

# Factors Associated with BMI, Weight Perceptions and Trying to Lose Weight in African-American Smokers

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This study examined sociodemographic, behavioral and psychosocial factors associated with BMI, weight perceptions and trying to lose weight among African-American smokers (N=600, M=44.2 years, 70% female). Sixty-eight percent of the sample were overweight or obese (sample BMI M=28.0, SD=6.7). Three separate, simultaneous multivariable regression models were used to determine which factors were associated with BMI, weight perceptions and trying to lose weight. Poorer health, female gender and high-school education or higher were significantly associated with higher BMIs ( $p<0.05$ ). Being female (OR=5.8, 95% CI=3.6–9.3) and having a higher BMI (OR=0.6, 95% CI=0.5–0.6) was associated with perception of overweight and smoking more cigarettes per day (OR=1.0, 95% CI=1.0–1.1), and perceiving oneself as overweight (OR=14.1, 95% CI=8.2–24.2) was associated with trying to lose weight. Participants somewhat underestimated their BMI in their weight perceptions. Those who perceived themselves as overweight were more likely to be trying to lose weight; therefore, increasing participant awareness of actual BMI status may lead to improved weight-control efforts in African-American smokers. Several expected associations with outcomes were not found, suggesting that BMI and weight constructs are not well-understood in this population.

**Key words:** obesity ■ weight perception ■ weight loss ■ minority groups ■ smoking cessation

## INTRODUCTION

The documented increases in overweight and obesity<sup>1</sup> in the U.S. population are an even greater risk when combined with other known health compromising behaviors—most notably tobacco use, which remains highly prevalent among low-income African Americans.<sup>2</sup> Over 60% of the U.S. population is overweight or obese [body mass index (BMI) >25].<sup>3,4</sup> Over one in five African-American adults are obese (BMI>30),<sup>1,5</sup> placing them at high risk for numerous health maladies, including cardiovascular diseases, diabetes and certain cancers.<sup>1,3,5</sup> The annually measurable nature of the increases in overweight and obesity<sup>1,3,4</sup> suggests that mutable, lifestyle factors—rather than genetic factors—may be responsible for the increases. At the same time as the dramatic weight increases, weight perceptions and trying to lose weight have become widely recognized themes in American media and culture. Regardless of ethnic background, nearly two in five Americans report that they are trying to lose weight.<sup>6</sup> Little is known about the relationship of behavioral factors to individual perceptions of overweight and efforts to lose weight among low-SES African Americans who smoke cigarettes, an underrepresented subgroup at greatest risk for health-compromising conditions. The purpose of this study was to systematically investigate associations of sociodemographic, behavioral and psychosocial variables with BMI, perceived weight and trying to lose weight in a sizeable sample of African-American adults who smoke cigarettes.

Behavioral factors, including poor dietary habits and physical inactivity, identified among the top three actual causes of death in the United States,<sup>7</sup> contribute to overweight and obesity and are often identified as important targets in changing weight perceptions and losing weight.<sup>8,9</sup> Although about 30% of Americans state that they have reduced their calorie or fat intake in an effort to lose weight or maintain a current weight,<sup>6</sup> other data suggest that

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**Table 1. Sample Demographic, Behavioral and Psychosocial Characteristics**

	<b>Total Sample (N=600)</b>
<b>Demographic Characteristics</b>	
Age M (SD) range (16.6–52.3)	44.2 (11.1)
Female Gender	70.0% (420)
Education Greater than HS	50.0% (300)
<i>Health Care Coverage</i>	
None	18.7% (112)
Private	61.8% (371)
Medicare/Medicaid/Other	19.5% (117)
Married/cohabitating	38.3% (230)
Employed Full Time	66.0% (395)
<i>Monthly Household Income</i>	
Greater than \$1,800	44.7% (268)
<b>Behavioral Characteristics</b>	
<i>Frequency of physical activity</i>	
Less than once per week	48.0% (282)
1–2 times per week	18.9% (111)
3–7 times per week	33.2% (195)
<i>Frequency of fruit eaten</i>	
One time per month or less	21.6% (129)
1–2 times per week	20.8 (124)
3–6 times per week	14.4% (86)
One time per day	23.0% (137)
Two times per day	11.9% (71)
3–6 times per day	8.4% (50)
<i>Frequency of vegetables eaten</i>	
One time per month or less	2.3% (14)
1–2 times per week	7.7% (46)
3–6 times per week	15.4% (92)
One time per day	35.5% (212)
Two times per day	29.1% (174)
3–6 times per day	10.0% (60)
<b>Psychosocial Characteristics</b>	
<i>Self-Rated General Health</i>	
Good/very good/excellent	74.2% (445)
CES-D M (SD)*	11.8 (8.8)
Daily hassles M (SD)	3.3 (2.3)
Perceived Stress M (SD)	21.3 (8.1)

