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Healthcare Provider Counselling for Weight Management Behaviours among Adults with Overweight or Obesity: A Cross-sectional Analysis of National Health and Nutrition Examination Survey, 2011–2018

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ABSTRACT

Objectives To determine if adults with overweight or obesity received counselling from their healthcare providers (HCPs) to lose weight and/or adopt healthful behaviours associated with weight loss, and whether they took action on their HCPs' recommendations.

Design Cross-sectional analysis of 2011–2018 National Health and Nutrition Examination Survey (NHANES) data.

Sample NHANES respondents aged 18+ who were overweight/obese and had seen an HCP in the previous 12 months (n=13 158).

Methods Respondents reported if their HCPs recommended they control/lose weight, increase exercise/physical activity (PA) and/or reduce fat/calorie intake, and if they adopted the offered recommendation(s). Weighted logistic regression models examined receipt of HCP counselling by sex, age, race/ethnicity, and weight status accounting for demographic characteristics and complex sampling. Similar analyses examined reported adoption of HCPs' recommendations.

Results The sample was 53.1% women, 45.0% were overweight and 55.0% had obesity. In total, 40.4% received counselling to control/lose weight, 49.5% to increase exercise/PA and 38.9% to reduce fat/calorie intake. The following groups were less likely (p<0.001) to receive counselling: men; younger adults (aged 18–39) versus middle-aged (aged 40–64) and older adults (aged 65+); White versus Black and Hispanic respondents; overweight respondents versus respondents with obesity. Approximately half of those advised to make changes reported doing so (53.6% controlled/lost weight, 57.3% increased exercise/PA, 51.8% reduced fat/calorie intake). Differences in the adoption of recommendations were identified by sex, age group, race/ethnicity and weight status (all p<0.05); women, middle-aged and older adults, Black and Hispanic respondents and individuals with obesity were more likely to adopt one or more recommendations.

Conclusion Most respondents did not receive HCP counselling, and approximately half of those who received counselling reported taking action. HCPs may need training to provide counselling and to offer recommendations tailored to the social contexts of populations less likely to adopt weight control related recommendations.

Strengths and limitations of this study

- An important strength of this study is the use of data that are nationally representative of the US adult population.
- Additional strengths are that the study examined if respondents received healthcare provider (HCP) counselling for three weight-related recommendations (weight loss/control, increase exercise/physical activity and reduce fat/calorie intake), and also examined whether respondents acted on their HCPs' recommendations.
- Limitations of the study include the use of self-reported data to assess receipt of counselling from HCPs, and reported action on offered recommendations.

BACKGROUND

Obesity is epidemic in the USA with 37.9% of men and 41.1% women having obesity.[1] When estimates of overweight are included, this percentage increases to approximately 72%.[1] The high levels of overweight and obesity are a public health crisis due to their association with increased risk of chronic disease, including cancer, diabetes, heart disease[2] and increased mortality.[3]

Physician counselling for weight loss is associated with increased intention to lose weight and weight loss,[4 5] yet research indicates that more than half of patients in the USA who are overweight or have obesity have not received this counselling from their physicians.[5 6] Analysis of data from the 2005

National Ambulatory Medical Care Survey determined that 28.9% of adults with obesity received an obesity diagnosis, and just 17.6% received weight loss counselling.[7] Among individuals who are overweight/obese, prior research has found that women are more likely than men to receive physician counselling for weight loss,[6] as are individuals with higher incomes and greater educational attainment compared with individuals with lower incomes and less education.[8 9]

As energy balance and body weight are directly related, patient counselling for weight loss should include discussions related to caloric intake and expenditure. Unfortunately, the available research indicates that dietary counselling by healthcare providers (HCPs) (eg, physician, nurse practitioner, physician assistant) during medical visits rarely occurs.[10] Nationally representative data from the 2011 National Health Interview Survey (NHIS) found that 32.6% of respondents received general dietary counselling from their HCPs, with Hispanic and Black respondents being more likely than White respondents, and women more likely than men, to receive dietary counselling.[10] Therefore, there is a need to determine if HCPs are offering other diet-related recommendations, including limiting caloric intake, that can contribute to small deficits in energy balance and promote weight loss and/or weight maintenance in those who are overweight or have obesity.

