Impact of maternal knowledge of recommended weight gain in pregnancy on gestational weight gain

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BACKGROUND: Obesity is prevalent among reproductive-aged women and is associated with increased obstetric complications. Weight gain recommendations exist; however, knowledge of these recommendations is low, and few women gain appropriate weight during their pregnancies. Excessive gestational weight gain is common and is associated with adverse outcomes. Little is known about the relationship between knowledge of gestational weight gain recommendations and actual weight gain.

OBJECTIVES: Our objectives were to assess knowledge of weight gain recommendations in pregnancy and to determine its association with actual weight gain among women who seek care at an urban, regional perinatal center. We hypothesize that low levels of knowledge will predict inappropriate weight gain in this population.

STUDY DESIGN: This is a cross-sectional study with linked chart review of 338 women who sought routine obstetric ultrasound scans at an urban, regional perinatal center that serves a largely low-income population of predominately black women. Descriptive statistics, chi-square test, and analysis of variance were performed.

RESULTS: This population has low rates of accurate knowledge of weight gain recommendations in pregnancy (27%) and low rates of appropriate gestational weight gain (30%). Inappropriate gestational weight gain was highest among women who were obese before pregnancy. Accurate knowledge of gestational weight gain recommendations was associated with appropriate weight gain in pregnancy ($P = .02$), as was prepregnancy weight category ($P = .004$) and correct identification of prepregnancy weight category ($P = .005$).

CONCLUSION: These findings support the need for improvements in educational efforts about weight gain in pregnancy for high-risk, low-income women in an urban setting, which may improve compliance with the recommendations.

Key words: chart review, gestational weight gain, knowledge, obesity, overweight, pregnancy, survey

More than one-half of reproductive-aged women (20-39 years old) are obese or overweight; the rates are highest among non-Hispanic black and Mexican American women.[1] Obesity in pregnancy is associated with maternal illnesses that include gestational diabetes mellitus and preeclampsia, the need for cesarean delivery, anesthetic and surgical risks during delivery, and postpartum complications such as wound infections or thromboembolic events. Fetal risks include prematurity, stillbirth, congenital anomalies, macrosomia, birth injury, and childhood obesity.[1,2]

The increasing burden of the obesity epidemic in the United States and evidence of the effects of inappropriate gestational weight gain prompted the Institute of Medicine (IOM) to publish updated guidelines for weight gain in pregnancy in 2009. The 2009 IOM weight gain recommendations are 18−40 pounds for underweight women (body mass index [BMI], <18.5 kg/m^2), 25−35 pounds for normal weight women (BMI, 18.5−24.9 kg/m^2), 15−25 pounds for overweight women (BMI, 25−29.9 kg/m^2), and 11−20 pounds for obese women (BMI, ≥30 kg/m^2).[3,4]

However, evidence suggests that pregnant women are gaining weight outside these recommendations. According to the Center for Disease Control and Prevention, only one-third of women (32%) had appropriate weight gain during their pregnancy in 2012−2013.[5] Not only are weight gain recommendations not being followed, but studies have also found high rates of excessive gestational weight gain. Johnson et al[6] found 73% of a large cohort of nulliparous women (n = 8293) gained more weight than recommended by the IOM. Risk factors for excessive gestational weight gain include obesity, low socioeconomic status, being overweight before pregnancy, and underestimating one's prepregnancy weight class.[7,8] Excessive gestational weight gain has been associated with an increased risk of hypertensive disorders during pregnancy,[6] cesarean delivery,[6] large for gestational age infants,[6,9,10] and postpartum maternal weight retention.[10] Excessive gestational weight gain has also been associated with increased childhood obesity, which suggests that focus on gestational weight gain may be important for health at the individual, familial, and societal levels.[11,12]

There are few studies that have assessed maternal knowledge of the 2009 IOM recommendations for gestational weight. Previous studies reported accurate knowledge of these recommendations that ranged from 31−48%.[13-16] However, it is unclear whether knowledge of the recommendations is associated with actual weight gained during pregnancy. This study sought to assess knowledge of recommended weight gain in pregnancy and the association between this knowledge and gestational weight gain in the women who attended an urban hospital-based clinic.

