



ORIGINAL RESEARCH ARTICLE

Weight Perceptions and Weight-Related Behaviors among Low Income Postpartum Women

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Abstract

Background: Minority and low-income women have higher rates of postpartum weight retention, contributing to increased rates of obesity in these populations. Weight perceptions may be an important factor contributing to the adoption of weight-management behaviors. The purpose of this study was to examine the relationships between weight perceptions and weight-related behaviors among overweight low-income women during postpartum enrolled in a weight loss intervention study.

Methods: This is a cross-sectional analysis of the Fresh Start study baseline data among overweight and obese low-income women during postpartum (N = 132). General linear regression models assessed the association between weight perceptions and energy intake, energy expenditure, self-monitoring, and self-regulation.

Results: Women who perceived themselves to be very overweight had significantly lower self-regulation ($\beta = -4.0$, SE = 1.6, $p = 0.014$) and higher energy expenditure ($\beta = 1.3$, SE = 0.7, $p = 0.05$) compared to women who perceived themselves to be moderately overweight or a little overweight. There were no significant associations between weight perceptions and self-monitoring or energy intake.

Conclusions: This study found that weight perceptions among these women are important factors to consider for weight loss. Future research should focus on investigating the impact of tailoring interventions to weight perceptions to impact engagement in weight-related behaviors in diverse low-income women during postpartum.

Keywords

Postpartum women, Weight perceptions, Weight loss

Introduction

There has been a significant rise in obesity among U.S. women over the past decade [1]. As of 2014, approximately 40% of women in the U.S. were considered obese, with obesity rates being disproportionately high among minority and low-income women [1,2]. The childbearing years are a critical life stage for women, as excessive weight gain during pregnancy and postpartum weight retention are common, particularly among minority women [3,4]. As of 2012, greater than 40% of Hispanic and black women gained above the 2009 Institute of Medicine (IOM) recommended limit for gestational weight gain [4] and, on average, racial/ethnic minority women retain 2 to 3 times more weight postpartum compared to non-Hispanic white women [3-7]. Increases in weight during the childbearing years places women at high risk for obesity and obesity-related diseases over their life course [8]. Thus, weight loss among women during postpartum is critical for the prevention of obesity in later years, particularly among low income and minority women.

Perceptions of one's weight may be an important precursor for the adoption of evidence-based weight-related behaviors (i.e. physical activity, caloric restriction) and weight loss [9,10]. Over two-thirds of U.S. adults are overweight or obese and 40% report being happy with their weight. However, only 51% report wanting to weigh less and 26% report seriously trying to lose weight [11,12]. This discrepancy may be greater among racial/ethnically diverse and socioeconomically disad-

vantaged groups. In a national sample of British adults, low income individuals who were overweight or obese were less likely to perceive their weight as unhealthy, and therefore less likely to attempt weight loss than individuals of higher SES [13]. In a nationally-representative sample from the National Health and Examination Survey (NHANES; N = 11,319), overweight non-Hispanic blacks who perceived their weight as normal or underweight were less likely to desire to weigh less or less likely to have attempted weight loss compared to overweight non-Hispanic whites [14]. Latina women who were exceeding the IOM guidelines during pregnancy (N = 62) were also less likely to view their weight as important or make efforts to control their gestational weight gain compared to normal weight women [15].

While weight perceptions may be associated with weight loss in these groups, there is a scarcity of data on the association between weight perceptions and weight-related behaviors among low income and racial/ethnically diverse women during weight loss efforts in the postpartum period. Thus, the purpose of this study was to examine the relationships between weight perceptions and weight-related behaviors among overweight low-income women during postpartum enrolled in a weight loss intervention study.

Methods

Design

This is a cross-sectional analysis of the Fresh Start study baseline data. Fresh Start was a randomized clinical trial of a behavioral weight loss intervention targeting overweight and obese low-income women during postpartum who are clients of five Women Infants and Children (WIC) clinics in the Worcester, Massachusetts area. The methods of the intervention have been published elsewhere [16]. Briefly, the weight loss intervention consisted of an 8-week group-based curriculum, and included a narrative component, print materials, group discussion, and access to exercise facilities [16]. All procedures were approved by the University of Massachusetts Medical School Institutional Review Board.

