Published in final edited form as:

Womens Health Issues. 2010 ; 20(2): 133–138. doi:10.1016/j.whi.2009.11.005.

Multiparity is associated with High Motivation to Change Diet among Overweight and Obese Postpartum Women

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Abstract

Background—Pregnancy is associated with weight gain and obesity. The aim of this study is to identify the effect of parity and other factors on motivation to change diet to lose weight in a cohort of overweight and obese postpartum women.

Study Design—*Active Mothers Postpartum (AMP)* is a randomized controlled trial aimed at postpartum weight reduction. At baseline, we measured motivation to change diet to lose weight among 491 overweight/obese postpartum women. Logistic regression was used to model the effect of parity on motivation to change diet at baseline while adjusting for potential confounders including age, race, education, BMI category, and breastfeeding status.

Results—Approximately two thirds (68%) of participants were highly motivated to change their diet to lose weight. In the multivariable model, women with three or more children had 2.5 times the odds of high motivation compared to primigravid women, and women *not* breastfeeding had 1.6 times the odds of high motivation compared to any breastfeeding.

Conclusion—Although risk for obesity is incurred starting with a woman's first pregnancy, women in this study were more motivated to change their diet to lose weight after their third pregnancy. Further research is needed to understand how to best capitalize on the high motivation in women with several children and also how to improve motivation for primigravid women and women who are breastfeeding.

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No Conflicts of Interest to report.

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Keywords

postpartum obesity; parity; diet; weight loss

Introduction

Postpartum weight retention can be a significant contributor to the development of obesity (Gunderson & Abrams, 2000; Gore et al., 2003). Pregnancy is frequently cited by women as a cause of their obesity (Rossner, 1992), and one in five postpartum women are five or more kilograms heavier 6–18 months postpartum than they were before pregnancy (Gunderson & Abrams, 2000). Several studies have also confirmed the association of higher parity and obesity (Bastian et al., 2005; Weng et al., 2004; Cohen et al., 2009).

Factors influencing postpartum weight retention include excessive gestational weight gain and overweight or obese pregravid status (Gunderson & Abrams, 2000; Gore et al., 2003). Both these weight-related factors also have negative consequences for the pregnancy itself. Pregravid obesity increases a woman's risk of preeclampsia, gestational diabetes mellitus, and cesarean delivery (Lynch et al., 2008), and excessive gestational weight gain is associated with high birthweights, macrosomia and cesarean delivery (Viswanathan et al., 2008).

Postpartum weight retention is also associated with modifiable behavioral factors such as diet, physical activity and breastfeeding (Oken et al., 2007; Olson et al., 2003; Ohlin & Rossner, 1994; Baker et al., 2008). Research and clinical programs can assist women in achieving healthy lifestyle behaviors to lose weight after pregnancy, but few such programs have been tested (Amorim et al., 2007), and little is known about what factors may motivate women to participate in such programs.

As weight retention is compounded over multiple pregnancies, women's interest in weight loss programs may increase, and high pre-treatment motivation is an important predictor of weight loss success (Teixeira et al., 2005). Previous studies have not specifically examined the role parity plays in postpartum women's motivation to lose weight. Thus, the goal of the current analysis was to determine the effect of parity and other factors on motivation to change diet to lose weight in a cohort of overweight and obese postpartum women.

Methods

Study Design

This cross-sectional study was conducted utilizing data from a baseline survey for a randomized controlled trial, *Active Mothers Postpartum (AMP)*, designed to enhance weight loss in postpartum women who were overweight or obese prior to and during early pregnancy. The study was reviewed and approved by the Institutional Review Board of Duke University Medical Center. The design, rationale, and baseline participant characteristics have been presented in detail previously (Ostbye et al., 2008).

Women who did not speak English, were less than 18 years old, or had any health conditions that prevented them from walking a mile unassisted were excluded. Women with height and weight measured by research staff indicating a BMI ≥ 25 kg/m² at their six weeks postpartum visit were considered eligible and written informed consent was obtained. These postpartum visits occurred at a mean of 46 days (SD 11) after delivery.

