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Discrepancy between Actual and Perceived Weight Status in Rural Patients: Variations by Race and Gender

Dr. K. Bryant Smalley, Ph.D., Psy.D.,

Executive Director of the Rural Health Research Institute and an Associate Professor in the Psychology Department at Georgia Southern University

Dr. Jacob C. Warren, Ph.D., and

Serves as the Endowed Chair and Director of the Center for Rural Health and Health Disparities and an Associate Professor of Community Medicine in the Mercer University School of Medicine

Mr. B. David Morrissey, M.D.P.

Administrative Coordinator of the Rural Health Research Institute at Georgia Southern University

Abstract

The study's goal was to determine if differences in weight misperception by race and/or gender occur within a sample of economically disadvantaged rural patients with diabetes and/or hypertension. Diabetic and hypertensive patients were enrolled in the study from a network of federally qualified health centers (FQHCs) in the rural South. Multivariate logistic regression analysis suggests that, even when controlling for age, education level, employment status, and poverty, rural African American patients with chronic disease are more likely than their White counterparts to misperceive their weight status (OR = 1.709, p = .037). This difference in perceived weight occurred despite the absence of an underlying difference in actual weight status between African American and White patients (p = .171). In addition, rural men were much more likely than rural women to misperceive their weight status (OR = 2.688, p < .001). Implications for intervention development and implementation are discussed.

Keywords

Body weight; chronic disease; rural populations; weight perception; African Americans

Obesity is an entrenched health problem in the U.S. Over one-third of adults and nearly 17% of youth across the U.S. are considered obese (body mass index [BMI] > 30) and obesity rates in general have not declined for the last decade.[1] Sustained high rates of overweight and obesity are found not only in the U.S., but in many countries in Europe, Asia, and elsewhere in North America as well.[2] While there is some hope that increases in prevalence rates may be beginning to slow, efforts to reduce the number of obese Americans have not been very successful,[3] and obesity will continue to be a health concern in the U.S. for the foreseeable future.

Corresponding Author: K. Bryant Smalley, Ph.D., Psy.D., Executive Director, Rural Health Research Institute, Georgia Southern University, GSU Box 8028, Statesboro, GA 30460, bsmalley@georgiasouthern.edu.

This is particularly true in rural areas, where obesity rates for adults are consistently higher than in urban areas, with rates of obesity among rural residents approaching 40%.[4,5] There are a number of interrelated factors in rural communities that have been shown to influence obesity rates[6] and that contribute to rural/urban health disparities.[7] These include behavioral factors such as poor diet[8, 9] and lower levels of physical activity[10] along with social factors such as education and socioeconomic status.[11] These, as well as other indicators such as isolation, access to transportation,[12] and availability of health care providers and healthy food options,[13] make rural populations especially vulnerable to the health conditions associated with overweight and obesity such as diabetes and cardiovascular disease.[14]

Regardless of location, low-income and lower-education populations across the U.S. are more at risk for obesity, although the relationship between socioeconomic status and obesity is complex and often cyclical. Families at lower income levels tend to choose cheaper, high-energy, low-nutrient density food options compared with their wealthier counterparts[15] and children raised in low socioeconomic status households have been shown to have higher rates of obesity as adults.[16] Because poverty is so closely tied to race and education level, it is sometimes difficult to make direct correlations between obesity and income; however, lower levels of health literacy and education have been linked to less healthy diets.[17]

Obesity disparities are also evident across race and gender,[11] with the most severe disparities occurring with these groups living in rural areas.[18] There is strong evidence that women and girls in low-income populations are at increased risk for obesity.[19,20] This has been attributed to a number of factors that affect women in rural areas, including over-eating associated with depression and isolation[21] and nutritional sacrifices made by mothers providing for their children.[22] There is also evidence that African Americans suffer from higher rates of obesity than Whites, the highest rates being in Black women with less than a high school education.[23, 24] The effect of race on obesity rates is influenced not only by individual characteristics, but also by the racial diversity of the community[25] and built infrastructure such as recreational spaces and fast-food establishments in communities with higher concentrations of racial minorities.[26]

