

# Abuse History and Nonoptimal Prenatal Weight Gain

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## SYNOPSIS

**Objective.** The purpose of this study was to examine the differences between women who reported current and past physical or sexual abuse and those who did not in terms of mean total prenatal weight change, the odds for inadequate prenatal gain, and the odds for excessive prenatal gain.

**Methods.** This study used a matched retrospective cohort design. Data were from the charts of 578 clients of an urban prenatal care clinic. Multiple regression analyses, stratified by maternal age, were conducted to examine the association of past and current abuse with total prenatal weight change and with adequacy of prenatal weight gain for Body Mass Index category.

**Results.** For teens, abuse was not associated with prenatal weight change. For adults, mean total gains were 6.9 pounds greater for those who reported current abuse than for those who reported no abuse. Compared to women who reported no abuse, adults who reported only a history of physical abuse had 3.1 times the odds, and those who reported a history of sexual abuse (with or without physical abuse) had 3.0 times the odds for inadequate prenatal weight gains. Adults who reported a history of sexual abuse were 2.4 times as likely to have excessive prenatal weight gains as adults who reported no abuse.

**Conclusions.** The relationship of abuse and prenatal weight gain was different in adults and teens. This study may be the first to report an association between abuse and excessive prenatal gains, suggesting that addressing the psychosocial needs of women may help optimize prenatal weight gain.

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Violence has numerous negative implications for women's health.<sup>1</sup> For pregnant women, violence may affect the course of pregnancy and fetal health. Studies have reported that 1% to 21% of pregnant women in the United States have experienced abuse during pregnancy.<sup>2-15</sup> A recent review of this literature found that most studies report a prevalence of abuse during pregnancy of 4% to 8%, with some studies showing as many as 30% of pregnant women reporting a history of physical or sexual abuse.<sup>16</sup> Abuse may be associated with low birthweight<sup>14,17,18</sup> or other adverse birth outcomes,<sup>5,7,19-21</sup> although the biological mechanisms have not been delineated. Many risk factors for adverse birth outcomes are more prevalent in abused than in nonabused pregnant women, including prenatal substance use,<sup>2,3,5,7-9,11,14,22-24</sup> unintended pregnancy,<sup>4,7,8,25,26</sup> inadequate prenatal care,<sup>10,27,28</sup> and poor weight gain.<sup>4,14,29</sup>

Prenatal weight gain is strongly and directly related to infant birthweight.<sup>30,31</sup> The association between abuse and prenatal weight gain has, however, received limited attention. Although previous studies have reported a significant association between abuse and inadequate prenatal weight gain,<sup>4,14,29</sup> it is also possible that abuse is associated with excessive prenatal weight gain through behavioral or physiological responses to abuse-related stress. Excessive prenatal weight gain has been linked to adverse pregnancy outcomes, especially macrosomia,<sup>32,33</sup> which may increase the risk for serious obstetric consequences such as shoulder dystocia,<sup>34</sup> fetal injury,<sup>35</sup> and postpartum hemorrhage.<sup>36</sup> Additionally, national data from the 1995-1998 linked birth/death records indicate that infants with birthweights >4,500 g have higher rates of neonatal and overall infant mortality than infants with birthweights from 3,000 g to 4,499 g.<sup>37</sup> Excessive gain is associated with elevated risk for cesarean delivery.<sup>38,39</sup> It is also associated with postpartum weight retention,<sup>40,41</sup> which has implications for obesity-related maternal health consequences. Because as many as one-fifth of all pregnant women in the U.S. report having experienced abuse while pregnant and nearly one-third may have a history of abuse,<sup>16</sup> it is imperative to clarify the modifiable mechanisms through which abuse influences birth outcomes. Prenatal weight gain, if it is a mechanism, has excellent potential for intervention.<sup>30</sup>

The purpose of this study was to examine differences in mean total prenatal weight change, the odds for inadequate prenatal weight gain, and the odds for excessive prenatal weight gain in women who reported current or past histories of abuse compared to those who did not. We hypothesized that women who reported current or past histories of abuse would be significantly more likely to have inadequate or exces-

sive prenatal weight gains, compared with women who reported no abuse. Because adolescent and adult women are known to differ with regard to birth outcomes,<sup>42</sup> prenatal weight gain,<sup>43</sup> and the experience of abuse,<sup>13</sup> we stratified the analyses by age group.