Inclusion criteria included childbirth in the previous 6 weeks to 6 months, age 18 or older, a body mass index (BMI) of $> 27 \text{ kg/m}^2$, and obstetric provider approval for participation in the diet and physical activity components of the intervention. Women were excluded if they were unwilling to give informed consent, if they were pregnant or planning to become pregnant within the following 24 months, if they had a psychiatric illness that limited their ability to participate, if they were taking a medication that causes weight changes, if they had no access to a telephone, or if they were planning to move out of the area within the study period.

Participants were screened for eligibility during their routine visits to the WIC clinics. WIC providers completed a checklist of eligibility criteria for all women based on

chart information and gave potentially eligible women a study fact sheet. Interested women provided their contact information. Potentially eligible participants were then contacted by the study recruiter via telephone, who obtained verbal consent and screened for additional eligibility criteria. Eligible women were scheduled for a study visit where they were provided written consent and completed baseline assessment measures. Trained research staff administered the baseline survey and obtained anthropometric measures (i.e., height, weight).

Measures

BMI: Height and weight were measured by trained study staff using a stadiometer and portable digital scale, respectively. BMI was then calculated using the formula, $\text{BMI} = 703 \times [\text{weight}(\text{lb.})/\text{height}^2 (\text{in.}^2)]$.

Weight-related behaviors: Weight-related behaviors were measured using the Weight-Behavior Inventory (WBI), which has been validated among overweight and obesity minority adults [17]. This tool consists of 35 questions in which women are asked how often they used a series of strategies to manage their weight over the past 30 days, by responding “never or hardly ever”, “some of the time”, “about half of the time”, “much of the time”, “always or almost always”. The value for each response option ranges from 1 to 5, and higher scores indicate more optimal weight-related behaviors. The WBI includes four subscales: energy intake, energy expenditure, self-monitoring, and self-regulation. The energy intake subscale includes 8 items that asked how often the respondent reduced his or her calorie intake, decreased portion sizes of desserts, increased fruits and vegetables, ate less fat or cut out/reduced sweets or junk food in the previous 30 days. The energy expenditure subscale includes 3 items that asked how often the respondent exercised for a period of 30 minutes or more, exercised at the gym or participated in an exercise class, or altered daily routines to get more lifestyle physical activity in the previous 30 days. The self-monitoring subscale consists of 4 items that asked how often the respondent recorded or graphed physical activity and weight, wrote down type or quantity of food consumed, or weighed herself regularly in the previous 30 days. Finally, the self-regulation subscale is comprised of 5 items that asked how often the respondent reduced portion sizes, shopped from a list, decided ahead of time what to eat for meals and snacks, kept healthy snacks for themselves, or changed food preparation techniques in the previous 30 days.

Weight perceptions: Perception of weight was measured by a single question. Women were asked to think about how much they weight and if they considered themselves “very overweight”, “moderately overweight”, “a little overweight”, “just right”, “a little underweight”, “moderately underweight”, or “very underweight” [18].

Covariates: Sociodemographic factors such as age, gender, education, income, and marital status were

self-reported. The Perceived Stress Scale was used to measure participants' perceived stress in the past month [19]. This 10-item questionnaire asks how often the respondent felt or thought a certain way (i.e., unable to control the important things in their life, nervous and 'stressed', could not cope with all the things they had to do, etc.) in the past month using a 5-point frequency scale (never, almost never, sometimes, fairly often, very often) [19].

Statistical analysis

SAS 9.4 (SAS Institute, Cary, NC) was used for data analysis. Means, standard deviations, and frequencies were calculated for demographic variables, weight perceptions and WBI subscales; energy intake, energy expenditure, self-monitoring, and self-regulation. Linear regression models assessed the association between weight perceptions and energy intake, and general linear mixed models assess the association between weight perceptions and energy expenditure, self-monitoring, and self-regulation. For each of the four factors, we report a crude model and a model adjusted for age, education, race, and BMI for each of the four outcomes. Due to increased demands experienced by women during the postpartum period (i.e., child care, time constraints) all of which may contribute to increased stress, we also controlled for perceived stress to reduce the potential effect of stress on weight perceptions and weight related behaviors.

