

## SERUM UREA AND URIC ACID CONCENTRATION IN PREGNANT WOMEN IN SUB-URBAN COMMERCIAL COMMUNITY IN AFRICA.

\*JE Ahaneku, \*\*JI Adinma, \*\*\*GI Ahaneku, \*\*BO Nwosu, \*PC Nwofor, \*\*\*\*CC Okoli  
*Departments of \*Chemical Pathology, \*\*Obstetrics and Gynaecology, \*\*\*Medicine, and \*\*\*\*Medical Microbiology, College of Health Sciences, Nnamdi Azikiwe University and the Teaching Hospital, Nnewi, Anambra State, Nigeria.*

### ABSTRACT

Serum uric acid and urea levels were determined in 27 pregnant and 17 non-pregnant black African women. Uric acid levels for the pregnant women were significantly raised, and the relationship between uric acid elevation and gestational proteinuric hypertension was discussed.

In conclusion, we recommend that uric acid estimation should be included during routine antenatal clinics in normal pregnancy. That the use of uric acid levels should be encouraged for the diagnosis and management of gestational proteinuric hypertension in African pregnant women. The above recommendation will help to reduce prenatal morbidity and mortality in African pregnant women.

**Key Words:** Urea, uric acid, gestational proteinuric hypertension, pregnant women, Africans.

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### INTRODUCTION

Hypertension is a known risk factor for coronary heart disease (CHD)<sup>1</sup>, and raised blood urea level has been implicated as a predictor of early death in acute myocardial infarction<sup>2</sup>. The association between uric acid levels and gestational proteinuric hypertension (GPH) had long been recognised<sup>3,4</sup>. Further reports of the association between uric acid levels and perinatal outcome<sup>5</sup> have led to the consistent use of uric acid measurements in the diagnosis and management of patients with GPH. A recent report has shown that there are racial variations in serum uric acid concentration in pregnancy<sup>6</sup>. Certain reports of serum uric acid<sup>7</sup> and urea<sup>8</sup> levels in some pregnant urban Africans were documented over a decade ago. The present study was therefore, designed to evaluate serum urea and uric acid levels in pregnant women residing in a typical suburban commercial community in Nigeria; in whom we previously reported, had variable cholesterol levels from the remaining parts of the nation<sup>9</sup>. The assessment of uric acid levels will provide information that may recommend the inclusion of uric acid determination for the diagnosis and management of pregnant women with gestational proteinuric hypertension in the African communities.

### SUBJECTS AND METHODS

**Selection:** Twenty seven pregnant women were recruited into the study during the second trimester or prior to 30 weeks of gestation. These women were

recruited from the antenatal (out-patients) clinics of the Department of Obstetrics and Gynecology, Nnamdi Azikiwe University Teaching Hospital, Nnewi Nigeria. Seventeen non-pregnant women of similar age and demographic profiles with those of the pregnant women (see table 1), served as controls. Pregnant and non-pregnant women who were known to have illness such as hypertension, diabetes mellitus, renal diseases, liver diseases, pre-eclampsia, gout, etc were excluded from this study. The non-pregnant women were neither lactating mothers nor on oral contraceptives. The exercise was explained to both pregnant and the non-pregnant women, and they all gave their consent before inclusion into the study.

### Sampling procedure, Urea and Uric acid Assays:

Ten millilitres of venous blood were withdrawn from the pregnant and non-pregnant women in the morning hours, into a sterile container, allowed to clot and the serum separated and stored immediately at -8°C before analysis. Serum urea and uric acid levels in both pregnant and non-pregnant women were determined by enzymatic methods (Bayer Diagnostics Sera pack testing kits, UNICHEM Nigeria Ltd). For each assay, a commercial quality control (Bayer Diagnostics Control sera, UNICHEM Nigeria Ltd), and pooled sera of known values were always included.

**Data Analysis:** The mean values of urea and uric acid for the pregnant and non-pregnant women were compared using the two-tailed independent t-test. Spearman correlation was also used to assess possible relationship between uric acid and urea in the pregnant women.

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Correspondence: Prof JE Ahaneku  
E-Mail: ahanekujoe@yahoo.co.uk

## RESULTS

Figure 1, shows the mean and standard deviation of urea and uric acid levels in pregnant and non-pregnant women. The mean uric acid level for the pregnant women was significantly higher ( $P < 0.05$ ) than the value for non-pregnant women. The slight increase in the mean urea level for the pregnant women was not statistically significant (see Fig 1b). A significant positive correlation ( $P = 0.02$ ) was observed between urea and uric acid levels in the pregnant women.