## METHODS

Data were abstracted from the medical charts of 578 prenatal clients who received care at a Midwestern prenatal clinic that served a primarily low-income urban population and who delivered infants at an affiliated hospital. Medical and demographic data were originally charted on standardized prenatal care forms and were abstracted for this study by a trained medical records technician at the clinic. The chart review was conducted from October 1997 through January 1998. The study was approved by the University of Minnesota's Institutional Review Board.

### Sample selection

Using a matched retrospective cohort design, we selected study subjects from an automated clinical database of all prenatal clients who delivered infants at an affiliated hospital in 1991-1996. The database included demographic and clinical information as well as documentation of abuse status as reported to clinic social workers. Of the 1,865 women in this database, 304 (16%) had positive database documentation of current or past physical or sexual abuse. For each of these 304 women, we randomly selected two comparison subjects matched by maternal age group (<20 years of age and ≥20 years of age) and year of infant's birth. Thus, the records of 912 women were selected for chart abstraction (49% of prenatal clients who delivered infants at the affiliated hospital in 1991-1996).

Of this sample, 149 subjects (16%) were excluded at the time of abstraction because the social workers' form was missing from the chart so there was no documentation of abuse status, and 58 subjects (6%) were excluded prior to analysis for incomplete documentation of past or current abuse status. Thirteen subjects (1%) had more than one delivery during the study period; for each of these women, one pregnancy was randomly selected for inclusion. Prior to analysis, an additional 51 subjects (6%) were excluded because of missing clinical data for pregravid height or weight or no documented weight for the three-week period prior to delivery. Because the aim of this study was to assess total prenatal weight change in the context of a full-term pregnancy, another 63 subjects (7%) were excluded because they had preterm deliveries. Thus, 578 subjects (63% of the original sample) were included in the final

study analyses; these included 270 women reporting current or past abuse and 380 women who reported never having experienced physical or sexual abuse.

### Measures

Medical and demographic data were documented in the medical record on standardized prenatal care forms. The dependent variables for the present study were: a continuous variable representing total prenatal weight change and two dichotomous variables representing “inadequate” and “excessive” total prenatal weight gains.

We calculated total prenatal weight change by subtracting the chart-documented, self-reported pregravid weight from the first prenatal visit from the last weight measurement documented on the chart. Optimal, inadequate, and excessive total prenatal weight gain were defined according to the Institute of Medicine recommendations for minimum and maximum total prenatal weight gain by Body Mass Index (BMI) category.<sup>30</sup> We calculated BMI as pregravid weight in kilograms divided by height in meters squared. Optimal prenatal weight gain ranges suggested by the IOM are: 28–40 pounds for underweight women (BMI <19.8), 25–35 pounds for normal weight women (BMI 19.8–26.0), 15–25 pounds for overweight women (BMI 26.1–29.0), and ≥15 pounds for obese women (BMI >29.0). For these analyses, we used an upper limit for optimal gain of 25 pounds for obese women.<sup>32,44</sup>

According to clinic protocol, one of two social workers conducted a psychosocial interview at the first prenatal visit with each client. The interview included a standard list of content to be discussed in an open-ended format; thus, there were no standardized questions. The social worker queried about “current abuse” (physical or sexual) and “previous abuse” (physical or sexual). The presence or absence of abuse and the type (physical, sexual) and perpetrator of the abuse (partner, parent, family, other) were noted on the interview form. The abuse assessment protocol was developed for clinical practice, not as a research instrument; thus, the assessment method used was not validated.

We created four mutually exclusive abuse categories: (a) current physical and/or sexual abuse with or without a history of physical or sexual abuse; (b) history of physical abuse only; (c) history of sexual abuse with or without history of physical abuse; and (d) no reported physical or sexual abuse. “Current” abuse refers to those who reported current physical and/or sexual abuse at the first prenatal visit.

### Covariates

The covariates included in the final models included a continuous variable for BMI; dichotomous variables for maternal age group (<20 years vs. ≥20 years), “race” (nonwhite vs. white), and parity (primiparous vs. multiparous); and a categorical variable for year of delivery.

All potential covariates were selected a priori because of their known or suspected association with abuse status and/or pregnancy weight gain. For this study, self-reported race was used as a proxy for unmeasured social factors that may confound the association between abuse status and pregnancy weight gain. Race, as a social construct, remains an imperfect but relevant mechanism to measure these unknown social variables.

We used a dichotomous representation of race due to small numbers of subjects who identified with a race other than “black” or “white.”

