Provider Advice and Patient Perceptions on Weight Across Five Health Systems

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Introduction: To improve the management of overweight and obesity in the primary care setting, an analysis of patient perceptions of weight status and predictors of weight loss attempts for those with overweight and obesity is needed.

Methods: Primary care patients (*n*=949) across 5 health systems in the Mid-Atlantic region of the U.S. were surveyed in 2015; data analysis was performed in 2018. Survey data was combined with data via the electronic health record to understand patients' perceptions of weight, factors associated with weight loss efforts, and provider counseling practices.

Results: Most participants with overweight or obesity perceived themselves as weighing too much and reported trying to lose weight. Furthermore, most participants with obesity reported receiving advice to lose weight by a provider in the past 12 months. However, less than half of patients with overweight reported receiving advice to lose weight, maintain weight, or develop healthy eating and physical activity patterns from a health professional in the past 12 months. Among participants with overweight and obesity, multivariable logistic regression analysis demonstrated that the perception of being overweight and receiving healthcare advice to lose weight had the highest odds of reporting attempted weight loss (OR=5.5, 95% CI=2.7, 11.2 and OR=3.9, 95% CI=1.9, 7.9, respectively).

Conclusions: The findings emphasize the importance of provider attention to weight management counseling and identifies patients with overweight as needing increased attention by providers.
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INTRODUCTION

Obesity rates of U.S. adults continue to rise, increasing from 33.7% in 2007—2008 to 39.6% in 2015—2016.[1] Obesity-related conditions, including type 2 diabetes, cardiovascular disease, and certain cancers, are some of the leading causes of preventable death.[2] BMI itself has a J-shaped association with all-cause mortality, cancer, cardiovascular diseases, and respiratory diseases, with the lowest risk occurring at 21—25 kg/m^{2}.[3] However, even modest weight loss (i.e., 5%—10% of body weight) has been shown to achieve clinically meaningful outcomes in the management of these obesity-related conditions.[4]

Primary care providers (PCPs) play a key role in the management of patients with obesity and obesity-related

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diseases; patients expect their PCP to initiate discussions about weight management in a respectful, individualized manner.[5,6] Patients who report receiving healthcare counseling about losing weight are approximately 2 to 3 times more likely to report that they are currently trying to lose weight or have successfully achieved weight loss.[7] Indeed, when patients simply receive a diagnosis of overweight (BMI $\geq 25−29.9$ kg/m^2) or obesity (BMI ≥ 30 kg/m^2) by their healthcare provider, they are significantly more likely to classify themselves as overweight and report pursuing weight control (trying to lose weight or preventing weight gain).[8,9]

Despite these findings, national survey data from 2003 to 2008 showed that 74% of participants with overweight and 29% of participants with obesity reported never receiving a diagnosis of overweight or obesity.[8] Of individuals with overweight, 23% of women and 48% of men perceived their weight as appropriate.[8] With the increasing prevalence of overweight and obesity, misperception of weight status has increased, perhaps owing to a higher threshold for weights that appear normal or about right.[8,10] This discrepancy between patient-reported weight perception and observed weight status represents a potential starting point for provider-initiated weight counseling. Unfortunately, more than half of primary care patients with obesity report not receiving weight counseling,[7,11] and only a minority of PCPs are providing most primary care weight counseling in the U.S.[12] In fact, the odds of primary care patients receiving counseling on diet, exercise, or weight declined from the 1990s to the 2000s, with cited possible explanations including physicians' doubts about the efficacy of counseling, lack of training in lifestyle counseling, and increasing time constraints during PCP visits.[13,14] Factors associated with an increased likelihood of weight and lifestyle counseling include a higher BMI, greater number of medical conditions, higher levels of education, female sex, and being insured.[7,11,15]

