

Disparities by Ethnicity and Socioeconomic Status in the Use of Weight Loss Treatments

Adam Gilden Tsai, MD, MSCE; Thomas A. Wadden, PhD; Janine L. Pillitteri, PhD; Mark A. Sembower, MS; Karen K. Gerlach, PhD, MPH; Theodore K. Kyle, RPh, MBA; Valentine J. Burroughs, MD, MBA

Financial Support: The survey that provided this data was supported by GlaxoSmithKline Consumer Healthcare (GSKCH), which markets the over-the-counter weight loss drug orlistat (alli™). The survey was conducted by the Center for Survey Research and Analysis at the University of Connecticut. Drs Pillitteri and Gerlach, and Sembower perform consulting services for GSKCH. This work was supported in part by National Institutes of Health grants 5 K12 HD043459-04 and DK56124. Dr Burroughs serves on the board of the National Medical Association.

Previous Presentations: This was presented as an abstract at the 2007 annual meeting of The Obesity Society.

Background: Prior research suggests that ethnic minorities and individuals of low socioeconomic status (SES) may be more likely to attempt weight loss using unproven methods.

Methods: Data were from a national, random-digit-dial telephone survey of weight loss practices. Seven modalities of weight loss were examined. Multivariable analysis controlled for clinical and sociodemographic variables (including race/ethnicity, SES, and body mass index), as well as self-perception of weight and weight loss attitudes.

Results: In multivariable analysis, African Americans (OR, 1.71; 95% CI, 1.05-2.78; $p = .03$) and Latinos (OR, 1.69; 95% CI, 1.11- 2.60; $p = .016$) were more likely than Caucasians to report use of over-the-counter (OTC) weight loss supplements. African Americans (OR, 0.39; 95% CI, 0.21-0.71; $p = .002$) and Latinos (OR, 0.56; CI, 0.33-0.97; $p = .038$) also were less likely than Caucasians to report use of commercial weight loss programs. Higher-SES individuals were more likely than low-SES persons to report self-directed attempts at weight loss (OR, 1.39; CI, 1.00-1.93; $p = .05$) and commercial programs (OR, 2.12; CI, 1.51-2.97; $p < .001$) and less likely to report use of OTC supplements (OR, 0.64; CI, 0.47-0.88; $p = .006$). African Americans were more likely than Caucasians to report use of medically supervised programs (OR, 1.74; CI, 1.06-2.86; $p = .028$).

Conclusions: With the exception of medically supervised programs, ethnic minorities and low-SES individuals are generally more likely to report use of unproven methods for weight loss and less likely to report use of potentially benefi-

cial treatments. These findings should be explored in more detail. Use of proven treatments for weight management should be encouraged.

J Natl Med Assoc. 2009;101:62-70

Author Affiliations: University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania (Drs Tsai and Wadden); Pinney Associates, Pittsburgh, Pennsylvania (Dr Pillitteri, Sembower, Dr Gerlach); GlaxoSmithKline Consumer Healthcare, Pittsburgh, Pennsylvania (Kyle); and St Francis Hospital, Wilmington, Delaware (Dr Burroughs).

Corresponding Author: Adam Gilden Tsai, MD, MSCE, Mail Stop C-263, 4455 E 12th Ave, Room 317, Denver, CO 80220 (adam.tsai@ucdenver.edu).

Obesity carries a high burden of comorbid disease and is more common among individuals of low socioeconomic status (SES) and some ethnic minorities (eg, African Americans, Latinos).¹⁻³ Thus, differences in obesity contribute to the higher rates of diabetes and cardiovascular disease in these populations. Economic and social factors (eg, cost of food; access to healthy lifestyle options; educational attainment; and cultural factors, including food preferences, habits, and self-perception of weight) as well as genetics are the primary causes of disparities in obesity rates.³⁻⁷ However, treatment of obesity can induce weight loss and improve the health of obese persons.^{8,9} Thus, it is also important to know whether there are disparities in the use of treatment.¹⁰

A number of previous reports have described the weight loss practices of US adults.¹¹⁻¹⁷ However, few studies have specifically examined the weight loss treatments used by ethnic minorities and low-SES groups. In a survey of women receiving care at a federally funded clinic, African Americans were less likely than Caucasians to practice recommended weight loss strategies (ie, calorie restriction and increased physical activity), but no ethnic or SES differences were found in the use of weight loss medications/supplements (“diet pills”), and the use of organized weight loss programs was not assessed.¹¹ A survey of women from a weight gain prevention study found that SES was positively correlated with healthy weight control practices.¹² A national survey, using data from the National Health and Nutri-

tion Examination Survey (NHANES), found that African American women (compared to Caucasian women) and low-SES men and women (compared to higher-SES persons), were less likely to be actively managing their weight.¹⁶ Two other national surveys, using data from the Behavioral Risk Factor Surveillance Survey (BRFSS), found that ethnic minorities (compared to whites), especially women, were less likely to practice recommended weight loss strategies and/or less likely to use organized weight loss programs,^{15,17} and that low-SES individuals were more likely than higher-SES persons to practice recommended strategies.¹⁷ (Organized programs are defined as interventions involving regular meetings with a counselor or health care provider.¹⁸) A survey of African American women found that overweight individuals were more likely than normal-weight individuals to exercise but also were less likely to skip meals. Differences by SES in weight management practices were not reported.¹³ Finally, a survey of African Americans and Latinos found that self-help approaches predominated as strategies for weight management. Differences by SES in this survey were not described (Burroughs, Nonas, Sweeney et al. Weight loss practices among African American and Hispanic adults in the United States: results from a national survey. Manuscript submitted for publication.) Of the studies described above, only 3 reported multivariable analysis for weight loss practices.^{11,12,17}