### Analyses

We decided a priori that maternal age may be a confounder; thus, age group was a matching variable in sample selection. Subsequent examination of total weight gain, reported abuse, and other covariates by maternal age group verified significant differences. We performed preliminary analyses using chi-square and analysis of variance to examine the bivariate associations between selected covariates and prenatal weight gain categories (inadequate, optimal, and excessive). We used multiple linear regression to examine the relationship between abuse categories and mean total prenatal weight change adjusted for birthweight, gestational age as recorded in the chart, parity, BMI, and maternal age at delivery.

We conducted logistic regression analyses to examine the association of abuse with inadequate prenatal weight gain and with excessive prenatal weight gain. Separate analyses were conducted to model two dependent variables: (a) odds of inadequate weight gain compared with optimal prenatal weight gain; and (b) odds of excessive weight gain compared with optimal prenatal weight gain. Abuse was modeled as a dichotomous variable (any abuse vs. no abuse) and in separate analyses, as four dummy-coded variables (representing the categories of abuse) using the comparison group as the referent. Potential confounders were identified in bivariate analyses and were assessed using change-in-estimate criteria of >10%.<sup>45</sup> In the logistic regression analyses, we accounted for the matching variables by including them as covariates or conducting stratified analyses. All final models also included

“race,” BMI, and/or parity. These analyses produced adjusted odds ratios and 95% confidence intervals. All analyses were conducted with SAS version 6.12,<sup>46</sup> with statistical significance defined as  $p \leq 0.05$ .

**RESULTS**

**Sample characteristics**

Of the 578 subjects included in the analyses, 289 (50%) identified themselves as white, 191 (33%) identified themselves as African American, and 98 (17%) were coded as “other.” Ages ranged from 13 to 43 years

(mean age = 21.4; standard deviation [SD] = 4.8), and 274 (47%) were teens (i.e., <20 years old) at delivery. Although all subjects delivered at term, gestational age at delivery varied from 37 to 42 weeks (mean gestational age = 39.4; SD = 1.2).

Excluded subjects were significantly more likely than those included in the analyses to be nonwhite (60% vs. 50%;  $p=0.004$ ) and to be multiparous (45% vs. 35%;  $p=0.005$ ). There were no significant differences between excluded and included subjects in maternal age group, marital status, education, medical assistance, smoking status, or alcohol use.

**Table 1. Selected characteristics of 274 teen prenatal clients who delivered term live births in 1991–1996, by prenatal weight gain category**

Characteristic	Prenatal weight gain category					
	Inadequate (n = 47)		Optimal (n = 89)		Excessive (n = 138)	
	Mean	SD	Mean	SD	Mean	SD
Age (years)	17.1	1.5	17.4	1.4	17.1	1.4
Prenatal weight gain (lb)	18.1	6.8	29.0	5.8	44.8	10.4
Gestational age (weeks)	39.4	1.1	39.3	1.1	39.5	1.2
Birthweight (g) <sup>a</sup>	3,125.5	367.3	3,218.0	373.9	3,421.4	390.6
	Number	Percent	Number	Percent	Number	Percent
Parity						
First birth	43	91.5	68	76.4	117	84.8
≥1 previous births	4	8.5	21	23.6	21	15.2
Pregravid BMI <sup>a</sup>						
<19.8 (underweight)	17	36.2	28	31.5	12	8.7
19.8–26.0 (normal weight)	24	51.1	40	44.9	81	58.7
>26.0 (overweight/obese)	6	12.8	21	23.6	45	32.6
Lived with spouse/partner	13	28.3	21	23.6	22	16.1
Recipient of medical assistance	39	83.0	70	78.7	105	76.1
Inadequate education for age <sup>a,b</sup>	7	16.3	29	32.6	25	18.9
Smoked during pregnancy	9	19.2	27	30.3	41	29.7
Alcohol use during pregnancy	1	2.1	8	9.0	13	9.4
Illicit drug use during pregnancy	0	0.0	6	6.7	7	5.1
Abuse status						
No abuse	32	68.1	50	56.2	79	57.3
Current physical and/ or sexual abuse	2	4.3	10	11.3	12	8.7
History of physical abuse only	8	17.0	11	12.4	20	14.5
History of sexual abuse with or without history of physical abuse	5	10.6	18	20.2	27	19.6

NOTE: Teens defined as <20 years of age at delivery

<sup>a</sup>Significantly different across weight gain categories;  $p < 0.05$  in chi-square analysis for categorical variables and analysis of variance for continuous variables