To improve the management of overweight and obesity in the primary care setting, the current landscape of patient perceptions of weight and predictors of weight loss attempts is examined. Primary care patients across 5 health systems in the Mid-Atlantic region of the U.S. are surveyed to better understand these issues. Patient-reported outcomes and electronic health record (EHR) data are used together to understand patients' perceptions of their weight, factors associated with weight loss efforts, and current provider counseling practices. Using EHR data to calculate BMI is important, as self-reported body size from national surveys via the Behavioral Risk Factor Surveillance System has been a major source of insight regarding perceived provider roles in weight management in the past.[7,11,16]

METHODS

The PaTH Clinical Research Network Study of Healthy Lifestyles and Health Care was conducted at 5 health systems and affiliated academic institutions (Geisinger Health System, Johns Hopkins University/Johns Hopkins Health System, Penn State College of Medicine/Penn State Milton S. Hershey Medical Center, Lewis Katz School of Medicine at Temple University/Temple Health System, and University of Pittsburgh/University of Pittsburgh Medical Center) that are part of a clinical research network. The health systems include heterogeneity in the extent to which their patients live in rural, urban, or suburban settings as well as differences in the proportion of patients from minority racial and/or ethnic groups. All sites except for 1 are academic medical centers. IRB approval was obtained via Johns Hopkins University using a reliance agreement. Patients were surveyed in 2015 by electronic questionnaires consisting of validated and investigator-developed measures. Data reported in this study were analyzed in 2018.

Study Sample

Potential participants for the study were identified through the EHRs at health systems affiliated with the participating sites. Eligibility criteria included the following: age ≥ 18 years at the time of initial data query, at least 1 height recorded in the EHR, and at least 2 encounters with weight recorded within a 5-year time window. The authors excluded participants who were not proficient in English. Participants were asked if they had completed the survey previously for another participating site; if so, they were considered ineligible to participate again.

Eligible patients ($n=33,839$) were identified by the aforementioned inclusion and exclusion criteria using an electronic phenotype applied to the EHR and contacted by methods that varied by site. Recruitment methods included materials sent from patients' respective primary care clinics by mail, e-mail, or via their EHR account (i.e., patient portal). Consent and survey delivery were electronic at all participating sites; the electronic consent form contained 3 required questions to assess comprehension. For EHR portal-based recruitment, survey delivery and consent documentation were performed via Epic, the EHR software for 3 of the study sites. Study data for all other participants were collected and managed using REDCap, version 6.5, and hosted at each study site.[17] Research participants were not compensated for participation.

Measures

The questionnaire was adapted from validated measures and investigator-developed items.[18] An iterative process was used to develop the survey in collaboration with patients from participating healthcare systems who were engaged as members of the research team. Questionnaire items examined in this analysis include perceived weight status, weight-related goals, how helpful providers were in developing healthy eating and physical activity patterns in the past 12 months, and receipt of advice on weight management by providers in the past 12 months. Those who reported receiving advice on weight were also asked which health professionals provided this advice. Height, weight, and BMI were obtained from the EHR for each survey participant; the closest measure before the survey data was used in this analysis. Overweight was defined as BMI $\geq 25−29.9$ kg/m^2 and obesity was defined as BMI ≥ 30 kg/m^2. Obesity was further subcategorized,

Table 1. Demographics of Surveyed Participants, Including Participants With Overweight and Obesity

