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Impact of weight-related advice from healthcare professionals on body mass index of patients in the USA

H-Y. Yang^{a,b}, H-J. Chen^{b,c}, Y-J. Hsu^{d,e}, L.J. Cheskin^{b,f}, and Y. Wang^{b,f,g,*}

^aDepartment of Nursing, Mackay Medical College, Taipei, Taiwan

^bJohns Hopkins Global Center on Childhood Obesity, Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

^cInstitute of Public Health and Department of Public Health, School of Medicine, National Yang-Ming University, Taipei, Taiwan

^dDepartment of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

^eInstitute of Hospital and Health Care Administration, School of Medicine, National Yang-Ming University, Taipei, Taiwan

^fJohns Hopkins Weight Management Center, Department of Health, Behavior & Society, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

^gFisher Institute of Health and Well-Being, Ball State University, Muncie, IN, USA

Abstract

Objectives—Healthcare professionals (HCPs) can help promote healthy eating and active living in patients. This study assessed the effects of weight-related advice from HCPs on change in body mass index (BMI) of patients in the USA.

Study design—A 1-year follow-up study of 20,002 adults who participated in a nationally representative survey between 2004 and 2008.

Methods—Using the 2004–2008 Medical Expenditure Panel Survey data, 1-year BMI and weight status changes were compared between patients who did and did not report receiving advice on exercise or on restricted intake of fat and cholesterol from their HCPs.

Results—Patients who received weight-related advice had a greater increase in BMI compared with those who did not receive weight-related advice. Stratified by the baseline weight status of

* Corresponding author. Address: Fisher Institute of Health and Well-Being, Ball State University, 2000 W. University Avenue, Muncie, IN 47306, USA. Tel.: +1 765 285 8121. youfawang@gmail.com (Y. Wang).

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Ethical approval

This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Competing interests

None declared.

patients (i.e. normal weight, overweight or obese), adverse direction of BMI change was only significantly associated with advice on exercise. Patients who received advice to exercise more were more likely to move to a higher weight status than remain at the same weight status, compared with patients who did not receive advice to exercise more.

Conclusion—This study did not find that weight-related advice from HCPs had a positive impact on BMI loss in patients. On the contrary, patients who reported receiving weight-related advice from HCPs had worse weight outcomes 1 year later than patients who did not report receiving weight-related advice. Further research is warranted to elucidate the role of weight-related advice from HCPs on lifestyle change, and obesity prevention and control.

Keywords

Obesity; Overweight; Health professional advice; Body mass index

Introduction

Obesity is a significant public health crisis in the USA.^{1–3} Approximately 70% of American adults are overweight or obese.¹ Overweight and obesity increase the risk of many chronic diseases, such as cardiovascular diseases, type 2 diabetes and cancers,^{4,5} and thus contribute to excess medical expenditure and mortality.^{6,7}

Recent literature reviews for describing best current practices for weight management and clinical guidelines recommended that healthcare professionals (HCPs) should identify patients who need to lose weight, and provide counselling, advice and treatments matched to the risk profiles of patients.^{8–10} Based on these guidelines, physicians should actively use prevention strategies for patients who would benefit from weight loss [e.g. communicating with patients about the risk of high body mass index (BMI) and waist circumference, directing and enhancing patients' attention to a lower-calorie diet and lifestyle change, and offering behavioural therapy to patients].^{8–10} Primary care professionals are appropriate channels to promote healthy eating and active living because they usually have contacts with patients, and may maintain an ongoing relationship with them. However, clinicians often do not address the issue with their obese patients, despite the fact that the diagnosis of obesity can be obvious.^{11–13} Previous studies showed that only 36–42% of US obese patients reported that they had ever received advice to lose weight from their HCPs,^{14–16} and the figure was 14–15% for overweight patients.^{15,17} Moreover, the provision of weight loss counselling was associated with other factors, such as the patient's socio-economic status, health conditions and physician characteristics.^{18–22}