\* The scores on the CES-D depression scale can range from 0–60. Scores of 16 or higher are considered to be indicative of the likelihood of clinical depression because it represents the 80th percentile in a representative population.<sup>35</sup>

only one in five U.S. adults consumes the recommended five or more daily servings of fruits and vegetables.<sup>10,11</sup> In addition to the health-protective benefits against cancer and cardiovascular diseases, eating a higher proportion of vegetables has been associated with lower BMI.<sup>10</sup>

Physical activity has been associated with lower BMI,<sup>9</sup> and 61% of Americans state that they are doing more physical activity in order to lose or maintain weight.<sup>6</sup> Despite these reports, overall rates of physical activity have remained relatively low over the last two decades,<sup>9</sup> with approximately 29% of U.S. adults reporting no leisure-time physical activity.<sup>9</sup> Ethnic minority and low-SES populations report the lowest participation rates.<sup>12</sup> This rate increases for ethnic minorities; approximately 39% of African Americans participate in no leisure-time physical activity.<sup>6</sup> Moreover, the rate of no leisure-time physical activity continues to rise in persons with an annual family income of less than \$10,000 (41%) and in persons with less than a high school education (46%) as compared to the rest of the population.<sup>9,12</sup>

Psychosocial factors, such as depression and stress, have been associated with overweight and obesity,<sup>13</sup> although the findings are mixed, suggesting that associations may vary depending upon how psychosocial factors are assessed and how overweight and obesity are defined.<sup>14</sup> Perceiving oneself as overweight and unsuccessful attempts trying to lose weight may also increase psychological distress. People who are overweight or who perceive themselves as overweight tend to report lower health self-ratings,<sup>15</sup> perhaps in part because obesity is highly associated with numerous disease outcomes.<sup>3</sup> It is not well understood how these factors interact in African-American or smoking populations.

African Americans have high smoking rates; 28% of African Americans smoke cigarettes.<sup>16</sup> As many as 45% of African-American smokers report that they want to quit “a lot”;<sup>17</sup> however, concern about weight and weight gain is frequently cited as a barrier to smoking cessation.<sup>18–20</sup> College-aged African-American women may report a healthier body image<sup>21–23</sup> and fewer preoccupations about weight than do European-American women.<sup>24</sup> However, other literature posits that among adults, overweight and dieting women from both ethnic groups report considerable concerns about weight.<sup>25</sup> Also among women, African Americans and European Americans both report equal levels of eating,<sup>26</sup> not wanting to be fat<sup>23</sup> and trying to lose weight.<sup>11</sup> Another study showed that although weights preferred by African-American women may be higher than weights preferred by European-American women, the difference itself between the actual weight of the woman and the weight that she would prefer to be was greater for African-American than

European-American women.<sup>27</sup> African-American women who are overweight may experience greater stress than European-American women who are overweight,<sup>28</sup> suggesting that concern about weight may be related to issues of cultural identification and social class.<sup>29</sup> Despite growing interest among researchers, concerns and perceptions of weight among African-American adults are not well understood, and the existing research has been done almost exclusively on women. Fear of weight gain has been cited as a primary reason to continue tobacco smoking in African-American populations; however, little is known about factors that may be associated with perceptions of weight and trying to lose weight among African Americans who smoke.

Overweight and obesity in the United States may adversely affect as many as two-thirds of the adult population and have been considered an epidemic.<sup>30</sup> Interventions are needed to address this problem; however, a dearth of research exists to develop interventions, especially among subgroups of the population who have historically been underserved and at higher risk of suffering debilitating diseases associated with overweight and obesity. The purpose of this study was to examine factors that might be associated with BMI, weight perceptions and trying to lose weight in a sample of African-American adult male and female smokers.

**METHOD**

**Sample**

These data were drawn from a previously described, double-blind, placebo-controlled, randomized trial of 600 African-American smokers recruited at an inner-city community health center over a 16-month peri-

od.<sup>31,32</sup> Participants provided written informed consent during the first visit. The trial procedures were approved and monitored by the University of Kansas Medical Center’s Committee for the Protection of Human Participants. Eligible persons described themselves as “African-American or black,” were at least 18 years of age, smoked at least 10 cigarettes per day, were interested in quitting in the next 30 days, spoke English, and had a home address and working telephone. Only one smoker per household was allowed to enroll. Participants were excluded if they had a contraindication for bupropion SR (predisposition to seizures, excessive alcohol use, bulimia or anorexia nervosa, current use of bupropion), were pregnant, currently used psychoactive medication, used other forms of tobacco or nicotine replacement in the past 30 days, were in drug treatment during the past six months or were being treated for depression.