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TABLE 1
Characteristics of pregnant women (n = 338) presenting for routine ultrasound scanning in an urban hospital-based clinic

Characteristic	Frequency
Mean age at study recruitment, y ± SD (range)	26.24 ± 5.58 (17-45)
Mean prepregnancy body mass index, kg/m^2 ± SD (range)	27.61 ± 7.76 (15-60)
Prepregnancy weight category by body mass index, n (%)[a]	
Underweight (<18.5 kg/m^2)	16 (4.7)
Normal weight (18.5–24.9 kg/m^2)	139 (40.9)
Overweight (25–29.9 kg/m^2)	69 (20.3)
Obese (≥30 kg/m^2)	114 (33.5)
Black race, n (%)	295 (87.3)
Uninsured, n (%)	58 (17.2)
Multiparous, n (%)	210 (62.1)
Previous pregnancy affected by hypertensive or diabetic disorder of pregnancy[b]	44 (21.0)
History of cesarean delivery[b]	65 (31.0)
Prenatal care with resident, fellow, or attending physician[c]	225 (66.6)
Any medical history, n (%)[d]	128 (37.9)
Hypertension	48 (14.2)
Pregestational diabetes mellitus	13 (3.8)
Asthma	43 (12.7)
HIV positive	13 (3.8)
Mental health disorder, n (%)	33 (9.8)
Depression	6 (1.8)
Anxiety	16 (4.7)
Substance use in pregnancy, n (%)	33 (9.8)

[a] Determined by self-reported height and weight to calculate body mass index; [b] Frequencies calculated as percentages of those who were multiparous, n = 210; [c] Other prenatal care was provided by certified nurse midwives; [d] A significant medical history included women with chronic hypertension, pregestational diabetes mellitus, asthma, thyroid disorders, sickle cell disease, HIV, congenital heart disease, seizure disorders, or medical conditions considered to be significant by the study team.

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Materials and Methods

The study is a cross-sectional survey with linked chart review. Women who sought routine dating or anatomy ultrasound scans in an urban, regional perinatal center that is affiliated with two academic institutions were identified as potential participants and screened for eligibility. Exclusion criteria included non-English speaking and reading, unable to provide informed consent, reported age of <18 years old, known multiple gestation, and history of bariatric surgery. Participants who met inclusion criteria and expressed interest in participation underwent informed consent and the Health Insurance Portability and Accountability Act authorization. Participants completed a survey using audio computer-assisted self-interview software. A chart review was later performed to collect participant characteristics of interest and to ascertain actual weight gained during the index pregnancy. The study received Emory University Institutional Review Board expedited approval and Grady Memorial Hospital Research Oversight Committee approval.

A power analysis was performed, and a sample size of 340 women was determined to be sufficient to detect a 33% prevalence of accurate knowledge of recommended weight gain with a 95% confidence level and 5% confidence limit.

Our key outcome of interest was accurate knowledge of weight gain recommendations during pregnancy. This outcome was determined by categorization of the participant's weight category from her BMI (calculated from her self-reported prepregnancy weight and height) according to the World Health Organization definitions. We then compared how much weight the woman thought that she should gain during pregnancy to the IOM 2009 guidelines for her determined weight category. For the women who did not report their height in the survey, this value was obtained from the chart review. There were 11 participants with no or implausible prepregnancy weights reported in the survey. Ten of these women had a first recorded weight from early in pregnancy, and this weight was used as their prepregnancy weight. One participant's data were excluded because of having an earliest recorded weight at 36 weeks of gestation.

Appropriate weight gain during pregnancy was our second outcome of interest. Weight gain during pregnancy was calculated as the difference between the last recorded weight in the chart before delivery and the prepregnancy weight reported in the survey. Those who did not deliver at our institution were not included in this portion of the analysis. Total weight gain was categorized as appropriate or inappropriate based on whether this value falls within the IOM recommended weight gain for the participants' weight category by BMI that was calculated from self-reported height and weight.

The survey included participant reports of prepregnancy weight, perceived weight class, knowledge of weight gain recommendations, intentions regarding eating and exercise during pregnancy, and screening for disordered eating.[17] The chart review abstracted the following information: demographics, medical and obstetric history, prenatal course, and recorded weights