Variable	Total sample (*n*=949)		Overweight, BMI 25–29.9 kg/m^2 (*n*=316)		Obese, BMI ≥30 kg/m^2 (*n*=381)	
	n	*n* (%)	*n*	*n* (%)	*n*	*n* (%)
Age, years, mean (SD)	949	56.00 (15.57)	316	58.55 (15.40)	381	54.15 (14.27)
Weight, lbs, mean (SD)	949	187.72 (54.24)	316	171.26 (24.89)	381	234.21 (48.27)
Height, inches, mean (SD)	949	66.03 (3.94)	316	66.51 (4.05)	381	65.82 (3.89)
BMI, kg/m^2, mean (SD)	949	30.14 (7.83)	316	27.26 (1.46)	381	37.69 (6.64)
Sex, female	949	645 (68.0)	316	189 (59.8)	381	266 (69.8)
Had documented encounter with a provider in past 12 months	949	884 (93.2)	316	259 (81.2)	381	380 (99.7)
Education	859		285		342	
8th grade or less		4 (0.5)		1 (0.4)		3 (0.9)
Some high school		7 (0.8)		3 (1.1)		0 (0.0)
High school graduate or GED		78 (9.1)		27 (9.5)		38 (11.1)
Some college or 2-year degree		205 (23.9)		56 (19.6)		111 (32.5)
College graduate		169 (19.7)		48 (16.8)		72 (21.1)
More than a college degree		391 (45.5)		149 (52.3)		116 (33.9)
Prefer not to answer		5 (0.6)		1 (0.4)		2 (0.6)
Marital status	855		284		340	
Married		488 (57.1)		185 (65.1)		156 (45.9)
Living with partner		53 (6.2)		14 (4.9)		29 (8.5)
Widowed		59 (6.9)		17 (6.0)		22 (8.5)
Divorced		93 (10.9)		30 (10.6)		46 (13.5)
Separated		29 (3.4)		8 (2.8)		15 (4.4)
Never married		124 (14.5)		28 (9.9)		67 (19.7)
Prefer not to answer		9 (1.1)		2 (0.7)		5 (1.5)
Race/Ethnicity *(select all that apply)*	859		284		342	
White		696 (80.9)		243 (85.6)		256 (74.9)
Black, African American, African, or Afro-Caribbean		116 (13.5)		31 (10.9)		73 (21.3)
Hispanic, Latino, or Spanish origin		27 (3.1)		9 (3.2)		13 (3.8)
Asian		18 (2.1)		6 (2.1)		2 (0.6)
Middle Eastern/North African		4 (0.5)		2 (0.7)		0 (0.0)
Native American, American Indian, or Alaskan Native		10 (1.2)		3 (1.1)		4 (1.2)
Pacific Islander		1 (0.1)		1 (0.4)		0 (0.0)
Other		4 (0.5)		1 (0.4)		1 (0.3)
Prefer not to answer		10 (1.2)		3 (1.1)		4 (1.2)
Language mainly spoken at home	858		285		341	
English		844 (98.4)		277 (97.2)		340 (99.7)

Table 1. Demographics of Surveyed Participants, Including Participants With Overweight and Obesity (*continued*)

Variable	Total sample (n=949) n	n (%)	Overweight, BMI 25−29.9 kg/m² (n=316) n	n (%)	Obese, BMI ≥30 kg/m² (n=381) n	n (%)
Spanish		5 (0.6)		1 (0.4)		1 (0.3)
Chinese		1 (0.1)		0 (0.0)		0 (0.0)
Other		8 (0.9)		7 (2.5)		0 (0.0)
Prefer not to answer		0 (0.0)		0 (0.0)		0 (0.0)
Employment status (select all that apply)	859		285		342	
Employed for wages		453 (52.7)		149 (52.3)		190 (55.6)
Self-employed		66 (7.7)		25 (8.8)		20 (5.8)
Out of work for >1 year		23 (2.7)		4 (1.4)		13 (3.8)
Out of work for <1 year		8 (0.9)		0 (0.0)		6 (1.8)
Homemaker		47 (5.5)		14 (4.9)		15 (4.4)
Student		36 (4.2)		9 (3.2)		11 (3.2)
Retired		257 (29.9)		97 (34.0)		85 (24.9)
Disabled/Unable to work		76 (8.9)		21 (7.4)		45 (13.2)

with Class 1 obesity defined as BMI $\geq$30−34.9 kg/m^2, Class 2 obesity defined as BMI $\geq$35−39.9 kg/m^2, and Class 3 obesity defined as BMI $\geq$40 kg/m^2.

Statistical Analysis

Demographics of survey participants were obtained from self-report and linked with EHR data. Descriptive statistics were computed for participant responses and EHR measures. Responses to survey questions regarding weight perception, weight-related goals, and provider counseling were compared between male and female participants using chi-square tests (or Fisher's exact test when expected cell counts were fewer than 5).

