

# THE EFFECT OF LANGUAGE PREFERENCE ON PRENATAL WEIGHT GAIN AND POSTPARTUM WEIGHT RETENTION IN URBAN HISPANIC WOMEN

**Objective:** To describe prenatal weight gain and postpartum loss patterns among Hispanic women receiving prenatal care at an urban community health center by language preference.

**Methods:** Data were abstracted from medical records of prenatal patients seen from 2000–2008. Included were self-identified Hispanic women, English- or Spanish-speaking, aged 16–40 years, with weight measured at  $\leq 13$  and at  $> 37$  weeks gestation. Women with preexisting diabetes, hypertension, gestational diabetes, preeclampsia, multiple gestation, or preterm delivery were excluded. Bivariate (*t*-test, chi-square) and multivariate regression (linear, polychotomous logistic) statistics were used in the analysis.

**Results:** Of 259 women who met eligibility criteria, 52 (20.1%) were primarily Spanish speakers. Overall, 43.6% exceeded prenatal weight gain recommendations; 30.8% of Spanish speakers vs 46.9% of English speakers ( $P = .07$ ). Among normal-weight women, Spanish speakers gained below and English speakers gained above that recommended ( $P = .03$ ). At late postpartum, 22.9% overall returned to their baseline body mass index ( $BMI \pm 0.5 \text{ kg/m}^2$ ); Spanish speakers retained 1.21 vs 1.53  $\text{kg/m}^2$  among English speakers, which was not statistically significant. Adjusting for baseline BMI, age, and smoking status, language preference was not associated with prenatal weight gain or postpartum weight retention. In adjusted models, being overweight at baseline was predictive of excessive prenatal weight gain (OR 2.12, 95% CI .99, 4.53;  $P = .05$ ); older age was protective for postpartum weight retention (OR .90; 95% CI .82, .98;  $P = .02$ ).

**Conclusions:** Adherence to prenatal weight gain guidelines was poor and few women returned to their baseline weight at late postpartum, regardless of language preference. (*Ethn Dis.* 2010;20:162–168)

**Key Words:** Weight Gain, Weight Loss, Pregnancy, Postpartum, Hispanic Americans, Acculturation

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## INTRODUCTION

Obesity has reached epidemic proportions in the United States. While obesity affects all segments of society, it disproportionately affects low-income ethnic minority populations. According to the National Health and Nutrition Examination Survey (2003–2004), rates of obesity among White women have stabilized (30%), but continue to increase among non-Hispanic Black women (54%) and Mexican American women (42%), including those of child-bearing age.<sup>1</sup> Among women aged 20–39 years, 24% of White women, 50% of non-Hispanic Black women, and 36% of Mexican American women are obese.<sup>2</sup> Obesity increases with age even within child-bearing years, with rates of 19% reported in women aged 18–29 years and 25% in women aged 30–39 years.<sup>3</sup>

Reproductive-aged obese women compared to normal-weight women are more likely to experience medical and gynecological complications.<sup>4,5</sup> During pregnancy, obese women are more likely to develop gestational diabetes or preeclampsia,<sup>6,7</sup> give birth to a child with a birth defect or macrosomia,<sup>8,9</sup> or require a cesarean section delivery.<sup>10</sup> Infants born to obese women, irrespective of their birth weight, are twice as likely to be obese as adults.<sup>11,12</sup> One of the major contributors to obesity for reproductive-aged women is excessive weight gain in pregnancy and failure to lose weight postpartum.<sup>13–15</sup>

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The Institute of Medicine (IOM) has established prenatal weight-gain guidelines based on pre-pregnancy body mass index (BMI).<sup>16</sup> Of all BMI categories, overweight women are most likely to over gain during pregnancy. One recent cohort study of over 50,000 women reported that approximately 40% of normal-weight women gained excessively compared to 60% of overweight women.<sup>17</sup> Gaining in excess of IOM guidelines increases the risk of delivering a macrosomic baby<sup>9</sup> and increases the risk of developing or worsening obesity for the mother, particularly among low-income women.<sup>14–15</sup> Large cohort studies have found that women who gained excessively in pregnancy or who retained weight at 6 months or 1 year postpartum were significantly more likely to be obese 10 or 15 years later, respectively.<sup>15,18</sup>

