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Body Mass Index and weight gain prior to pregnancy and risk of gestational diabetes mellitus

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Abstract

Objective—To evaluate obesity and rate of weight change during the 5 years before pregnancy and risk of gestational diabetes mellitus (GDM) in a nested case-control study.

Study Design—GDM cases (n=251) and controls (n=204) were selected from a multiethnic cohort of 14,235 women who delivered a live birth between 1996 and 1998. Women who gained or lost weight were compared with those with a stable weight (± 1.0 kg/year).

Results—Women who gained weight at a rate of 1.1 to 2.2 kg/year had a small nonsignificant increased risk of GDM (odds ratio(OR): 1.63 [95% CI: 0.95-2.81]) and women who gained weight at a rate of 2.3 to 10.0 kg/year had 2.5 fold increased risk of GDM (OR: 2.61 [95% CI: 1.50-4.57]), compared to women with stable weight (after adjusting for age, race-ethnicity, parity and “baseline” body mass index). Conclusion: These results suggest that weight gain within five years before pregnancy may increase the risk of GDM.

Keywords

Gestational diabetes; obesity and weight gain

Introduction

Gestational diabetes mellitus (GDM), defined as any degree of glucose intolerance with onset or first recognition during pregnancy(1), complicates 4% to 7% of pregnancies in the United States(2). The incidence of GDM in the U.S. appears to have increased during the past decade. (3) GDM is associated with an increased risk of perinatal complications, (4) and in the long-

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term, women with GDM (5) and their offspring (6) are at high risk of developing type 2 diabetes (T2DM).

Few modifiable risk factors for GDM are known. Women with gestational diabetes have increased insulin resistance and decreased insulin secretion in response to glucose, metabolic abnormalities that are characteristics of individuals with T2DM.(7) The known risk factors for GDM seem to mirror the established predictors of T2DM(8). Obesity is the major identified modifiable risk factor associated with GDM to date(9). Several studies suggest that weight change, specifically weight gain during various periods of adult life, is associated with increased risk of T2DM(10-13). However, data are limited on the role of weight change before pregnancy and risk of GDM. There have been only two prior studies, both examined self-reported weight change from age 18 to shortly before pregnancy and both found weight gain of 10.0 kg or more was associated with an increased risk of GDM (9;14). However, no prior studies have examined weight change during the years shortly before pregnancy and risk of GDM. If weight gain shortly before pregnancy increases the risk of GDM, preconception care could include advising women to avoid weight gain, especially women at high risk of GDM.

In a nested case-control study, we examined the rate of weight change during the 5 years immediately before pregnancy and risk of GDM, among women who delivered singleton live infants at a large U.S. group practice prepaid health plan and received uniform screening and a standardized diagnostic test for GDM

Materials and Methods

The study setting was the Kaiser Permanente Medical Care Program of Northern California (KPMCP-NC), which currently provides comprehensive medical services through 15 hospitals and 23 outpatient clinics to over 3 million members located in a 14-county region in Northern California. The KPMCP-NC membership represents approximately 30% of the surrounding population and it is representative of the population living in the same geographic area demographically, ethnically and socioeconomically, except that the KPMCP-NC membership underrepresents the very poor and the very wealthy(15).

Cohort identification

The methods of this study have been described in detail elsewhere(16). Briefly we identified all pregnancies that resulted in a singleton livebirth between January 1, 1996 and June 30, 1998 among women without recognized diabetes prior to that pregnancy. We linked the resulting list of livebirths to the health plan's laboratory database. This clinical database captures all laboratory tests and results performed at the KPMCP-NC regional laboratory, and it was used to obtain screening plasma glucose results of any 50-g, 1-h OGTT and the 100-g, 3-h OGTT diagnostic tests. All pregnancies resulting in a singleton livebirth, screened for GDM between 24-28 weeks' gestation, without a diagnosis of GDM in a prior pregnancy, among women who were continuous health plan members for 5 years prior to pregnancy were eligible to be selected for this study. There were 14,235 eligible pregnancies from which to select cases and controls. Trained medical records abstractors completed chart review and confirmed if criteria for inclusion (screening test performed at 24-28 weeks' gestation according to the earliest ultrasound performed) were met and if any of the exclusion criteria (multiple births, history of GDM or diabetes) were present.