When considering other reasons that may underlie differences in obesity across race and gender, an increasing amount of research focus has been placed on the discrepancy between actual and perceived weight status, with the underlying assumption that those who misperceive their weight will be less likely to engage in weight loss activities. There has been considerable research on the difference between perceived and actual BMI, suggesting that a part of the problem of obesity may stem from the inability of many to assess their own weight status accurately.[27–31] Furthermore, given the stigma associated with obesity, misperceptions and/or inaccurate reports of one's weight status may also serve as a protective mechanism against the stigma and shame associated with being overweight/obese (strongly influenced by social desirability[31]). Determining if certain groups are at higher risk for weight misperception has direct implications for intervention development, as it has been shown that when weight is recognized by an individual as a health problem, weight loss efforts are more successful.[27]

There is, however, evidence that race, gender, and SES play an important role in self-perception of body weight. Specifically, African Americans, men, and low-SES individuals have been shown to be less likely than Whites, women, and higher-SES individuals to label themselves “overweight” or “obese,” when their measured BMI places them in these categories.[28] Cultural differences can drive these disparities as African American females, in particular those with a strong racial identity, tend to report more positive self-images and satisfaction in their body types.[32, 33] It is unclear, however, to what extent simultaneous differences in socioeconomic factors and educational level may be influencing weight misperception.

While previous research has shown gender and racial differences in weight misperception, these studies have largely occurred in community samples within urban contexts in which confounding variables, such as education level, employment status, and income may partially if not fully explain the differences found. It is unclear to what extent these differences occur 1) within individuals with an obesity-linked medical condition (e.g., diabetes or hypertension) who are therefore most affected by obesity complications; 2) within rural contexts; and 3) between races and genders when other sociodemographic factors are held constant or controlled. The goal of the current study was to determine if differences in weight misperception by race and/or gender occur within a sample of economically disadvantaged rural patients with a current diagnosis of diabetes and/or hypertension.

Methods

Participants

The data for the current study came from the quantitative data collection phase of Project EDUCATE, an ongoing five-year study that is a large-scale, multifocal investigation of the needs and experiences of rural federally qualified health center (FQHC) patients with diabetes and/or hypertension. As part of this project, a total of 497 participants were recruited from the patient population at a network of FQHCs serving a multi-county region of the rural South. As described below, 438 of these patients were included in the analytic sample for the current study. Participants were active patients at one of six of the FQHC’s adult-serving locations, and were recruited to create a sample approximately proportionate to the relative patient volume at each location. Inclusion criteria were: 1) aged 18 years or older; 2) diagnosed with diabetes, hypertension, or both; and 3) able to understand spoken or written English.

Procedure

Participants were recruited from the patient population through flyers posted within the clinics, through referral by clinic front-desk staff, and through direct approach by study staff. Following an initial description of the study, eligibility screening, and informed consent, participants completed a series of questionnaires using audio computer assisted self-interviewing (ACASI). Following completion of the survey, participants were compensated $15 for their time and effort through a gift card to a retail supermarket. Data were collected

in an anonymous fashion. All procedures were reviewed and approved by the Institutional Review Boards of Mercer University and Georgia Southern University.

Measures

In addition to other measures not relevant to the current study, participants completed a background assessment of demographic characteristics and health history. The health history portion included questions assessing self-reported height and weight, from which BMI (i.e., "actual weight category") was calculated using the standard formula of weight in kilograms divided by height in meters squared. In addition, participants were presented with well-validated BMI silhouette stimuli (taken from the Stunkard Figure Rating Scale)[34,35] that have been widely used with diverse samples[34–39] and asked to indicate which silhouette best represented their current weight (i.e., "perceived weight"). The silhouette scale has nine body images of increasing weight statuses, and has been correlated to specific BMIs through large validation studies. For the purposes of this study, silhouettes 1 through 4 were classified as normal weight, silhouettes 5 and 6 were classified as overweight, and silhouettes 7 through 9 were classified as obese.