In addition to dietary counselling, it is important that individuals with overweight or obesity receive counselling for physical activity (PA) due to its association with weight gain prevention and maintenance of weight loss.[11 12] Although findings are inconsistent,[13] research suggests that physician counselling to increase PA is associated with increased activity levels.[14 15] Nonetheless, HCP counselling for PA remains low. Data from 2010 indicate that only one-third of patients were counselled by their HCPs to increase PA,[16 17] and that there are differences in counselling by weight status. One study found that a greater percentage of people with normal weight (34.4%) were advised to increase their activity compared with individuals who wereoverweight (32.9%) or had obesity (31.1%),[16] while another study determined that people with obesity were most likely to receive this advice.[17] Moreover, women are more likely than men to receive HCP counselling for PA.[17] This difference may be due to the fact that women are more likely than men to seek medical attention[18] and may be more comfortable asking for advice from their HCPs than men. Research also has found that Hispanic and non-Hispanic Black adults[17] and patients with higher levels of education attainment[16 17] are more likely to receive PA counselling.

HCP counselling for behaviour change can promote changes in behaviour. For example, receiving weight loss advice from HCPs is associated with eating less fat and calories[19 20] and exercising to lose weight.[19] Patients with type 2 diabetes who receive weight management counselling from HCPs are more likely to report ever trying to lose weight (89.7% vs 27.2%) and to report modifying their diet (85.1% vs 48.0%) compared with those who did not receive this counselling.[21]

There is a need to update and expand the existing research exploring weight-related counselling by HCPs and to determine if patients who are overweight or have obesity receive counselling for lifestyle behaviours associated with weight reduction and/or weight maintenance. There also is a need to determine if patients who receive this counselling take action on these recommendations. Thus, the objective of the present study was to use a nationally representative data set to: (1) explore differences in the receipt of HCP counselling to control/lose weight and/or adopt weight-related lifestyle behaviour changes by sex, age, race/ethnicity and weight status and (2) determine if there were differences in the adoption of HCPs' recommendations by sex, age, race/ethnicity and weight status.

METHOD

This study was a cross-sectional analysis of four cycles of the National Health and Nutrition Examination Survey (NHANES) data (2011–2018). NHANES uses a multistage, probability sampling to identify a sample that represent the US civilian, non-institutionalised population. See online supplemental figure 1) for the study's conceptual model. The analytical sample for the current study was limited to respondents aged 18 and older with a body mass index (BMI) of 25 kg/m^2 or higher who reported seeing an HCP (excluding hospital stays, emergency room and home visits and telephone calls) at least once in the 12 months prior to data collection. Of the 39 156 NHANES respondents, 13 158 were eligible based on our inclusion criteria and have been included in the analysis for the present study.

Patient and public involvement

Patients and the public were not involved in the design, conduct, reporting or dissemination plans of this study as the study is a secondary analysis of publicly available data.

Measures

Receipt of HCP counselling

Three items assessed receipt of HCP counselling for weight loss and lifestyle behaviours. As part of the medical conditions survey, respondents reported (yes, no) whether a doctor or health professional in the past 12 months had recommended that they: (1) control/lose weight, (2) increase exercise/PA and (3) reduce fat/calorie intake to lower their risk for certain diseases.[22]

Action on HCP counsellingns

Respondents who reported receiving HCP counselling for weight loss/control or lifestyle behaviours reported (yes, no) if they were: (1) trying to control/lose weight, (2) increase exercise/PA and (3) control fat/calorie intake to reduce their risk for certain diseases.[22]

Covariates

Covariates were selected based on the available literature and the focus of the paper and included weight status, age, sex, race/ethnicity, PA and income to poverty ratio (PIR). BMI was calculated using height and weight measured by trained NHANES staff (20). BMI was then used to determine weight status (overweight (25–29.9 kg/m^2) or obese (≥30 kg/m^2)).[23] Respondents also reported their age, sex, race/ethnicity (White, Black, Hispanic (Mexican-American and other Hispanic), other), education (high school diploma or less, some college, college degree or above) and smoking status (never, former, current). For analysis, age was categorised and used to create the following groups: younger adults (aged 18–39), middle-aged adults (aged 40–64) and older adults (65 years of age or older). Family income and family size were used to calculate the PIR, the ratio of family income to the federal poverty level,[22] which was then dichotomised to at/above or below the poverty level.