Case definition

Women were classified as having GDM at the index pregnancy (the first pregnancy during 1996-1998) if two or more of the four plasma glucose values obtained during the 100-g, 3-h OGTT were abnormal according to the NDDG criteria(17): fasting ≥ 105 mg/dl (5.8 mmol/l);

1-h ≥ 190 mg/dl (10.5 mmol/l); 2-h ≥ 165 mg/dl (9.1 mmol/l); 3-h ≥ 145 mg/dl (8.0 mmol/l). If more than one GDM diagnostic test was performed, we used the results of the test performed latest in a woman's pregnancy to determine the presence or absence of GDM. All plasma glucose measurements were performed using the hexokinase method by the regional laboratory of KP Northern California. This laboratory participates in the College of American Pathologists' accreditation and monitoring program. Of the 437 GDM cases we identified electronically, medical chart review confirmed that 388 met the study's eligibility criteria

Control definition

Eligible controls were women who were screened for GDM between 24-28 weeks gestation of the index pregnancy and whose glucose challenge test was normal or abnormal but whose OGTT values did not meet the National Diabetes Data Group (NDDG) criteria for GDM. In order to be eligible medical chart review had to confirm the absence of exclusion criteria. The majority of controls were previously randomly selected and had their medical records abstracted for a case-control study of maternal hyperglycemia and infant complications (hypoglycemia, hyperbilirubinemia and macrosomia) among women without GDM according to the NDDG criteria(18). Medical chart review was completed on a total of 368 eligible controls.

Data Collection

Trained medical chart abstractors reviewed all available medical records to obtain information on subjects' body weight as well as potential confounders. Body weights recorded at two time points, baseline and pre-pregnancy, were the basis for determining weight gain in the 5 years before the index pregnancy. "Baseline" weight was defined as the earliest measured weight during a non-pregnant state recorded in the medical record during the 5 years prior to the index pregnancy, but after the age of 18 years. Pre-pregnancy weight was defined as the woman's self-reported pre-pregnancy weight recorded on her prenatal form for the index pregnancy. Rate of weight change was calculated as the change in body weight (in kilograms) between the baseline weight and pre-pregnancy weight divided by the time in years between the two weights.

Compared with women who were excluded, women with information on rate of weight change were more likely to be 35 or older (40.2% versus 29.7%, $p < 0.001$), to be married (76.7% versus 63.7%, $p < 0.001$), to have 2 or more prior livebirths (26.6% versus 22.2%, $p = 0.20$) and to have a history of infertility (16.7% versus 12.9%, $p = 0.14$). They were less likely to have 12 or fewer years of education (35.2% versus 42.3%, $p = 0.24$) and to be nulliparous (38.7% versus 44.4%, $p = 0.20$).

Other information obtained from the medical record review included any additional weights measured after the baseline weight, notes regarding cigarette smoking status, and the presence of other medical conditions including: infertility, amenorrhea, polycystic ovarian syndrome and hypothyroid disease. Last menstrual period (LMP) before the index pregnancy, marital status, parity and height were abstracted from the prenatal form completed at the first prenatal visit. Women's self reported race-ethnicity and education were obtained from electronic birth certificate databases.

Study Population

Women for whom information on rate of weight change was unavailable were excluded ($n = 101$ (12.8%)) missing measured baseline weight, $n = 171$ (21.7%) missing self-reported prepregnancy weight, $n = 45$ (5.7%) missing both baseline and prepregnancy weights, $n = 9$ (1.1%) missing

date of measurement, n=7 (0.9%) impossible values). A total of 251 cases and 204 controls remained for analysis.

Statistical methods

Unconditional logistic regression was used to obtain odds ratios (ORs) as estimates of the relative risk of gestational diabetes in relation to varying levels of rate of weight change. Women were categorized into 4 groups of rate of weight change: lost 1.1 to 12.2 kg/year, stable weight (within 1.0 kg/year), gained 1.1 to 2.2 kg/year and gained 2.3 to 10.0 kg/year. These categorizations were chosen *a priori*, within 1.0 kg/year corresponds roughly with the stable weight category of a previous study of weight change and GDM(9) and women who gained weight at a rate of more than 1.0 kg/year were divided into two categories based on the mid-point of the distribution in controls. To assess confounding, we entered covariates into a logistic regression model one at a time and then compared the adjusted and unadjusted odds ratios (19). Final logistic regression models included covariates that altered unadjusted odds ratios for rate of weight change by at least 10% as well as those covariates of a priori interest (i. e., parity). Variables evaluated for confounding were: maternal age (years), baseline BMI (kg/m²), pre-pregnancy BMI (kg/m²), parity (0, 1, 2+), maternal education in years (≤ 12 , 13-15, 16, >16), note of infertility (yes/no), amenorrhea (yes/no), PCOS (yes/no), hypothyroid (yes/no), family history of diabetes (yes/no) and smoked prior to pregnancy (yes/no). To assess the potential modifying effects of baseline BMI (overweight ≥ 25 kg/m² versus not overweight <25 kg/m²), we repeated analyses within these sub-groups. This study was approved by the human subjects committee of the Kaiser Foundation Research Institute. A sub-analysis restricted to women who had at least one pregnancy prior to the index pregnancy examined the association by breastfeeding (yes/no).

