Assessing the Value of Weight Loss Among Primary Care Patients

Christina C. Wee, MD, MPH, Mary B. Hamel, MD, MPH, Roger B. Davis, ScD, Russell S. Phillips, MD

BACKGROUND: **Modest weight loss of 10% of baseline weight is beneficial and achievable for overweight and obese patients. However, whether primary care patients value modest weight loss is unclear.**

OBJECTIVE: **To quantify the value patients place on modest weight loss.**

DESIGN: **Cross-sectional telephone survey.**

SETTING: **Patients at a large hospital-based primary care practice.**

PARTICIPANTS: **Three hundred sixty-five primary care patients (60% response rate).**

MEASUREMENTS: **Utilities or value for weight loss estimated from willingness to risk death or trade time in exchange for losing different levels of weight (weight loss in pounds equivalent to a 5%, 10%, and 20% reduction in initial weight or to achieve a body mass index [BMI] of 25 kg/m^2) using the standard gamble and time tradeoff formats.**

RESULTS: **Of respondents, 15% of overweight (BMI, 25 to 29.9 kg/m^2) and 42% of obese patients (BMI ≥ 30 kg/m^2) believed they needed to lose more than 10% of their weight to derive any health benefits. However, 18% of overweight and 33% of obese patients were willing to risk death to lose 10% of their weight. Patients with higher BMI valued higher degrees of weight loss. Among the overall sample, the utilities derived using standard gamble were 0.95 for current weight, 0.96 for 5% weight loss, 0.97 for 10% weight loss, and 0.98 for 20% weight loss; among obese patients, utilities were 0.88, 0.91, 0.93, and 0.96, respectively. Utilities derived using time tradeoff were lower but correlated with utilities derived from standard gamble. Utilities did not vary by education, gender, race, having comorbidities, or smoking.**

CONCLUSIONS: **Many primary care patients value modest weight loss. The value placed on loss of 10% body weight among obese patients where utility improved from 0.88 to 0.93 is similar to recovery from major depression. Nevertheless, the majority of patients still do not highly value modest weight loss. Clinicians should emphasize the health benefits of modest weight loss when counseling about weight.**

KEY WORDS: **Obesity; weight loss; quality of life; utilities; standard gamble.**
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Received from the Division of General Medicine and Primary Care (CCW, MBH, RBD, RSP), Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, Mass.

Address correspondence and requests for reprints to Dr. Wee: Beth Israel Deaconess Medical Center, 330 Brookline Avenue, Rose 115, Boston, MA 02215 (e-mail: cweekuo@bidmc.harvard.edu).

Mounting evidence demonstrates that modest reductions in weight improve obesity-related risk factors and comorbidities.[1–4] A few studies also suggest weight loss improves quality of life.[5] Guidelines recommend that obese patients (body mass index [BMI] ≥ 30 kg/m^2) and overweight patients (BMI, 25 to < 30 kg/m^2) with weight-related health risks lose 10% of their baseline weight.[6] However, whether patients value such modest weight loss is unclear.

Prior studies suggest that patients frequently have unrealistic weight loss goals[7–9] and are often disappointed when their expectations are not met.[7,8] However, these studies are often conducted in populations actively seeking weight loss treatment at tertiary weight loss centers or convenience samples.[7–9] The views of such patients may not reflect those of patients seen in primary care.

There are several ways to measure the value patients attach to weight loss. In some studies, patients were asked directly how much weight they would like to lose or about their satisfaction with different levels of weight loss.[7–9] This approach, however, may be insensitive to capturing the modest value patients attach to small weight changes. Another method is to measure quality of life through health status measures such as the Medical Outcomes Study Short-Form Health Survey 36 (SF-36).[5,10] By measuring change in health status score with weight loss, one can infer the value associated with that weight change.