Results

There were 139 women enrolled in the study. There

was no missing data for the primary outcome variables (i.e., self-regulation, energy intake, energy expenditure, and self-monitoring subscales) and weight perception. Seven participants reported their weight perception as "underweight" and were not included in the analysis resulting in a final analytic sample size of 132 women. Table 1 presents the demographic characteristics for the study sample. The mean age was 28.2 years (SD = 5.8) and mean BMI was 31.4 kg/m² (SD = 4.4). Over one-third of the women were Hispanic/Latina (35.6%) and about one quarter (25.8%) were non-Hispanic black. Among women perceiving themselves to be very overweight, over one-third of Hispanic/Latina women (39.3%) perceived themselves to be very overweight compared to 30.4% non-Hispanic white and 21.4% non-Hispanic black women.

Results showed that women who perceived themselves to be very overweight had significantly lower self-regulation scores ($\beta = -4.0$, SE = 1.6, p-value = 0.014) compared to women who perceived themselves to be moderately overweight or a little overweight, after adjusting for age, education, race, marital status, BMI, and stress (Table 2). Women who perceived themselves to be very overweight had significantly higher energy expenditure scores compared to women who perceived themselves to be moderately or a little overweight ($\beta = 1.3$, SE = 0.7, p-value = 0.05; Table 2). There were no significant associations between weight perception and self-monitoring or energy intake.

Discussion

To our knowledge, this is the first study to specific-

Table 1: Characteristics of study participants according to measures of weight perception, fresh start study, baseline data (N = 132).

	Weight Perception								p-value
	Total Sample (n = 132)		Very Overweight		Moderately Overweight		Little Overweight		
	N	%	N	%	N	%	N	%	
Total	n/a	n/a	56	42.4	48	36.4	28	21.2	n/a
Age- mean, SD*	28.2	5.8	27.6	5.3	28.2	5.7	29.5	6.9	0.534
BMI- mean, SD*	34.1	4.4	36.2	4.4	33.2	3.9	31.4	3.1	< 0.0001
Race									
White	43	32.6	17	30.4	19	39.6	7	25	0.263
Hispanic/Latina	47	35.6	22	39.3	14	29.2	11	39.3	
Black	34	25.8	12	21.4	12	25	10	35.7	
Other/Missing	8	6.1	5	8.9	3	6.3			
Education									
< High School	16	12.6	4	7.4	5	10.9	7	25.9	0.226
High School graduate	42	33.1	18	33.3	15	32.6	9	33.3	
Some college/graduate	69	54.3	32	59.3	26	56.5	11	40.7	
Living with partner									
No	62	47.3	24	43.6	25	52.1	13	46.4	0.689
Yes	69	52.7	31	56.4	23	47.9	15	53.6	
Weight-Related Behaviors									
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Energy Intake	20.7	7	20.8	7.1	19.7	6.4	22	7.9	0.477
Energy Expenditure	5.3	2.4	5.9	2.7	4.9	1.9	4.9	2.4	0.045
Self-monitoring	6.1	3	5.9	2.7	6.1	3.4	6.3	3	0.847
Self-regulation	17.9	5.8	16.5	5.6	17.8	5.4	20.6	5.9	0.013

Percent's may not sum to 100 due to missing and rounding; P-values generated from likelihood ratio Chi squared or Wilcoxon test*; n/a = Not Applicable; SD = Standard Deviation.

Table 2: Characteristics of study participants according to measures of the outcome Weight Related Behavior Inventory (WBI) (N = 132).