Results

Characteristics of women with GDM and controls are presented in Table I. Women with GDM were less likely to be non-Hispanic white or African American, but more likely to be older than 35 years, to be Hispanic, Asian or from other race groups, to have 12 or fewer years of education, to have 2 or more prior livebirths and to have a high baseline and pre-pregnancy BMI.

After adjustment for age, race-ethnicity and parity, GDM risk was increased among women who were overweight or obese at baseline (ORs 2.14 [95% CI:1.41-3.25] and 1.93 [95% CI: 1.20-3.10], respectively) (Table II). Women who were overweight or obese before pregnancy were also at increased risk of GDM.

Weight change was sufficient to increase the attained BMI category for 48.3% of the women initially underweight (BMI <20.0), 29.6% of women initially normal weight (BMI =20.1-24.9) and 26.7% of women overweight (BMI=25.0-29.9) at baseline. In contrast, weight change from baseline resulted in a decrease in attained BMI category for only 5.0% of normal weight women, 7.8% of overweight women and 3.6% of obese women. After adjusting for age, race-ethnicity, baseline BMI and parity, women who lost weight at a rate of 1.1 to 12.2 kg per year had no altered risk of GDM (OR 1.16 [95% CI: 0.59-2.28]) compared with women with a stable weight (within 1.0 kg per year). Women who gained weight at a rate of 1.1 to 2.2 kg per year had some suggestion of a small increased risk of GDM (adjusted OR 1.63 [95% CI: 0.95-2.81]) compared with women with stable weight, although this finding did not reach statistical significance. Women who gained weight at a rate of 2.3-10.0 kg per year experienced a 2.5 fold increased risk of GDM (adjusted OR 2.61 [95% CI: 1.50-4.57]) compared with women with stable weight (Table II). The association between rate of weight gain and GDM risk was slightly attenuated when adjustment was made for pre-pregnancy BMI (BMI attained before

the index pregnancy) instead of baseline BMI (Table II); the OR associated with the highest rate of weight gain decreased to 1.98 (95% CI: 1.08-3.61).

We repeated analyses of risk of GDM in relation to rate of weight gain prior to pregnancy within subgroups of women based on their BMI at baseline (Table III). While there was no significant effect modification by BMI at baseline, the odds ratios for the associations between weight gain and GDM did vary somewhat by this variable; the OR associated with 2.3 to 10.0 kg per year weight gain was 2.81 [95% CI: 1.33-5.93] for women not overweight (BMI < 25.0 kg/m²), while the corresponding OR for overweight or obese women (BMI ≥ 25) was 1.76 [95% CI: 0.79-3.92]. Among women who were overweight or obese at baseline there was some suggestion that weight loss may be associated with a decreased risk of GDM (OR:0.80 [95% CI: 0.32-1.99], however, this finding was not statistically significant. Similarly, while there was no significant effect modification by pre-pregnancy BMI, weight gain (1 to 10 kg per year) was associated with a higher increase in risk of GDM among women with a pre-pregnancy BMI under 25.0 (91 cases and 115 control; OR: 2.03 [95% CI: 0.94-4.38]) than among women with a pre-pregnancy BMI of 25.0 or higher (160 cases and 89 controls; OR: 1.28 [95% CI: 0.70-2.34]).