For patients with overweight or obesity, logistic regression models identified significant predictors of attempting weight loss. Univariate logistic regression models were first constructed with each potential predictor as an independent variable, producing unadjusted ORs and 95% CIs. Next, a multivariable logistic regression model was constructed using automated forward selection with a criterion of $p<0.05$ for entry into the model. Even if not significant in multivariable modeling, site was included in the final model as a design variable. All analyses assumed a type 1 error rate of 0.05, and no adjustments were made for multiplicity.

RESULTS

Overall, 33,839 patients were approached across all sites (10,706 by mail, 21,273 by e-mail, 1,582 by EHR patient portal, and 278 in person). Recruitment was halted when the goal of enrolling 1,000 patients in the survey was achieved, as a recruitment rate of 3.0% is similar to other studies using e-mail and EHR-based recruitment.[19−21] The recruitment rate for this cohort study was 2.8% (*n*=949). Among all participants, mean age was 56 years, average BMI was 30.1 (SD=7.8) kg/m^2, and 68% of participants were female (Table 1). Across all sites, 81% were white, 14% were black, and 3% were Hispanic. Most participants were highly educated; 65% had at least a college degree. A total of 63% were married or living with their partner. For 98% of surveyed participants, English was the primary language spoken at home. A total of 60% of participants were employed or self-employed. One site differed in demographics in that most of its participants were black (81 of 126 participants). Demographics of all sites did not differ significantly when examining only participants with overweight or obesity (Table 1). This set of analyses focuses on data from participants with BMI $\geq$25 kg/m^2.

Of participants with overweight (*n*=277), 71% (*n*=198) described their weight as *slightly overweight*; 17% (*n*=28) of women described their weight as *about the right weight* compared with 24% (*n*=27) of men (Figure 1). Of participants with obesity (*n*=328), 60% (*n*=198) described their weight as *very overweight* and 35% (*n*=115) as *slightly overweight*; 66% (*n*=152) of women selected *very overweight*, compared with 47%

(*n*=46) of men (Figure 1). Furthermore, among participants with overweight, 69% of men and 74% of women reported they were currently trying to lose weight, and 26% of men and 15% of women were trying to maintain weight (Table 2). Among participants with obesity, 87% of men and 92% of women reported currently trying to lose weight.

Of participants with overweight or obesity, 92% had an EHR-documented encounter with a healthcare provider in the past 12 months. Among those with overweight, 48% reported that in the past 12 months a healthcare provider helped them, to varying degrees, develop healthy eating and physical activity patterns and 35% reported that a provider advised them to lose weight (Table 2). Furthermore, in the past 12 months, 63% of participants with obesity reported that a healthcare provider helped them to develop healthy eating and physical activity patterns and 70% reported that a healthcare provider had advised them to lose weight (Table 2). These findings did not differ significantly between men and women. When patients with overweight and obesity did receive advice on weight, 89% reported that it came from their PCP. Other than PCPs, the most common health professionals that were reported to provide weight advice were nutritionists or dieticians (16%), cardiologists (10%), nurse practitioners or physician assistants (9%), and orthopedic surgeons (9%).