Recruitment took place from 2004 to 2006. Of the 2,821 women pre-screened from patient records, 1,695 were eligible for screening. Approximately half of these potentially eligible

women (798) were reached by phone; 148 refused screening and 136 did not meet inclusion criteria. Five hundred and fourteen women signed the study consent form and 491 women completed the baseline telephone survey.

For this analysis, the primary outcome variable was motivation to change eating to reduce calories. To determine motivation to change diet, participants were asked, “*How much do you want to make changes in your eating habits to reduce calories, even when your family or social life takes a lot of time?*” on a scale from 1 (not at all) to 7 (completely). Because the distribution of this item was extremely skewed (median 6), we dichotomized motivation as “high” (7 on this scale) vs. “low” (1–6 on this scale). This one-item measure of motivation or desire to change behavior has face validity and has been used in previous studies targeting changes in diet and exercise to lose weight (Perugini & Bagozzi, 2001). Motivation and/or desire provide the impetus for influencing intentions to change the behavior (Bagozzi & Kimmel, 1995). In a previous study of 108 subjects, motivation to change diet to lose weight explained a moderate amount of the actual behavioral change ($R^2=0.25$) (Perugini & Bagozzi, 2001).

The main independent variable was parity (defined as the number of live births) at baseline study enrollment. Women were classified as overweight (BMI 25.0 – 29.9 kg/m²), obesity class I (BMI 30.0 – 34.9 kg/m²), obesity class II/III (BMI ≥ 35 kg/m²) (National Heart, Lung, and Blood Institute, 2008). Sociodemographic and health characteristics with known or possible associations with motivation to change diet after giving birth were evaluated as candidate predictors. Baseline characteristics included maternal age, race (black/non-black), marital status (married and living with partner/not married and divorced), education ($\leq$ high school/some college or greater), income ($<$ \$60,000/ $\geq$ \$60,000), self-reported overall health (excellent/very good or good/fair/poor), delivery mode (vaginal/cesarean), Edinburgh Postnatal Depression Scale (EPDS) score (≥ 13 / <13) (Cox et al., 1987; Murray & Carothers, 1990), breastfeeding status (breastfeeding exclusively/some formula/no breastfeeding), and expected employment at 6 months (working full-time, working part-time, staying home with child every day).

A bivariate analysis using the chi-square test was conducted to describe any associations of the potential covariates with high motivation to change diet. Correlation coefficients between the potential covariates were calculated. After selecting only variables that were not highly correlated with one another, multivariate logistic regression was performed using stepwise backwards elimination. That is, all candidate variables were included in the preliminary model and stepwise backwards elimination was used to remove variables with p-values greater than 0.5 (Harrell, 2001). The final model is summarized by odds ratios with corresponding 95% confidence intervals. For all tests, a two-sided α of 0.05 was considered statistically significant. All statistical analyses were performed using SAS, version 9.1 (SAS Institute, Cary, NC).

Results

The mean age of the 491 women included in this analysis was 31 (range 19–46) years. Forty-seven percent were black. Most were married or living with a partner (79%), 41% earned more than \$60,000 per year, 79% had more than a high school education, and 64% planned to work full-time by the time their child was 6 months old. The mean BMI was 32.9 kg/m² (SD 6.3) with 198 (40%) overweight, 153 (31%) obesity class I, and 140 (29%) obesity class II/III. Forty-one percent were primiparous, 36% had two children; and 23% had three or more children. At approximately 6 weeks postpartum, 9% met screening criteria for depression. Thirty-four percent reported exclusively breastfeeding, 27% reported breastfeeding combined with formula feeding, and 39% reported not breastfeeding. Forty-one percent reported their overall health as very good or excellent. Most (68%) women were highly motivated to change their diet to lose weight.

In the bivariate analysis (See Table 1), high motivation to change diet was significantly more likely in women who are black (74% v. 63%, $p=0.01$), have less than \$60,000 per year salary (73% v. 61%, $p=0.006$), have high school education or less (77% v. 66%, $p=0.02$), not living with partner/spouse (78% v. 65%, $p=0.02$), have three or more children (81% v. 65%, $p=0.001$), who report their health as good/fair/poor compared to excellent/very good (74% v. 64%, $p=0.01$), are not breastfeeding (76% v. 63%, $p=0.002$), and are in obesity class I (77% v. 56%, $p=0.001$), or in obesity class II/III (76% v. 56%, $p=0.001$).