<sup>b</sup>Inadequate education defined as not having completed the expected number of years of schooling, calculated by subtracting seven years from age in years

BMI = Body Mass Index

**Characteristics of teens**

Forty-seven teens (17% of 274 teens) had inadequate total prenatal weight gains (mean = 18.1 lb; median = 18 lb), and 138 teens (50%) had excessive total prenatal weight gains (mean = 44.8 lb; median = 44.0 lb). Eighty-nine teens (32%) had histories of physical or sexual abuse documented in their charts, and 24 teens (9%) had reported current physical and/or sexual abuse at the first prenatal visit. Of these 24 teens, 19 also reported pre-pregnancy histories of physical and/or sexual abuse. The distribution of optimal, inadequate, and excessive prenatal weight gain did not vary significantly by abuse status in univariate analyses

but did vary by infant birthweight, pregravid BMI, and inadequate education for age (Table 1).

**Characteristics of adults**

Sixty-seven adults (22% of 304 adults) had inadequate total prenatal weight gains (mean = 14.2 lb; median = 18 lb), and 147 adults (48%) had excessive total prenatal weight gains (mean = 43.4 lb; median = 41 lb). One hundred thirty-four adults (44%) had histories of physical or sexual abuse documented in their charts, and 23 adults (8%) had reported current physical and/or sexual abuse at the first prenatal visit. Of these 23 adults, 19 also reported pre-pregnancy histories of

**Table 2. Selected characteristics of 304 adult prenatal clients who delivered a term live birth in 1991–1996, by prenatal weight gain category**

Characteristic	Prenatal weight gain category					
	Inadequate (n = 67)		Optimal (n = 90)		Excessive (n = 147)	
	Mean	SD	Mean	SD	Mean	SD
Maternal age (years)	23.8	3.4	24.7	4.8	24.3	4.5
Prenatal weight gain (lb)	14.2	10.3	27.5	6.1	43.4	10.9
Gestational age (weeks) <sup>a</sup>	39.0	1.3	39.1	1.2	39.6	1.1
Birthweight (g) <sup>a</sup>	3,258.3	399.8	3,226.0	420.2	3,467.3	426.4
	Number	Percent	Number	Percent	Number	Percent
Parity <sup>a</sup>						
First birth	24	35.8	42	46.7	81	55.1
≥1 previous births	43	64.2	48	53.3	66	44.9
Pregravid BMI <sup>a</sup>						
<19.8 (underweight)	7	10.5	19	21.1	14	9.5
19.8–26.0 (normal weight)	38	56.7	45	50.0	73	49.7
>26.0 (overweight/obese)	22	32.9	26	28.9	60	40.9
Lived with spouse/partner	20	29.9	37	41.1	49	33.3
Recipient of medical assistance	55	82.1	76	84.4	114	77.6
Inadequate education <sup>b</sup>	18	28.1	23	26.4	28	19.6
Smoked during pregnancy	31	46.3	41	45.6	57	38.8
Alcohol use during pregnancy	16	23.9	18	20.0	29	19.7
Illicit drug use during pregnancy	4	6.0	7	7.8	9	6.1
Abuse status reported						
No abuse	31	46.3	52	57.8	64	43.5
Current physical and/or sexual abuse	2	3.0	6	6.7	15	10.2
History of physical abuse only	24	35.8	19	21.1	38	25.9
History of sexual abuse with or without history of physical abuse	10	14.9	13	14.4	30	20.4

NOTE: Adults defined as ≥20 years of age at delivery

<sup>a</sup>Significantly different across weight gain categories;  $p < 0.05$  in chi-square analysis for categorical variables and analysis of variance for continuous variables

<sup>b</sup>Inadequate education defined as less than a high school education

BMI = Body Mass Index

**Table 3. Adjusted odds ratios for inadequate prenatal weight gain compared with optimal prenatal weight gain, by maternal age group at delivery and abuse status (n = 293 subjects who delivered a term live birth in 1991–1996)**

Abuse status	Teens (n = 136)		Adults (n = 157)		All subjects (n = 293)	
	Adjusted OR <sup>a</sup>	95% CI	Adjusted OR <sup>a</sup>	95% CI	Adjusted OR <sup>a</sup>	95% CI
No abuse	1.00		1.00		1.00	
Current physical and/or sexual abuse	0.34	0.05, 1.46	0.43	0.06, 2.17	0.36	0.10, 1.07
History of physical abuse only	1.48	0.50, 4.37	3.06	1.34, 7.34	1.99	1.07, 3.75
History of sexual abuse with or without history of physical abuse	0.48	0.15, 1.40	2.99	1.03, 8.82	1.02	0.49, 2.07
Any abuse	0.70	0.32, 1.49	2.20	1.10, 4.53	1.21	0.74, 1.98