The goal of this study was to examine differences in weight loss practices between whites and ethnic minorities with higher obesity rates (ie, African Americans and Latinos) and to examine differences between low-SES versus higher-SES individuals, as determined by a national, randomly selected sample. We sought to determine whether differences related to ethnicity and SES would persist after controlling for demographic, lifestyle, and clinical variables, as well as for self-perception of weight and beliefs about the efficacy of weight loss treatments. We sought to describe differences regarding the use of self-help weight loss (eg, self-directed diets, meal replacements), as well as organized weight loss treatments. Based on previous studies, we hypothesized that African Americans and Latinos, (compared to Caucasians), as well as low-SES individuals (compared to higher-SES persons), would be less likely to use organized treatments for weight loss.^{12,15} Conversely, we hypothesized that African Americans, Latinos, and low-SES individuals would be more likely to attempt to lose weight with non-evidence-based practices,^{11,15,17} such as over-the-counter (OTC) weight loss supplements.¹⁹⁻²¹

METHODS

Study Population and Recruitment

A total of 3500 US adults, aged 18 years and older, consented to participate in a telephone interview con-

ducted by the Center for Survey Research and Analysis (CSRA) at the University of Connecticut. The methods used to conduct the survey have been previously described in detail.²⁰ Individuals were identified through a random-digit-dial telephone survey conducted from November 2005 through January 2006 in the 48 contiguous states. Stratified sampling was done via geographic regions, as defined by the US Census Bureau, to ensure that regions were represented in approximate proportion to their share of the total US population. Data were weighted by gender, age, race, education, and geographic region to correct for differential probabilities of selection within households and demographic imbalances.

Interviews were conducted in the respondent's language of choice (English or Spanish). The average interview length was 24 minutes. Due to the length of the survey, call-backs were scheduled to complete interviews when respondents were unable to complete the survey during a single telephone call. Respondents were not compensated for their participation.

Disposition of Participants

A total of 64 025 telephone numbers were dialed, and a respondent was contacted in 12 599 households. Of these, 3500 respondents completed the survey in its entirety. The response rate was 19%, based on the number of completed interviews in the numerator ($n = 3\ 500$) over an estimate of the number of eligible persons in the sample ($n = 18\ 442$).²² The cooperation rate was 30%, which is the number of completed interviews over the number of eligible persons who were contacted.

Questionnaire

The questionnaire was developed by the study investigators, who drew from weight-related content found in national surveys such as the NHANES, the National Health Interview Survey (NHIS), and the BRFSS. A pretest of the telephone survey was conducted with 232 respondents to evaluate clarity and content and to ensure complete and accurate data were being collected. The final questionnaire included questions about beliefs, attitudes, and practices related to weight and weight control; past weight loss attempts; the use of various products/methods for weight loss; the role of doctors in weight loss; and demographics, weight history, and medical conditions.

Weight and weight history. Self-reported height and weight were used to calculate body mass index (BMI) based on World Health Organization classifications.²³ BMI was calculated as kg/m^2 . Self-reported weight status was obtained by asking respondents to describe their current weight using a 5-point scale ranging from very underweight to very overweight. Those who did not self-identify as currently overweight were asked whether they had ever considered themselves to be overweight in the past (yes/no). Those who reported being currently over-

weight or overweight in the past and who reported having made a weight loss attempt (“Have you ever made a serious and deliberate weight loss attempt that has lasted more than 3 days?”) were eligible to be included in our analyses ($n = 1603$). After excluding those with missing BMI values ($n = 88$), ethnic minorities other than African American or Latino ($n = 67$), or those who were underweight ($n = 11$), the final total sample for analysis was 1437. African Americans and Latinos were underrepresented in the final sample relative to their percentage of the US population, both in the overall survey and in the subsample analyzed for the present study. Specifically, 11.0% ($n = 380$) of the overall sample and 9.4% ($n = 135$) of the analysis sample were African American, while 14.1% ($n = 489$) of the overall sample and 12.4% ($n = 179$) of the analysis sample were Latino. These percentages compare to 15.0% (African American) and 14.8% (Latino) in the US population, respectively (www.census.gov). Similarly, those with lower educational attainment were slightly underrepresented. Specifically, 46.6% ($n = 1620$) of the overall survey sample and 40.1% ($n = 574$) of the analysis sample had a high school education or less, compared with 47.6% of the US population (www.census.gov).

