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Determinants of homocysteine in pregnancy

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Background: Pregnancy is associated with changes in homocysteine metabolism; most likely related to hormonal factors and fetal requirements. Studies assessing total homocysteine concentration (tHcy) and its determinants in pregnancy have been undertaken in populations with Western dietary patterns.

Hypothesis: tHcy and determinants of tHcy in pregnant women from a population where access to fortified foods is limited and where women habitually consume diets rich in fish, eggs, rice and fruit, do not differ from Westernised populations.

Methodology: Pregnant women (n=226) recruited in Seychelles, provided blood samples at enrolment, week 28 of gestation and at delivery. Cord blood was obtained from a subset of participants (n=135). Serum tHcy and related B vitamin concentration were assessed on completion of the study.

Results: As in other studies, maternal tHcy was lower during pregnancy than at delivery while folate and B12 status declined significantly to delivery. Despite a lower maternal folate status, cord blood folate status was similar to that reported previously in populations with Westernised diets. Folate was a significant determinant of tHcy at all timepoints. Betaine and B12 were also significant determinants of cord blood tHcy. In contrast to previous studies, betaine was only a significant determinant of maternal tHcy when the amino acid, methionine, was included in the model.

Implications: Our results suggest that, during pregnancy in the face of lower folate status and lower serum methionine, betaine is a significant determinant of tHcy, possibly owing to an increase in the activity of betaine homocysteine methyl transferase (BHMT) remethylation pathway.