Self-reported PA was measured using the Global Physical Activity Questionnaire, a 16-item instrument that assesses frequency and duration of work-related, travel-related and leisure time PA.[24] A score was calculated for each PA category and scores were summed to calculate daily minutes of moderate to vigorous PA.[24] Participants were then classified as to whether they met the current aerobic PA recommendation (yes vs no) using the US Department of Health and Human Services' recommendation of at least 150 min/week of moderate or 75 min/week vigorous intensity PA or an equivalent combination of both.[25]

Statistical analyses

Based on the NHANES Analytic Guideline for sample weights selection and construction when using multiple NHANES survey cycles,[26] the NHANES mobile examination centre exam 8-year weights were used for all analyses in an effort to address complex survey design. Descriptive results were assessed with means±SE being calculated for continuous variables and frequencies and weight proportions (n (weighted %)) for categorical variables. P values were obtained by performing linear regression and logistic regression analyses for categorical and continues variables, respectively. Weighted multivariate logistic regression models were used to calculate adjusted odds ratios (ORs) and 95% CIs, and to determine if there were differences in being advised by HCPs to: (1) control/lose weight, (2) increase exercise/PA and (3) reduce fat/calorie intake, by sex, race/ethnicity, age group and weight status. The models were adjusted for age, sex, education, BMI, PIR, smoking status and PA, with covariates being added to the model simultaneously. Similarly, weighted multivariate logistic regression models, also adjusted for age, sex, education level, BMI, PIR, smoking status and PA, were constructed to examine differences in reported action on HCP counselling by sex, age, race/ethnicity and weight status among respondents who reported being offered the corresponding behaviour counselling. Respondents with missing data on key variables were excluded from the analysis. All analyses were conducted using SAS V.9.4 (SAS Institute Inc., Cary, NC) with $p<0.05$ set a priori for statistical significance.

RESULTS

The analytic sample included 13 158 respondents. The average age for respondents was 49.8 years, and 53.1% were women, 36.0% had a high school education or less, 45.0% were overweight and 55.0% had obesity. Furthermore, 58.1% of respondents were classified as meeting the current aerobic PA recommendation. There were statistically significant differences between racial/ethnic groups regarding percentage of men, educational attainment and household income (see table 1).

Receipt of HCP counselling

The percentage of respondents who reported receiving HCP counselling to control/lose weight, increase exercise/PA and reduce fat/calorie intake was 40.4%, 49.5% and 38.9%, respectively (see figure 1 and online supplemental table 1). In total, 19.6% of overweight individuals and 57.5% of individuals with obesity reported receiving HCP counselling to control/lose weight in the previous 12 months. As shown in table 2, women were more likely than men to report being counselled to control/lose weight (OR=1.21, 95% CI: 1.10, 1.32), increase exercise/PA (OR=1.34, 95% CI: 1.22, 1.46) and reduce fact/calorie intake (OR=1.13, 95% CI: 1.00, 1.27).

Differences in HCP counselling by age were identified. Middle-aged adults (aged 40–64) were more likely than younger adults (aged 18–39) to receive HCP counselling to control/lose weight (OR=1.72, 95% CI: 1.53, 1.93), increase exercise/PA (OR=1.71, 95% CI: 1.49, 1.97) and reduce fat/calorie intake (OR=2.00, 95% CI: 1.76, 2.28). A similar pattern was observed between younger and older adults (aged 65+), with older adults having an increased likelihood of being advised to control/lose weight, increase exercise/PA and reduce fat/calorie intake (see table 2).

Additionally, differences in counselling by race/ethnicity and weight status were identified. Black respondents were more likely than White respondents to report being advised to control/lose weight (OR=1.26, 95% CI: 1.11, 1.44), increase exercise/PA (OR=1.25, 95% CI: 1.10, 1.43) and reduce fat/calorie intake (OR=1.49, 95% CI: 1.29, 1.71). Hispanic respondents were more likely than White respondents to be receive counselling as were individuals with obesity (see table 2).

Reported action on HCPs' recommendations

Approximately half of respondents who received counselling from their HCPs to control/lose weight and/or change their behaviours reported that they acted on these recommendations (see figure 2 and online supplemental table 2). More specifically, among those who received counselling, 53.6% reported that they had controlled/

Table 1 Characteristics of respondents aged 18+ by weight status, and differences by weight status NHANES 2011–2018 (n=13 158)