Analysis

For the purposes of the current study, only African American and White participants for whom height, weight, and perceived body shape were available were included in the analytic sample (n = 438). Hispanic participants were excluded from the analysis due to insufficient numbers for separate analyses. Data were first examined descriptively using chi-square analysis to examine demographic and weight differences between races, as well as to examine discrepancies between perceived weight using the BMI silhouettes and actual BMI calculated from self-reported height and weight. Each participant's actual BMI was categorized using standard cut-points: normal weight (BMI < 25); overweight (BMI between 25 inclusive and 30); obese (BMI between 30 inclusive and 40); and morbidly obese (BMI above 40 inclusive). Participants were then classified as having a discrepancy between perceived and actual weight if they perceived themselves as at least one category lower in weight than their actual weight (e.g., morbidly obese identifying as overweight; overweight identifying as normal weight). Morbidly obese participants who identified as obese were not considered discrepant, as there are not clear divisions in the BMI silhouette stimuli used between obese and morbidly obese.

A multivariate logistic regression including both race and gender was then conducted to examine predictors of discrepancy, controlling for age, education level, employment status, and poverty. Only overweight, obese, and morbidly obese participants were included in the logistic regression analysis, as the factors affecting the perception of a normal-weight person that she or he is overweight are likely different from the direction of inquiry.

Results

The average age of the sample was 52.6 years, with 73.5% of the sample being female and 54.1% African American. Overall, the sample had relatively low levels of education and income, with nearly two-thirds (65.4%) of the sample having a high school education or less

and nearly three-fourths (72.5%) having an annual income of less than $20,000 per year. When considering weight status, 12.2% of the sample was normal weight, 18.7% overweight, 39.1% obese, and 30.0% morbidly obese. The African American and White samples did not significantly differ on any investigated characteristic (age, gender, education level, employment status, poverty, or weight status). Complete demographic characteristics can be found in Table 1.

Table 2 presents the alignment of actual and perceived weight status, separated by race. Among African American participants, 57.1% of overweight participants perceived themselves to be normal weight, and 61.1% of obese participants perceived themselves to be normal weight or overweight. Among White participants, 36.4% of overweight participants perceived themselves to be normal weight, and 54.0% of obese participants perceived themselves to be normal weight or overweight.

Table 3 presents the result of the multivariate logistic regression analysis examining differences by race and gender in misperceived weight. A total of 305 participant responses were included in the logistic regression analysis. In unadjusted terms, 51.1% of men misclassified their weight status, compared with 34.7% of women. Of African Americans, 41.0% misclassified their weight status, compared with 35.9% of Whites. After controlling for age, education level, employment status, and poverty, African American participants were 71% more likely to misperceive their weight than White participants (OR = 1.709; p = .037), and men were 2.7 times as likely as women to misperceive their weight (OR = 2.688; p < .001).

Discussion

Our study's results suggest that, even when controlling for age, education level, employment status, and poverty, rural African American patients with chronic disease are still more likely than their White counterparts to misperceive their weight status. In addition, rural men are much more likely than rural women to misperceive their weight status. These findings are important for a number of reasons.

First, to the best of our knowledge, this is the first study to examine misperceptions of weight among a uniformly economically disadvantaged, racially diverse, rural patient population experiencing obesity-related medical complications. This helps to advance the understanding of intervention needs among this highly underserved group by highlighting the importance of emphasizing accurate self-assessment of weight, particularly among African American patients. Current weight loss promotion efforts may not be reaching rural African Americans; a mismatch between perceived and actual need to lose weight can have significant effects on future weight loss success.[40,41,36] Therefore, it could be that current interventions may actually be effective if paired with an educational component to help individuals accurately self-assess their weight.