Other variables. Ethnicity was defined either as (1) white/Caucasian, (2) black/African American, or (3) Hispanic/Latino. (The number of respondents choosing other racial/ethnic categories was too small for meaningful analysis.) Age was analyzed in 4 categories: 18-29; 30-49, 50-64, and greater than 65 years of age. Education was used to define SES and was dichotomized as high school education or less vs any education beyond high school. (Household income was removed from the models, as it correlated highly with educational attainment.) Health status was dichotomized as poor/fair or good/excellent, and health insurance status was classified as insured or uninsured.

Weight loss modalities. Weight loss methods assessed included the following: (1) a self-designed diet or a meal plan from a book or website (eg, Atkins, South Beach); (2) a “formal diet program where you met with a group or counselor” (eg, Weight Watchers, Jenny Craig); (3) a medically supervised weight loss program (“working with a physician or dietitian”); (4) exercise to lose weight; (5) prescription medication; (6) “over-the-counter appetite suppressants, herbal products, or weight loss supplements” (hereafter referred to as OTC supplements); and (7) meal replacement products, including

Table 1. Demographics of Analysis Sample ($N = 1437$) by Education Level and by Race/Ethnicity^a

	Education	
	High School or Less ^b ($n = 574$)	Some College or More ^b ($n = 859$)
Race/ethnicity		
Caucasian	73.5% ^c (422)	81.5% ^d (70)
African American	10.0% ^c (57)	8.7% ^c (75)
Hispanic	16.5% ^c (95)	9.8% ^d (84)
Age		
18-29	18.6% ^c (107)	13.5% ^d (115)
30-49	34.7% ^c (199)	43.3% ^d (368)
50-64	28.1% ^c (161)	32.3% ^c (274)
≥ 65	18.6% ^c (107)	11.0% ^d (94)
Mean (SD)	48.0 (19.1) ^c	46.8 (12.2) ^c
Gender		
Male	46.5% ^c (267)	45.9% ^c (394)
Female	53.3% ^c (307)	54.1% ^c (465)
Body mass index		
Normal weight (18.5-24.9)	15.3% ^c (88)	22.1% ^d (190)
Overweight (25-29.9)	37.6% ^c (216)	42.9% ^c (369)
Obese (≥ 30)	47.1% ^c (270)	35.0% ^d (300)
Mean (SD)	30.9% (8.0) ^c	29.2% (5.2) ^d
Health insurance status		
Uninsured	20.0% ^c (115)	9.1% ^d (78)
Insured	80.0% ^c (458)	90.9% ^d (780)
Marital status		
Married/living as married	68.0% ^c (391)	74.8% ^d (652)
Not married	32.0% ^c (183)	25.2% ^d (216)
Health status		
Fair/poor	35.2% ^c (202)	21.3% ^d (183)
Excellent/good	68.8% ^c (372)	78.7% ^d (676)
Self-perception of weight		
Formerly overweight	18.8% ^c (108)	22.8% ^c (196)
Slightly overweight	62.1% ^c (356)	59.7% ^c (512)
Very overweight	19.1% ^c (110)	17.6% ^c (151)

both “shakes, powders, or bars” as well as “prepackaged entrees or meals.” A question was asked regarding any history of weight loss surgery. However, only 1% of respondents answered yes, precluding any analysis of this item.

Questions about beliefs. We also analyzed data from several questions that inquired about respondents’ beliefs regarding the safety and efficacy of prescription weight loss medications and OTC supplements. These items were not available from validated questionnaires and were developed by the investigators specifically for this survey.

Statistical Analysis

We assessed differences in the use of weight loss practices by demographic characteristics (ie, age, race/ethnicity, education, gender) and other variables with bivariable analysis (*t* tests or χ^2 , as appropriate). Any variable that was associated with the weight loss practice, as determined by a *p* ≤ .15, was then included in a multivariable logistic regression that controlled for all demographic characteristics as well as health sta-

tus, health insurance status, number of comorbid medical conditions, and beliefs about the efficacy of weight loss medications and OTC supplements. (Multivariable models examining ethnic differences controlled for SES, and models examining SES differences controlled for ethnicity.) A forward stepwise procedure was used in which all variables with significance in bivariable analysis were included in multivariable models. All analyses were conducted with weighted data using SAS version 9.1 for Windows. A *p* value < .05 was considered significant for all analyses.

RESULTS

Demographic Characteristics

Ethnic differences. Demographic characteristics of the analysis sample, subdivided by ethnicity and by educational attainment, are shown in Table 1. A higher percentage of Caucasians were high school graduates compared to Latinos, but African Americans did not differ compared to the other 2 groups. Caucasians were older, on average, compared to African Americans and Lati-

Table 1. Demographics of Analysis Sample (N = 1437) by Education Level and by Race/Ethnicity^a (cont)