We repeated the analysis among the subset of 447 women who had 2 measured weights prior to the index pregnancy, modeling rate of weight change between the 2 measured weights and adjusting for age, race-ethnicity, baseline BMI and parity. In the sub-analysis the odds ratios for weight loss, weight gain of 1.1 to 2.2 kg per year and weight gain of 2.3 to 10.0 kg per year were ORs: 0.74 [95% CI: 0.34-1.61], 1.17 [0.70-1.98] and 1.94 [1.15-3.27], respectively. In the sub-analysis among women who breastfed during the 5 year period, the odds ratios for weight loss, weight gain of 1.1 to 2.2 kg per year and weight gain of 2.3 to 10.0 kg per year were: ORs; 0.82 (0.22-3.08), 1.59 (0.60-4.26) and 3.75 (1.30-10.8), respectively.

Comment

In this study, women with GDM were 2.5 times more likely than controls to have gained weight at a rate of 2.5 kg per year or more during the 5 years before pregnancy, relative to women with a stable weight (within 1.0 kg per year) (Table 2). This association persisted after adjusting for baseline BMI and was only slightly attenuated after adjusting for pre-pregnancy BMI, suggesting the association is independent of attained BMI before pregnancy. However, the association with weight gain was only significant among women who were not overweight (BMI<25.0) at baseline (Table 3).

Weight gain in adult life has been shown to increase the risk for T2DM (10;12;20). Data on weight change before pregnancy in relation to the occurrence of GDM have been sparse. Our results are generally consistent with previous studies of self-reported weight change from age 18 and GDM risk(9;14). In the Nurses Health Study II, Solomon et al found that weight gain of 5.0-9.9 kg from age 18 to shortly before pregnancy was associated with a 67% increased risk of self-reported GDM, and women who gained 10.0-19.9 kg had a 2.5-fold increased risk of GDM, when compared to women with a stable weight (± 4.9 kg)(9). More recently Rudra et al. found that a weight gain of 10.0 or more kg from age 18 to pregnancy was associated with a 3-fold increased risk of GDM, after adjusting for baseline BMI and other confounders (14).

Two studies examined weight gain between pregnancies among women who two pregnancies. Glazer et al found that among obese women (at least 200 lbs) who had a subsequent pregnancy, weight gain of at least 4.5 kg between pregnancies was associated with a 47% increased risk of diagnosed GDM, whereas women who lost at least 4.5 kg had a 37% reduced risk of diagnosed GDM when compared with women with stable weight(21). Villamor et al found

among women with two consecutive pregnancies that weight gain resulting in an increase of 3 or more BMI units during the interpregnancy interval was associated with a 2-fold increase risk in GDM (18). They also found that the increase risk in GDM was higher among women who were not overweight at the first pregnancy, this is similar to our finding that the association with rate of weight gain was strongest among women not overweight at baseline. These results suggest that even a modest amount of weight gain among women who are not overweight is sufficient to increase the risk of GDM.

Neither our study nor that of Solomon et al (9) observed an altered risk of GDM among women who lost weight prior to pregnancy. This is likely due in part to the relatively small numbers of women who lost weight before pregnancy, Rudra et al (14) were unable to assess the association with weight loss and GDM as none of the women who lost weight developed GDM. It is also possible that the women who did lose weight did not lose enough to reduce insulin resistance and their risk of GDM. Our study is the first study on rate of weight change during the 5 years immediately before pregnancy and risk of GDM among a cohort with uniform screening, an objective diagnosis of GDM and information on measured weights.

Obesity has consistently been associated with an increased risk of GDM(9;22) and T2DM (23). Similarly, we found that both baseline and pre-pregnancy BMI were positively associated with GDM risk, but pre-pregnancy BMI was more strongly associated. There is some evidence that weight gain, itself may result in increased insulin resistance(24). Swinburn et al(24) examined short-term weight gain among Pima Indians and found the slope of the decrease in insulin sensitivity for change in body weight was 4.5 times steeper than the cross-sectional slope between insulin sensitivity and body weight, suggesting weight gain is associated with increased insulin resistance beyond that which can be explained by the cross-sectional data. In addition, recent data from the Diabetes Prevention Program showed that weight reduction is associated with a decreased risk of diabetes(25).

The second half of a normal pregnancy is characterized by a progressive state of insulin resistance, hyperinsulinemia, and mild postprandial hyperglycemia. However, glucose tolerance remains normal for most women, who are able to increase their insulin secretion to compensate for the insulin resistance of pregnancy(7). While we had limited power, our data suggest that gaining weight shortly before pregnancy was associated with increased risk of GDM mainly among women who were normal weight at baseline. Recent weight gain may result in an increase in insulin resistance which may lead to “exhaustion” of the B-cell capacity to secrete adequate insulin for the level of insulin resistance induced by pregnancy and therefore lead to the development of GDM. The effect of weight gain on β -cells may be less evident in women who were already overweight since their excess weight had already attenuated their β -cell function. We found the strongest associations between weight gain and increased risk of GDM among women who were not initially overweight or obese at baseline.