**Assessment**

The assessment included measures of demographic, behavioral and psychosocial variables. Demographic questions included age, education, marital status, gender, income, employment, insurance status and residential mobility. Income was assessed categorically and collapsed to three categories (low <\$1,100, medium \$1,100–\$1,800 or high >\$1,800 per month) for analyses.

**Behavioral Variables**

**Dietary habits.** Two questions were adapted from the Behavioral Risk Factor Surveillance Survey (BRFSS). In separate questions, participants reported the frequency of eating fruit and vegetables (times per day, week or month).<sup>33,34</sup>

**Physical activity.** Physical activity was assessed

**Table 2. Bivariate Relationships among Dependent Variables, BMI, Perceived Weight and Trying to Lose Weight**

	Body Mass Index M (SD)	Percent Trying to Lose Weight
<b>Sample (N=600)</b>	28.8 (6.7)	40%
<i>Perceived weight<sup>a,b</sup></i>		
Underweight (n=75)	21.0 (2.7)	1%
About right (n=161)	24.8 (3.3)	11%
Overweight (n=348)	32.4 (5.8)	62%
<i>Trying to lose weight<sup>c</sup></i>		
No (n=349)	26.7 (6.4)	
Yes (n=235)	32.0 (5.7)	

<sup>a</sup> BMI significantly increases across weight perception categories, F (2,581)=239.9, p<0.001; <sup>b</sup> Trying to lose weight significantly increases across weight perception categories,  $\chi^2(2)=178.2$ , p<0.001; <sup>c</sup> BMI significantly higher among those trying to lose weight, F (2,582)=103.5, p<0.001

using an item from the BRFSS that assesses the number of times per week or per month that the participant took part in physical activities, such as running, aerobics, dancing, gardening or walking for exercise.<sup>33,34</sup>

### Psychosocial Variables

**Health status.** Participants rated their general perceived health using a question adapted from the BRFSS. Participants rate their general health as excellent, very good, good, fair or poor. Responses were collapsed into excellent, very good or good, and fair or poor.<sup>33,34</sup>

**Depressive symptoms.** Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale (CES-D).<sup>35</sup> Scores range from 0 to 60, with scores of 16 or higher indicative of the likelihood of clinical depression. The CES-D is a 20-item, four-point Likert scale (1=rarely or none of the time, about one day; to 4=most or all of the time, about 5–7 days) to assess self-report symptoms related to depressive mood. The alpha coefficient for the CES-D was 0.85 (general population) and 0.90 (a patient sample). Test-retest reliability estimates were reported: 0.51 (two weeks), 0.67 (four weeks) and 0.59 (both six- and eight-week intervals). In terms of the concurrent validity estimates, the CES-D was positively correlated with the Hamilton Clinician’s Rating Scale ( $r=0.44$ ), and with the Raskin Rating Scale ( $r=0.54$ ).<sup>36</sup>

**Daily hassles.** Hassles, or daily sources of frustration (e.g., having a check late or lost in the mail or having a violent argument with a friend or relative), were measured using a modified, 11-item hassles index that was based on an instrument used success-

fully in a prior study of stress in African-American smokers<sup>37</sup> that was adapted from an original scale by Kanner, Coyne and Lazarus.<sup>38</sup> Each respondent reported whether or not a particular event happened to them or someone important to them in the past three months. We used nine items from the Romano et al. measure<sup>37</sup> and added two items we thought might be relevant to the population targeted in our study. The additional items assessed hassles related to: 1) losing medical, food or housing benefits and 2) having to move. High scores could range from zero to 11, depending on the number of self-reported hassles that the respondent indicates have occurred to either himself or herself, or a person “most important” to him or her during the preceding three months. Researchers have reported good internal consistency (Cronbach’s  $\alpha=0.74$ ) and evidence of construct validity.<sup>37</sup> The Cronbach’s alpha coefficient for our abbreviated instrument was 0.65 (0.58 when excluding the two hassles items that were added).