	Race/Ethnicity		
	Caucasian (n = 1123)	African American (n = 135)	Hispanic (n = 179)
Education			
High school or less	37.6% ^c (422)	43.5% ^{c,d} (57)	53.0% ^d (95)
Some college or more	62.4% ^c (701)	56.5% ^{c,d} (75)	47.0% ^d (84)
Age			
18-29	12.4% ^c (139)	26.4% ^d (36)	26.3% ^d (47)
30-49	38.4% ^c (428)	44.2% ^c (60)	46.3% ^c (83)
50-64	32.8% ^c (365)	21.8% ^d (29)	23.5% ^d (42)
≥ 65	16.5% ^c (183)	7.7% ^d (10)	3.9% ^d (7)
Mean (SD)	49.1 (13.4) ^c	41.8 (16.4) ^d	40.0 (19.6) ^d
Gender			
Male	44.6% ^c (501)	36.5% ^c (49)	61.8% ^d (110)
Female	55.4% ^c (622)	63.5% ^c (86)	38.2% ^d (68)
Body mass index			
Normal weight (18.5-24.9)	21.3% ^c (239)	9.8% ^d (13)	14.8% ^{c,d} (27)
Overweight (25-29.9)	41.5% ^c (466)	37.0% ^c (50)	38.2% ^c (68)
Obese (≥ 30)	37.2% ^c (418)	53.1% ^d (72)	47.0% ^d (84)
Mean (SD)	29.4 (5.4) ^c	33.8 (10.6) ^d	30.3 (7.4) ^c
Health insurance status			
Uninsured	10.6% ^c (119)	27.7% ^d (37)	20.3% ^d (36)
Insured	89.4% ^c (1003)	72.3% ^d (98)	79.7% ^d (142)
Marital status			
Married/living as married	74.6% ^c (836)	53.5% ^d (72)	71.1% ^c (127)
Not married	25.4% ^c (285)	46.5% ^d (63)	28.9% ^c (52)
Health status			
Fair/poor	25.8% ^c (289)	37.2% ^d (50)	26.8% ^c (48)
Excellent/good	74.2% ^c (834)	62.8% ^d (85)	73.2% ^c (131)
Self-perception of weight			
Formerly overweight	21.0% ^c (236)	18.4% ^c (25)	23.8% ^c (42)
Slightly overweight	61.3% ^c (689)	57.6% ^c (78)	57.9% ^c (103)
Very overweight	17.7% ^c (198)	24.0% ^c (32)	18.4% ^c (33)

^a Variables with different superscripts (c, d, etc.) are statistically different at the .05 level. Data are displayed as % (n) and all numbers are weighted.

^b Sample sizes for education level do not add to 1437 because of nonresponse to this item for 4 survey participants.

nos. Average BMI was higher in African Americans than in Caucasians or Latinos. Caucasians were more likely than African Americans or Latinos to have health insurance. A lower percentage of African Americans reported that they were in good or excellent health as compared to Caucasians and Latinos. For the above comparisons, with the exception of education, no significant differences were found between the latter 2 groups in each

comparison. No significant differences in self-perception of weight were found among the 3 ethnic groups, even though African Americans were heavier than Caucasians or Latinos.

SES differences. Compared to the low-SES group, the higher-SES group had the following significant differences: BMI 1.7 kg/m² lower, a higher percentage reporting health insurance, a higher percentage that were

Table 2. Bivariable and Multivariable Logistic Regression Analysis of Factors Associated With Reported Use of Commercial Weight Loss Programs^a

	Bivariable			Multivariable ^b		
	OR	95% CI	P Value	OR	95% CI	P Value
Race/ethnicity						
Caucasian	1.00			1.00		
African American	0.48	0.29-0.80	.005	0.39	0.21-0.71	.002
Hispanic	0.50	0.32-0.77	.002	0.56	0.33-0.97	.038
Education						
High school or less	1.00			1.00		
Some college or more	1.91	1.46-2.50	< .001	2.12	1.51-2.97	< .001
Age						
18-29	1.00			1.00		
30-49	3.75	2.18-6.45	< .001	3.13	1.70-5.77	< .001
50-64	5.61	3.25-9.69	< .001	3.99	2.10-7.58	< .001
≥ 65	4.47	2.46-8.13	< .001	3.51	1.70-7.24	< .001
Gender						
Female	1.00			1.00		
Male	0.19	0.14-0.26	< .001	0.15	0.10-0.21	< .001
Body mass index						
Normal weight (18.5-24.9)	1.00			1.00		
Overweight (25-29.9)	0.92	0.64-1.31	.636	1.03	0.61-1.72	.922
Obese (≥30)	1.41	1.00-1.99	.052	1.55	0.87-2.74	.137
Health insurance status						
Uninsured	1.00			1.00		
Insured	2.37	1.51-3.71	< .001	2.07	1.21-3.53	.008
"Eat less and exercise more" belief ^c						
Somewhat/strongly disagree	1.00			1.00		
Strongly/somewhat agree	1.38	0.90-2.13	.143	0.84	0.49-1.44	.524
Health status						
Fair/poor	1.00					
Excellent/good	0.91	0.69-1.19	.479			
Self-perception of weight						
Formerly overweight	1.00			1.00		
Slightly overweight	1.60	1.11-2.29	.011	1.79	1.05-3.07	.033
Very overweight	3.93	2.61-5.92	< .001	3.17	1.62-6.20	< .001
Comorbid conditions						
None	1.00			1.00		
1	1.13	0.78-1.63	.524	0.83	0.53-1.29	.398
2	1.16	0.77-1.74	.482	0.66	0.40-1.08	.098
3	1.93	1.28-2.91	.002	0.82	0.48-1.38	.453
≥ 4	2.41	1.70-3.44	< .001	1.16	0.73-1.83	.542
Lifetime weight loss attempts						
1 or 2 lifetime attempts	1.00			1.00		
3 or 4 lifetime attempts	1.17	0.80-1.72	.419	1.02	0.67-1.57	.927
5 to 9 lifetime attempts	1.69	1.15-2.50	.008	1.47	0.95-2.29	.087
≥ 10 lifetime attempts	3.84	2.74-5.38	< .001	2.91	1.97-4.29	< .001

^a Values are odds ratios (ORs); 95% confidence intervals (CIs).

