

## ABSTRACT

### **Preeclampsia in Jamaican women: Folate intake, homocysteine levels and polymorphisms of the methylene tetrahydrofolate reductase (MTHFR) gene**

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**Objective:** To determine the association of total plasma homocysteine (tHcys) levels, dietary folate intake, plasma folate levels and single nucleotide polymorphisms (SNPs) in the methylenetetrahydrofolate reductase (MTHFR) gene with the development preeclampsia (PE) in Jamaica.

**Design & Methods:** The main study consisted of 103 participants (50 women with PE and 53 controls). In addition two other studies were done; a) a sub-study of 16 non-pregnant women and b) a cohort study of 106 women recruited at various trimesters in pregnancy and an additional 21 women that were recruited prospectively throughout pregnancy. Informed consent was obtained from each participant. Venous blood samples were collected and data were taken from hospital records. The tHcys levels were measured after reduction with dithioerythritol (DTE) and derivatization with mono-bromo-bimane using High Performance Liquid Chromatography (HPLC). For the main study each participant was administered a food frequency questionnaire that focused mainly on foods rich in folate. Serum folate and vitamin B<sub>12</sub> levels were measured using a chemiluminescent kit (DPC, Immulite, CA., USA). DNA obtained from buffy coats was used to perform genotyping. PCR/RFLP was used to determine the

genotypes of the women. Routine laboratory tests for standard clinical parameters in pregnancy were carried out in the Department of Pathology, University Hospital of the West Indies (UHWI).

**Results:** The mean tHcys levels decreased in trimesters one and two of pregnancy but were increased significantly in the third trimester ( $p=0.000$ ). Glutathione levels and the glutathione: homocysteine ratio decreased significantly throughout pregnancy ( $p=0.000$ ). However, mean tHcys, glutathione levels and their ratios were similar in PE and controls ( $p=0.115$ ,  $0.442$ ,  $0.176$  respectively). There was no difference in the frequency of the SNPs (677TT, 1317CC, 1298CC) between PE and controls ( $\chi^2=1.235$ ,  $p=0.539$ ,  $\chi^2=2.132$ ,  $p=0.344$ ;  $\chi^2=0.839$ ,  $p=0.657$ , respectively). The mean dietary folate intake was  $207.6 \pm 127.5\mu\text{g/day}$  for women with PE and  $193.7 \pm 158.9\mu\text{g/day}$  for controls ( $p=0.711$ ). The folate obtained from supplements was similar for PE and the controls ( $p=0.413$ ). Mean serum folate and vitamin B<sub>12</sub> levels were similar in both cases and controls ( $p=0.186$ ,  $0.990$ , respectively). In the general population, the prevalence of the 677T, 1298C and 1317C alleles were 9.5%, 41.5% and 26%, respectively. The 677TT, 1298CC and 1317CC genotype distribution did not affect tHcys levels ( $\chi^2=146.38$ ;  $p=0.986$ ,  $\chi^2=162.00$ ;  $p=0.313$ ,  $\chi^2=192.72$ ;  $p=0.391$ ). Mean serum triglycerides were significantly higher in the women with PE than in the controls ( $2.15 \pm 0.90\text{mmol/L}$  and  $1.67 \pm 0.48\text{mmol/L}$ ,  $p=0.00$ ).