Studies have suggested that weight loss advice from HCPs may improve the health behaviours of overweight and obese patients.²³ Patients who reported receiving such advice had greater intention to lose weight.^{14,17,21–25} Other studies have reported that weight-related counselling improved patients' understanding of obesity-associated health problems and the benefits of weight loss.²⁶ Patients who had been counselled had a stronger desire and readiness for weight loss.^{26,27} These patients also had enhanced willingness to change their diet or increase their physical activity.²⁸ A recent report based on the National Health

and Nutrition Examination Surveys showed an association between patients' recalled weight loss and their physician's discussion on weight status.²⁹

To the authors' knowledge, no previous study has examined the impact of weight advice or counselling from HCPs on prospective change in BMI of patients. Previous studies have mainly focused on the impact of weight loss advice (rather than specific advice regarding diet and exercise) on willingness to take actions and changes in behaviours.^{23,29} Given the recent clinical guidelines to emphasize the role of HCPs in advising and prescribing lifestyle interventions for overweight and obese patients, understanding the impact of this behavioural advice from HCPs related to weight control in the real-world primary care setting could inform future efforts and interventions to promote successful overweight/obesity management practices. This study investigated the influence of advice from HCPs on diet and exercise on 1-year change in BMI of US adult patients using nationally representative longitudinal data.

Methods

Data sources

This study used longitudinal data from the Panel 9 to Panel 11 (2004–2008) Medical Expenditure Panel Survey (MEPS) Household Components files. MEPS used a complex sampling design, incorporating stratification, clustering, multiple stages of selection and disproportionate sampling. The sampling framework provided a nationally representative sample of non-institutionalized US civilians.³⁰

For each panel, five rounds of interviews took place over a 2-year period. Respondents were questioned on topics such as their health status; demographic and socioeconomic characteristics; health insurance coverage; and use of, access to and satisfaction with healthcare providers and services. The current study used self-reported weight and height collected in Round 3 as baseline, and in Round 5 (1 year later) as a postadvice measure to evaluate the impact of weight-related advice. The authors could not assess the changes in eating and exercise by these patients as such data were not collected.

Study subjects

Non-pregnant adults (aged ≥ 18 years) who had visited a doctor's office or clinic at least once in the previous 12 months (excluding emergency visits) were included in this study. Patients with missing BMI at baseline ($n=489$) or at follow-up ($n=576$), patients with extreme BMI values (< 18.5 , $n=3$) and patients with extreme BMI changes (< -30 or $> +28$, $n=6$) were excluded. In addition, patients with BMI < 18.5 at baseline ($n=309$) were excluded because it is inappropriate to advise underweight patients to lose weight. The final study sample consisted of 20,002 subjects.

Study variables

Outcome variables—The two outcomes in this study were changes in BMI and changes in weight status (i.e. normal weight, overweight or obese) from baseline to follow-up. BMI

was calculated based on self-reported weight and height: $BMI = [\text{weight in pounds} / (\text{height in inches})^2] * 703$.³¹

Change in BMI was calculated as BMI at follow-up minus BMI at baseline. Weight status categories included normal weight (BMI < 24.9), overweight (BMI 25.0–29.9) and obesity (BMI ≥ 30.0). Changes in weight status included no change (remaining in the same category), moving upwards (e.g. changing from normal weight to overweight or obese, or changing from overweight to obese) and moving downwards (e.g. changing from obese to overweight, or from overweight or obese to normal weight).

Independent variables—At baseline, patients were asked to recall whether they had received weight-related advice from an HCP during the 12 months preceding the interview: ‘Has a doctor or other health professional ever advised (PERSON) to eat fewer fat or high-cholesterol foods?’ and ‘Has a doctor or other health professional ever advised (PERSON) to exercise more?’ The HCP could be a general doctor, a specialist doctor, a nurse practitioner, a physician’s assistant, a nurse or another health professional whom a patient would see for healthcare services. Those who reported receiving advice from HCPs were called ‘advice receivers’, and those who did not report receiving advice were called ‘non-receivers’.