Among surveyed patients with overweight and obesity, univariate logistic regression analysis identified younger age, female sex, lower education level, active employment, obesity class, perception of being overweight, and receiving healthcare advice to lose weight as predictors of trying to lose weight. Multivariable logistic regression analysis demonstrated that several of these variables independently predicted who reported trying to lose weight: younger age, lower education level, Class 1 obesity, perception of overweight, and receipt of healthcare advice to lose weight (Table 3). Site was not an independent predictor. Individuals with at least some college education had lower odds of reporting attempted weight loss than those with lower education levels (OR=0.19, 95% CI=0.08, 0.44). Participants with Class 1 obesity had higher odds of reporting attempted weight loss than participants with overweight (OR=2.80, 95% CI=1.21, 6.47). However, a similar association for participants with Class 2 obesity was not significant in the multivariable logistic regression analysis (OR=1.37, 95% CI=0.61, 3.08). Participants who perceived themselves as slightly or very overweight had higher odds of reporting attempted weight loss (OR=5.45, 95% CI=2.66, 11.17). Participants who reported receiving advice to lose weight by a healthcare provider in the last 12 months were more likely to report attempting weight loss than those who received no weight-related advice (OR=3.85, 95% CI=1.89, 7.86). Those who reported being told to gain or maintain current weight were less likely to report attempting weight loss than participants who were not given any weight-related advice (OR=0.23, 95% CI=0.09, 0.58).
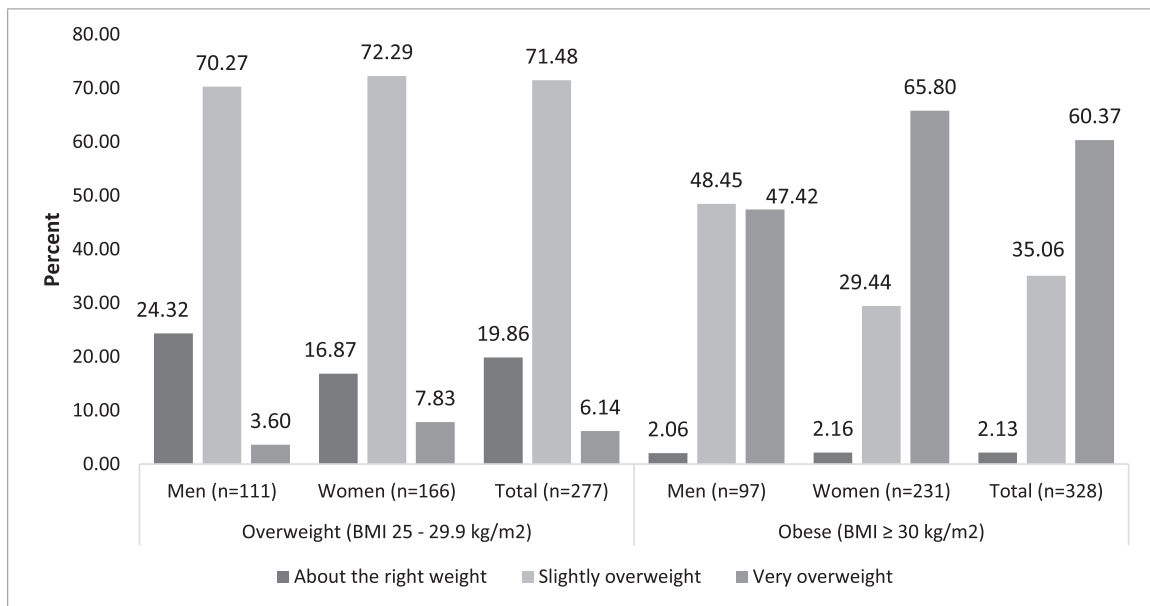
Figure 1. Survey responses to the question *How do you describe your weight?* among participants with overweight and obesity. Percent response to answer choices *slightly underweight* or *very underweight* not shown, as no more than 12 total respondents chose either response. When comparing responses between men and women, *p*-value=0.329 and 0.019 for participants with overweight and obesity, respectively.

