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Original Studies

Pre-Pregnancy Body Mass Index among Pregnant Adolescents: Gestational Weight Gain and Long-Term Post Partum Weight Retention

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Abstract. *Study Objective:* To determine the relationship between adolescents' pre-pregnancy body mass index (BMI), and gestational weight gain and postpartum weight retention.

Design: We review the medical records of adolescents participating in a prospective cohort study on comprehensive health care and parenting education to determine pre-pregnancy BMI, gestational weight gain, and postpartum weight retention at one year.

Setting: Urban academic hospital clinic.

Participants: 102 pregnant adolescents aged 15–21 years.

Main Outcomes: Gestational weight gain and weight retention at one year postpartum.

Results and Conclusions: Fifty-two (51%) adolescent women had normal pre-pregnancy BMI according to the Institute of Medicine classification. Adolescent women with normal (36.5%) and high pre-pregnancy BMI (66.5%) were more likely than women with low pre-pregnancy BMI (26.5%) to exceed recommended gestational weight gain. Adolescent women who exceeded recommended weight gain retained significantly more weight at 1 year postpartum than women with weight gain within or below the recommendation. In a linear regression model that controlled for age, smoking, pregnancy complication, and post partum contraceptive use, pre-pregnancy BMI and gestational weight gain were the strongest predictors of postpartum weight retention at 1 year.

A normal to high pre-pregnancy BMI and excessive gestational weight gain are important predictors of postpartum weight retention in adolescents. These two predictors must be monitored systematically with the aim of preventing postpartum obesity and its associated diseases among this population.

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Introduction

Four in 10 adolescent girls get pregnant at least once before the age of 20 in the United States, leading to nearly 900,000 teenage pregnancies each year.[1–3] Among adolescents, there is some evidence those with excessive maternal weight gain has a greater tendency to retain excess weight postpartum,[4] placing them at risk of becoming obese. There is a higher rate of obesity among adolescents from lower income groups as opposed to higher income groups.[5,6] The identification of groups of people at risk of becoming obese is one of the Healthy People 2010 objectives for prevention and research. However, little is known about weight retention among adolescent women following delivery and its relationship with weight gain during pregnancy.

The purpose of this study was to examine the correlates of excessive maternal weight gain among adolescent mothers using a clinic based sample of pregnant adolescents from an urban, academic teaching hospital. We examine the association between adolescent women's pre-pregnancy and postpartum weights 12 months following delivery with attention to how much they gained during pregnancy. It also examines the implications of gaining weight according to the latest Institute of Medicine recommendations for women's postpartum weight. Recognizing that larger weight gains may be associated with

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subsequent obesity, the Institute of Medicine has identified this as an area where further research is needed.[7]

Materials and Methods

This study is part of a larger prospective cohort study of the effectiveness of comprehensive health care and parenting education to pregnant and parenting adolescents on adolescent parenting, the development of self-sufficiency and maternal and child health. The current study addresses pre-pregnancy body mass index (BMI), gestational weight gain and postpartum weight retention among adolescents.

Subjects

The study subjects were parenting adolescents within the larger prospective cohort study. Subjects were recruited at their child's primary care visit at the Teen and Tot clinic between January 2002 to January 2005 as part of a demonstration care project. Eligible subjects were 21 years or less at enrollment, with a singleton infant at delivery or whose child was 18 months or younger at recruitment. The subjects lived in neighborhoods adjacent to the Boston Medical Center hospitals. The Institutional Review Boards of Boston Medical Center approved the study.

Methods and Procedure

The medical records were reviewed quarterly from before pregnancy until the adolescent mother was three years postpartum. For the purpose of this study, records from the electronic medical record of the adolescent mother and child were reviewed for information up until one year postpartum. The following were reviewed from the medical record: the pre-pregnancy weight (the last weight before a positive pregnancy test was confirmed); pre-pregnancy BMI (calculated as weight in kilograms divided by the square of height in meters); weight gain during pregnancy was calculated from pre-pregnancy weight and last pregnancy weight recorded before delivery either at the last prenatal visit or at delivery. Postpartum weight retention was calculated as the difference between the gestational weight gain(weight at delivery or 2−6 weeks postpartum − prepregancy weight) and the postpartum weight loss (weight at delivery/or 2−6 weeks postpartum − weight at 1 year postpartum) Other data abstracted from the medical record included: age at menarche, gravidity, parity, smoking history during pregnancy, and contraception use at 6 months postpartum. Young women's actual weight gain during pregnancy was classified according to the Institute Of Medicine's guidelines/ reclassification (Table 1).

Table 1. Institute of Medicine Recommendations for Weight Gain in Pregnancy

Initial Body Mass Index	IOM Recommended Gestational Weight Gain (Pound)
<19 (low)	28−40
19.8−26.0 (normal)	25−35
26.1−29 (high)	15−25
>29.0 (obese)	At least 15*

*The obese pregnant women are to gain at least 15 pounds like the women with high BMI. but with no upper limit of weight gain set for obese women.

Statistical Evaluation

Data were analyzed by testing bivariate relationships among study measures. Main outcome variables were: gestational weight gain and weight retention at one year postpartum. To evaluate for independent associations of pregnancy weight gain in teen mothers on these two continuous dependent variables, linear regression analyses were conducted to control for potential confounders. The adjusted potential confounding variables used in the regression to predict gestational weight gain are: age of mother at delivery, pre-pregnancy BMI, smoking during pregnancy, age at menarche, contraception use at six months and pregnancy complications The model to predict postpartum weight retention in teen mothers used a linear regression model with all the above confounding variables, and in addition, included pregnancy weight gain. A *P*-value less than 0.05 was considered statistically significant.

We utilized the Institute of Medicine's 1990 weight gain guidelines for pregnant women, the first guidelines to adjust for pre-pregnancy weight and height. The BMI has been found to be a better indicator of nutritional status than weight alone.[7] Based on these guidelines, ''underweight'' women (BMI < 19.8) should be advised to gain 28−40 pounds during pregnancy; ''overweight'' women (BMI = 26.1 to 29.0) should be advised to gain 15−25 pounds; and ''normal'' weight women (BMI = 19.8 to 26.0) 25 to 35 pounds. Obese women (BMI > 29.0)should be advised to gain at least 15 pounds with no upper limit stated.

Results

One hundred twelve adolescent women were eligible for this analysis. Ten were excluded because of missing information on weight retention at 1 year postpartum, leaving a final sample size was 102. Descriptive maternal characteristics of the sample are shown in Table 2.

At enrollment, the mean age of adolescent mothers in the study was 15 ± 1.5 years. Ninety-eight percent

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