Table 1: Demographic Profile of the Pregnant Women and Control Subjects.

Variables	Pregnant Women	Non-Pregnant Women (Control)
Number of subjects	27	17
Age (years)	22-38	23-33
Obesity ( $\text{kg}/\text{m}^2$ )	Nil	Nil
Smoking habit	Nil	Nil
Alcohol intake	Nil	1
Education (years)	9-16	12-17
Gestation (weeks)	23.04 $\pm$ 5.06	-

Gestation in weeks is expressed as mean  $\pm$  standard deviation.

Figure: 1a

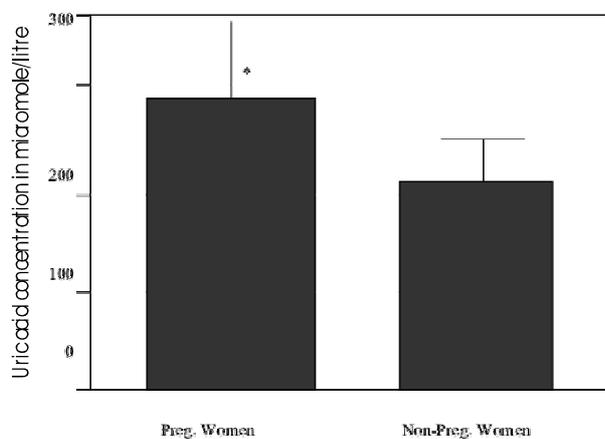
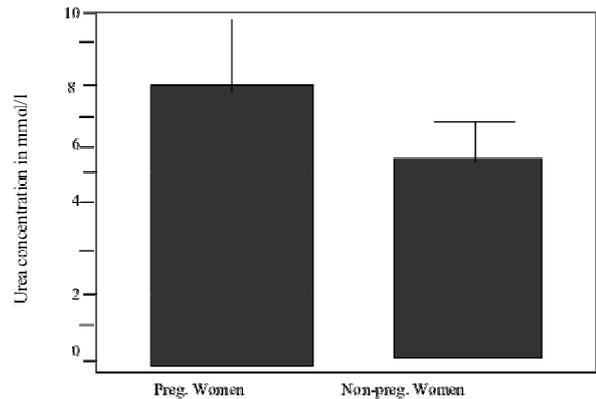


Figure: 1b



Figures 1a & 1b represent Uric acid and urea levels in pregnant and non-pregnant women \*  $= P < 0.05$ .  $n = 27$  for pregnant women;  $n = 17$  for non-pregnant women. Preg. = Pregnant.

## DISCUSSION

Our finding of raised serum uric acid level in pregnant women is consistent with the observations by others in different populations<sup>6-7</sup>. Urea level also increased in the pregnant women, but the increment was not remarkable when compared with the level from non-pregnant women (control). A direct association was however observed between the non-protein nitrogen compounds (urea and uric acid) in the pregnant women. The increased in the non-protein nitrogen compound (uric acid) was attributed to the change in metabolism during pregnancy, as well as to an increased intake of proteinous foods by the pregnant women. Hyperuricemia is associated with increased mortality from cardiovascular diseases in women<sup>1</sup>. Meanwhile, of great importance to us is the relevance of uric acid elevation for the monitoring of gestational proteinuric hypertension in our African pregnant women. Though, the raised level of uric acid in the pregnant women was within the reference (normal) range for our environment, it is however, important to note that an increase  $> 0.12$  mmol/l or a consistently raised level of 0.06 mmol/l in normal pregnant women above and initial baseline result should alert the clinician to the possibility of developing gestational proteinuric hypertension<sup>5</sup>. These observations therefore suggest the need for uric acid assessment during routine antenatal clinics in normal pregnancy, as well as for the management of patients with gestational proteinuric hypertension in African pregnant women. In such situations, unusually high uric acid levels may alarm the clinician for urgent intervention.

From our findings, we hereby recommend as follows: (1) That uric acid estimations should be included during routine antenatal clinics in normal pregnancy. (2) That the use of uric acid levels should

be encouraged for the diagnosis and management of gestational portienuric hypertension in African pregnant women. These recommendations will help to reduce prenatal mortality and morbidity in African pregnant women.

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