Variables	Total (n=13 158) n (weighted %)	Overweight (n=5876,45.0%) n (weighted %)	Obese (n=7282,55.0%) n (weighted %)	P value
Sex				
Male	6015 (46.9)	3055 (51.4)	2960 (43.2)	<0.001*
Female	7143 (53.1)	2821 (48.6)	4322 (56.8)	<0.001*
Age (years)	49.8±0.3	50.1±0.4	49.5±0.3	0.119
18–39	3821 (30.7)	1718 (31.3)	2103 (30.2)	0.351
40–64	5849 (47.1)	2440 (44.6)	3409 (49.1)	0.001*
65+	3488 (22.2)	1718 (24.2)	1770 (20.6)	0.001*
Education level				
High school diploma or less	5593 (36.0)	2422 (34.0)	3171 (37.7)	<0.001*
Some college or more	7149 (64.0)	3243 (66.0)	3906 (62.3)	<0.001*
Race/ethnicity				
White	5002 (66.3)	2279 (67.8)	2723 (65.1)	0.02*
Black	3327 (12.3)	1208 (9.6)	2119 (14.5)	<0.001*
Hispanic	3293 (14.5)	1437 (14.0)	1856 (14.8)	0.135
Other	1536 (6.9)	952 (8.6)	584 (5.5)	<0.001*
PIR≥1.0	9297 (86.2)	4216 (87.5)	5081 (85.2)	0.003*
Smoking status				
Never smoked	7525 (56.5)	3376 (57.3)	4149 (55.8)	0.269
Formerly smoked	3361 (27.4)	1465 (26.4)	1896 (28.1)	0.135
Currently smoke	2161 (16.1)	977 (16.3)	1184 (16.0)	0.786
BMI (kg/m^2), mean (SE)	32.2±0.1	27.4±0.0	36.2±0.1	<0.001*
Met PA recommendation,‡ n	6588 (58.1)	3077 (62.5)	3511 (54.4)	<0.001*

Overweight=BMI of 25.0–29.9 kg/m^2; Obesity=BMI of 30+ kg/m^2. Data are presented as weighted mean±SE for continuous variables and frequencies and weight proportions for categorical variables.
*p<0.05.
‡PA recommendation=at least 150 min/week of moderate or 75 min/week vigorous intensity PA, or an equivalent combination of both.
BMI, body mass index; NHANES, National Health and Nutrition Examination Survey; PA, physical activity; PIR, ratio of family income to poverty.

lost weight, 57.3% said that they increased exercise/PA and 51.8% indicated they had reduced fat/calorie intake.

Women were more likely than men to report adopting the recommendation to increase exercise/PA (OR=1.43, 95% CI: 1.21, 1.67). There was, however, no statistically significant difference between men and women in reported efforts to control/lose weight or reduce fat/calorie intake. Middle-aged (OR=0.83, 95% CI: 0.71, 0.98) and older adults (OR=0.66, 95% CI: 0.54, 0.81) were less likely to report increasing exercise/PA than younger adults, but were more likely to report reducing fat/calorie intake than younger adults (middle-aged: (OR=1.49, 95% CI: 1.27, 1.74); older adults (OR=1.37, 95% CI: 1.10, 1.71)).

As shown in table 3, there were differences in the adoption of HCPs' recommendations by race/ethnicity and weight status. Black respondents were more likely than White respondents to report adopting HCPs' recommendations (control/lose weight (OR=1.23, 95% CI: 1.08, 1.40), increase exercise/PA (OR=1.34, 95% CI: 1.14, 1.57) and reduce fat/calorie intake (OR=1.44, 95% CI: 1.25, 1.66)). Hispanic respondents were also more likely than White respondents to report adopting the recommendation to control/lose weight and to reduce fat/calorie intake. There was no difference between Hispanic and White respondents in terms of reported efforts to increase exercise/PA. Furthermore, respondents classified as having obesity were more likely to adopt HCPs' recommendations than respondents who were overweight.

DISCUSSION

In this nationally representative sample of adults aged 18+ who were overweight or had obesity, 19.6% of overweight individuals and 57.5% of individuals with obesity reported receiving HCP counselling to control or lose weight in the previous 12 months. These findings align somewhat with prior studies.[8 9] For example, 44% of respondents