Other covariates

All covariates were based on measures at baseline, including patient’s age, sex, race/ethnicity, language spoken/used at home (i.e. English, Spanish and other languages), BMI, moderate and vigorous physical activity, number of chronic diseases, self-rated health status (categorized into three groups: excellent/very good, good and fair/poor), usual source of care (yes/no), frequency of clinic visits in the past year, education level, employment status, health insurance type (categorized into three types: private, public and uninsured), current smoking status, residence location (Northeast, Midwest, South, West), living in a metropolitan statistical area, and the year of baseline interview. The following chronic conditions were considered based on respondents’ reports on utilizing medical services for these conditions: (1) diabetes mellitus; (2) lipid metabolism disorder; (3) essential hypertension, hypertension with complications and secondary hypertension; (4) acute myocardial infarction, coronary atherosclerosis and other heart diseases, and non-specific chest pain; (5) acute cerebrovascular disease, other cerebrovascular diseases and transient cerebral ischaemia; (6) cancers; (7) coma, stupor and brain damage; (8) paralysis; (9) gout and other crystal arthropathies; and (10) blindness. Thus, the number of chronic conditions ranged from 0 to 10.

Statistical analysis

All analyses were conducted using the `svy` commands in Stata Version 11.2 (StataCorp LP, College Station, TX, USA) to incorporate the MEPS longitudinal sampling weights and variance adjustment variables to provide nationally representative estimates.

First, the characteristics of advice receivers and non-receivers were examined. Student’s *t*-test or Pearson’s Chi-squared test was used to compare characteristics of patients who

received weight-related advice at baseline and those who did not. Second, linear regression models were fit to examine the relationship between advice from HCPs and change in BMI in patients during follow-up. Multinomial logistic regression models were fit to assess the associations between advice and weight status change, adjusted for potential confounding factors that may affect weight change, including patients' demographic characteristics, health condition and health-service-seeking behaviour (i.e. having a usual source of care, number of clinic visits).

Results

Characteristics of study subjects

Patients' characteristics differed between those who received diet and exercise advice and those who did not (Table 1). Compared with those who did not receive weight-related advice from HCPs (non-receivers), advice receivers were older, more likely to be men, non-Hispanic black or Hispanic groups, and overweight/obese. Moreover, advice receivers were less likely to rate their health as excellent or very good, and more likely to have a usual source of care. On average, the BMI of patients increased by 0.04 over the study year, and 82% of patients remained at the same weight status at follow-up.

Effect of weight-related advice from HCPs on change in BMI in patients

Table 2 shows the difference in 1-year BMI change between patients who did and did not recall receiving advice from their HCPs about restricting fat and cholesterol in their diet: 0.02 vs +0.09 (P -value from t -test=0.002). Regarding advice on exercise, the BMI change was 0.01 for patients who recalled receiving advice, and +0.09 for patients who did not recall receiving advice (P -value from t -test=0.003).

Stratified by baseline weight status, the data showed different directions of weight change for normal weight and overweight/obese patients (Table 2). In the normal weight group, advice receivers had a significantly greater BMI increment than non-receivers, while advice receivers in the overweight/obese group had a greater decrement in BMI change than overweight/obese non-receivers; however, the difference was not significant.

The results after adjustment for baseline covariates showed a different pattern (Table 3). Both diet and exercise advice were associated with positive BMI change (+0.1 for diet advice and +0.16 for exercise advice) in the analysis including all study subjects, suggesting either less weight loss or greater weight gain among advice receivers than among non-receivers. In normal weight patients, those who recalled receiving advice on exercise had a greater BMI increase (by 0.17) than those who did not recall receiving advice ($P=0.006$). In overweight and obese patients, the difference in BMI change associated with receiving advice on exercise was 0.14 ($P=0.022$).

Receiving advice on exercise was related to a 1.16 times higher relative odds of moving downwards in weight status than remaining at the same weight status [95% confidence interval (CI) 1.01–1.34], and a 1.19 times higher relative odds of moving upwards in weight status than remaining at the same weight status (95% CI 1.01–1.39, Table 4). Stratified by the baseline weight status of patients, advice on exercise was associated with greater

likelihood of an upwards shift in weight status than remaining at the same weight status (relative risk reduction 1.33, 95% CI 1.06–1.67). The greater odds of a downwards shift in weight status was associated with advice on exercise, but the odds ratios were not significant in the stratification analysis. Advice on fat and cholesterol restriction was not associated with a subsequent change in weight status.