^b All variables were included in the multivariable logistic regression, except for those with grey shading in the right-hand column (ie, variables with a *p* value < .15 in bivariable analysis).

^c Survey respondents were asked to agree or disagree with the following statement: "The only way to lose weight is to eat less and exercise more."

Table 3. Bivariable and Multivariable Logistic Regression Analysis of Factors Associated With Reported Use of Over-the-counter Weight Loss Products

	Bivariable			Multivariable ^b		
	OR	95% CI	P Value	OR	95% CI	P Value
Race/ethnicity						
Caucasian	1.00			1.00		
African American	2.17	1.48-3.16	< .001	1.71	1.05-2.78	.030
Hispanic	1.62	1.16-2.28	.005	1.69	1.11-2.60	.016
Education						
High school or less	1.00			1.00		
Some college or more	0.74	0.59-0.93	.011	0.64	0.47-0.88	.006
Age						
18-29	1.00			1.00		
30-49	0.85	0.61-1.18	.322	0.77	0.50-1.19	.231
50-64	0.50	0.35-0.71	< .001	0.37	0.22-0.60	< .001
≥ 65	0.44	0.29-0.68	< .001	0.35	0.18-0.65	.001
Gender						
Female	1.00			1.00		
Male	0.30	0.23-0.38	< .001	0.28	0.20-0.39	< .001
Body mass index						
Normal weight (18.5-24.9)	1.00			1.00		
Overweight (25-29.9)	0.95	0.69-1.32	.779	0.90	0.55-1.47	.673
Obese (≥30)	1.59	1.16-2.19	.005	1.36	0.79-2.35	.268
Health insurance status						
Uninsured	1.00			1.00		
Insured	0.47	0.34-0.66	< .001	0.85	0.55-1.32	.477
"Eat less and exercise more" belief ^c						
Somewhat/strongly disagree	1.00					
Strongly/somewhat agree	0.88	0.61-1.27	.489			
Beliefs about efficacy of prescription medications						
Not too/not at all effective	1.00			1.00		
Very/somewhat effective	2.23	1.68-2.97	< .001	1.80	1.28-2.53	< .001
Beliefs about efficacy of OTC supplements						
No/don't know	1.00			1.00		
Yes	1.90	1.51-2.40	< .001	1.50	1.11-2.03	.009
Belief about safety of OTC supplements						
False/don't know	1.00					
True	1.13	0.89-1.43	.330			
Health status						
Fair/poor	1.00			1.00		
Excellent/good	0.58	0.45-0.75	< .001	0.93	0.64-1.35	.701
Self-perception of weight						
Formerly overweight	1.00			1.00		
Slightly overweight	1.34	0.98-1.83	.064	1.41	0.89-2.24	.144
Very overweight	3.02	2.08-4.37	< .001	2.45	1.32-4.54	.004
Comorbid conditions						
None	1.00			1.00		
1	0.89	0.65-1.24	.498	1.30	0.86-1.99	.217
2	1.15	0.81-1.63	.441	1.80	1.11-2.93	.018
3	1.01	0.69-1.50	.943	1.27	0.74-2.20	.388
≥ 4	1.31	0.94-1.82	.108	1.19	0.71-1.99	.502
Lifetime weight loss attempts						
1 or 2 lifetime attempts	1.00			1.00		
3 or 4 lifetime attempts	1.73	1.24-2.42	.001	1.98	1.32-2.96	< .001
5 to 9 lifetime attempts	2.71	1.91-3.85	< .001	2.92	1.87-4.55	< .001
≥ 10 lifetime attempts	3.47	2.52-4.79	< .001	3.70	2.46-5.57	< .001

^a Values are odds ratios (ORs); 95% confidence intervals (CIs).

^{*} All variables were included in the multivariable logistic regression, except for those with grey shading in the right-hand column (ie, variables with a p value < .15 in bivariable analysis).

^c Survey respondents were asked to agree or disagree with the following statement: "The only way to lose weight is to eat less and exercise more."

married, and a higher percentage that reported good or excellent health. No significant differences by SES were found for mean age. Similar to ethnicity, no differences were found for self-perception of weight despite the higher weight of the low-SES group.

Bivariable Analysis (Tables 2 and 3)

Ethnic differences. African Americans and Latinos were more likely than Caucasians to report having used exercise or OTC supplements for weight loss (all p values $< .01$). They also were less likely than Caucasians to report having used commercial programs ($p < .05$ for both). No significant differences were observed between African Americans and Latinos on these measures.