**Perceived stress scale.** Perceived stress was assessed with a 14-item Likert-type questionnaire that measured the frequency of feelings in the last month. Items ask participants to rate how often (0=never, 1=almost never, 2=sometimes, 3=fairly often, 4=very often) they face particular feelings, such as being upset because something happened unexpectedly, felt confident about handling personal problems and angered because of things that happened that were outside of personal control.<sup>39,40</sup> Scores can range from 0 to 56. The Cronbach’s alpha for the PSS was 0.80. PSS norms are available from a large probability sample.<sup>39</sup> The mean PSS score for Cohen & Williamson’s entire study sample (N=2387) was 19.62. For current

**Table 3. Multivariable Models Describing Body Mass Index, Perceived Weight and Trying to Lose Weight**

<b>Body Mass Index</b>	<b>Estimate (B)</b>	<b>T</b>	<b>p</b>
Intercept	30.2	50.5	0.001
Self-rated health good, very good or excellent	-2.3	-3.7	0.001
Male gender	-1.7	-2.9	0.004
Greater than high-school education	1.6	2.9	0.004
<b>Perceived Weight</b>	<b>Estimate (B)</b>	<b><math>\chi^2</math></b>	<b>p</b>
Intercept 1	11.3	149.7	0.001
Intercept 2	14.6	187.3	0.001
Male gender	1.8	52.6	0.001
BMI	-0.6	193.8	0.001
<b>Trying to Lose Weight</b>	<b>Estimate (B)</b>	<b><math>\chi^2</math></b>	<b>p</b>
Intercept	0.43	0.60	0.440
Age	0.02	5.76	0.016
Cigarettes per day	0.03	5.26	0.022
Perceived weight			
Overweight vs. underweight	2.38	12.37	0.001
Overweight vs. about right	0.13	0.12	0.729

smokers (n=708) the mean was 20.4, for successful quitters (n=616) the mean was 19.1, for never smokers (n=1028) the mean was 19.4, and for African Americans, regardless of smoking status (n=185), the mean was 21.5.<sup>39,40</sup>

## Dependent Variables

**BMI.** BMI (kg/m<sup>2</sup>) was calculated based on self-reported height: “How tall are you?” and anthropometric assessment of weight. Both height and weight were converted to metric calculations for BMI calculations. Height was self-reported based on available assessment equipment and institutional review board-approved study procedures. Trained research assistants weighed all participants using the Befour Right-Weigh Electronic Scale. Participants removed bulky clothes, such as coats.

**Perceived weight.** Perceived weight was assessed using an item drawn from the third National Health and Nutrition Examination Survey (NHANES III): “Do you consider yourself now to be overweight, underweight or about the right weight?”<sup>41</sup>

**Trying to lose weight.** Trying to lose weight was assessed using an item drawn from NHANES III: “Are you trying to lose weight now?”<sup>41</sup>

## Analyses

Analyses were performed using SAS software Release 8.01.<sup>42</sup> We summarized categorical baseline variables using frequencies and percentages, calculating means and standard deviations to summarize baseline quantitative variables. We used two sample t-tests or analysis of variance (ANOVA) to examine the association between baseline categorical variables and BMI. We used Chi-squared or Fisher’s Exact Tests to assess the association of baseline categorical variables with perceived weight (underweight, about right, overweight) and trying to lose weight (yes/no). We used ANOVA to test for differences in baseline continuous variables among perceived weight categories and two sample t-tests to test for differences in baseline continuous variables between trying to lose weight categories. This results in a number of analyses used to aid in the identification of factors that might be associated with BMI, perceived weight and trying to lose weight. A correction for multiple tests, such as the Bonferroni method, would be very conservative, thus we have reported the actual p values to three decimal places so that readers can assess the magnitude of each difference.

We used regression models to investigate multivariable relationships. We modeled the joint effects of demographic, behavioral and psychosocial factors in separate models for each of the three dependent variables, BMI, perceived weight and trying to lose weight. In addition, we included BMI in the model for per-

ceived weight, and we included BMI and perceived weight in the model for trying to lose weight. We used both linear stepwise regression and best subsets regression, using Mallows’ Cp criterion selection method to model the joint relationship of the independent variables assessing demographic, behavioral and psychosocial factors to BMI. Weight perception consisted of three ordinal categories (underweight/about right/overweight). Thus, we used ordered polytomous logistic regression using the proportional odds model to model cumulative logits assessing the relationship of the previously identified independent variables along with BMI to perceived weight. Polytomous logistics regression allows us to model an ordinal dependent variable in a similar manner to modeling a dichotomous variable with standard dichotomous logistic regression. We used dichotomous logistic regression to model the relationship of the previously identified independent variables along with BMI and perceived weight to trying to lose weight. The models obtained from the stepwise logistic regression and best subsets selection methods from both the polytomous and dichotomous logistic regression analyses were further validated using the forward and backward model selection methods where we found equivalent effects.