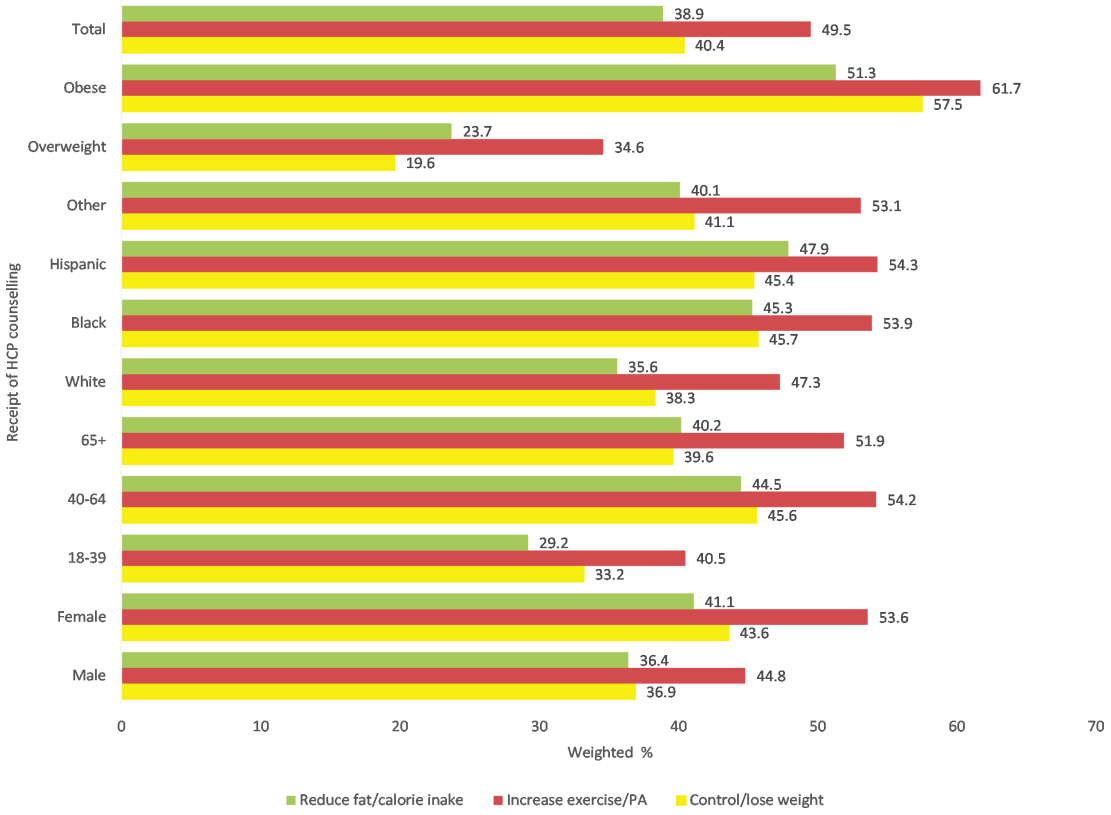

Figure 1 Receipt of healthcare provider (HCP) counselling by sex, age, race/ethnicity and weight status (n=13 158). Note: PA = physical activity.

with obesity were advised by HCPs to lose weight in 1994; this decreased to 40% in 2000.[9] More recently, Lorts and Ohri-Vachaspati found that 42% of those with a BMI of 30.0–39.9 kg/m^2 and 63% of those with a BMI ≧40 kg/m^2 were advised by their HCPs to lose weight.[8] While the percentage of individuals with obesity counselled to lose/control weight found in the current study is encouraging, it is concerning that only 19.6% of individuals who were overweight received this advice. The health risks associated with overweight are well documented, and there is evidence to support that being overweight increases one's risk for developing obesity.[2] It is not clear why individuals who were overweight were not counselled to lose/control weight: however, it is possible that the HCPs do not view being overweight as problematic as being obese.[27]

In the current study, 61.7% of respondents with obesity were advised to increase exercise/PA. An analysis of data from the 2010 NHIS data determined that 30.5% of overweight and 46.9% of respondents with obesity had received similar advice.[16] The increase in HCP counselling may be due to increased knowledge among HCPs about the importance of PA for prevention of a growing number of health conditions and/or the recent release of the second edition of the Physical Activity Guidelines for Americans,[25] which aims to increase the ease of relaying public health recommendations for PA. Although the present study found that a greater percentage of patients received HCP counselling to increase exercise/PA than prior work,[16] more patients should have received this advice, as only 58.1% were meeting the current aerobic PA recommendation based on self-reported activity levels.

Results of the current study indicate that HCPs were more likely to counsel patients to increase exercise/PA over reducing caloric/fat intake and/or controlling/losing weight. Only 38.9% of respondents reported being advised to reduce fat/calorie intake (23.7% of respondents with overweight, 51.3% of respondents with obesity), which is similar to,[10] and greater than rates found in prior studies.[7 28] It is possible that HCPs offer recommendations to increase exercise/PA over weight control/loss, as they may be hesitant to discuss body weight with patients due the potentially sensitive nature of this topic.[29] Additionally, HCPs may not provide nutrition counselling due a lack of training, low self-efficacy to provide this counselling,[30] and limited time.[31] Future research could explore why dietary changes are not being regularly recommended.

The current study identified gender differences in the receipt of HCP counselling, with a greater percentage of women than men being advised to control/lose weight, increase exercise/PA and reduce fat/calorie intake. This finding confirms prior research.[8 10 16] It is possible that HCPs perceive women as being more receptive than men to weight loss-related recommendations and advice. Additionally, women visit HCPs more often[32] and as a result may have developed a more trusting relationship with their HCPs, allowing for more sensitive conversations about weight-related topics.