NOTE: Teens defined as <20 years old at delivery, and adults as ≥20 years old at delivery

<sup>a</sup>Adjusted for parity, “race,” and year of delivery

<sup>b</sup>Adjusted for Body Mass Index, “race,” and year of delivery

<sup>c</sup>Adjusted for Body Mass Index, “race,” year of delivery, and maternal age group

OR = odds ratio

CI = confidence interval

physical or sexual abuse. The distribution of optimal, inadequate, and excessive prenatal weight gain did not vary by abuse status in univariate analyses, but did vary by gestational age, infant birthweight, “race,” parity, and pregravid BMI (Table 2).

**Prenatal weight change in teens**

The adjusted mean total prenatal weight change was higher, although not significantly, for teens who reported current abuse (35.0 lb ± 2.6), past physical abuse (35.9 lb ± 2.0), or past sexual abuse (37.7 lb ± 1.8), compared with those for whom no abuse was

reported (34.0 lb ± 1.0). In multiple logistic regression analysis, abuse was not associated with odds for inadequate prenatal weight gain vs. optimal prenatal weight gain in teens (Table 3) or with the odds for excessive vs. optimal prenatal weight gain in teens (Table 4).

**Prenatal weight change in adults**

Adults who reported current abuse had significantly higher adjusted mean total prenatal weight gains (38.5 lb ± 2.9 ) than adults who reported no abuse (31.6 lb ± 1.2; *p*=0.03). Adjusted mean total prenatal weight

**Table 4. Adjusted odds ratios for excessive prenatal weight gain compared with optimal prenatal weight gain, by maternal age group at delivery and abuse status (n = 464 subjects who delivered a term live birth in 1991–1996)**

Abuse status	Teens (n = 227)		Adults (n = 237)		All subjects (n = 464)	
	Adjusted OR <sup>a</sup>	95% CI	Adjusted OR <sup>a</sup>	95% CI	Adjusted OR <sup>a</sup>	95% CI
No abuse	1.00		1.00		1.00	
Current physical and/or sexual abuse	0.88	0.35, 2.27	2.14	0.75, 6.84	1.19	0.60, 2.44
History of physical abuse only	1.40	0.61, 3.38	1.87	0.92, 3.88	1.62	0.95, 2.82
History of sexual abuse with or without history of physical abuse	1.04	0.51, 2.15	2.38	1.09, 5.46	1.55	0.92, 2.67
Any abuse	1.10	0.63, 1.93	2.08	1.17, 3.76	1.50	1.00, 2.24

NOTE: Teens defined as <20 years old at delivery, and adults as ≥20 years old at delivery

<sup>a</sup>Adjusted for parity, “race,” and year of delivery

<sup>b</sup>Adjusted for Body Mass Index, “race,” and year of delivery

<sup>c</sup>Adjusted for Body Mass Index, “race,” year of delivery, and maternal age group

OR = odds ratio

CI = confidence interval

gains were similar for adults who reported past sexual abuse ( $33.1 \text{ lb} \pm 1.9$ ) or past physical abuse ( $31.2 \text{ lb} \pm 1.6$ ) and adults who reported no abuse ( $31.6 \text{ lb} \pm 1.2$ ).

In multiple logistic regression analyses, the odds for inadequate prenatal weight gain in adults with any report of abuse were 2.2 times as high as for those did not report abuse (Table 3). In analysis by abuse categories, adults who reported a past history of physical abuse only were 3.1 times as likely to have inadequate prenatal weight gains as those who reported no abuse. Those who reported a history of sexual abuse were nearly three times as likely to have inadequate prenatal weight gains as those who reported no abuse.

The odds of excessive compared with optimal prenatal weight gain were 2.1 times as high for adults with any report of current or past abuse as for those who reported no abuse (Table 4). In analysis by abuse categories, adults who reported a history of sexual abuse were 2.4 times as likely to have excessive prenatal weight gains as those who reported no abuse. For adults who reported current abuse or a history of physical abuse only, the odds of excessive prenatal weight gain were in the hypothesized direction but were not statistically significant.