SES differences. Individuals with greater than a high school education were significantly more likely than those with less education to report having used self-designed weight loss regimens, commercial programs, meal replacements, and exercise. They also were significantly less likely to report having used OTC supplements.

Differences by factors other than ethnicity or SES. Women were significantly more likely than men to report having used all weight loss modalities except for self-designed regimens and exercise. More frequent reported use of all weight loss modalities, except for self-designed regimens and exercise, also was observed in individuals who were obese by BMI (compared to normal-weight individuals) and in those who perceived themselves as “very overweight” (compared to individuals who perceived themselves as “formerly overweight.”) (Few differences were found between normal-weight and overweight individuals, as assessed by BMI, or between those who perceived themselves as “slightly overweight” vs “formerly overweight.”) Persons with a greater number of comorbid medical conditions were significantly more likely to report having used all weight loss modalities, except for self-designed regimens, and were significantly less likely to report having used exercise for weight loss. Older individuals were significantly more likely than younger respondents to report having used commercial programs and medically supervised programs, and were significantly less likely to report having used meal replacements, exercise, and OTC supplements. (No age differences were found for self-designed programs or medications.) Those with a greater number of lifetime attempts at weight loss were significantly more likely to report having used all modalities for weight loss.

Multivariable Logistic Regression Analysis (Tables 2 and 3)

Results of multivariable analyses, which controlled for sociodemographic (eg, age, gender, education, race/ethnicity) clinical (eg, BMI, health status), and attitudes (eg, beliefs about safety and efficacy of treatments) fac-

tors, were generally similar to those from bivariable analysis. With regard to ethnicity and SES, 2 findings from bivariable analysis were no longer significant in multivariable analysis. First, neither African Americans nor Latinos (compared to Caucasians) nor higher-SES persons (compared to low-SES individuals) were significantly more likely to report use of exercise. Second, higher-SES individuals were no more likely than low-SES respondents to report use of meal replacements. Additionally, 2 findings were observed in multivariable analyses that were not significant in bivariable analysis. First, African Americans were less likely than Caucasians to report having used meal replacements. Second, African Americans were more likely than Caucasians to report having used medically supervised weight loss programs.

Multivariable logistic regression analyses overall provided good accuracy in predicting the use of treatments. Specifically, the C statistics for multivariable models ranged from 0.71 to 0.79, except for the model predicting self-designed programs (C statistic of 0.64).

DISCUSSION

Disparities in health and health care are well documented.²⁴⁻²⁷ Disparities exist across multiple patient-level factors, including race/ethnicity, SES, and gender, as well as environmental-level and health care–system factors, such as area of residence (urban vs rural) and provider of medical care.²⁸⁻³⁰ Disparities in obesity rates contribute to ethnic and SES disparities in health.³¹

In this random-digit-dial telephone survey of weight loss practices in US adults, we found in multivariable analysis (controlling for SES) that African Americans and Latinos were significantly less likely than Caucasians to report use of commercial programs and significantly more likely than Caucasians to report use of OTC supplements for weight loss. African Americans also were significantly less likely than Caucasians to report use of meal replacements for weight loss and, surprisingly, were significantly more likely to report use of medically supervised programs. No differences were observed between Latinos and African Americans or between and Latinos and Caucasians on these measures. The above findings are consistent with the results of previous surveys that compared whites to ethnic minorities^{11,15-17} as well as surveys that examined only ethnic minorities¹³ (Burroughs, Nonas, Sweeney et al. Weight loss practices among African American and Hispanic adults in the United States: results from a national survey. Manuscript submitted for publication.) These findings held after controlling for sociodemographic and clinical factors (including SES) as well as weight loss attitudes and beliefs. Surprisingly, African Americans were significantly more likely to report use of medically supervised programs and to report use of meal replacements. The finding of more frequent use of medically supervised programs contradicts the overall results. This

finding could represent chance alone or, alternatively, may indicate a true difference in the use of weight loss therapies. A larger sample of ethnic minorities would help in differentiating these 2 possibilities.

Regarding SES, multivariable analysis (controlling for ethnicity) revealed that individuals with greater than a high school education, as compared to those with less than high school education, were significantly more likely to report use of self-designed regimens and commercial programs and significantly less likely to report use of OTC supplements. As with ethnicity, the findings are generally consistent with results of prior surveys,^{12,16,17} and held after controlling for ethnicity and other factors. Our study is the first to assess both ethnic and SES differences in a national sample using multivariable analysis to control for sociodemographic and clinical factors. The results suggest that disparities by SES in the reported use of weight loss treatments may be more widespread than ethnic disparities.

The finding of more frequent use of OTC supplements in populations with higher rates of obesity (ethnic minorities and those of low SES) is of concern. At the time this survey was conducted, no OTC supplements had been demonstrated to be safe and effective for weight loss. Ethnic and SES differences in reported use of supplements persisted after controlling for a number of factors, including self-perceived weight, beliefs about weight loss, and beliefs about the safety and efficacy of prescription medications and OTC supplements. The differences that persist may reflect, among ethnic minorities, cultural views about weight^{10, 32,33} or difficulty accessing more formal treatment for weight loss.^{34,35} Alternatively, differences may be the result of targeted marketing of supplement products to minorities. Similarly, reported differences in OTC supplement use between low- and higher-SES individuals in multivariable analysis may reflect lower levels of education about weight management or financial barriers to formal treatment.