Studies have assessed prenatal weight gain and postpartum weight retention in White women,<sup>13–15</sup> Black women,<sup>19–20</sup> and Hispanic women,<sup>21–26</sup> although few examined the effect of acculturation on these outcomes in Hispanic women.<sup>25–27</sup> In a small study of Mexican-American adolescents, Gutierrez reported that prenatal weight gain increased with increasing duration of residence in the United States.<sup>27</sup> A larger cohort study of over 4500 Hispanic women reported on the risk of under gaining, not over gaining, and found that being US born was associated with a lower risk of inadequate weight gain in pregnancy (AOR .61, 95% CI 0.31–1.00).<sup>26</sup> Chasan-Taber reported that excessive prenatal weight gain worsened progressively across generations, and was highest (51%) in third generation Hispanic women.<sup>25</sup> Other studies have reported a similar association between a higher degree of accul-

turation and worsening health measures in both pregnant and nonpregnant women.<sup>28-31</sup>

Studies use country of origin, length of residence in the United States, generational status, and language preference as measures of acculturation. Among variables used in measuring acculturation, only language preference is commonly entered in health records. The increasing use of electronic health records facilitates identification of individuals with health risks that require additional support. Obesity rates are increasing in Hispanic women of all ages.<sup>32</sup> In addition, female Hispanic adolescents have twice the risk of developing type 2 diabetes than similarly aged Hispanic males.<sup>33</sup> Consequently, it is essential to identify those at highest risk of inappropriate prenatal weight gain and postpartum weight loss in order to develop effective programs and target interventions to those at highest risk. Therefore, the purpose of this study was to determine whether language preference could be used as a marker of higher risk in pregnant Hispanic women. The specific objectives were to determine whether prenatal weight gain and postpartum weight loss patterns of self-identified Hispanic women receiving care at an urban community health center differed by language preference.

## METHODS

### Setting and Sample

A retrospective chart review was conducted at an urban community health center, the South Bronx Health Center for Children and Families (SBHCCF), after approval by the Investigational Review Boards of Montefiore Medical Center and Yale University School of Nursing. The community served by SBHCCF is predominantly Hispanic (73%) and Black (24%); approximately half live below the poverty line.<sup>12</sup> One in four residents

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are foreign-born; the predominant countries of origin are the Dominican Republic, Mexico, and Honduras.<sup>34</sup> Reflecting the local community, at SBHCCF 69% of patients are Hispanic and 31% are Black, 54% have Medicaid health insurance coverage and 23% are uninsured.

Medical records of all women who received prenatal care from 2000 to 2008 were reviewed to determine if they met study criteria. Inclusion criteria required that subjects be self-identified Hispanic women, English- or Spanish-speaking, aged 16-40 years, who began prenatal care at  $\leq 13$  weeks of gestation. Women who had preexisting diabetes, hypertension, gestational diabetes, preeclampsia, multiple gestation or preterm delivery were excluded. Women without measured heights and weights were also excluded.

### Definition of Variables

Measured weight was abstracted from the medical record at three time periods: early pregnancy (13 weeks of gestation or earlier); late pregnancy (37 weeks of gestation to delivery); and late postpartum (between 10 and 14 months postpartum). Height was measured at the first prenatal visit. Prenatal weight gain was defined as measured maternal weight at  $>37$  weeks of gestation minus weight at  $\leq 13$  weeks of gestation. BMI was calculated using the standard definition ( $\text{kg}/\text{m}^2$ ) at early pregnancy and late postpartum. Recommended weight gain in pregnancy was defined using 1990 IOM guidelines based on early pregnancy BMI category: 28-40 lb for underweight women

(<19.8 BMI); 25-35 lb for normal weight women (19.8-26 BMI); 15-25 lb for overweight women (26.1-28.9 BMI); and at least 15 lb for obese women ( $>29$ BMI).<sup>18</sup> Prenatal weight gain was categorized as below, within, or above IOM guidelines. Since the 1990 IOM guidelines did not specify a recommended range for women with BMI  $>29$ , 15-25 lb was considered within IOM guidelines for obese women in this study.

Postpartum weight retention was based on BMI change from early pregnancy to late postpartum. Women were considered to have returned to baseline BMI if the difference between their early pregnancy and late postpartum BMI was within  $\pm 0.5 \text{ kg}/\text{m}^2$ . At registration into prenatal care, women completed a questionnaire that asked them to self-identify their race, ethnicity, and language preference. Documentation of these variables was abstracted from the medical record. Smoking, alcohol, and illicit drug use was defined as any use at any point of the pregnancy and abstracted from the medical record.