Table 2 Comparative ORs of receipt of healthcare provider (HCP) counselling by sex, age, race/ethnicity and weight status (n=13 158)

	HCP counselling to					
	Control/lose weight		Increase exercise/PA		Reduce fat/calorie intake	
	Adjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Sex		<0.001*		<0.001*		0.048*
Male	Ref		Ref		Ref	
Female	1.21 (1.10 to 1.32)		1.34 (1.22 to 1.46)		1.13 (1.00 to 1.27)	
Age (years)		<0.001*		<0.001*		<0.001*
18–39	Ref		Ref		Ref	
40–64	1.72 (1.53 to 1.93)		1.71 (1.49 to 1.97)		2.00 (1.76 to 2.28)	
65+	1.48 (1.27 to 1.71)		1.65 (1.39 to 1.96)		1.85 (1.55 to 2.20)	
Race/ethnicity		<0.001*		<0.001*		<0.001*
White	Ref		Ref		Ref	
Black	1.26 (1.11 to 1.44)		1.25 (1.10 to 1.43)		1.49 (1.29 to 1.71)	
Hispanic	1.55 (1.34 to 1.80)		1.54 (1.32 to 1.79)		1.90 (1.61 to 2.25)	
Other	1.42 (1.15 to 1.75)		1.52 (1.22 to 1.90)		1.47 (1.21 to 1.80)	
Weight status		<0.001*		<0.001*		<0.001*
Overweight	Ref		Ref		Ref	
Obese	5.56 (4.87 to 6.34)		3.00 (2.59 to 3.47)		3.35 (2.97 to 3.79)	

Overweight=BMI of 25.0–29.9 kg/m^2; Obesity=BMI of 30+ kg/m^2. Adjusted odds ratios (ORs) were obtained by performing multivariate PROC SURVEYLOGISTIC procedure, adjusted for all the variables in the table, and education level, PIR (ratio of family income to poverty), smoking status and physical activity.
*p<0.05.
BMI, body mass index; PA, physical activity.

Age also may be a factor of consideration affecting HCPs' decisions to recommend lifestyle changes related to weight loss. In the current study, younger adults were less likely than middle-aged or older adults to received HCP counselling. This finding corresponds with prior research,[10 16 33–35] and warrants concern, as the adoption of healthy lifestyle behaviours earlier in life may help reduce their risk of developing chronic conditions associated with overweight and obesity.[36] Intentional weight loss by older adults with obesity is associated with improved cardiovascular health, reduced inflammation and improved health-related quality of life, while being overweight may offer protection against wasting and other related disorders among older adults, especially the oldest old.[37 38] These contrasting effects of excess weight can be confusing to HCPs and patients, and may contribute to the current rates of weight loss-related counselling associated with HCP visits. Additional research is needed to understand why HCPs are less likely to advise younger adults to lose weight.

The current study also identified differences in HCP counselling by race/ethnicity. Black and Hispanic respondents were more likely than White respondents to report receiving HCP counselling. Analysis of 2010 NHIS data found that Hispanic and Black respondents were less likely to receive diet-related advice from HCPs than White respondents; however, the 2011 data determined that Hispanic and Black respondents were more likely than Whites respondents to receive this advice.[10] Reasons for these increase could be heighted awareness among by HCPs that overweight and obesity rates are higher among Blacks and Hispanics than Whites, as recent data from the National Center for Health Statistics reported that Hispanics (47.0%) and non-Hispanic Blacks (46.8%) had the highest prevalence of obesity, followed by non-Hispanic Whites (37.9%) and non-Hispanic Asians (12.7%).[39]

Additional research is needed to understand why HCPs do not offer counselling to more patients with overweight and obesity. While time constraints, limited training on counselling, and low self-efficacy may serve as barriers,[40–45] recently, it has been noted that medical schools in the USA are not adequately preparing physicians to manage patients with obesity.[46] Initial training and continuing education for HCPs should address these issues in a more comprehensive manner and help HCPs recognise the need for increased counselling related to weight loss and weight-related behaviours. HCPs may also need training on identifying patients who are overweight,[47 48] and recognising possible bias they may have regarding treatment for obesity as being ineffective.[49] It has been recommended that HCPs have an open discussion with their patients' about their personal health concerns, factors affecting their health status, and discuss the risks