The potential consequences of the lower reported use of commercial programs among ethnic minorities and lower-SES individuals are more difficult to assess. Recent evidence suggest that some commercial programs are effective for individuals who enroll in and complete these regimens.^{36,37} Thus, the differential use of commercial programs could reflect reduced access to such interventions among minorities and low-SES persons, potentially depriving them of health benefits. (Although the questionnaire was extensive, no items allowed us to quantify access to obesity treatment specifically.) Conversely, not all commercial programs are of high quality or are otherwise desirable. Some programs are very costly; others do not always provide appropriate monitoring of participants; and some programs encourage rapid weight loss,¹⁸ which is no more effective in the long-term than gradual weight loss.^{38,39} More

detailed probing of the types of interventions used and information about their safety, efficacy, and cost would be needed to judge definitively whether reported differences in the use of these treatments are to participants' potential benefit or detriment.

This study has several limitations. Most importantly, ethnic minorities and low-SES individuals were not the primary focus of this survey. Their underrepresentation in the sample may have limited our statistical power to detect differences in the reported use of treatments. Put another way, although we did find ethnic and SES differences in reported use of weight loss modalities, these differences might have been larger or more consistent with a more representative sample. Thus, this analysis should be repeated in a larger representative sample. Second, the low response rate for the survey also raises the concern that the results may not be completely representative. No information is available about the characteristics of nonrespondents. However, since minorities and low-SES individuals were underrepresented, the results could be biased towards the null (ie, fewer/smaller differences between ethnic groups and between SES groups). Despite the low response rate, the overall results were consistent with reports from prior surveys of weight loss practices with response rates of more than 50%.^{12,16} Additionally, decreasing response rates for telephone surveys since the early 1990s have not always resulted in biased estimates of health behaviors.⁴⁰ Thus, while nonresponse bias due to low response rates was certainly possible in this survey, we believed the response rate was adequate for the purposes of this study. Third, the use of self-report raises the possibility of misclassification bias among survey respondents. For example, what one survey respondent believed was a "medically supervised" program may not have been so. Such misclassification bias also would limit our ability to detect differences between ethnic or SES groups. Fourth, the interpretation of reported differences in use of treatments is not necessarily simple, as discussed in detail above for commercial programs. Finally, our results do not provide evidence of whether differences in use of treatments could be exacerbating disparities in obesity rates.

In summary, these results suggest that there are SES as well as racial/ethnic disparities in the use of certain weight loss treatments. These findings should be replicated in larger studies and explored in more detail in a sample with greater representation of ethnic minorities. At the same time, all individuals should be encouraged to use safe and effective weight loss treatments. Finally, clinicians should be aware of the increased likelihood of use of non-evidence-based treatments for weight management among ethnic minority and low-SES patients for weight management.

