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Anthropometric Changes over the Course of Pregnancy and Their Association With Adequacy of Gestation Weight Gain

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Gestational weight gain (GWG) is a normal and expected component of a healthy pregnancy as it reflects the increasing size and weight of the products of conception (e.g., fetus, placenta) as well as maternal tissue, blood, extracellular fluid and maternal fat stores. However, the one component that is malleable, maternal fat stores, has not been well described by adequacy of GWG. The Pregnancy Eating Attitudes Study (PEAS) protocol allows for an examination of how changes in anthropometric indicators during pregnancy vary based on whether GWG is within the Institute of Medicine (IOM) guidelines. Data were collected on 353 healthy pregnant women (white: 72%; black 15%; other 13%; mean age 30.4yrs), participating in the PEAS cohort at the University of North Carolina Prenatal Clinics. Anthropometric indicators (weight, mid upper arm circumference, and skin folds of the triceps, thigh and upper iliac) were measured at <12 weeks, 16-22 weeks, and 28-32 weeks' gestation. Fat gain was calculated using the formula by Paxton et al. 1 as $\text{fat gain} = 0.77 (\text{weight change, kg}) + 0.07 (\text{change in thigh skinfold thickness, mm}) - 6.13$. Adequacy of GWG was defined using the 2009 IOM guidelines, calculated for the period of observation. ANOVA was used to test for differences in anthropometric changes by baseline BMI and adequacy of GWG. Multiple logistic regression was used to examine the relationship of changes in anthropometrics, including fat gain, with adequacy of GWG, adjusting for baseline BMI. On average women gained 8.4 kg from a mean of 9.8 to 30.8 weeks of gestation which corresponded to 132% of the recommended GWG. Overall, 22.4% of women gained inadequately and 46% excessively. All anthropometric indicators were correlated with percent of recommended GWG, with fat gain having the highest correlation ($r=0.73$). There were significant differences in mean changes of anthropometric indicators by maternal BMI and adequacy of GWG. Among obese women as well as among those who gained inadequately all anthropometric indicators were in the negative direction (not including weight gain). Logistic regression results illustrated significant associations between inadequate weight gain and changes in mid-upper arm circumference, thigh and upper iliac skinfolds while excessive weight gain was only associated with changes in triceps skinfolds. Fat gain was associated with both inadequate and excessive weight gain. In summary, these data illustrate that anthropometric changes over the course of pregnancy differ by maternal BMI and are associated with adequacy of GWG.

Biography:

Dr. Siega-Riz is a professor of public health sciences and obstetrics and gynecology at the University of Virginia School of Medicine and holds a joint appointment at UNC. Her research focuses on the first 1000 days of life by understanding the influence of maternal weight status and dietary behaviors in the etiology of adverse pregnancy outcomes, including but not limited to, gestational diabetes, gestational disorders of hypertension, preterm birth and inadequate or excessive gestational weight gain. She is also exploring early determinants of childhood obesity in the Pregnancy Eating Attributes (PEAS) study funded by NICHD at UNC