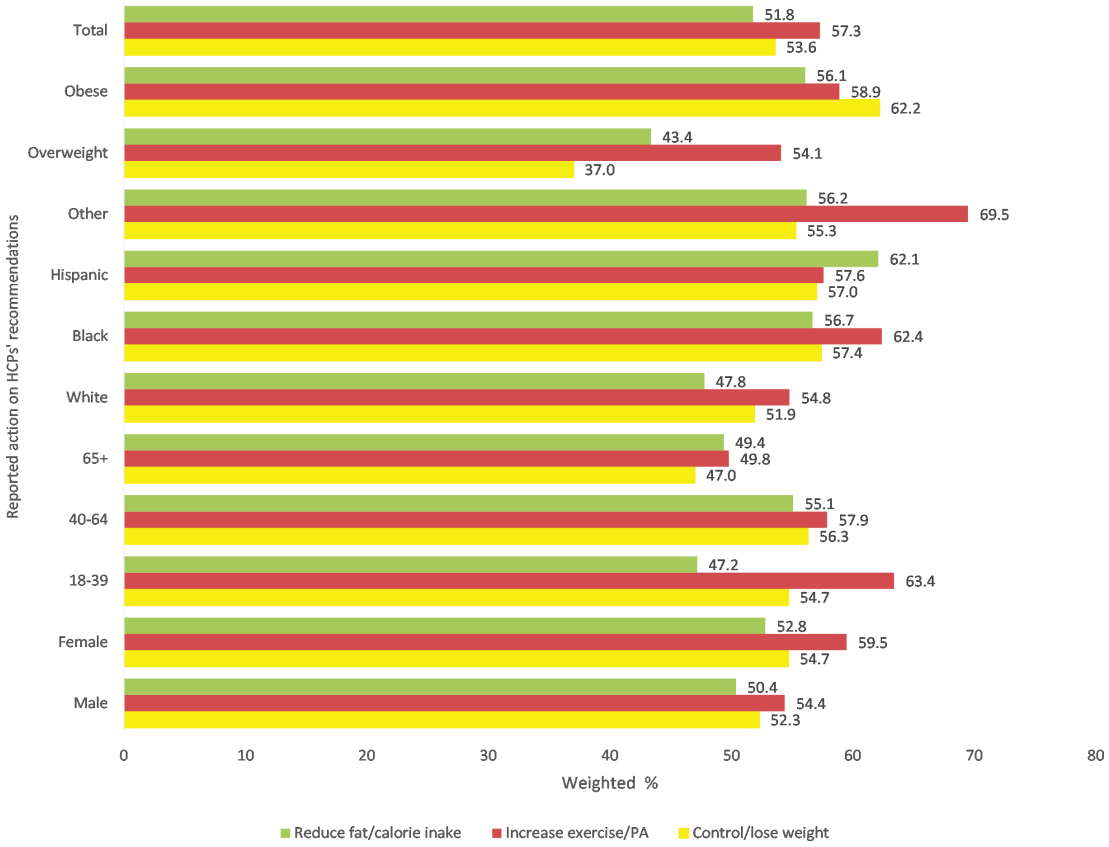

Figure 2 Reported action on healthcare providers' (HCPs') recommendations by sex, age, race/ethnicity and weight status (n=8458). Note: PA = physical activity.

associated with overweight/obesity before addressing the patient's weight status.[50] The use of PA as a vital sign has been recommended.[40] This clinical tool encourages HCPs to ask patients about their PA habits at each visit and allows for tracking of PA levels by incorporating results into electronic medical records. This would make the discussion about PA easier and more likely to occur.

In addition to examining the receipt of HCP counselling, the current study explored whether respondents who were counselled by HCPs acted on the offered advice. Between 51.8% and 57.3% of participants who received HCP counselling reported taking action on the offered advice (control/lose weight, increasing exercise/PA and/or reducing fat/calorie intake). These numbers are encouraging and support the idea that HCP counselling is valuable in promoting behaviour change. Women were more likely than men to reported increasing exercise/PA, but no other gender differences were identified in the adoption of the other recommendations. Differences in reported action by age also were identified, with middle-aged adults and older adults being less likely to report that they had increased exercise/PA and more likely to say they had limited fat/calories than younger adults. This finding suggests that HCPs should discuss the importance of healthful behaviours across the lifespan and may need to help middle-aged and older adults incorporate PA into their life. It is possible that some PA advice offered by HCPs does not resonate with older adults (eg, join a gym) or that older adults may have lower self-efficacy to be physically active, supporting the idea that PA advice needs to be personalised.

The present study also found differences in reported adoption of recommendations by race/ethnicity and weight status. Black and Hispanic respondents were more likely than White respondents to report they had adopted advice to control/lose weight, limit fat/calories and/or increase exercise/PA. Respondents with obesity were more likely to adopt the recommendations than overweight respondents. It is possible the individuals with obesity were motivated to adopt offered recommendations due to a heightened awareness of health risks associated with obesity or that HCPs offer individuals with obesity more thorough counselling than what is offered to respondents who are overweight. These finding indicate HCPs should continue to recommend that patients with obesity control/lose weight, increase exercise/PA and reduce fat and calorie intake, as these recommendations seem to be considered and adopted.

