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Maternal nutrition and fetal macrosomia in uncomplicated pregnancies: a prospective cohort study

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Fetal macrosomia or delivery of a large for gestational age (LGA) infant (birthweight >4000 g) in uncomplicated pregnancies is increasing in many Western countries which may have serious implications for maternal and neonatal morbidity⁽¹⁾. While fetal macrosomia has an established link with maternal diabetes the majority of macrosomic infants are born to non-diabetic mothers⁽²⁾, with maternal obesity now considered an established risk factor for delivering a macrosomic baby⁽³⁾. Evidence relating to maternal nutrition and macrosomia is inconclusive with the majority of studies to date investigating associations between maternal nutrition and birthweight rather than macrosomia specifically. The aim of this study was to investigate maternal nutrition as a potential modifiable risk factor for fetal macrosomia.

Low risk pregnant women predicted to deliver LGA infants (study group) and women predicted to deliver appropriate for gestational age (AGA) infants (control group) were recruited from antenatal clinics. Participants maintained a four day food diary in the third trimester of pregnancy. Demographic and obstetric data were collected from maternity records. Completed food diaries were imported into a food analysis database (WISP©). Total energy intake (TEI) and nutrient intakes were calculated. Data were analysed by recruitment groups (study and control group) and by delivery birthweight groups: predicted to and delivered a LGA infant (LGA:LGA); predicted to deliver a LGA infant but delivered an AGA infant (LGA:AGA); and, predicted to and delivered an AGA infant (AGA:AGA).

Of the 114 women who participated in the study, 100 women completed the food diary at 32 (2.6) weeks gestation. Intake of PUFA *n*-3 was significantly higher in the study group (women predicted to deliver LGA infants) when compared to the control group, after adjustment for known variables associated with birthweight ($p = 0.047$). Further analyses by delivery birthweight demonstrated that intake of PUFA *n*-3 remained significantly different between delivery groups ($p = 0.015$), and post hoc analyses revealed that women in the LGA:AGA group consumed significantly higher PUFA *n*-3 than women in the LGA:LGA group ($p = 0.044$). Furthermore, LGA:AGA women had significantly higher TEI ($p = 0.038$), significantly higher intake of total fats ($p = 0.029$) and PUFA *n*-6 ($p = 0.034$) and significantly lower intake of carbohydrates ($p = 0.032$) after adjustment for variables associated with birthweight.

Results suggest that an increased intake of PUFAs, combined with a decreased carbohydrate intake in the third trimester may have had a modifying effect on subsequent birthweight, in women predicted to have macrosomic babies. Further research is required to determine if adopting a diet high in PUFAs and low in carbohydrate can reduce the risk of macrosomia in low risk pregnancies.

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