Discussion

Previous studies have shown that patients who received weight loss advice from HCPs had a stronger intention to lose weight,^{26,27} or had a greater frequency of attempting to lose weight.^{14,17,21,25} Patients' recall of weight loss advice from HCPs was also associated with self-reported weight loss in the year preceding the interview.²⁹ The present study is among the first to examine the association between weight-related advice from HCPs (i.e. exercise and fat/cholesterol restriction) and subsequent BMI change in patients. Using US nationally representative longitudinal data collected from a large sample, the hypothesized impact of weight-related advice from HCPs was not seen in subsequent changes in BMI and weight status of patients during a 1-year follow-up. In contrast, weight-related advice was associated with an undesirable direction of BMI change, especially advice on exercise.

There are several reasons why this study did not find that weight-related advice had a desirable impact on the weight status of patients. First, accuracy of patient recall about receiving advice would depend on how often the advice or counselling was provided, how long ago the advice was given, and the effectiveness of the advice and clinical communication. HCP advice captured by the MEPS survey may not be sufficiently intensive to result in changes in BMI, as the literature has suggested that physician counselling with low to moderate intensity in the primary care setting is not enough to achieve clinically meaningful weight loss.³² Moreover, the time interval between the receipt of advice and change in BMI can be up to 2 years. If the effect of weight-related advice was short term, the long time lag may also explain the non-positive findings. The process of weight-related advice in clinical practice and the quality of counselling are important issues for future research to elucidate patients' lifestyle changes after they receive weight-related advice from HCPs. Second, how patients responded to such advice was unknown. Rebound in lifestyle modification is an example: although the patients follow the advice from HCPs, they may be unable to sustain the healthier lifestyle for a year, and may even have a worse lifestyle than before. One study in Finland found that people who made greater attempts to lose weight might subsequently gain more weight than those who did not make such attempts.³³ Achieving and sustaining weight loss, even a modest change, may require more than low-intensity advice or counselling.⁹ Third, HCPs preferentially advise patients at risk of chronic diseases to lose weight/exercise,^{11,15,17,25,34} but these less healthy patients are less likely to succeed in making these changes due to other competing health issues and reduced exercise capacity.³⁵ Furthermore, clinical advice was more likely to reach patients who would fail to lose weight or to maintain normal weight. This explanation is consistent with the findings that weight status of patients and weight-related behavioural interventions were more likely to be documented in medical records among patients whose BMI had increased.³⁶ Fourth, despite the prospective design, the 1-year follow-up may be subject to reverse causation. That is, patients who had experienced a continuous gain in BMI in the past several years

would be more likely to recall receiving weight-related advice at baseline, and to keep gaining weight in the following year. A large-scale intervention study is needed to evaluate the process of weight-related advice and the effectiveness of weight-related advice on weight control.

The recent guidelines for managing overweight and obesity in adults by the Obesity Society/American College of Cardiology/American Heart Association recommend lifestyle modification counselling for overweight/obese patients with risk factors.¹⁰ The guidelines also recommend that counselling should be applied to patients who are ready to change lifestyle, or the effect could be counterproductive.¹⁰ In particular, when the patients live in an environment that promotes overconsumption of energy-dense food and discourages an active lifestyle, the individual-based approach of clinical advice may not be successfully translated into improvement of healthy behaviours and weight status. The lack of positive effect of weight-related advice from HCPs on weight loss in patients found in this study may have painted a more negative picture of the potential impact of efforts to curb obesity than might occur with an accompanying effort to change the obesogenic environment, rather than relying solely on advice from HCPs.

Strengths and limitations

The major strength of this study is the large nationally representative sample. Second, the 1-year follow-up allowed the authors to ensure temporality between advice and subsequent change in BMI. Previous research has predominately been based on cross-sectional data or had a retrospective design. Third, previous studies often used telephone survey data from the Behavioral Risk Factor Surveillance System. The MEPS used face-to-face personal interviews for data collection, which contributed to a higher quality of data than telephone interviews.³⁷