Future research specifically investigating the impact of weight misperception on the effectiveness of interventions—including the impact of integrating a weight assessment component into existing interventions—is needed. Similarly, mixed methods research

examining the process by which African American patients self-assess their weight and the specific reference points used in that process could inform future community-level interventions (e.g., awareness campaigns). The weight misperceptions demonstrated are particularly important because the patients participating in the study were all experiencing an obesity-linked health condition (e.g., diabetes and/or hypertension). Given the power of weight control to both minimize sequelae[42–45] and reduce reliance upon medication[46,47] for both conditions, finding ways to counteract barriers to weight loss is critical. However, as previously noted, individuals who are overweight/obese who misperceive their weight may actually be protecting themselves from experiences of internalized weight stigma and shame. Therefore, future interventions and research should take into consideration the potentially harmful psychological effects of accurate weight perceptions and how to address this in a way that is sensitive to experiences of weight stigma while also promoting an accurate self-assessment of weight and future weight loss success.

Second, it is important to note that while misperception of weight was clearly and significantly different between African American and White patients, actual weight status was not different. This partially refutes previous literature claiming a direct connection between weight perception and obesity itself.[48,49] If weight misperception was the fundamental factor driving obesity disparities, we would have expected to see actual BMI differences corresponding to the weight misperception differences found in our sample. As is, our findings suggest that while weight misperception may be affecting obesity within the African American community, it is not a driving factor among patients with obesity-linked medical conditions. Future research is needed to investigate the degree to which weight misperception actually affects BMI, and if this varies across race and gender.

Finally, our findings suggest that, regardless of race, men are more likely than women to misperceive their weight. This is particularly interesting among African American men. One of the prevailing theories of obesity in African American women is the cultural norm of a heavier body type,[33, 50, 51] something that is not thought to affect men but that has been demonstrated partially to explain weight misperception in African American compared with White women.[52,53] The male/female difference in weight perception for African American men and women therefore points to an important but undescribed cultural process influencing weight perceptions for African American men. It is unclear what factors are leading African American men to perceive themselves as lighter than they in fact are, particularly when African American women are subject to cultural norms that similarly drive them toward a heavier ideal body type. Weight perceptions among men are much less studied than among women, and interventional research is needed to identify specific intervention targets to increase accurate weight perceptions among men (particularly for African American men).

Given the established rural-urban disparity with regards to obesity, future research into the discrepancy between actual and perceived weight status should explore not only rural-urban differences in discrepancies, but also investigate the unique impact of race, gender, and other sociocultural factors on this discrepancy among rural and urban residents, independently. Likewise, intervention development efforts should take geographically differences in health disparities and culture into consideration when developing and implanting intervention

efforts aimed at promoting accurate self-assessments of weight, weight-loss related knowledge, and ultimate weight loss success.

The study's findings should be interpreted within the context of its limitations. First, although multi-site, the study was conducted within a single FQHC network within a single U.S. state, which could limit generalizability of results; however, the racial diversity of the sample and its situation within a context of high socioeconomic disadvantage likely allows for meaningful inference to similarly disadvantaged groups. Second, given that probability sampling was not used as part of the recruitment methods and proficiency in English language was required for participation, the current sample may not fully represent the patient population of the FQHC network. Third, what we used as "actual" BMI was calculated from self-reported height and weight, which could lead to inaccurate data;[54, 55] however, there is no indication that this effect would bias results in a specific direction. Third, the study does not examine weight misperception across ethnicity, as the Hispanic sample in the parent study was insufficient for the current study's analytic approach. Finally, the silhouette scale used does not have a clear cutoff for morbid obesity, which did not allow us to examine the relative ability of patients to understand accurately the degree of their obesity.