	Total Sample		Energy Intake			Energy Expenditure			Self-Monitoring			Self-Regulation		
	n	%	B	SE	p-value	B	SE	p-value	B	SE	p-value	B	SE	p-value
<i>Weight Perceptions</i>														
Little Overweight	28	21.2	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref
Moderately Overweight	48	36.4	-2.2	1.8	0.23	0.1	0.6	0.8	0.2	0.8	0.79	-2.6	1.5	0.08*
Very Overweight	56	42.4	0.2	1.9	0.99	1.3	0.7	0.05**	-0.1	0.9	0.88	-4	1.6	0.014**

Adjusted for age, race, education, marital status, BMI, and stress; p-values generated from linear mixed regression models; SE = Standard Error; **significant at 0.05; *significant at 0.10.

ly examine weight perceptions and weight related behaviors among low income women during postpartum. Among this sample of low-income overweight women during postpartum, those who perceived themselves as being very overweight were more likely to have lower self-regulation scores than women who perceived themselves as moderately or a little overweight. Our self-regulation findings contrast previous literature in other population subgroups that found that those who report a higher perceived weight were more likely to engage in weight loss attempts or weight management behaviors [9,10]. For example, in a national sample of women, perceptions of being very overweight was strongly associated with weight loss attempts [20]. Another study with minority women found that among those who were overweight or obese, those who perceived their weight accurately were more likely to engage in weight management behaviors [14]. The assessment of self-regulation in the current study focused on specific dietary weight-management behaviors; reducing portion sizes, leaving food on their plate, changing food preparation techniques, meal planning, and shopping from a grocery list.

The finding that weight perception is related to lower self-regulation scores may differ from previous literature for a few reasons. First, women in this study may not be aware that the identified behaviors for self-regulation are effective weight loss strategies. For example, a qualitative study exploring African American pregnant women's barriers to postpartum weight loss found that despite being knowledgeable about the adverse effects of obesity, they had limited knowledge of effective weight loss strategies [21]. Second, self-regulatory weight-management behaviors such as portion control or meal planning may not be salient to women during postpartum who perceive themselves as very overweight, or these women may not feel as though they understand or are equipped to make the necessary dietary changes to lose weight. Nuss and colleagues suggested that personal health may not be a primary focus for new mothers, and that obese women at 1 year postpartum reported significantly more barriers (e.g. work demands, family obligations, difficulty in understanding nutrition concepts) to healthy eating than normal weight women [22]. Thus, although self-regulation behaviors have been repeatedly shown to be an important determinant

of success in weight loss programs in the general population, future research may consider strategies to optimize self-regulation behaviors among overweight and obese women during postpartum [23,24]. Finally, there may be some cultural and subcultural beliefs that may have influenced weight perceptions and weight related behaviors. For example, it is common in Hispanic and African American culture that a larger female body size is desired and mothers who are larger are perceived as strong [25-27]. While the current study recruited a sample of women who were interested in participating in a weight loss intervention and the women in this study desired weight loss, the amount of weight loss they were seeking may have been lower compared to other subgroups of the population. Even with the desired weight loss, they would achieve through an intervention, they may remain in the overweight BMI category and be satisfied with that outcome [25].

Our study findings also showed that women who perceived themselves to be very overweight had higher energy expenditure than women who perceived themselves to be moderately or a little overweight. In this study, energy expenditure was assessed via how often, over the past 30 days, women exercised for a period of 30 minutes or more, exercised at the gym or participated in an exercise class, or altered daily routines to get more lifestyle physical activity. Few studies have examined the relationship between weight perceptions and energy expenditure. Studies examining this association among adults and adolescents found that overweight and obese individuals who perceived their weight as normal or underweight may be more likely to engage in physical activity [28-30]. However, a majority of studies of weight perceptions have been conducted with the general population, and do not take into account the unique experiences of women during postpartum or samples of these women interested in losing weight. Our finding may partly be explained by the belief's women may have regarding the positive impact of exercise on body weight. Women may believe that physical activity is the primary contributor to weight loss and thus perceiving oneself as very overweight may prompt attempts to engage in this behavior, unlike the limited knowledge regarding the impact of self-regulatory behaviors as facilitative of weight loss. In a national sample of U.S. adults from the Behavioral Risk Factor Sur-