Limitations of this study include the large amount of missing data on weights recorded in the medical charts. Eligibility criteria included the presence in the medical record of at least one provider-measured non-pregnant weight and a self-reported pre-pregnancy weight for the index pregnancy; 42% of potential subjects were missing data on one of the weights. Women missing data on weight change were younger on average and more likely to be nulliparous and less educated. Women with these characteristics may have been less likely to have medical visits during the five year period. Depending on whether women with missing data were more or less likely to gain weight, we may have under or overestimated our GDM risks associated with weight change. In addition, we used one measured weight and one self-reported pre-pregnancy weight, therefore, depending on whether women under or overestimated their self reported pre-pregnancy weight we may have biased our results in either direction. The validity of self-reports of past body weight has been found to vary by body mass index and the amount

of weight gained (26). However, we conducted a sub-analysis among women who had two measured weight recorded in their charts and we found similar results, although the associations with weight gain were slightly attenuated. Another limitation is that weights were measured at different intervals before pregnancy: for example, for some women “baseline” weight was measured 5 years before the index pregnancy, and for others it was two years before pregnancy. Because of this, we modeled rate of weight change as kg per year as opposed to absolute weight change. Finally, we lacked information on possible risk factors for GDM such as diet and physical activity. However, a previous study of weight change and risk of T2DM did not find diet to be an important confounder(27).

There has been an increase in the incidence of GDM in the past decade in the US, (3) along with an increase in the prevalence of obesity.(28) Our findings suggest that especially among women who are not initially overweight, weight gain even at a rate of 1.1 to 2.2 kg per year in the 5 years before pregnancy can increase the risk of GDM. These findings suggest that preventing weight gain among women planning to become pregnant may reduce the risk of GDM, lifestyle interventions are likely to improve weight control in reproductive age women.

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Table 1

Selected characteristics of cases and controls

Characteristic	Cases (n=251)		Controls (n=204)		P-value
Age, years	No.	%	No.	%	
<25	16	6.4	31	15.2	0.002
25-29	29	11.6	34	16.7	
30-34	91	36.3	71	34.8	
35+	115	45.8	68	33.3	
Race-Ethnicity					<0.001
Non-Hispanic white	105	41.8	131	64.2	
Hispanic	56	22.3	22	10.8	
Asian	35	13.9	12	5.9	
African-American	18	7.2	24	11.8	
Other	34	13.5	14	6.9	
Unknown	3	1.2	1	0.5	
Marital Status					0.07
Never married	34	13.7	27	13.3	
Married	199	80.2	150	73.9	
Widowed, divorced, or separated	11	4.4	6	3.0	
Don't know	8	3.2	0	0.0	
Education, years					0.22
≤12	94	37.5	66	32.4	
13-15	75	29.9	76	37.3	
16	52	20.7	31	15.2	
≥17	27	10.8	29	14.2	
Don't know	3	1.2	2	1.0	
Parity					0.18
0	101	40.2	75	36.8	
1	78	31.1	80	39.2	
2+	72	28.7	49	24.0	

	Cases (n=251)		Controls (n=204)		P-value
Characteristic	No.	%	No.	%	
Breastfed (among women with a pregnancy during the 5 year period)					
Yes	67	71.3	74	77.9	0.54
Smoked during 5 years prior to pregnancy (noted in chart)					
No	210	83.7	166	81.4	0.44
Yes	40	15.9	25	12.3	
Don't know	1	0.4	3	1.5	
Infertility (noted in chart)					
No	200	79.7	179	87.7	0.02
Yes	51	20.3	25	12.3	
Amenorrhea (noted in chart)					
No	226	90.0	190	93.1	0.24
Yes	25	10.0	14	6.9	
Polycystic Ovarian Syndrome (noted in chart)					
No	249	99.2	202	99.0	0.83
Yes	2	0.8	2	1.0	
Hypothyroid (noted in chart)					
No	243	96.8	201	98.5	0.23
Yes	8	3.2	3	1.5	
Baseline BMI (Kg/m ²)					
< 25.0	123	49.0	134	65.7	0.002
25.0-29.9	76	30.3	39	19.1	
≥30.0	52	20.7	31	15.2	
Pre-pregnancy BMI (Kg/m ²)					
< 25.0	91	36.3	115	56.4	<0.001
25.0-29.9	81	32.3	51	25.0	
≥30.0	79	31.5	38	18.6	
Rate of weight change, kg/year					
-12.2 to -1.1	28	11.2	27	13.2	0.12
-1.0-1.0	99	39.4	98	48.0	