Despite these limitations, the present study exhibits many strengths, which contribute uniquely to the current rural health literature. More specifically, the current study uses a large, racially diverse sample of disadvantaged patients from across a multi-county region of the rural South. Furthermore, given that all of the participants in the current study were patients at a federally qualified health center and presented with an obesity-related chronic condition (i.e., diabetes and/or hypertension), the current findings provide valuable information about the particular weight loss needs of a highly vulnerable and underserved population. Lastly, the current examination of racial and gender differences in the discrepancy between actual and perceived weight status pinpoints the rural patients who may be at greatest risk for misperceiving their weight status (and thus their need for weight loss), namely African Americans and men; this not only elucidates specific targets for weight loss promotion efforts, but is also informative for the development of feasible intervention strategies.

In summary, the current study demonstrates that, even outside the context of age, education level, employment status, and income, rural African American patients with chronic diseases are less likely than their White counterparts to perceive their weight status accurately. Similarly, even across racial groups, rural men with chronic diseases were more likely to misperceive their weight status than were women. These findings have important implications for intervention development and delivery. Namely, culturally-tailored weight loss promotion efforts that target rural patients, especially patients who are African American and/or male, should include educational components that promote both skills and knowledge with regards to an accurate self-assessment of weight.

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Table 1

Participant Characteristics

Characteristic	Total Sample (n = 438)	African American (n = 237)	Caucasian (n = 201)	*p-value*
Demographics †				
Age	52.6 (12.1)	51.9 (12.3)	53.5 (11.7)	0.167
Gender				0.548
Female	73.5%	74.7%	72.1%	
Male	26.5%	25.3%	27.9%	
Education Level				0.496
Less than High School	28.3%	28.5%	28.1%	
High School	37.1%	37.9%	36.2%	
Some College/Vocational School	20.7%	18.3%	23.6%	
College/Vocational Degree	13.8%	15.3%	12.1%	
Employment Status				0.669
Full Time	23.5%	24.8%	22.0%	
Part Time	12.8%	13.1%	12.4%	
Unemployed, Looking for Work	12.8%	13.6%	11.8%	
Unemployed, Not Looking for Work	8.3%	7.5%	9.1%	
On disability	29.0%	29.9%	28.0%	
Retired	13.8%	11.2%	16.7%	
Poverty (Less than $20,000 per year)	72.5%	75.3%	69.3%	0.175
Weight Status				0.171
Normal (BMI < 25)	12.2%	11.1%	13.4%	
Overweight (25 ≤ BMI < 30)	18.7%	15.5%	22.4%	
Obese (30 ≤ BMI < 40)	39.1%	40.3%	37.8%	
Morbidly Obese (BMI ≥ 40)	30.0%	33.2%	26.4%	

† Age was compared using t-test; other variables tested with chi-square tests.

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$

Table 2

Actual vs Perceived Weight Status

African-American (n = 225)		**Actual Weight Status**			
		Normal Weight (n=25)	**Overweight (n=35)**	**Obese (n=90)**	**Morbidly Obese (n=75)**
Perceived Weight Status	Perceived Normal Weight	72.0%	57.1%	13.3%	0.0%
	Perceived Overweight	20.8%	28.6%	47.8%	6.7%
	Perceived Obese	8.0%	14.3%	38.9%	93.3%
Caucasian (n = 200)		Actual Weight Status			
		Normal Weight (n=27)	Overweight (n=44)	Obese (n=76)	Morbidly Obese (n=53)
Perceived Weight Status	Perceived Normal Weight	81.5%	36.4%	5.3%	0.0%
	Perceived Overweight	11.1%	50.0%	48.7%	5.7%
	Perceived Obese	7.4%	13.6%	46.1%	94.3%

Table 3

Predictors of Weight Misperception

Variable	Odds Ratio$_{ADJ}$	95% CI	p-value
Age	1.018	(0.992,1.045)	0.185
Gender	**2.688**	**(1.500,4.819)**	**< 0.001**
Race	**1.709**	**(1.033,2.827)**	**0.037**
Education Level	–	–	0.138
Employment Status	–	–	**0.039**
Poverty	1.02	(0.559,1.855)	0.983

Note: Overall ORs and CIs for education level and employment status are not reported due to the categorical nature of the variables.