HCPs should provide patients with appropriate referrals. A study determined that adults with obesity who were randomised to receive a referral from their primary care provider to weight loss treatment were more likely to initiate treatment than those randomised to usual care.[51] The American College of Sports Medicine encourages primary care physicians to include PA as part of integrative treatment plans by assessing PA at every healthcare

Table 3 Comparative ORs of reported action on healthcare providers' (HCPs') recommendations by sex, age, race/ethnicity and weight status (n=8458)

	Reported action					
	Controlled/lost weight as advised		Increased exercise/PA as advised		Reduced fat/calories intake as advised	
	Adjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Sex		0.266		<0.001*		0.166
Male	Ref		Ref		Ref	
Female	1.09 (0.93 to 1.27)		1.43 (1.21 to 1.67)		1.11 (0.96 to 1.28)	
Age (years)		0.027*		<0.001*		<0.001*
18–39	Ref		Ref		Ref	
40–64	1.14 (0.98 to 1.33)		0.83 (0.71 to 0.98)		1.49 (1.27 to 1.74)	
65+	0.90 (0.76 to 1.06)		0.66 (0.54 to 0.81)		1.37 (1.10 to 1.71)	
Race/ethnicity		0.001*		<0.001*		<0.001*
White	Ref		Ref		Ref	
Black	1.23 (1.08 to 1.40)		1.34 (1.14 to 1.57)		1.44 (1.25 to 1.66)	
Hispanic	1.32 (1.13 to 1.55)		1.12 (0.94 to 1.33)		1.91 (1.61 to 2.27)	
Other	1.22 (0.94 to 1.59)		1.86 (1.35 to 2.56)		1.48 (1.16 to 1.88)	
Weight status		<0.001*		0.039*		<0.001*
Overweight	Ref		Ref		Ref	
Obese	2.78 (2.38 to 3.25)		1.18 (1.01 to 1.39)		1.68 (1.45 to 1.94)	

Overweight=BMI of 25.0–29.9 kg/m^2; Obesity=BMI of 30+ kg/m^2. Adjusted odds ratios (ORs) were obtained by performing multivariate PROC SURVEYLOGISTIC procedure, adjusted for all the variables in the table, and education level, PIR (ratio of family income to poverty), smoking status and physical activity.
**p<0.05.
BMI, body mass index; PA, physical activity.

encounter, and providing patients with exercise 'prescriptions' or referrals.[52] Relatedly, a recent study found that only 10.9% of adults with overweight/obesity who were advised to lose weight sought help from health professionals.[53] HCPs also should discuss evidence-based strategies for behaviour change such as self-monitoring,[54] using SMART (specific, measurable, attainable, relevant and timely) goals,[54] and seeking social support[55] for their behaviour change efforts.

Study findings should be considered in light of study limitations, which include the cross-sectional study design and the use of self-reported data assessing receipt of HCP counselling, reported actions on HCPs' recommendations and PA levels. Furthermore, the NHANES data set does not provide details about the scope and frequency of HCP counselling. Future research could use qualitative research or mixed methods to explore both patients' and HCPS' perspectives about HCP counselling and adoption of HCPs' recommendation in depth while longitudinal studies using objective measures could determine if the adoption of HCP recommendations resulted in increased PA, changes in diet and weight loss. Lastly, it is possible that there is response bias for the reported adoption of HCPs' recommendations. Study strengths include examining three different recommendations and adoption of these recommendations, although the recommendation assessing calorie/fat intake did not assess type of fat (saturated, unsaturated). Additional study strengths include a large sample size and use of a national data set that included measured height and weight which was used to determine weight status. Study results are generalisable to non-institutionalised civilian adults aged 18+ in the US due to the NHANES' sampling frame.

Conclusion

The results of this analysis highlight several important aspects of recommendations for weight management, PA and diet among adults in the US who are overweight or have obesity. First, there is a need for more patients who are overweight or have obesity to receive HCP counselling related to losing/controlling weight, increasing exercise/PA and changing caloric and fat intake. Additionally, there is a need for HCPs to provide counselling to individuals who are overweight to potentially decrease the likelihood for transitioning to obesity. HCPs likely need additional training on how best to address behaviour change with patients. As differences in HCP counselling were identified by sex, age and race/ethnicity, there is a critical need to address these differences. Since many patients did not take action on HCPs' recommendations, efforts should be undertaken to increase adoption of offered recommendations. These efforts could include HCPs discussing evidence-based strategies for behaviour change with patients and providing patients with appropriate referrals to promote increased adoption of offered recommendations.

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