum uric acid patients, 10 had positive GTT results and among 45 normal serum uric acid patients, 2 had positive GTT result. **Conclusion:** Higher blood uric acid levels in the first trimester were associated with an increase in the risk of GDM development.

Key words: Diabetes, trimester, Uric acid

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This article may be cited as: Navani S. Serum uric acid as a predictor of gestational diabetes mellitus. J Adv Med Dent Scie Res 2016;4(3):177-179.

#### INTRODUCTION

Gestational diabetes mellitus (GDM) is a relatively common disorder of pregnancy. The prevalence of GDM ranges from 1 to 6% depending on the studied population.<sup>1</sup> Prediction and diagnosis of GDM is important for ongoing pregnancy and has important implications for subsequent health of the mother. GDM is considered a significant risk factor for subsequent development of type II diabetes and is associated with a poorer cardiovascular risk profile compared with women without GDM.<sup>2</sup>

The screening for GDM, that was established 50 years ago, demonstrates the increased risk of hyperglycaemia during pregnancy, and the evidence supporting that effective treatment may reduce hyperglycemia related adverse pregnancy outcomes.<sup>3</sup> Normal value of serum uric acid is between 2 to 6.5 mg/dl. In early pregnancy, there is decreased serum uric acid due to increased GFR. Uric acid is a product of metabolism of purines and is formed by xanthine oxidase enzyme.<sup>4</sup> Hypoxia and ischemia of the

placenta and cytokines such as interferon induce the expression of xanthine oxidase and therefore, increase the production of uric acid and also reactive oxygen species. Serum uric acid is interlinked with hypertension, obesity, hyperinsulinemia and dyslipidemia indicating that it could be a part of the group of factors of metabolic syndrome.<sup>5</sup> The present study was conducted to assess the role of serum uric acid as a predictor of Gestational diabetes mellitus.

#### **MATERIALS & METHODS**

The present study comprised of 80 antenatal women in first trimester. All gave their written consent to participate in the study.

Data such as name, age etc. was recorded. A venous blood sample was taken and was measured after fasting, one hour and two hours and assessed for GDM using ADA criteria. Results were entered in MS excel sheet for statistical analysis, where appropriate tests were applied. P value less than 0.05 was considered significant.

RESULTS	
Table I Demographic	data

Parameters	Variables	Number	P value
Age group (Years)	20-25	22	0.72
	26-30	38	
	31-35	20	
Parity	Multi	45	0.91
	Primi	35	
GTT result	Normal	68	0.01
	Positive	12	

Table I shows that age group 20-25 years had 22, 26-30 years had 38, and 31-35 years had 20 patients. Parity was multipara in 45 and primi in 35 patients. GTT result was normal in 68 and positive in 12 patients. The difference was significant (P < 0.05).

# Table II Measurement of uric acid

Serum uric acid	Number	P value
Elevated (>4.2)	35	0.51
Normal (<4.2)	45	

Table II, graph I shows that serum uric acid >4.2 was seen in 35 and <4.2 in 45 subjects. The difference was non-significant (P> 0.05).

# Graph I Measurement of uric acid



Table III Serum uric acid category with GTT results

Serum uric acid	GTT result		Total
	Normal	Positive	
Elevated	25	10	35
Normal	43	2	45
Total	68	12	80

Table III shows that among 35 elevated uric acid patients, 10 had positive GTT results and among 45 normal serum uric acid patients, 2 had positive GTT result.

# DISCUSSION

Several risk factors have been implicated in the development of GDM. These are similar to the factors associated with overt diabetes and include increased maternal age, obesity, ethnic background, family history of T2DM and a previous history of GDM.<sup>6</sup> In addition, other risk factors include previous history of a macrocosmic baby, previous adverse pregnancy outcome, glycosuria, polyhydramios or large foetus in present pregnancy.7 Among these risk factors, increased maternal weight is the most commonly evaluated reversible risk factor. Wang et al<sup>9</sup> showed that an independent significant relationship between reduced intake of polyunsaturated fat and development of GDM. In another study evaluating the effect of lifestyle behavior in white women, revealed a significant correlation of high consumption of saturated fat consumption and risk of GDM, whereas high consumption of polyunsaturated fat was associated with decreased risk for GDM.8 The present study was conducted to assess the role of serum uric acid as a predictor of Gestational diabetes mellitus.

We found that age group 20-25 years had 22, 26-30 years had 38, and 31-35 years had 20 patients. Parity was multipara in 45 and primi in 35 patients. GTT result was normal in 68 and positive in 12 patients. Laughon et al<sup>9</sup> in their study uric acid was measured in 1570 plasma samples collected at mean gestational age of  $8.9 \pm 2.5$  weeks. The primary outcome was GDM, diagnosed by 3-hour glucose tolerance test using Carpenter and Coustan criteria or by a 1-hour value of  $\geq 200 \text{ mg/dL}$ . Almost half (46.6%) of the women with GDM had first-trimester uric acid concentrations in the highest quartile (>3.57-8.30 mg/dL). Women with uric acid in the highest quartile had a 3.25-fold increased risk (95% confidence interval, 1.35-7.83) of developing GDM after adjustment for body mass index and age. This effect was concentration dependent as risk increased with increasing uric acid quartiles (P = .003).

We found that the serum uric acid >4.2 was seen in 35 and <4.2 in 45 subjects. Among 35 elevated uric acid patients, 10 had positive GTT results and among 45 normal serum uric acid patients, 2 had positive GTT result. Wolak et al10 examined the association between uric acid (UA) level during the first 20 weeks of pregnancy and the development of gestational diabetes mellitus (GDM) and preeclampsia in the second half of pregnancy. The study population included registered births (n = 5507). The UA levels during the first 20 weeks of pregnancy were sorted by  $UA \le 2.4 \text{ mEq/L}$ ; UA = 2.5-4.0 mEq/L, UA = 4.1-5.5mEq/L, and UA > 5.5 mEq/L. A significant linear association was documented between UA level in the first 20 weeks and the prevalence of GDM and mild preeclampsia. The lowest and the highest prevalence of GDM were found in the UA  $\leq 2.4$  mEq/L group (6.3%) and in the UA > 5.5 mEq/L group (10.5%) (p < 0.001), respectively. Mild preeclampsia was diagnosed in 2.1% of the patients from the UA  $\leq 2.4$ mEq/L group, 3.3% from the UA = 2.5-4.0 mEq/L group, 5.3% from the UA = 4.1-5.5 mEq/L group, and 4.5% from the UA > 5.5 mEq/L group. Three multiple logistic regression models controlling for maternal age showed that UA level is an independent risk factor for both GDM and mild preeclampsia.

### CONCLUSION

Authors found that higher blood uric acid levels in the first trimester were associated with an increase in the risk of GDM development.

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