A third approach to measuring the quality of life or value associated with a certain weight is to examine what a person is willing to risk or give up to be at that weight.[11] This approach, called utility or preference assessment, has been used to quantify the quality of life of people living with different diseases.[11–15] The standard gamble technique, often considered the gold standard for utility measurement, begins by asking a person to choose between 2 hypothetical scenarios: the certainty of continued life at a person's current health state, or a gamble between a positive outcome such as a state of perfect health or a negative outcome, usually certain death. The probabilities of these 2 outcomes are varied until the person views living at the current state of health or taking the gamble as equivalent. This point of indifference is the value point. Hence, an overweight person willing to take a high risk of dying to lose a certain amount of weight is believed to place a high value on the lower weight and a low value on their current weight. Using the same rationale, a second technique, known as the time tradeoff, quantifies a person's preference for quality versus quantity of life. A person is asked how much time at their current health he or she is willing to trade in exchange for a shorter time spent in a more desired health state. The value for their current condition relative to the more desired state is determined by the amount of time alive a person is willing give up.

In this context, we adapted the standard gamble and time tradeoff techniques to describe the preferences that primary care patients have for different levels of weight and weight loss, specifically modest weight loss.

METHODS

Patient Selection and Recruitment

We conducted a telephone survey of patients from one large hospital-based primary care practice in Boston between November 2001 and June 2003. Patients age 18 and older were eligible if they spoke English, had an identifiable primary care physician (PCP) at the practice, and did not have conditions or serious medical illnesses that would prevent them from participating, such as hearing impairment, terminal illness, or dementia. Patients were also excluded if we did not have an accurate mailing address or working telephone number.

We randomly sampled 1,000 patients from an electronic list of over 24,000 patients who received clinical care at the practice within a 2-year period. We obtained PCP consent to approach patients by mail, followed by a telephone call. Patients could decline participation by returning a postage-paid postcard. Patients who completed the survey were eligible to participate in a lottery for four cash prizes of $100 each. From the sample of 1,000 patients, our recruitment process identified 395 patients who were ineligible: 163 did not have an accurate address or telephone number on record, 129 were either no longer a patient of the practice or did not have an identifiable PCP, 52 did not speak English, 25 were hearing impaired or mentally disabled, 18 were too ill to participate, and 8 were deceased. Of the remaining 605 eligible patients, physicians excluded 16 patients for unclear reasons, 140 patients declined participation, and 83 could not be reached by telephone. We made at least 10 attempts at telephone contact before patients were considered nonrespondents. The final sample of 366 patients who completed the survey represented a response rate of 60%. We excluded the responses from one respondent who did not seem to understand many key questions. Age, gender, and race were not significantly different between respondents and nonrespondents. The Institutional Review Board at Beth Israel Deaconess Medical Center approved all study procedures.

Data Collection

The telephone survey elicited patient demographics, self-reported height and weight, comorbid illnesses, perceived life expectancy, and health habits. We assessed overall quality of life using the SF-36.[10] We assessed patients' preferences for weight in several different ways. We first asked patients to report their "dream" weight ("if you could be any weight, how much would you most like to weigh?"), their "satisfied" weight ("what is the most you could weigh and still be satisfied?"), and the minimum weight loss required to achieve any health benefits ("in your opinion, what is the smallest amount of weight you would have to lose in order to achieve any health benefits?"). We also elicited patients' preferences for various degrees of weight loss using standard gamble and time tradeoff. In the standard gamble, we asked patients to imagine a treatment that would enable them to permanently lose a certain amount of weight in pounds equivalent to a 5%, 10%, and 20% lower weight, or a BMI of 25 kg/m^2 (described as "…to reach _ lbs, the highest healthy weight for someone of your height"); we described the treatment as one that did not require any effort and would not result in any side effects, but was associated with a small chance of death. We then asked participants to estimate the highest chance of death they were willing to accept to lose different levels of weight permanently. In time tradeoff questions, we asked patients to imagine that they had 10 years left to live at their current weight, or a shorter period at a lower weight. We then asked them how much they would be willing to give up or trade (days, months, years) in exchange for living the remaining time of their life at one of the different weights. Our rationale for asking participants to assume that they had 10 years to live was to prevent respondents from envisioning loss of years in the distant future when quality of life may be poorer and time valued less. In a subset of patients (n = 203), we also presented additional standard gamble scenarios where patients were told to assume that weight loss would not prolong their life expectancy, in order to examine whether perceived improvement in life expectancy associated with weight loss contributed to the value patients placed on weight loss.