The present study has several limitations. First, the details of the weight-related health advice during clinical encounters are unknown in this study. The recall of advice is based on a yes/no question. The authors were not able to assess the frequency or intensity of advice from HCPs. In addition, it was not possible to tell if the weight-related advice itself or other quality and process factors led to more weight gain or less weight loss. In addition, patients' self-report of receiving advice could be subject to recall errors. Recall errors might be associated with the individual characteristics of patients, such as weight status, chronic conditions and socio-economic status. As these individual characteristics are also associated with BMI change, these factors could confound the association between self-report advice from HCPs and BMI change. The statistical models adjusted for these factors in order to address this issue, although residual confounding might exist. The time interval between receiving weight-related advice from HCPs and the baseline interview could also affect the accuracy of self-report regarding receiving advice from HCPs. However, this time interval should not have been associated with future BMI change, and thus would not be expected to confound the results. Second, the advice that the patients recalled in this study may not necessarily have been given for weight loss. Although the present study cannot tease out the impact of advice for different purposes, it still demonstrates the overall impact of receiving advice. Third, weight and height were based on patients' self-report. Height may be over-

reported and weight under-reported.³⁸ This misreporting would underestimate BMI and the change in BMI, which might attenuate the estimated strength of associations. However, previous studies have suggested that there are no discernible differences between results based on self-reported and measured obesity data.^{38–40}

Conclusion

In conclusion, weight-related advice from HCPs was not associated with a greater decrease in BMI among US patients based on the MEPS national longitudinal survey data. This study is an interim assessment of weight-related advice from HCPs on weight outcomes of patients. Additional studies are needed to understand the process and quality of weight-related advice, and what barriers and facilitators in the environment could affect lifestyle improvement and weight status management in patients.

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Highlights

- Weight-related advice is not associated with body mass index loss one year later.
- Factors other than weight-related counseling may need to be considered as well.
- Future studies can focus on the process and quality of weight-related advice.

Characteristics of American adult patients between advice receivers and non-receivers, Medical Expenditure Panel Survey 2004–2008.

Table 1

	Received advice to restrict high-fat/cholesterol food ^a (<i>n</i> =19,844)		Received advice to exercise more ^a (<i>n</i> =19,863)	
	Yes %/mean (SE)	No %/mean (SE)	Yes %/mean (SE)	No %/mean (SE)
Age in years, mean	55.1 (0.2)	46.5 (0.3)	<i>d</i> 53.1 (0.2)	47.6 (0.3) <i>d</i>
Male sex, %	47.5 (0.5)	41.3 (0.5)	<i>d</i> 44.4 (0.5)	43.6 (0.5)
Race/ethnicity, %				
Non-Hispanic white	75.8 (0.7)	78.0 (0.6)	<i>c</i> 75.0 (0.7)	78.9 (0.6) <i>d</i>
Non-Hispanic black	10.3 (0.5)	9.2 (0.4)	10.9 (0.5)	8.6 (0.4)
Hispanic	8.4 (0.5)	7.3 (0.3)	8.2 (0.4)	7.4 (0.4)
Other	5.5 (0.4)	5.5 (0.3)	5.9 (0.4)	5.1 (0.3)
Weight status at baseline, %				
Normal weight	20.9 (0.5)	44.2 (0.6)	<i>d</i> 20.5 (0.5)	46.6 (0.6) <i>d</i>
Overweight	36.0 (0.6)	34.6 (0.5)	35.0 (0.6)	35.3 (0.6)
Obese	43.1 (0.6)	21.2 (0.5)	44.5 (0.6)	18.1 (0.5)
Self-rated health status, %				
Excellent/very good	38.0 (0.7)	55.3 (0.6)	<i>d</i> 38.7 (0.6)	56.1 (0.7) <i>d</i>
Good	38.4 (0.6)	30.1 (0.5)	38.7 (0.6)	29.2 (0.6)
Fair/poor	23.6 (0.5)	14.6 (0.4)	22.6 (0.5)	14.7 (0.4)
Having usual source of care, %	93.5 (0.4)	85.9 (0.4)	<i>d</i> 92.6 (0.4)	86.1 (0.4) <i>d</i>
Change in BMI from baseline to 1-year follow-up, mean	−0.02 (0.03)	0.09 (0.02)	<i>c</i> −0.01 (0.03)	0.09 (0.02) <i>c</i>

BMI, body mass index; SE, standard error.