## RESULTS

### Sample Characteristics

Sample demographic, behavioral and psychosocial characteristics are presented in Table 1. The majority of the sample was female, and about half had completed some education past high school. One in five participants reported not having any healthcare coverage. One-third reported not working full time, and the sample was generally low-income, with over half reporting household incomes less than \$1,800 per month. Three-fourths of the sample rated their health as good, very good or excellent, but most of the sample (72.8%, n=428) reported not meeting surgeon general’s physical activity guidelines of at least 30 minutes of physical activity on five or more days a week. Over half of the sample reported eating fruit less than once a day, and one-fourth of the sample reported eating vegetables less than once a day. The mean level of perceived stress was 21—very similar to the mean of 20.4 reported for current smokers in a large probability sample and slightly below the mean of 25 reported by Cohen and colleagues<sup>39</sup> for a community sample of smokers enrolled in a smoking cessation program. With regard to depressive symptoms, more than 25% of the sample scored above the threshold typically used to indicate the likelihood of clinical levels of depression.<sup>35</sup>

Bivariate relationships among dependent variables (BMI, perceived weight and trying to lose weight) are presented in Table 2. Thirty-one percent (n=182) of

the sample were overweight (BMI=25–29.9), and 37% (n=218) of the sample were obese (BMI >29.9) (not shown in table) (Sample M BMI=29). Few (13%) rated themselves underweight, while 28% rated themselves about right, and 60% rated themselves overweight. Of those who rated themselves as underweight, 15% had an underweight BMI of less than 18.5, 81% had a normal BMI between 18.5 and 25, and 4% had an overweight BMI greater than 25. Of those who rated themselves about right, 2% had an underweight BMI, 53% had a normal-weight BMI, and 45% had an overweight BMI. Of those who rated themselves as overweight, none had an underweight BMI, 7% had a normal-weight BMI, and 93% had an overweight BMI. Two in every five participants stated that they were trying to lose weight.

### Bivariate Characteristics

**BMI.** Women had higher BMIs (M=29.3, s=standard deviation=6.8) than did men (M=27.7, s=6.1),  $t(582)=2.9$ ,  $p<0.005$ . Those with greater-than-high-school education had higher BMIs (M=29.5, s=6.5) compared to those with less-than-high-school education (M=28.2, s=6.8),  $t(582)=-2.3$ ,  $p<0.03$ . Those who rated their health as fair or poor had higher BMIs (M=30.3, s=7.8) compared to those who rated their health as good, very good or excellent (M=28.3, s=6.1),  $t(218)=2.8$ ,  $p<0.006$ .

**Perceived weight.** Women were more likely to report themselves overweight (67%) in comparison to men (41%),  $c2(2)=39.8$ ,  $p<0.001$ . Those with greater than high school education were more likely to report themselves overweight (64%) in comparison to those with less than high school education (55%),  $c2(2)=13.3$ ,  $p<0.002$ . Those who rated their health as fair or poor were more likely to report themselves as overweight (67%) compared to those who rated their health as good, very good or excellent (57%),  $c22(2)=7.3$ ,  $p<0.03$ . Depressive symptoms were lower among people who reported themselves about the right weight (M=10.2, s=8.6) compared to those who rated themselves underweight (M=13.9, s=10.4) or overweight (M=12.1, s=8.4),  $F(2, 590)=5.0$ ,  $p<0.008$ . Perceived stress was also lower among people who reported themselves about the right weight (M=19.9, s=7.6) compared to those who rated themselves underweight (M=22.2, s=9.2) or overweight (M=21.7, s=8.0),  $F(2, 593)=3.5$ ,  $p<0.05$ .

**Trying to lose weight.** Women were more likely to report that they were trying to lose weight (45%) in comparison to men (28%),  $\chi^2(1)=14.6$ ,  $p<0.001$ . The mean age was lower among people trying to lose weight (M=43.1, s=9.4) compared to those who were not trying to lose weight (M=45.0, s=12.0),  $t(583)=2.2$ ,  $p<0.05$ . The mean number of cigarettes smoked per day was lower among those trying to

lose weight (M=18.1, s=7.6) compared to those who were not trying to lose weight (M=19.8, s=8.4),  $t(597)=2.6$ ,  $p<0.009$ .