Data Analysis

Using descriptive statistics, we examined the baseline characteristics and perceptions for health and weight overall and by weight category. Respondents were categorized as normal weight (BMI, 18.5 to 24.9 kg/m^2), overweight (BMI, 25.0 to 29.9 kg/m^2), and obese (BMI $\geq$ 30 kg/m^2).[6] Using the χ^2 statistic, we compared the proportion of respondents willing to risk death or trade time across weight category; we used McNemar's test to compare willingness to risk death versus trade time to lose weight. Using ordinal logistic regression models, we assessed for an association between willingness to accept a risk of death to achieve a 10% weight loss and several other factors: gender, race, education level, having an obesity-related medical condition, self-reported general health status, and smoking. Our outcome was categorized as unwilling to risk death, willing to accept a 1% to 5% risk, and willing to accept a greater than 5% risk.

To further quantify the value patients attached to modest weight loss, we calculated mean utility scores elicited by standard gamble (primary outcome) and time tradeoff. Based on patients' responses to the 4 hypothetical weight scenarios, we assigned the weight or weight loss most valued by each patient a utility value of 1.00. We then

calculated the utility of current weight relative to the most desired weight scenario. For example, a person whose most valued weight was a weight loss of 20% and who was willing to take a 10% chance of dying to achieve this weight would have a utility score of 1.00 for a 20% weight loss and 0.90 for their current weight. Because all weight scenarios are posed relative to patients' current weight, all other utilities are then calculated relative to the patient's current weight. In our above example, if a patient is unwilling to risk death to lose the equivalent of 5% of their baseline weight, their utility for a 5% weight loss is 0.90, the same as their utility for their current weight. If they are willing to take a 3% risk of death to lose 10% of their weight, then their utility is 0.90 divided by 0.97, or 0.93. Similarly, in calculating utilities using responses to time tradeoff scenarios, we used the proportion of time traded in place of the risk taken. Hence, a person willing to give up 1 year of their life in exchange for living the remaining 9 years at a 20% lower weight would have a utility score for their current weight of 0.90.

To test the validity of our utility measures, we computed the Pearson correlation between utilities for current weight assessed by the 2 approaches and the mental component (MCS) and physical component scales (PCS) of the SF-36. Among the subset of respondents who were asked standard gamble scenarios that assumed no life expectancy benefit with weight change, we compared utilities for current weight assessed using the standard gamble scenario assuming no life expectancy benefit with utilities assessed using time tradeoff.

For all analyses, *P* values less than .05 were considered statistically significant.

RESULTS

Patient Characteristics

Of the 365 patients we surveyed, 33% were overweight (BMI, 25.0 to 29.9 kg/m^2) and 27% were obese. Table 1 describes our sample overall and by weight category. Patients with a higher BMI were significantly older, more likely to have an obesity-related condition, and had lower scores for physical but not mental functioning. They were also more likely to perceive a lower life expectancy.

Perception of Weight and Weight Loss

The BMI equivalent to patients' "dream weight" and highest "satisfied" weight was significantly higher for obese patients than for normal weight and overweight patients (Table 2). When asked to estimate the weight they viewed as ideal, only 10% of normal weight patients reported a dream BMI in the overweight or obese weight range, whereas 36% of overweight and 65% of obese patients viewed their dream BMI as above 25 kg/m^2. Nevertheless, to attain different goal weights, overweight and obese patients would need to lose a larger percentage of their baseline weight (Table 2). To achieve any health benefits, 15% of overweight and 42% of obese patients believed that they needed to lose more than 10% of weight in order to derive any health benefits.