Table 2. Survey Responses of Participants With Overweight and Obesity

Survey responses	Overweight (BMI 25–29.9 kg/m^2)				Obese (BMI ≥30 kg/m^2)			
	Men n (%)	Women n (%)	Total n (%)	p-value	Men n (%)	Women n (%)	Total n (%)	p-value
(1) Which of the following are you trying to do about your weight?				**0.029**				0.400
Lose weight	76 (68.5)	122 (73.5)	198 (71.5)		83 (87.4)	213 (92.2)	296 (90.8)	
Gain weight	0 (0.0)	0 (0.0)	0 (0.0)		0 (0.0)	1 (0.4)	1 (0.3)	
Stay the same weight	29 (26.1)	25 (15.1)	54 (19.5)		6 (6.3)	7 (3.0)	13 (4.0)	
Not trying to do anything about weight	6 (5.4)	19 (11.5)	25 (9.0)		6 (6.3)	7 (3)	16 (4.9)	
Total	111	166	277		95	231	326	
(2) In the last 12 months, how much have your doctor(s) or other health professionals helped you to develop healthy eating and physical activity patterns?				0.963				0.051
Not at all	57 (50.9)	87 (52.7)	144 (52.0)		35 (36.1)	85 (36.8)	120 (36.6)	
A little bit	29 (25.9)	42 (25.5)	71 (25.6)		37 (38.1)	67 (29)	104 (31.7)	
Moderately	16 (14.3)	24 (14.5)	40 (14.4)		21 (21.6)	47 (20.3)	68 (20.7)	
A lot	10 (8.9)	12 (7.3)	22 (7.9)		4 (4.1)	32 (13.9)	36 (11.0)	
Total	112	165	277		97	231	328	
(3) In the last 12 months, has a doctor, nurse, or other health professional given you advice about your weight?				0.831				0.247
No	64 (57.1)	87 (52.4)	151 (54.3)		24 (24.7)	65 (28.1)	89 (27.1)	
Yes, lose weight	36 (32.1)	61 (36.7)	97 (34.9)		69 (71.1)	160 (69.3)	229 (69.8)	
Yes, gain weight	2 (1.8)	2 (1.2)	4 (1.4)		0 (0.0)	3 (1.3)	3 (0.9)	
Yes, maintain current weight	10 (8.9)	16 (9.6)	26 (9.4)		4 (4.1)	3 (1.3)	7 (2.1)	
Total	112	166	278		97	231	328	
(4) What type(s) of health professional gave you advice about your weight in the last 12 months?[a]								
Primary care physician	43 (89.6)	69 (87.3)	112 (88.2)	0.568	68 (93.2)	147 (88.6)	215 (90.0)	0.158
Nutritionist or dietician	8 (16.7)	9 (11.4)	17 (13.4)	0.424	9 (12.3)	33 (19.9)	42 (17.6)	0.198
Orthopedic surgeon	1 (2.1)	5 (6.3)	6 (4.7)	0.410	9 (12.3)	19 (11.4)	28 (11.7)	0.817
Nurse practitioner or physician assistant	3 (6.3)	6 (7.6)	9 (7.1)	1.000	9 (12.3)	16 (9.6)	25 (10.5)	0.508
Physical therapist	0 (0.0)	3 (3.8)	3 (2.4)	0.293	8 (11)	17 (10.2)	25 (10.5)	0.821
Cardiologist	8 (16.7)	6 (7.6)	14 (11.0)	0.143	17 (23.3)	7 (4.2)	24 (10.0)	**<0.001**
Psychologist or mental health professional	1 (2.1)	3 (3.8)	4 (3.2)	1.000	4 (5.5)	17 (10.2)	21 (8.8)	0.323
Endocrinologist	1 (2.1)	1 (1.3)	2 (1.6)	1.000	6 (8.2)	13 (7.8)	19 (8.0)	0.900
OB/GYN physician	0 (0.0)	7 (8.9)	7 (5.5)	**0.045**	0 (0)	16 (9.6)	16 (6.7)	**0.004**

Table 2. Survey Responses of Participants With Overweight and Obesity *(continued)*

Survey responses	Overweight (BMI 25–29.9 kg/m²)				Obese (BMI ≥30 kg/m²)			
	Men n (%)	Women n (%)	Total n (%)	p-value	Men n (%)	Women n (%)	Total n (%)	p-value
Nurse	3 (6.3)	1 (1.3)	4 (3.2)	0.146	5 (6.8)	10 (6.0)	15 (6.3)	0.777
Pharmacist	0 (0.0)	1 (1.3)	1 (0.8)	1.000	1 (1.4)	5 (3)	6 (2.5)	0.671
Other	4 (8.3)	12 (15.2)	16 (12.6)	0.276	4 (5.5)	27 (16.3)	31 (13.0)	**0.034**
Total	48	79	127		73	166	239	

Note: Boldface indicates statistical significance (*p*<0.05).
ᵃAmong those participants who indicated that a health professional has provided them with advice about body weight, participants selected all that applied.
OB/GYN, obstetrician/gynecologist.

