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Periconceptional antioxidant micronutrient intake on fetal growth and maternal blood pressure in obese and overweight women

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Background: Reactive oxygen species are normally generated during the development of maternal-placental system, which are removed by antioxidant defenses such as copper/zinc superoxide dismutases (Cu/Zn SODs) and selenium-dependent glutathione peroxidases. These process is influenced by maternal diet and inadquent maternal antioxidant intake can lead to poor pregnancy outcome. We propose that an especially important time to assess maternal diet is the periconceptional period (4 wk before the last menstrual period (LMP) through 8 wk. after the LMP). We believe this time period is conceptually relevant exposure time since it relates with spiral arteries remodeling timeline. Based upon literature review, we selected six antioxidant micronutrient: vitamins C, vitamin E, copper, zinc, selenium, and magnesium, that act as precursor, essential cofactors for or themselves act as antioxidants. The aim of our study is to examine the interaction of maternal antioxidant micronutrients intake with fetal growth and maternal blood pressure (mean arterial pressure (MAP)) during periconceptional time in obese and overweight underserved women.

Methods: Study subjects were recruited as part of the Prenatal Exposures and Preeclampsia Prevention 3 Study, a longitudinal cohort study of preeclampsia mechanisms in obese and overweight women. Food Frequency Questionnaire (FFQ) (Berkeley Nutrition Services, Berkeley, California) was used to assess the usual dietary intake during periconceptional period. 286 women completed early-pregnancy (first trimester) FFQ. Linear regression model adjusted for maternal race, age, marital status, prepregnancy BMI, education, household income, parity, smoking, and periconception vitamin use was used to assess the association between maternal antioxidant micronutrients intake with fetal growth and MAP.

Results: Low birth weight was higher in younger (<20) or older (>30), non-hispanic black, not married, less educated, low-income, and smokers, overweight at the start of pregnancy. Vit E (P value=0.014) and Magnesium (P value=0.045) intake was positively correlated with birth weight. There was no significant association between antioxidant micronutrient and change in MAP.

Conclusion: Magnesium and Vitamin E intake were significantly associated with birth weight. Overall, our study population had lower intake of antioxidant nutrients compared to the Recommended Dietary Allowance (RDA). Dietary assessment, including appropriate supplementation, and intervention to improve antioxidant micronutrient intake during the periconception time may be indicated in underserved pregnant women to decrease the risk of fetal growth restriction.

Biography

Frey Gugs is a 4th year medical student at University of Pittsburgh School of Medicine. She has completed M.Sc in Global health from UCSF, and has earned B.A in Molecular cell Biology, from UC Berkeley. She has published one paper in reputed journal and was contributing author on a second paper.

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