Value for Current Weight and Weight Loss

Willingness to risk death or trade time to lose weight significantly increased with higher BMI. Compared to

Table 1. Characteristics of Study Population

	Overall *N* = 365	Normal Weight *n* = 143	Overweight *n* = 121	Obese *n* = 100
Mean age, y*	49.0 ± 0.8	45.2 ± 1.3	50.7 ± 1.4	52.5 ± 1.5
Mean current BMI, kg/m^2	27.7 ± 0.4	21.8 ± 0.2	27.0 ± 0.1	37.0 ± 0.7
Gender: women, %*	65	73	48	74
Race: white, %*	69	80	71	52
Black	20	6	21	39
Hispanic	4	3	5	5
Other	7	12	3	4
Education: high school or less, %*	21	11	19	37
Some college	25	17	31	31
College graduate	54	72	50	33
Perceived remaining life expectancy, y*	35.4 ± 1.0	39.5 ± 1.6	33.1 ± 1.6	31.9 ± 1.8
Health status, %*				
Very good to excellent	51	76	45	24
Poor to fair	16	7	15	32
Smoker, %				
Current obesity-related conditions, %*†	13	13	17	9
At least 1 condition	64	40	75	84
SF-36: MCS, mean	52.4 ± 0.6	53.1 ± 0.8	52.7 ± 1.1	51.0 ± 1.2
PCS, mean*	45.2 ± 0.4	47.8 ± 0.6	45.4 ± 0.7	41.3 ± 0.9

* *Signifies a statistically significant relationship between characteristic and weight category at P < .05.*

† *Obesity-related conditions include self-reported coronary artery disease, hypertension, asthma, obstructive sleep apnea, hypercholesterolemia, and gastroesophageal reflux disease.*

BMI, body mass index; MCS, mental component scale of the SF-36; PCS, physical component scale of the SF-36.

Table 2. Weight Change as Percent of Baseline Weight Needed to Achieve Weight Goals

	Overall *N* = 365 (%)	Normal Weight *n* = 143 (%)	Overweight *n* = 121 (%)	Obese *n* = 100 (%)
"Dream" weight*	−12.1 ± 0.01	−3.1 ± 0.01	−10.1 ± 0.01	−27.7 ± 0.01
"Satisfied" weight*	−5.5 ± 0.01	+2.2 ± 0.01	−3.6 ± 0.01	−18.8 ± 0.01
BMI of 25 kg/m^2*	−4.7 ± 0.01	+15.6 ± 0.01	−7.1 ± 0.004	−30.6 ± 0.01
Minimum weight loss to achieve any health benefits*	−5.4 ± 0.3	−1.8 ± 0.3	−4.9 ± 0.4	−11.2 ± 0.7

* *P* < .001 for all comparisons across BMI category; BMI, body mass index.

4% of normal weight patients, 19% of overweight and 33% of obese patients were willing to risk death to lose 10% of their weight (Table 3). BMI was also significantly related to willingness to trade time to lose weight. Patients were significantly more likely to risk death than trade time to lose weight for all weight scenarios except to lose 5% of weight. Willingness to take higher risk did not vary by gender, race, education level, illness burden, or smoking status in our bivariable or adjusted analyses.

Patients' most desired weight scenario varied according to patient's BMI (Table 4). In the standard gamble, 69% of overweight and 53% of obese patients valued a weight that was higher than the weight equivalent to a BMI of 25 kg/m^2. Utilities assessed varied significantly across BMI (Table 4), but were not significantly different when participants assumed no benefit in life expectancy with weight loss. Utilities assessed by time tradeoff were higher (P < .001 for all weight scenarios) but significantly correlated with standard gamble utilities; the Pearson coefficient was 0.51 for current weight, 0.46 for 5% weight loss, 0.61 for 10% weight loss, 0.31 for 20% weight loss, and 0.61 to achieve a BMI of 25 kg/m^2. Utilities for current health correlated with physical and mental component scores of the SF-36; the respective Pearson coefficients were 0.24 (P < .0001) and 0.11 (P = .03) for utilities assessed by standard gamble and 0.19 (P = .0003) and 0.17 (P = .001) for utilities assessed by time tradeoff.