Table 2 describes the multivariate results of the logistic regression model. Women with three or more children had higher odds of motivation to change diet compared to primiparous women (OR 2.5, 95% CI 1.3–4.6). Women with obesity class I and obesity class II/III had higher odds of motivation to change diet as compared to overweight women (OR 2.5, 95% CI 1.5–4.1) and (OR 1.9, 95% CI 1.1–3.2), respectively. Women who were not breastfeeding had higher odds of motivation to change diet as compared to women who were breastfeeding (OR 1.6, 95% CI 1.1–2.6).

Discussion

This study demonstrates that overweight and obese postpartum women with three or more children are more motivated to change their diet to lose weight compared to women with fewer children. Women who were not breastfeeding were also more motivated to consume less calories to lose weight. Although motivation does not always translate into behavior modification, it is an important determinant of intentions to change diet and exercise to lose weight (Perugini & Bagozzi, 2001) and of weight loss success (Teixeira et al., 2005), and women who are more motivated are more likely to change their behaviors than those who are not as motivated (Godin & Kok, 1996).

There are several reasons why women with excess weight may be less motivated to lose weight after having their first or second child. First, women may decide to put off weight loss until they are finished having children. This can be problematic if the first pregnancy is at a very young age and they are unsure of their desired parity. Second, women may think the weight gained during pregnancy will be lost automatically after their first child, and only after several pregnancies do they realize that the excess weight remains and even accumulates. Third, since fathers also gain weight with each child (Weng et al., 2004; Bakhshi et al., 2008), being overweight may seem more acceptable.

There are several reasons why women may be less motivated to change their diet to lose weight while breastfeeding. First, women may believe they will lose weight while breastfeeding because they expend extra calories producing breast milk. Unfortunately, weight loss will only occur if she does not consume extra calories. Many women find it difficult to restrict their calories while breastfeeding. Other women have concerns about changing the quality of breast milk while dieting. Lovelady et al. have shown that reducing calories does not affect the quality or quantity of breast milk in overweight women (Lovelady et al., 2000).

Setse et al (Setse et al., 2008) found similarly high rates of motivation to lose weight among pregnant women. In focus groups, pregnant women (ages 17–34) were concerned that postpartum depression would have a negative effect on motivation to lose weight. In the AMP study, we found low rates of depression (9%), and depression was not associated with motivation to change diet to lose weight (Krause et al., 2008). Multiparous women in the Setse study expressed frustration about failure to lose weight after their last pregnancy and also acknowledged that they had gained extra weight after each pregnancy (Setse et al., 2008).

Although black women are more likely to retain pregnancy weight, race was not associated with high motivation to change diet after adjusting for BMI. Black women are twice as likely

as white women to retain weight postpartum (Crowell, 1995), a difference not accounted for by socioeconomic status (Parker & Abrams, 1993). Recent results suggest a potential role for breastfeeding in reducing the risk of obesity in later life for white women but not black women (Cohen et al., 2009). The effect of breastfeeding on risk for obesity in black women may be confounded because overweight and obese women are less likely to breastfeed (Amir & Donath, 2007). Prospective studies are needed to fully understand the impact of breastfeeding on risk for obesity in black women.

There are limitations and strengths of these cross-sectional analyses. This study involved postpartum women enrolled in a weight loss study and may not generalize to women not enrolled in a research study. Therefore, we may have overestimated motivation to change behavior to lose weight. Our study sample included a relatively large proportion of women of higher socioeconomic status and excluded women who do not speak English, which may limit generalizability. A strength of *AMP* is that 47% of women completing the baseline survey were black and the participants' weight status ranged from overweight to obesity class III.