### Statistical Analysis

Univariate analyses were conducted to assess distribution of variables and to describe the sample. Contingency table analyses were used to examine associations with categorical data. Fisher's exact tests was used for small cell size and extended Mantel-Haenszel method, namely the row mean score, was used when the independent variable was ordinal. *T*-tests were used for continuous outcome variables. Assumptions of normality and constant standard deviation were assessed. Polychotomous logistic regression was used to examine the relationship between language preference and meeting IOM guidelines (below, within, and above recommended ranges as defined above), controlling for BMI, age, and smoking status. Within IOM guidelines was used as the referent group.

Polychotomous logistic regression was used to examine the relationship between language and postpartum weight retention (defined as below early pregnancy BMI, return to early pregnancy BMI, or above early pregnancy BMI), controlling for baseline BMI, age, and smoking status. Return to early pregnancy weight was used as the referent group. General linear models (ANCOVA) were used to examine the relationship between language and prenatal weight gain and postpartum weight retention (defined as continuous variables), controlling for baseline BMI, age, and smoking status. All analyses were conducted in SAS® version 9.1.

## RESULTS

### Baseline Characteristics

Of the 259 Hispanic women included in the analysis, 207 (79.9%) preferred English and 52 (20.1%) preferred Spanish (Table 1). Overall, 52% were overweight or obese at baseline; no significant differences in baseline BMI were seen between English- and Spanish-speakers. However, Spanish-speakers were significantly older than English-speakers (28.1 vs 24.5 years,  $P=.0004$ ) and a significantly higher percentage of English-speakers than Spanish-speakers (17.4% vs 3.8%;  $P=.01$ ) were smokers.

### Prenatal Weight Gain

Overall, 32.4% of women gained within the target range. Among normal-weight women, Spanish-speakers gained significantly less than English-speakers (mean 28.0 vs 33.3 lbs;  $P=.04$ ); Spanish-speakers were significantly more likely to gain below, and significantly less likely to exceed, the recommended range ( $P=.03$ ). Overweight and obese Spanish-speakers also had higher rates of gaining within guidelines than their English-speaking counterparts, which was not statistically significant. Overall, a higher percentage of

Spanish-speakers compared to English-speakers gained within guidelines (40.4% vs 30.4%) and below guidelines (28.8% vs 22.7%), whereas fewer exceeded guidelines (30.8% vs 46.9%); these differences did not reach statistical significance ( $P=.07$ ) (Figure 1).

In polychotomous regression analyses, language preference was not associated with adherence to IOM guidelines, adjusting for baseline BMI, smoking status, and age. None of the variables in the model (language preference, age, and tobacco use) was associated with the odds of gaining below the target range, using within IOM guidelines as the referent. Underweight women were less likely to exceed IOM guidelines (OR 0.23; 95% CI .06, .93;  $P=.04$ ); overweight women were more likely to exceed IOM guidelines, which was marginally significant (OR 2.12, 95% CI .99, 4.53;  $P=.05$ ). Normal weight, obesity, language preference, age, and tobacco use were not associated with exceeding IOM guidelines in the adjusted model.

### Postpartum Weight Retention

Of 259 women in this study, 105 (40.5%) had a measured weight between 10 and 14 months postpartum. Spanish-speaking women tended to retain postpartum weight compared with English-speaking women; at late postpartum, 70.8% of Spanish-speakers compared to 61.7% of English-speakers exceeded their early pregnancy BMI ( $>0.5$  kg/m<sup>2</sup> over baseline) (Table 2). Mean change from early pregnancy to late postpartum BMI was 1.21 kg/m<sup>2</sup> for English-speaking and 1.53 kg/m<sup>2</sup> for Spanish-speaking women; however, these differences were not statistically significant.

Results of polychotomous regression analyses show no association of language, tobacco use, or baseline BMI with return to early pregnancy BMI. Age was the only significant predictor; the older the woman, the more likely she is to return to her early pregnancy

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*Overweight women in this study were twice as likely to exceed recommended prenatal weight gain, which was marginally significant.*

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weight. With increasing age, women's BMI was significantly less likely to be below early pregnancy at late postpartum (OR .83; 95% CI .72, .96;  $P=.01$ ) and less likely to be above early pregnancy at late postpartum (OR .90; 95% CI .82, .98;  $P=.02$ ).