^a Pearson's Chi-squared tests for categorical variables and *t*-tests for continuous variables.

^b *P*<0.05.

^c *P*<0.01.

^d *P*<0.001

Table 2

Crude 1-year changes in body mass index and weight status by patients' recall of advice from healthcare professionals on diet and exercise.

	Received advice to restrict high-fat/cholesterol food ^a (n=19,844)		Received advice to exercise more ^d (n=19,863)	
	Yes	No	Yes	No
All patients	Mean (SE) -0.02 (0.03)	Mean (SE) 0.09 (0.02)	Mean (SE) -0.01 (0.03)	Mean (SE) 0.09 (0.02)
Normal weight	0.44 (0.04)	0.32 (0.03)	0.47 (0.04)	0.31 (0.03)
Overweight or obese	-0.14 (0.04)	-0.09 (0.04)	-0.14 (0.03)	-0.09 (0.04)
Weight status change	% (SE)	% (SE)	% (SE)	% (SE)
Same	81.5 (0.5)	82.0 (0.4)	81.3 (0.4)	82.0 (0.4)
Downwards	9.5 (0.3)	8.7 (0.3)	9.8 (0.3)	8.5 (0.3)
Upwards	9.0 (0.4)	9.3 (0.3)	8.9 (0.3)	9.5 (0.3)

SE, standard error.

^a Pearson's Chi-squared tests for categorical variables and *t*-tests for continuous variables.

^b *P*<0.05.

^c *P*<0.01

Table 3

Influence of receiving advice from healthcare professionals on subsequent 1-year change in body mass index (BMI),^a by weight status.

	<i>n</i>	Received advice to restrict high-fat/cholesterol food ^b			Received advice to exercise more ^b		
		Coef.	SE	P-value	Coef.	SE	P-value
All patients	19,256	0.10	0.05	0.042	0.16	0.05	0.001
Normal weight	6108	0.11	0.06	0.068	0.17	0.06	0.006
Overweight or obese	13,148	0.08	0.06	0.221	0.14	0.06	0.022

^aBMI change is the difference in BMI from baseline to follow-up.

^bLinear regression adjusted patients' age, sex, race/ethnicity, language spoken/used at home, BMI at baseline, moderate and vigorous physical activity at baseline, number of chronic diseases, self-rated health status, having a usual source of care, frequency of clinic visits in past year, education level, employment status, insurance type, current smoking status, region, metropolitan statistical area and data collection year. Advice to restrict high-fat/cholesterol food and advice to exercise more were controlled in the models.

Table 4

Adjusted relative risk ratios (RRR) for 1-year change in weight status^a between advice receivers and non-receivers at baseline, by weight status.

	Received advice to restrict high fat/cholesterol food ^b	Received advice to exercise more ^b
	RRR (95% CI)	RRR (95% CI)
All patients		
Downwards vs remaining at the same weight status	1.00 (0.87–1.16)	1.16 (1.01–1.34)
Upwards vs remaining at the same weight status	1.17 (0.98–1.38)	1.19 (1.01–1.39)
Normal weight patients		
Downwards vs remaining at the same weight status	0.70 (0.30–1.66)	1.20 (0.57–2.53)
Upwards vs remaining at the same weight status	1.14 (0.90–1.45)	1.33 (1.06–1.67)
Overweight or obese patients		
Downwards vs remaining at the same weight status	0.99 (0.85–1.14)	1.06 (0.92–1.22)
Upwards vs remaining at the same weight status	1.04 (0.83–1.31)	1.23 (1.03–1.48)

BMI, body mass index.

^aBMI status change is weight status changed upwards or downwards, or remained the same (weight status: normal weight, overweight or obesity).

^bMultinomial logistic regression model patients' age, sex, race/ethnicity, language spoken/used at home, BMI at baseline, moderate and vigorous physical activity at baseline, number of chronic diseases, self-rated health status, having a usual source of care, frequency of clinic visits in past year, education level, employment status, insurance type, current smoking status, region, metropolitan statistical area and data collection year. Advice to restrict high-fat/cholesterol food and advice to exercise more were controlled in the models.