DISCUSSION

We found that 19% of overweight and 33% of obese primary care patients were willing to risk death to achieve weight losses of up to 10% of their current weight. Patients attached higher value, as measured through utility assessment, to higher degrees of weight loss. Patients who were heavier were also more likely to value weight loss. The value for weight loss did not vary by education, gender, race, having obesity-related conditions, or smoking. Utilities or value for current weight ascertained by standard gamble were generally lower than utilities assessed using time tradeoff; however, the two results were highly correlated.

Assessing the value patients place on modest weight loss is important because this level of weight loss is achievable with nonsurgical weight loss treatment[2,4] and improves health risk factors such as lipid levels, blood pressure, and glucose tolerance.[1–4] Prior studies in selected populations have found that patients have unrealistic weight loss expectations.[7–9] One study of 397 obese patients found that patients needed to lose 38% of their weight on average to achieve their "dream weight" and 25% to reach a weight

Table 3. Percentage of Patients Willing to Risk Death or Trade Time to Lose Weight

	Normal Weight		Overweight		Obese	
	Accept No More Than 1% to 5% Risk	Accept More Than 5% Risk	Accept No More Than 1% to 5% Risk	Accept More Than 5% Risk	Accept No More Than 1% to 5% Risk	Accept More Than 5% Risk
Weight loss						
5%	0.7	0.0	5.8	6.6	11.0	14.0
10%	2.1	1.4	7.4	11.6	12.0	21.0
20%	1.4	0.7	6.6	9.1	12.0	31.0
BMI, 25 kg/m^2	0.0	0.0	10.7	9.1	18.0	32.0
	Trade No More Than 5% of Remaining Life	**Trade More Than 5% of Remaining Life**	**Trade No More Than 5% of Remaining Life**	**Trade More Than 5% of Remaining Life**	**Trade No More Than 5% of Remaining Life**	**Trade More Than 5% of Remaining Life**
Weight loss						
5%	2.1	0.0	7.4	0.0	21.0	0.0
10%	2.1	0.0	8.3	0.0	22.0	0.0
20%	2.1	0.0	8.3	0.0	31.0	0.0
BMI, 25 kg/m^2	0.0	0.0	10.5	0.0	33.0	0.0

BMI, body mass index.

Table 4. Utilities for Weight as Assessed Using Standard Gamble and Time Tradeoff Techniques*

	All Patients	Normal Weight Patient	Overweight Patient	Obese Patient
Utilities for weight assessed by standard gamble				
Relative to most desired weight				
Current weight	0.95 ± 0.007	1.00 ± 0.004	0.95 ± 0.013	0.88 ± 0.021
5% weight loss	0.96 ± 0.006	1.00 ± 0.003	0.96 ± 0.012	0.91 ± 0.017
10% weight loss	0.97 ± 0.005	1.00 ± 0.002	0.98 ± 0.007	0.93 ± 0.015
20% weight loss	0.98 ± 0.004	1.00 ± 0.001	0.98 ± 0.006	0.96 ± 0.012
BMI, 25 kg/m^2	0.99 ± 0.004	1.00 ± 0.004	0.98 ± 0.010	0.98 ± 0.007
Utilities for weight assessed by time tradeoff				
Relative to most desired weight				
Current weight	0.99 ± 0.003	1.00 ± 0.001	0.99 ± 0.004	0.97 ± 0.008
5% weight loss	0.99 ± 0.002	1.00 ± 0.000	0.99 ± 0.003	0.97 ± 0.007
10% weight loss	0.99 ± 0.002	1.00 ± 0.001	0.99 ± 0.003	0.98 ± 0.007
20% weight loss	1.00 ± 0.001	1.00 ± 0.001	1.00 ± 0.002	0.99 ± 0.003
BMI, 25 kg/m^2	1.00 ± 0.001	1.00 ± 0.001	1.00 ± 0.001	1.00 ± 0.001

* *Utilities are calculated relative to the weight most desired by each patient from the 4 weight scenarios presented and is set at 1.0. Body weights with a lower utility score are less valuable to patients.*
BMI, body mass index.

that was "acceptable."[8] Our study suggests that obese patients seen in primary care also have unrealistic expectations, but to a lesser degree. Moreover, in our study, a third of obese patients were willing to risk death to lose 10% of their weight, and overweight patients had more achievable "dream" and "satisfied" weights as a percentage of baseline weight. This latter finding is consistent with results from a convenience sample of college students whose "acceptable" weights would have required a weight loss well below 10% of their weight.[17] These findings offer some optimism to primary care clinicians who may not counsel patients about obesity because they perceive patients are disinterested in treatments that offer less than substantial weight loss. On the other hand, the majority of obese patients do not value weight losses of 5% to 10% as measured through utility assessment, even though over half of obese patients understand that losing less than 10% of weight would result in health benefit.