## DISCUSSION

In our study, 32% met IOM prenatal weight gain guidelines. Other studies have reported similar adherence rates of 17% to 35% in Hispanic women.<sup>21,24,25</sup> Our data also support previous findings of an association between higher baseline BMI and excessive prenatal weight gain.<sup>14,15,19,24</sup> Overweight women in this study were twice as likely to exceed recommended prenatal weight gain, which was marginally significant.

In multivariate analyses, language preference among Hispanic women was not significantly associated with prenatal weight gain in our study. However, Spanish-speakers demonstrated a consistent pattern of better adherence to IOM recommendations than English-speakers, overall and in every BMI category except underweight. In the overall sample, Spanish-speakers were more likely to meet guidelines than English-speakers (40% vs 30%, respectively) and less likely to exceed guidelines (31% vs 47%, respectively). This pattern approached statistical significance ( $P=.07$ ). Univariate analyses of prenatal weight gain by BMI category showed a significant difference by

**Table 1. Subject characteristics**

	Hispanic Population (N=259)	Preferred English (n=207)	Preferred Spanish (n=52)	P value
Age (y) at entry to prenatal care, mean ± SD	25.2 ± 5.5	24.5 ± 5.0	28.1 ± 6.6	.0004
Race*				
White, n (%)	225 (86.9)	174 (84.1)	51 (98.1)	
Black, n (%)	12 (4.6)	12 (5.8)	0	.07‡
Multiracial/declined, n (%)	22 (8.5)	21 (10.1)	1 (1.9%)	
Parity, n (%)				
Nulliparous	103 (39.8)	87 (42.1)	16 (30.8)	.14
Multiparous	156 (60.2)	120 (57.9)	36 (69.2)	
BMI (kg/m <sup>2</sup> ) at first visit, mean ± SD	27.1 ± 6.0	27.4 ± 6.3	25.8 ± 4.4	.19
BMI category at first visit, n (%)				
Underweight <19.8 kg/m <sup>2</sup>	19 (7.3)	14 (6.8)	5 (9.6)	
Normal 19.8–26 kg/m <sup>2</sup>	102 (39.4)	80 (38.6)	22 (42.3)	.78
Overweight 26.1–28.9 kg/m <sup>2</sup>	61 (23.5)	49 (23.7)	12 (23.1)	
Obese ≥29 kg/m <sup>2</sup>	77 (29.7)	64 (30.9)	13 (25.0)	
GA at first visit (weeks), mean ± SD	9.4 ± 2.2	9.3 ± 2.2	9.6 ± 2.2	.22
GA at last visit (weeks), mean ± SD	39.0 ± 1.1	39.1 ± 1.1	38.8 ± 1.1	.07
Substance use during pregnancy,† n (%)				
Tobacco	38 (14.7)	36 (17.4)	2 (3.8)	.01
Alcohol or illegal drugs	4 (1.5)	3 (1.4)	1 (1.9)	1.0‡

\* Response options given at registration for race, but not ethnicity, differed over the course of the study.

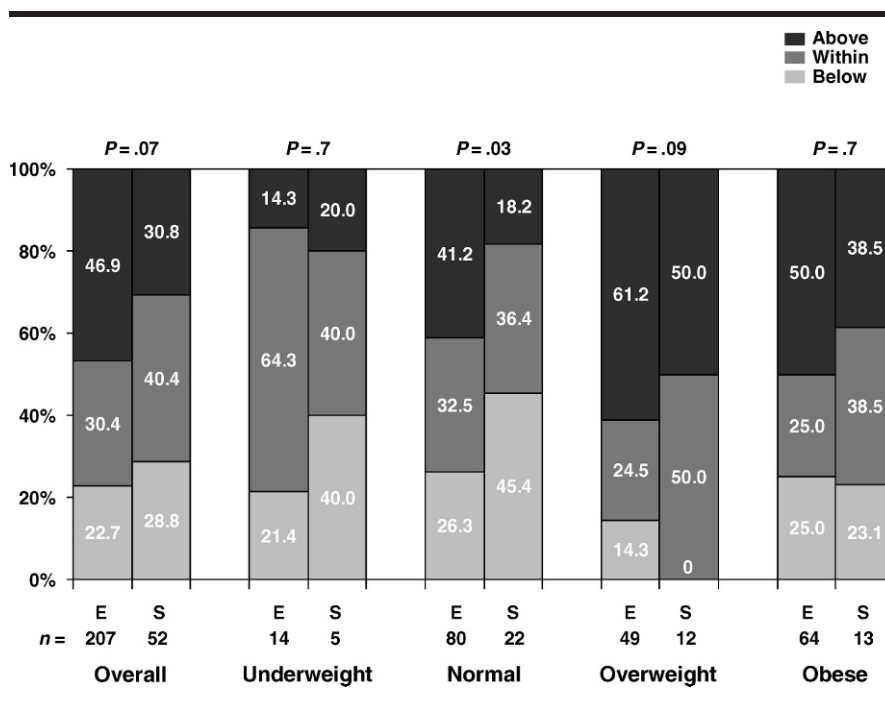
† Ever use of any amount, at any stage of pregnancy.