DISCUSSION

Patients across 5 healthcare systems in the U.S. were surveyed to study perceptions of weight, provider counseling on lifestyle management of overweight and obesity, and factors associated with weight loss efforts. Compared with the 2013−2016 nationally representative data from the National Health and Nutrition Examination Survey,[22] more participants with overweight and obesity in this 2015 sample report trying to lose weight; data from the National Health and Nutrition Examination Survey show that 67% of adults with obesity and 49% of adults with overweight tried to lose weight in the past 12 months, compared with 91% of adults with obesity and 71% of adults with overweight in this study's sample. This could reflect the fact that this survey solely sampled patients actively receiving care at academic medical centers and that the population was not a nationally representative sample. This study's population included fewer minority and lower-SES participants, but the inclusion of multiple health systems serving patients in rural, suburban, and urban regions improves geographic diversity.

Participants with overweight and obesity who reported receiving healthcare advice to lose weight had significantly higher odds of reporting attempted weight loss (OR=3.85, 95% CI=1.89, 7.86). This is consistent with prior studies and emphasizes the importance of provider attention to counseling about weight loss.[7,11] Given the central role of prevention in primary care, it is not surprising that PCPs were most often cited as the main source of healthcare advice about weight. Compared with nationally representative surveys, more participants with obesity in this sample report receiving counseling on lifestyle and weight loss.[7,11,14,15] However, less than half of patients with overweight in this sample reported receiving counseling on weight management or healthy eating and physical activity from a healthcare provider in the past 12 months: 48% reported that a provider helped them develop healthy eating and physical activity patterns, 35% were told to lose weight, and 9% were told to maintain weight. This illustrates a class of patients that may benefit from increased attention by providers to support weight control (i.e., weight maintenance or weight loss), given the risks of overweight, especially when concomitant risk factors for cardiovascular disease are present.[3,4]

Compared with prior nationally representative data on weight perception,[8] most men and women with overweight in this survey perceived their weight as *slightly overweight* and fewer described their weight as *about the right weight*. Despite concerns about rising misperceptions of weight because of the increasing rates of obesity,[8,10] participants in this sample may have had a more

Table 3. Variables Predicting Who Reports Trying to Lose Weight Among Participants With Overweight and Obesity

Predictor	Unadjusted OR (95% CI)	AOR (95% CI)	Adjusted *p*-value
Age	0.968 (0.953, 0.984)	0.973 (0.952, 0.995)	**0.016**
Female sex	1.597 (1.046, 2.440)		
Well-educated (at least some college)	0.360 (0.207, 0.628)	0.191 (0.084, 0.435)	**<0.001**
Married or cohabiting	0.904 (0.587, 1.393)		
English language	1.108 (0.673, 1.824)		
Perceived overweight	10.882 (6.430, 18.414)	5.453 (2.663, 11.168)	**<0.001**
Health professional helped in developing healthy eating	0.756 (0.499, 1.145)		
Given advice about weight			
Lose weight vs no advice	5.695 (3.301, 9.826)	3.852 (1.888, 7.856)	**<0.001**
Other advice vs no advice	0.171 (0.083, 0.353)	0.232 (0.093, 0.579)	
White race (yes/no)	1.379 (0.775, 2.453)		
Black race (yes/no)	0.480 (0.233, 1.099)		
Hispanic ethnicity (yes/no)	0.474 (0.109, 2.067)		
Employed	2.012 (1.317, 3.073)		
Unable to work	0.807 (0.422, 1.546)		
Class of obesity[a]			
Class 1 vs overweight	3.676 (1.997, 6.766)	2.797 (1.210, 6.468)	**<0.001**
Class 2 vs overweight	4.164 (2.342, 7.403)	1.370 (0.610, 3.075)	
Site			
Site 1 vs 5	0.841 (0.455, 1.557)	1.072 (0.477, 2.405)	0.054
Site 2 vs 5	0.429 (0.237, 0.779)	0.550 (0.234, 1.292)	
Site 3 vs 5	0.709 (0.399, 1.259)	1.505 (0.671, 3.372)	
Site 4 vs 5	1.683 (0.668, 4.239)	3.459 (0.780,15.337)	