veillance System (BRFSS), two-thirds of adults reported using physical activity as a weight loss strategy, but only 21.5% of men and 19.4% of women reported using the combination of eating fewer calories and exercising 150 minutes or more per week [31]. A study of women during postpartum with gestational diabetes also reported that 61% of the sample believed that weight loss was the greatest benefit of exercise [32]. Devine, et al. found similar findings among women during postpartum who emphasized the importance of continuous physical activity as a strategy for postpartum weight management, although none of these studies assessed weight perceptions [33]. The women in this study who perceived themselves to be very overweight may be focusing on physical activity as their primary strategy for weight loss or weight management. However, while physical activity is critical for weight loss, research suggests that activity alone stimulates 1-3-kilogram weight loss over a 6-month period [34]. Women who perceive themselves as very overweight may benefit from messaging associated with the importance of combining exercise with diet modification as this is the most effective strategy for weight loss.

There are several limitations to this study. First, the cross-sectional nature of the study design precludes conclusions of cause-effect relationships. Future longitudinal and experimental studies are needed to assess causal relationships between weight perceptions and weight-related behaviors in this population. Further, weight perceptions were measured by a single question, which may impact overall study results. Second, this study was conducted with a sample of diverse low-income women during postpartum who enrolled in a weight loss program in Massachusetts. Given this potential selection bias, these findings may not be generalizable to other population subgroups and those in other geographical regions. Weight perceptions may be associated with motivations for which women enrolled the study. For example, women who perceive themselves as very overweight but who self-regulate their dietary behaviors may not feel as though they need to be part of a weight loss intervention but can instead lose weight on their own. As a result, very overweight women who do not self-regulate their behavior may have been more interested in enrolling in a weight loss program. Similarly, women who perceived themselves as very overweight and who are more likely to engage in exercise may have been more prone to enroll in the study as it offered a gym membership to participants. Third, due to constraints on the survey measures, this study was not able to analyze the extent to which women perceived their weight accurately. Evidence suggests that there is often a disconnect between actual weight and perception of weight, particularly among overweight and obese adults; and that these individuals are perceiving themselves to be a healthy weight [28,35,36]. Such weight misperceptions may impede the adoption of healthful

lifestyle behaviors among overweight and obese adults [28]. However, the discrepancy between actual and perceived weight may have been lesser in this study as all women were overweight and enrolled the study to lose weight. Nevertheless, future research in this area may consider analyzing the extent to which women during postpartum accurately perceive their weight as well as the associations between accuracy of weight loss.

This study also had several strengths. First, to our knowledge, this was the first study to examine the associations between weight perceptions and weight-related behaviors in a sample of diverse low-income overweight women during postpartum. Having a better understanding of the factors associated with weight-related behaviors is critical for the design of effective weight loss interventions. Second, this study evaluated four different weight-related behaviors: energy expenditure, energy intake, self-regulation, and self-monitoring. Previous research in this area have characterized weight-related behaviors together or examined associations between weight perceptions and weight loss or weight loss attempts without examining associations between weight perceptions and specific behaviors that account for weight loss. By examining these behaviors individually, we may attain a deeper understanding of intervention needs of women with different weight perceptions.

Conclusion

The factors that are associated with weight-related behaviors and weight loss in low income women during postpartum are understudied. This study found that weight perceptions among these women are important factors to consider for weight loss. Results of this study found that women who perceived themselves to be very overweight were less likely to engage in self-regulatory behaviors and more likely to report energy expenditure than women who perceived themselves as a little overweight. Future research should focus on investigating the impact of tailoring interventions to weight perceptions to impact engagement in weight-related behaviors in diverse low-income women during postpartum.

Competing Interests

The authors declare they have no competing interests.

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Author's Contributions

MR and SL designed the study and collected the data. VS and CH were major contributors in drafting the manuscript. NK analyzed and interpreted the data. All authors read and approved the final manuscript.

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