**Interrelationships among dependent variables.** Prior to examining joint factors associated with BMI, perceived weight and trying to lose weight, we examined the interrelationships of these variables. As presented in Table 2, all three dependent variables were significantly associated with each other. People who rated themselves as underweight had lower BMIs than did those who reported themselves about right, who in turn had lower BMIs than did those who reported themselves overweight,  $F(2,581)=239.8$ ,  $p<0.001$ . People who were trying to lose weight had higher BMIs than did those who were not trying to lose weight,  $t(1,582)=-10.17$ ,  $p<0.001$ , and reported higher perceived weight,  $\chi^2(2)=178.2$ ,  $p<0.001$ .

### Multivariable Models

Table 3 presents the parameter estimates for the regressions modeling BMI, perceived weight and trying to lose weight.

**BMI.** Variables describing sociodemographics, health behaviors and psychosocial factors were entered simultaneously into a stepwise linear regression modeling BMI. Poorer general health, female gender and greater-than-or-equal-to-a-high-school education were significantly associated with higher BMIs.

**Perceived weight.** Variables describing sociodemographics, health behaviors, psychosocial factors and BMI were entered simultaneously into a stepwise proportional odds regression modeling perceived weight. Females (OR=5.8, 95% CI=3.6–9.3) were more likely to perceive themselves as overweight. Participants with higher BMIs (OR=1.8, 95% CI=1.6–1.9) were more likely to rate themselves as overweight.

**Trying to lose weight.** Variables describing sociodemographics, health behaviors, psychosocial factors, BMI and perceived weight were entered simultaneously into a stepwise logistical regression modeling trying to lose weight. Younger participants (OR=1.02, 95% CI=1.00–1.04) and participants who smoked more cigarettes per day (OR=1.03, 95% CI=1.00–1.06) were more likely to be trying to lose weight. Participants who rated themselves as overweight in comparison to those who rated themselves as underweight (OR=134.15, 95% CI=18.37–979.56) were more likely to be trying to lose weight. Participants who rated themselves as overweight in comparison to participants who rated themselves as about the right weight (OR=14.09, 95% CI=8.19–24.24) were more likely to be trying to lose weight.

### DISCUSSION

Although participants were not recruited by

weight status, a much higher proportion of the sample than the general public was overweight, consistent with other studies of African Americans.<sup>27</sup> A high percentage of the sample (37%) was obese, suggesting that there is a need to address BMI in addition to tobacco cessation among African-American smokers who come from similar lower-SES populations. Despite the high proportion of overweight and obesity, 23% of the sample perceived themselves inaccurately according to clinical BMI classifications. The mean weight of the group that rated themselves underweight (mean BMI=21) was well within the normal range for BMI, and the mean weight of the group that rated themselves “about right” was borderline overweight (mean BMI=25). This overestimation may represent the difference between clinical definitions and cultural definitions of body weight.

Despite the tendency among some of the sample to underestimate weight status, we found that BMI was significantly associated with perceived weight before and after adjusting for other factors. However, BMI dropped out of the stepwise and best subset models of trying to lose weight. This is likely a result of the relationship between BMI and perceived weight, and suggests that perceived weight may mediate the association between BMI and trying to lose weight (i.e., perceptions of weight determine who will try to lose weight). If this is the case, a simple strategy to increase attempts to lose weight might be to provide accurate feedback to individuals about their overweight status in comparison to national healthy BMI guidelines. This may be especially important in populations that may be less aware of health and medical concerns, such as African-American populations, who may perceive ideal body size and shape larger than what may be recommended for optimal health.<sup>27</sup>

We also found that gender was differentially associated with BMI and perceived weight in the multivariable models. Being female was associated with greater BMI and being more likely to perceive oneself as overweight. We considered that gender might modify the effect of weight perceptions in determining efforts at weight loss; however, analyses did not show a significant interaction (analyses not shown). Thus, being male may be associated with more accurate perceived weight. This suggests that women have higher BMIs in this sample, but men report more accurate perceptions of their weights. Men may be more accurate in perceiving their weight as underweight, about right or overweight. On the other hand, men may experience less social pressure to maintain a thinner weight, and this, in turn, may make their perceived weight more accurate.

Although the number of cigarettes smoked per

day was not related to BMI or weight perceptions, our findings suggest that smoking more cigarettes may still be related to trying to lose weight. Those who smoked more cigarettes per day were more likely to be trying to lose weight. In the multivariable model comparing those trying to lose weight with those not trying to lose weight, people who smoke about 10 more cigarettes per day are about 1.35 times more likely to be trying to lose weight. One reason for smoking may be to keep weight gain at bay; thus, people who smoke more cigarettes might use smoking as a weight loss strategy. Concern about weight and weight gain is frequently cited as a barrier to smoking cessation.<sup>18-20,43</sup> In particular, African-American women may be more reluctant to gain any weight upon quitting smoking than European-American women.<sup>20</sup> There is a need to address cigarette smoking in overweight populations in order to understand the phenomenon and intervene effectively.