Note: Boldface indicates statistical significance (*p*<0.05).
[a]Definitions of weight class: overweight, BMI ≥25–29.9 kg/m^2; obese Class 1, BMI ≥30–34.9 kg/m^2; obese Class 2, BMI ≥35–39.9 kg/m^2.

accurate perception of weight because of their access to health care. The perception of being slightly or very overweight had the highest odds of participants reporting attempted weight loss (OR=5.45, 95% CI=2.66, 11.17), emphasizing the importance of acknowledging the diagnosis of overweight or obesity with the patient. Similarly, prior studies demonstrate that both weight control and attempted weight loss were positively associated with a perception of weighing too much as well as a healthcare diagnosis of overweight or obesity.[8,9]

Unexpectedly, a higher level of education was associated with a decreased likelihood of attempting weight loss. This is surprising as those with higher levels of education appear to have healthier behaviors than those with less education.[23] In addition, prior studies indicate that higher levels of education are associated with increased likelihood of receiving healthcare advice to lose weight.[11,15] This finding may indicate a bias, as 88% of this study's participants with overweight and obesity had at least some college education. Another possible explanation is a shift away from a weight-centric strategy among individuals living with overweight and obesity, such as the health at every size approach[24]; perhaps those with higher levels of education are moving away from weight-related goals and focusing on healthy eating and physical activity.

This study utilized data obtained from a large sample size of primary care patients across 5 different healthcare systems, demonstrating the use of EHR data and low-touch, minimal-infrastructure approaches to obtain patient-reported outcomes and combine them with EHR data so that key variables such as body size could be measured rather than self-assessed. Developing such approaches is critical as health systems shift toward actively improving care based on lessons from care delivery.[25] Future research should focus on determining whether patients' weight perception and physician advice to lose weight tracks with EHR-documented longitudinal weight change.

Limitations
The study population may not be generalizable to primary care patients nationwide, as most participants were middle-aged, white, well-educated, and English-speaking. Furthermore, the low recruitment rate could have introduced a participation bias; perhaps participants who completed the survey were more likely to be focused on weight management than the total eligible population. Additionally, the number of encounters with the healthcare system in the 12 months before survey administration was not examined and so it cannot

be determined if multiple encounters would have affected weight loss attempts. Finally, although intent to lose weight is an important step in the process of behavior change,[26] participants' methods of attempting weight loss or who successfully achieved weight loss were not examined.

CONCLUSIONS

Most patients in this sample with overweight and obesity perceive themselves as weighing too much and report trying to lose weight. This is an encouraging finding, as perception of weight was the strongest predictor of reporting attempted weight loss. Further, among this group of individuals receiving care at academic medical centers, a much higher percentage of those with obesity report being counseled to lose weight by their healthcare providers compared with national survey data from the 2000s.[7,11,13,14]

Still, more than half of patients classified as overweight reported not receiving any advice on weight management or eating and activity patterns in the past 12 months by a health professional. Given that patients with overweight, particularly those with additional risk factors for cardiovascular disease, are at increased risk for chronic health conditions,[3,4] patients with overweight may merit increased attention from PCPs and other healthcare providers regarding weight management and healthy lifestyle behaviors. Continued efforts are necessary not only to improve counseling for patients with obesity in the primary care setting but also to expand these efforts to high-risk patients with overweight to assist in reducing the risk of developing obesity, cardiovascular disease, diabetes, and cancer.

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