## DISCUSSION

Previous studies that examined the association between abuse and prenatal weight gain focused exclusively on the risk for inadequate gain.<sup>4,14,29</sup> The present study makes two unique contributions through the examination of: (a) the risk for inadequate *and* excessive prenatal weight gain associated with abuse; and (b) the differential risk associated with types of abuse.

These data provide partial support to the study hypotheses that women who reported current or past histories of abuse would be more likely to have inadequate or excessive total prenatal weight gains than their counterparts for whom there was no record of abuse. However, this was demonstrated only for the adult sample.

The most intriguing findings were that nearly half of the sample had excessive total prenatal weight gains and that excessive prenatal gain was significantly and strongly associated with reports of abuse in adults. To our knowledge, this finding has not been previously reported. Excessive prenatal weight gains are common in low-income populations.<sup>47,48</sup> However, the abuse–excessive weight gain relationship has not been documented in the literature. Although this relationship has not been fully explored, it is plausible. While abuse-related stress and depression may lead to decreased appetite and insomnia in some women, it may

lead to weight gain and hypersomnia in other women.<sup>49,50</sup> Additionally, abuse may be associated with a stress-induced neuroendocrinological response that is characterized by rapid weight gain in some women.<sup>51,52</sup>

The abuse–prenatal weight change relationship differed markedly between teens and adults, which is consistent with the findings of Parker et al.<sup>14</sup> and Curry et al.,<sup>18</sup> who reported differences between adult and adolescent pregnant women in abuse prevalence, correlates of abuse, and obstetric or prenatal risks associated with abuse. It is possible that adults are affected by the cumulative effects of more long-term exposure to abuse or that adults and teens experience differential severity.<sup>13</sup> Because adults may be more likely to report that husbands or partners have abused them<sup>13</sup> and because teens may be more likely to have experienced recent familial abuse,<sup>13,53</sup> it is plausible that the experience of abuse, and thus its effects, differs. Differences may also be attributable to differing interpretations of abuse or differing responses to abuse-related stress.

This study was somewhat limited by its reliance on self-report for abuse status and for pregravid weight. The abuse assessment protocol was developed by one of the two social workers who administered it, but its psychometric properties were never tested. Documentation of abuse came from the first prenatal visit only, but it has been suggested that women in medical care settings do not always report abuse the first time they are questioned.<sup>14</sup> We therefore suspect that abuse was underestimated in this study. Although the degree of misclassification is not known, it is likely that it did occur and that our findings likely underestimate the differences between abused and non-abused subjects. Additionally, although we were able to distinguish between current and past abuse, we did not have specific information about the time period in which the abuse occurred, whether it was a single event or a chronic exposure, or the severity of the abuse. As in previous studies,<sup>14,18</sup> we included all perpetrators, not just romantic partners; thus, we were unable to distinguish between partner abuse, familial abuse, or other physical or sexual abuse experienced by pregnant women.

The study also relied on self-reported pregravid weight, which may be a valid estimate for normal weight women, but women who are overweight or obese may underestimate their pregravid weight.<sup>54</sup> Underweight women may tend to overestimate their pregravid weight, but on average, the amount by which they overestimate is negligible.<sup>55</sup> Although such biased reporting would affect the continuous variable for total prenatal weight gain, it is unknown to what degree it

might have affected the classification of women into BMI categories and subsequently the classification of inadequate and excessive gains. Biased reporting could have resulted in an overestimation of total prenatal weight gain by women who were overweight and obese and subsequent misclassification into the excessive gain group. However, we have no reason to believe that women who underreported their pregravid weight would also be more likely to report abuse. The finding of a higher risk for inadequate prenatal weight gain in abused adults was consistent with the study's hypothesis and corroborated the results of previous studies.<sup>4,14,29</sup> The lack of association for teens was not anticipated given the strength of the association reported for teens in previous studies.<sup>4,14</sup> These findings are consistent with research and clinical experience that shows differential prenatal risk markers for adults and teens and differential experiences of abuse.<sup>14,18</sup> Of particular interest in this study was the strong association between abuse and excessive gain among adults. The etiology of rapid weight gain, including gain in pregnancy, is poorly understood. These data suggest that addressing the psychosocial needs, along with the nutritional needs, of pregnant women may optimize prenatal weight gains. Both inadequate and excessive prenatal gains have implications for the course of pregnancy and pregnancy outcomes; thus, future research is warranted to further explore the prenatal weight gain patterns of women who report current or past abuse.

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