REFERENCES

1. Must A, Spadano J, Cookley EH, et al. The disease burden associated with overweight and obesity. *JAMA*. 1999;282:1523-1529.
2. Ogden CL, Carroll MD, Curtin LR, et al. Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA*. 2006;295:1549-1455.
3. Cossrow N, Falkner B. Race/ethnic issues in obesity and obesity-related comorbidities. *J Clin Endocrinol Metab*. 2004;89:2590-2594.
4. Blisard N, Steward H, Jolliffe D. *Low-income households' expenditures on fruits and vegetables*. Economic Research Service, US Department of Agriculture; 2004.
5. Diez-Roux AV, Nieto FJ, Caulfield L, et al. Neighbourhood differences in diet: the Atherosclerosis Risk in Communities (ARIC) Study. *J Epidemiol Community Health*. 1999;53:55-63.
6. Drewnowski A, Darmon N. The economics of obesity: dietary energy density and energy cost. *Am J Clin Nutr*. 2005;82(1 suppl):265S-273S.
7. Seligman HK, Bindman AB, Vittinghoff E, et al. Food insecurity is associated with diabetes mellitus: results from the National Health and Nutrition Examination Survey (NHANES) 1999-2002. *J Gen Intern Med*. 2007;22:1018-1023.
8. Li Z, Maglione M, Tu W, et al. Meta-analysis: pharmacologic treatment of obesity. *Ann Intern Med*. 2005;142:532-546.
9. Wadden TA, Butryn ML, Byrne KJ. Efficacy of lifestyle modification for long-term weight control. *Obes Res*. 2004;12 suppl:151S-162S.
10. Kumanyika S. Obesity, health disparities, and prevention paradigms: hard questions and hard choices. *Prev Chronic Dis*. 2005;2:A02.
11. Breitkopf CR, Berenson AB. Correlates of weight loss behaviors among low-income African-American, Caucasian, and Latina women. *Obstet Gynecol*. 2004;103:231-239.
12. Jeffery RW, French SA. Socioeconomic status and weight control practices among 20- to 45-year-old women. *Am J Public Health*. 1996;86:1005-1010.
13. Kumanyika S, Wilson JF, Guilford-Davenport M. Weight-related attitudes and behaviors of black women. *J Am Diet Assoc*. 1993;93:416-422.
14. Levy AS, Heaton AW. Weight control practices of US adults trying to lose weight. *Ann Intern Med*. 1993;119:661-666.
15. Serdula MK, Williamson DF, Anda RF, et al. Weight control practices in adults: results of a multistate telephone survey. *Am J Public Health*. 1994;84:1821-1824.
16. Weiss EC, Galuska DA, Khan LK, et al. Weight-control practices among US adults, 2001-2002. *Am J Prev Med*. 2006;31:18-24.
17. Bish CL, Blanck HM, Serdula MK, et al. Diet and physical activity behaviors among Americans trying to lose weight: 2000 Behavioral Risk Factor Surveillance Survey System. *Obes Res*. 2005;13:596-607.
18. Tsai AG, Wadden TA. Systematic review: an evaluation of major commercial weight loss programs in the United States. *Ann Intern Med*. 2005;142:56-66.
19. Blanck HM, Serdula MK, Gillespie C, et al. Use of nonprescription dietary supplements for weight loss is common among Americans. *J Am Diet Assoc*. 2007;107:441-447.
20. Pillitteri JL, Shiffman S, Rohay J, et al. Use of dietary supplements for weight loss in the United States: a national survey. *Obesity*. 2008;16:790-796.
21. Saper RB, Eisenberg DM, Phillips RS. Common dietary supplements for weight loss. *Am Fam Physician*. 2004;70:1731-1738.
22. American Association for Public Opinion Research. Standard definitions: final dispositions of case codes and outcome rates for surveys (4th ed). AAPOR; 2006.
23. World Health Organization. *Obesity: Preventing and Managing the Global Epidemic*. Report of a WHO Consultation on Obesity. Geneva, Switzerland; 1998.
24. Cooper LA, Hill MN, Powe NR. Designing and evaluating interventions to eliminate racial and ethnic disparities in health care. *J Gen Intern Med*. 2002;17:477-486.
25. Fiscella K, Franks P, Gold MR, et al. Inequality in quality: addressing socioeconomic, racial, and ethnic disparities in health care. *JAMA*. 2000;283:2579-2584.
26. Groman R, Ginsburg J. Racial and ethnic disparities in health care: a position paper of the American College of Physicians. *Ann Intern Med*. 2004;141:226-232.
27. Nelson A. Unequal treatment: confronting racial and ethnic disparities in health care. *J Natl Med Assoc*. 2002;94:666-668.
28. Bach PB, Pham HH, Schrag D, et al. Primary care physicians who treat blacks and whites. *N Engl J Med*. 2004;351:575-584.
29. Hasnain-Wyne R, Baker DW, Nerenz D, et al. Disparities in Health Care Are Driven by Where Minority Patients Seek Care: Examination of the Hospital Quality Alliance Measures. *Arch Intern Med*. 2007;167:1233-1239.
30. Skinner J, Weinstein JN, Sporer SM, et al. Racial, ethnic, and geographic disparities in rates of knee arthroplasty among Medicare patients. *N Engl J Med*. 2003;349:1350-1359.
31. Banks J, Marmot M, Oldfield Z, Smith JP. Disease and disadvantage in the United States and England. *JAMA*. 2006;295:2037-2045.
32. Barnes AS, Goodrick GK, Pavlik V, et al. Weight loss maintenance in African-American women: focus group results and questionnaire development. *J Gen Intern Med*. 2007;22:915-922.
33. Kumanyika SK. Special issues regarding obesity in minority populations. *Ann Intern Med*. 1993;119:650-654.
34. Davis EM, Clark JM, Carrese JA, et al. Racial and socioeconomic differences in the weight-loss experiences of obese women. *Am J Public Health*. 2005;95:1539-1543.
35. French SA, Neumark-Sztainer D, Story M, et al. Reducing barriers to participation in weight-loss programs in low-income women. *J Am Diet Assoc*. 1998;98:198-200.
36. Heshka S, Anderson JW, Atkinson RL, et al. Weight loss with self-help compared with a structured commercial program: a randomized trial. *JAMA*. 2003;289:1792-1798.
37. Rock CL, Pakiz B, Flatt SW, et al. Randomized trial of a multifaceted commercial weight loss program. *Obesity*. 2007;15:939-949.
38. Tsai AG, Wadden TA. The evolution of very-low-calorie diets: an update and meta-analysis. *Obesity*. 2006;14:1283-1293.
39. Wadden TA, Foster GD, Letizia KA. One-year behavioral treatment of obesity: comparison of moderate and severe caloric restriction and the effects of weight maintenance therapy. *J Consult Clin Psychol*. 1994;62:165-171.
40. Biener L, Garrett CA, Gilpin EA, et al. Consequences of declining survey response rates for smoking prevalence estimates. *Am J Prev Med*. 2004;27:254-257. ■

We Welcome Your Comments

The *Journal of the National Medical Association* welcomes your Letters to the Editor about articles that appear in the *JNMA* or issues relevant to minority healthcare. Address correspondence to EditorJNMA@nmanet.org.



**REUSE THIS
CONTENT**

To photocopy, e-mail, post on Internet or distribute this or any part of *JNMA*, please visit www.copyright.com.