This study assessed a sizeable sample of African-American smokers, most of whom were undereducated and with relatively low household incomes, both men and women, providing insight into a population that has been understudied. These data may not be representative of all African Americans or all people who smoke, although most bivariable relationships were consistent with expected relationships based on previous research. However, completing a high-school education was associated with higher BMI. Given the undereducated nature of our sample (only 50% had completed high school), this may be an artifact of a restricted education range. Our sample was cross-sectional; therefore, causation should not be implied.

Although many expected bivariable relationships were found associating health and psychosocial factors with BMI, weight perceptions and trying to lose weight, most of these relationships were not born out by multivariable models. This suggests that behavioral and psychosocial factors may have a more complicated role than anticipated in this sample population or that the selected behavioral and psychosocial measures were inappropriate or not sensitive enough in this population. Our measures were limited to those available on the baseline survey of the larger trial, designed to promote smoking cessation. Although these measures had all been used before in epidemiological studies and, in particular, the psychosocial measures have been shown repeatedly to be reliable and valid, some may not have been sufficient to show a relationship in a multivariable model assuming one existed. For example, it was impossible to determine whether eating a large salad might constitute 3–4 daily servings of fruits and vegetables but only count as having eaten vegetables once in a day. Although our BMI assess-

ment relied on objective weight assessments, objective assessments of height together with stronger assessments of perceived weight and trying to lose weight may produce different results.

Perceived weight tended to underestimate BMI in this sample of African-American smokers; however, those who recognized that they were overweight were more likely to be trying to lose weight. The data suggest that feedback may be an effective way to get people to try to lose weight; however, among smokers, it is important to address tobacco cessation along with weight loss. Overweight and obesity remain a significant challenge, and innovative strategies that simultaneously target weight loss and tobacco cessation are needed.