‡ Fisher's Exact Test.

SD = standard deviation; BMI = body mass index; GA = gestational age.

language preference among normal-weight women ( $P=.03$ ) and a trend among overweight women ( $P=.09$ ). Because factors such as age, smoking status, and baseline BMI affect prenatal weight gain, the sample size in our study may be too small to show a more consistent and stronger relationship between language preference, BMI category, and prenatal weight gain.

Of three studies identified that examined prenatal weight gain by any marker of acculturation, three used length of residence in the United States and one also used language preference.<sup>25–27</sup> Two studies found a significant association between increasing weight gain and increasing duration of residence.<sup>25,27</sup> Siega-Riz ( $N=4791$ ) reported that US born Hispanic women had a lower risk of inadequate prenatal weight gain, but did not differentiate language preference or length of residence for those who were foreign-born.<sup>26</sup> In a recent prospective cohort



**Fig 1. Prenatal weight gain among Hispanic women by language preference and baseline BMI category. E = preferred English; S = preferred Spanish**

**Table 2. Postpartum weight retention**

	Hispanic Population N=105*	Preferred English n=81	Preferred Spanish n=24	P value
BMI change at late postpartum, n (%)				
Below (<0.5 kg/m <sup>2</sup> )	14 (13.3)	13 (16.0)	1 (4.2)	.32†
Return to baseline (±0.5 kg/m <sup>2</sup> )	24 (22.9)	18 (22.2)	6 (25.0)	
Above (>0.5 kg/m <sup>2</sup> )	67 (63.8)	50 (61.7)	17 (70.8)	
Mean change (SD), kg/m <sup>2</sup>	1.29 (1.06)	1.21 (1.18)	1.53 (0.96)	.49
Range	-3.45 - 6.24	-3.45 - 5.91	-0.86 - 6.24	

\* Postpartum weight measurement was not available for all patients.

† Fisher's exact test.

study of predominantly Puerto Rican women (N=770),<sup>25</sup> Chasan-Taber found that Hispanic women who lived less than 10 years in the United States were 50% less likely to exceed IOM recommendations than third-generation Hispanic women (P=.01).<sup>25</sup> Using a more nuanced definition than that used in our study, Spanish language preference was associated with a significantly lower risk of excessive weight gain (37% of Spanish-only speakers, 45% of English and Spanish speakers, and 47% of English-only speakers exceeded guidelines; P=.02). These findings are comparable to our results, in a study with a much larger sample size. In our study, approximately 31% of Spanish-speakers gained excessively.

Of note, ours is the only study known by the authors that analyzed prenatal weight gain by language preference and baseline BMI category. Other studies have consistently found that overweight women are more likely to exceed gestational weight gain guidelines than normal-weight or obese pregnant women.<sup>17,35</sup> Interesting, in our sample, while Spanish-speakers had better weight gain patterns than English-speakers, this same pattern was seen; 18.2% of normal-weight Spanish-speakers vs 41.2% of normal-weight English-speaker, 50% of overweight Spanish-speakers vs 61.2% of overweight English-speakers, and 38.5% of obese Spanish-speakers vs 50% of obese English-speakers gained excessively (Figure 1).