These results have important implications for clinicians caring for pregnant and postpartum women. Our findings suggest that a clinician may choose to provide different weight loss advice, depending upon patient factors such as parity. Postpartum women with three or more children are an important population to target for intensive weight loss interventions because of their high motivation to change their diet. While this multiparous population still requires support and skill building resources, i.e., referral to a nutritionist or a weight loss program, there may be less of a need to bolster motivation. For these women with several children, it is also important to recommend eliciting instrumental support from friends and family. This support might include helping with childcare or meeting together to exercise (Wing & Jeffery, 1999).

Primiparous women may require more encouragement to lose weight because they have no prior experience of attempting to shed weight in the postpartum period. It is likely that these first-time mothers are underprepared for how much weight they might retain and thus may benefit from motivational counseling during and immediately after pregnancy. During pregnancy, women access the health care system frequently and may be more receptive to changing behaviors (Birdsall et al., 2009).

Our results also suggest that women who are breastfeeding may be an important group for clinicians to target for weight loss interventions since they also report lower levels of motivation to change their diet behaviors. These women may require more information during pregnancy about appropriate diets while breastfeeding and realistic expectations about weight loss, as a result of breastfeeding, if calories are not restricted.

Understanding which women are highly motivated to change their diet also allows for research studies to target this group. Formal interventions tailored to parity and breastfeeding status should differentially target motivation, skills-building, support seeking, and other constructs helpful in promoting healthful eating habits. Further research is needed to understand how to best capitalize on the high motivation in women with several children and also how to improve motivation for primigravid women and women who are breastfeeding.

Acknowledgments

The funding agency is National Institute of Diabetes and Digestive and Kidney Diseases at the National Institutes of Health. Dr. Bastian had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Grant # DK 64986

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Table 1

Characteristics of overweight and obese post-partum women by motivation to change eating

Characteristic	High Motivation N=334	Low Motivation N=157	P value
Age, mean [sd]	30.6 [6]	31.1 [5]	0.3
Race:			
Black	169 (74)	59 (26)	0.01
Non black	165 (63)	98 (37)	
Income:			
<\$60,000	205 (73)	77 (27)	0.006
≥\$60,000	119 (61)	77 (39)	
Education:			
High school or less	79 (77)	23 (23)	0.02
Some college or greater	255 (66)	134 (34)	
Marital status:			
Single/divorced/separated/widowed	80 (78)	23 (22)	0.02
Married or living with partner	254 (65)	134 (35)	
Expected employment (at 6 months post-partum):			
Full-time	213 (69)	97 (31)	0.8
Part-time	60 (70)	26 (30)	
Not working for pay	60 (66)	31 (34)	
Number of Children:			
One child	123 (61)	78 (39)	0.001
Two children	119 (67)	58 (33)	
Three or more children	92 (81)	21 (19)	
Self-reported Health:			
Excellent/very good	150 (64)	52 (36)	0.01
Good/fair/poor	184 (74)	105 (26)	
Weight category (BMI; kg/m²)			
Overweight (25–29.9)	110 (56)	88 (44)	0.001
Obese class I (30–34.9)	118 (77)	35 (23)	
Obese class II/III (35+)	106 (76)	34 (24)	
Depression:			

Characteristic	High Motivation N=334	Low Motivation N=157	P value
No	300 (67)	146 (33)	0.3
Yes	34 (76)	11 (24)	
Delivery type:			0.5
Vaginal	198 (67)	98 (33)	
C-section	125 (70)	52 (309)	
Breastfeeding:			0.007
Exclusively breastfeeding	103 (61)	65 (39)	
Breastfeeding and formula feeding	87 (65)	47 (35)	
No breastfeeding	144 (76)	45 (24)	

Table 2

Multiple logistic regression analysis; high motivation to change diet to lose weight as dependent variable

Characteristic	Odds ratio	95% confidence intervals
Age	0.99	0.95–1.04
Black versus other	1.05	0.7–1.7
≥\$60K income versus <\$60K income	0.8	0.5–1.3
Number of children		
One child	1.0	
Two children	1.3	0.8–2.1
Three or more children	2.5	1.3–4.6
Weight category (BMI; kg/m ²)		
Overweight (25–29.9)	1.0	
Obese class I (30–34.9)	2.5	1.5–4.1
Obese class II/III (35+)	1.9	1.1–3.2
No breastfeeding versus any breastfeeding	1.6	1.1–2.6