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## REFERENCES

- Mokdad AH, Serdula MK, Dietz WH, et al. The spread of the obesity epidemic in the United States, 1991-1998. *JAMA*. 1999;282:1519-22.
- Cigarette smoking among adults—United States, 1999. *MMWR Morb Mortal Wkly Rep*. 2001;50:869-873.
- Must A, Spadano J, Coakley EH, et al. The disease burden associated with overweight and obesity. *JAMA*. 1999;282:1523-1529.
- Flegal KM, Troiano, RP. Changes in the distribution of body mass index of adults and children in the U.S. population. *Int J Obes Relat Metab Disord*. 2000;24:807-818.
- Mokdad AH, Serdula MK, Dietz WH, et al. The continuing epidemic of obesity in the United States. *JAMA*. 2000;284:1650-1651.
- Division of Adult and Community Health, NCI/CDPH, Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System Online Prevalence Data. www.cdc.gov. 22 January.
- McGinnis JM, Foege WH. Actual causes of death in the United States. *JAMA*. 1993;270:2207-2212.
- National Institutes of Health & National Heart Lung and Blood Institute. Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity: The Evidence Report. 1998. U.S. Government Press: Washington, DC.
- USDHHS. Physical activity and health: A report of the surgeon general. 1996. Centers for Disease Control and Prevention: Atlanta.
- CDC. Five-a-day fruits and vegetables surveillance. <http://apps.nccd.cdc.gov/5ADaySurveillance/>. June 12, 2002.
- Serdula M, Coates R, Byers T, et al. Evaluation of a brief telephone questionnaire to estimate fruit and vegetable consumption in diverse study populations. *Epidemiology*. 1993;4:455-463.
- Crespo CJ, Smit E, Andersen RE, et al. Race ethnicity social class and their relation to physical inactivity during leisure time: results from the Third National Health and Nutrition Examination Survey, 1988-1994. *Am J Prev Med*. 2000;18:46-53.
- Istvan J, Zavela K, Weidner G. Body weight and psychological distress in NHANES I. *Int J Obes Relat Metab Disord*. 1992;16:999-1003.
- Onyike CU, Crum RM, Lee HB, et al. Is obesity associated with major depression? Results from the Third National Health and Nutrition Examination Survey. *Am J Epidemiol*. 2003;158:1139-1147.
- Kaplan MS, Huguet N, Newsom JT, et al. Prevalence and correlates of overweight and obesity among older adults: findings from the Canadian National Population Health Survey. *J Gerontol A Biol Sci Med Sci*. 2003;58:1018-1030.
- CDC. Cigarette smoking among adults—United States, 1992, and changes in the definition of current cigarette smoking. *Morbidity and Mortality Weekly Reports*. 1994;43:342-347.
- USDHHS, U.S. Department of Health and Human Services. Reducing Tobacco Use: a report of the Surgeon General. 2000. Atlanta, GA: CDC, National Center for Chronic Diseases Prevention and Health Promotion, Office on Smoking and Health. 322-369.
- Pirie PL, Murray DM, Luepker RV. Gender differences in cigarette smoking and quitting in a cohort of young adults. *Am J Public Health*. 1991;81:324-327.
- Froom P, Melamed S, Benbassat J. Smoking cessation and weight gain. *J Fam Pract*. 1998;46:460-464.
- Pomerleau CS, Brouwer RJ, Jones LT. Weight concerns in women smokers during pregnancy and postpartum. *Addict Behav*. 2000;25:759-767.
- Gray S. Social aspects of body image: perception of normalcy of weight and affect of college under graduates. *Percept Mot Skills*. 1977;45:1035-1040.
- Harris MB, Walters LC, Waschull S. Gender and ethnic differences in obesity related behaviors and attitudes in a college sample. *Journal of Applied Social Psychology*. 1991;21:1545-1566.
- Abrams KK, Allen LR, Gray JJ. Disordered eating attitudes and behaviors psychological adjustment and ethnic identity: a comparison of black and white female college students. *Int J Eat Disord*. 1993;14:49-57.
- Miller KJ, Gleaves DH, Hirsch TG, et al. Comparisons of body image dimensions by race/ethnicity and gender in a university population. *Int J Eat Disord*. 2000;27:310-316.
- Harris DL, Carr AT. Prevalence of concern about physical appearance in the general population. *Brit J Plas Surgery*. 2001;54:223-226.
- Pumariega AJ, Gustavson CR, Gustavson JC, et al. Eating attitudes in African-American women: the essence eating disorders survey. *The Journal of Treatment and Prevention*. 1994;2:5-16.
- Pomerleau CS, Zucker AN, Namenek Brouwer RJ, et al. Race differences in weight concerns among women smokers: results from two independent samples. *Addict Behav*. 2001;26:651-663.
- Walcott-McQuigg JA. The relationship between stress and weight-control behavior in African-American women. *J Natl Med Assoc*. 1995;87:427-432.
- Caldwell MB, Brownell KD, Wilfley DE. Relationship of weight, body dissatisfaction and self-esteem in African-American and white female dieters. *Int J Eat Disord*. 1997;22:127-130.
- Wickelgren I. Obesity: how big a problem? *Science*. 1998;280:1364-1367.
- Harris KJ, Ahluwalia JS, Catley D, et al. Successful recruitment of minorities into clinical trials: the Kick It at Swope project. *Nicotine Tob Res*. 2003;5:575-584.
- Ahluwalia JS, Harris KJ, Catley D, et al. Sustained release bupropion for smoking cessation in African Americans: a randomized controlled trial. *JAMA*. 2002;288:468-474.
- Nelson DE, Holtzman D, Bolen J, et al. Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). *Soz Präventivmed*. 2001;46 Suppl 1:S3-42.
- Stein AD, Lederman RI, Shea S. The Behavioral Risk Factor Surveillance System questionnaire: its reliability in a statewide sample. *Am J Public Health*. 1993;83:1768-1772.
- Weissman MM, Sholomskas D, Pottenger M, et al. Assessing depressive symptoms in five psychiatric populations: a validation study. *Am J Epidemiol*. 1977;106:203-214.
- Radloff LS. The CES-D Scale: a self-report depression scale for research in the general population. *Applied Psychol Measurement*. 1977;1:385-401.
- Romano PS, Bloom J, Syme SL. Smoking, social support and hassles in an urban African-American community. *Am J Public Health*. 1991;81:1415-1422.
- Kanner AD, Coyne JC, Schaefer C, et al. Comparison of two modes of stress measurement: daily hassles and uplifts versus major life events. *J Behav Med*. 1981;4:1-39.
- Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24:385-396.



40. Cohen S, Lichtenstein E. Perceived stress, quitting smoking and smoking relapse. *Health Psychol.* 1990;9:466-478.  
 41. Serdula MK, Coates RJ, Byers T, et al. Fruit and vegetable intake among adults in 16 states: results of a brief telephone survey. *Am J Public Health.* 1995;85:236-239.

42. SAS Institute Inc., The SAS System for Windows. 1999-2000: Cary, NC.  
 43. Pomerleau CS, Kurth CL. Willingness of female smokers to tolerate postcessation weight gain. *J Subst Abuse.* 1996;8:371-378. ■



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