Studies exploring a relationship between Hispanic ethnicity and postpartum weight retention have yielded mixed results.<sup>22,36</sup> This is the only study known to the authors that reports postpartum weight retention in Hispanic women by any marker of acculturation. In this study, only older age was a significant predictor of returning to within ±0.5 of baseline BMI. Overall, 64% of women exceeded their baseline BMI at late postpartum, substantially more than in a study by Amorin (49%) using the same measure of postpartum weight retention.<sup>13</sup> The mean increase in BMI from baseline to late postpartum in this study was 1.3 kg/m<sup>2</sup>.

Our study had several strengths. First, our study used measured weight at all time points to ensure that weight gain patterns described are accurate. Many studies use self-reported weight, which is subject to recall bias.<sup>9,18,22,25</sup> Studies have reported that women overestimate their height and underestimate their weight.<sup>37</sup> The difference between measured and self-reported weight has been estimated to be approximately 1 kg, however 20% to 30% of women have been found to inaccurately report their weight by 5 lb or more.<sup>37</sup> Discrepancies between actual and self-reported weights occur more frequently and are greater in overweight and obese women than normal-weight women.<sup>38</sup> Misclassification to lower BMI categories may result in underreporting excessive prenatal weight gain and overstating postpartum weight retention.

Second, we analyzed postpartum weight retention by change in BMI, which has several advantages over change in weight above baseline as defined in other studies.<sup>13-15</sup> BMI allows more accurate comparison of the impact of postpartum weight retention for specific groups and is more predictive of health outcomes. BMI increases of 1 to 2 kg/m<sup>2</sup> are associated with increased risk of developing type 2 diabetes, even for normal weight women.<sup>39</sup> Increase in BMI of 3 kg/m<sup>2</sup> between pregnancies, even in women with healthy baseline BMI, increases the risk of preeclampsia, gestational diabetes, and cesarean delivery in subsequent pregnancies.<sup>40</sup>

Lastly, our sample was drawn from an urban inner city community with a high percentage of foreign-born residents, primarily from Mexico, Dominican Republic, and Honduras. These three countries are the country of affiliation for 68% of all Hispanics living in the United States<sup>41</sup> and have among the highest proportions of foreign-born residents of all Hispanic subgroups.<sup>42</sup> Therefore, the findings of this study are likely to be representative of Hispanics living in other urban communities.

The two major limitations of our study are its small sample size, particularly for subgroup analysis, and that other measures of acculturation were not available. Length of residence in the United States and country of origin are not routinely obtained as part of the

medical interview at our center. However, language preference can be found on most paper and electronic health records.

Of note, our analysis used the 1990 IOM weight gain standards for pregnancy, rather than the guidelines issued in May 2009. Because no studies have been published using these new guidelines, we analyzed our data using the older criteria so that comparisons could be made to similar studies. The new guidelines update the BMI criteria used to define underweight, normal weight, overweight, and obesity and clarify the weight gain recommendations for obese women. Because the 1990 IOM guidelines did not specify a recommended weight range for obese women, studies have historically excluded obese women,<sup>43</sup> combined overweight and obese into one category<sup>13</sup> or used the same weight gain recommendation (15–25 lb) for both overweight and obese women as in our study.<sup>25</sup>

## CONCLUSIONS

The inability of most women in this study to adhere to the IOM prenatal weight gain recommendations and to return to their early pregnancy BMI by late postpartum has major implications for their future health. Excessive prenatal weight gain is common among Hispanic women and increases the attendant risk of abnormal glucose levels, gestational diabetes, and preeclampsia. Excessive prenatal weight gain increases perinatal complications and is one of the strongest predictors of postpartum weight retention, which in turn predicts long-term obesity.<sup>15,44</sup>

Hispanic women have high rates of obesity and are at higher risk of diabetes, making weight control in pregnancy an essential strategy to prevent diabetes in a more susceptible population. Indeed, one study estimated that the lifetime risk of Hispanic

women developing diabetes exceeds 50%.<sup>45</sup> Fertility rates are also higher among Hispanic women than any other racial/ethnic group, suggesting that pregnancy-associated obesity will remain a critical health issue for the foreseeable future. Further studies with larger samples are needed to help tease out the complex relationships among language preference, BMI, and prenatal weight gain and postpartum weight retention in Hispanic women.

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## PRENATAL WEIGHT GAIN IN URBAN HISPANIC WOMEN - Hackley et al

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