	Cases (n=251)		Controls (n=204)		P-value
Characteristic	No.	%	No.	%	
1.1-2.2	55	21.9	39	19.1	
2.3-10.0	69	27.5	40	19.6	
Time between weights, years					0.32
1-2	29	11.6	37	18.1	
3	34	13.5	28	13.7	
4	100	39.8	70	34.3	
5	88	35.1	69	33.8	

Odds ratios and 95% confidence intervals (CI) for gestational diabetes associated with BMI and rate of weight change during the 5 years prior to pregnancy.

Table II

	Cases (n=251)	Controls (n=204)	Crude OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR [§] (95% CI)
	n (%)	n (%)			
Baseline [*] body mass index (kg/m ²)					
Less than 20.0	30 (12.0)	28 (13.7)	1.11 (0.66-1.87)	1.27 [†] (0.72-2.25)	
20.0-24.9	93 (37.1)	106 (52.0)	1.00	1.00	
25.0-29.9	76 (30.3)	39 (19.1)	2.00 (1.36-2.96)	2.14 [†] (1.41-3.25)	
30.0 or more	52 (20.7)	31 (15.2)	1.69 (1.09-2.62)	1.93 [†] (1.20-3.10)	
Pregnancy body mass index (kg/m ²)					
Less than 20.0	18 (7.2)	22 (10.8)	0.86 (0.47-1.56)	0.75 [†] (0.38-1.48)	
20.0-24.9	73 (29.1)	93 (45.6)	1.00	1.00	
25.0-29.9	81 (32.3)	51 (25.0)	2.22 (1.46-3.36)	2.44 [†] (1.53-3.89)	
30.0 or more	79 (31.5)	38 (18.6)	3.03 (1.93-4.74)	3.89 [†] (2.35-6.43)	
Rate of weight change					
-12.2 to -1.1	28 (11.2)	27 (13.2)	1.03 (0.56-1.87)	1.16 [‡] (0.59-2.28)	1.32 [§] (0.68- 2.56)
-1.0-1.0	99 (39.4)	98 (48.0)	1.00	1.00	1.00
1.0-2.2	55 (21.9)	39 (19.6)	1.40 (0.85-2.29)	1.63 [‡] (0.95-2.81)	1.44 [§] (0.83-2.49)
2.3-10.0	69 (27.5)	40 (19.6)	1.71 (1.06-2.76)	2.61 [‡] (1.50-4.57)	1.98 ^{§§} (1.08-3.61)

* Baseline=first weight measured within 5 years prior to pregnancy in kg/height in meters²

[†] adjusted for age, race/ethnicity and parity

[‡] adjusted for age, race/ethnicity, baseline bmi and parity

[§] adjusted for age, race/ethnicity, prepregnancy bmi and parity

Table III
Odds ratios and 95% confidence intervals (CI) for gestational diabetes associated with rate of weight change by baseline body mass index (BMI)

	Among women with BMI < 25 at baseline			Among women with BMI ≥ 25 at baseline		
	Cases (n=123)	Controls (n=134)	OR ^a (95% CI)	Cases (n=128)	Controls (n=70)	OR ^a (95% CI)
Rate of weight change kg/yr	n (%)	n (%)		n (%)	n (%)	
-12.2 to -1.1	11 (8.9)	13 (9.7)	1.75 (0.65-4.70)	17 (13.3)	14 (20.0)	0.80 (0.32-1.99)
-1.0-1.0	54 (43.9)	73 (54.5)	1.00	45 (35.2)	25 (35.7)	1.00
1.0-2.2	32 (26.0)	24 (17.9)	2.10 (1.05-4.19)	23 (18.0)	15 (21.4)	0.92 (0.40-2.12)
2.3-10.0	26 (21.1)	24 (17.9)	2.81 (1.33-5.93)	43 (33.6)	16 (22.9)	1.76 (0.79-3.92)

^a adjusted for age, race-ethnicity (white vs non-white) and parity