Utility assessment may offer a sensitive alternative to rating scales and health status measures when evaluating weight-related preferences and quality of life. At least one study has shown that utilities improve with even modest reductions in BMI.[18] Among subjects participating in a weight loss trial, reduction in BMI by 1 unit was associated with a gain in utility score of 0.017.[18] Some studies[9] have respondents express their value for weight in monetary terms or in terms of other disease states; however, such methods are distinct from the traditional utility approach because they use reference standards such as wealth or health states that are not valued in the same way by all individuals. Utility theory posits that avoidance of death is valued universally; hence, like generic health status measures, utilities can be compared across different disease and health states.[12,13] The utility of 0.88 that patients assign to being obese in our study is similar to those reported by patients with laryngeal cancer and diabetes, and lower than for patients with clinical depression.[15,18] One large study of over 27,000 patients found that 20% of patients with depression were willing to risk death to recover from depression; the utility assessed by standard gamble for all patients with depression was 0.94 compared to a score of 1.00 for perfect health.[14,15] Hence, the value obese patients placed on a weight loss of 10%, where the utility improved from 0.88 to 0.93, is similar to recovery from depression among patients with clinical depression.[14,15]

Utilities also have the advantage of being inclusive of all facets of obesity and weight loss relevant to the preferences of individual patients. Body weight affects how people are treated in society.[19–21] Obese persons are discriminated against educationally, economically, in social relationships, and in health care[19–22]; these consequences may influence the value attached to weight loss. Several health status measures attempt to capture these domains by including questions related to sexual activity, social interaction, and general satisfaction with life.[23,24] By design, however, these instruments impose a proportional value to each domain, which may not be consistent with the priorities of individual patients. In our study, patients were free to consider all factors important to them when making value judgments about weight.

Using utility assessment poses many challenges, however. Unlike other health conditions where the desired state is often very clear, the desired weight varies among individuals. A large proportion of patients in our study reported a most desired weight that was higher than a BMI of 25 kg/m^2, a weight generally considered the highest optimal weight from a health risk perspective. Because utility assessments for other conditions have traditionally defined the reference state as one with "perfect health" rather than "perfect life" or "perfect health and weight," whether utilities assessed in our study are directly comparable to other studies and whether factors other than value for health should influence clinical and health policy decisions warrant discussion.

Patients were less likely to trade time than risk death to lose weight.[13] It is unlikely that this discrepancy is a result of patients being more likely to consider the health benefits of weight loss in the standard gamble than the time tradeoff because we found no significant differences in utilities whether or not the standard gamble scenarios assumed a life expectancy with weight loss. A likelier possibility is that the prospect of only having 10 years left to live in the time tradeoff scenario overwhelmed any consideration for the benefits of weight loss in this relatively young population.

Despite the challenges and limitations of measuring preferences about weight through utility assessment, such information has become increasingly important and is essential to valid cost-effectiveness analyses of medical interventions.[25] Limited data on the cost-effectiveness of interventions that result in modest weight loss may contribute to the poor reimbursement and implementation of obesity treatment in the United States.

Our study must be interpreted with caution, as respondents were selected from one hospital-based practice and results may not generalize elsewhere. Results are also all based on self-report and may be subject to bias. We also do not specify the potential "health benefits" that may be associated with weight loss in our questions and do not know which if any health benefits patients considered in placing a value to different body weights. Furthermore, the survey is cross-sectional and captures patients' preferences for weight loss hypothetically at one point in time and may not represent value for actual weight loss. Finally, we may not have had adequate power to detect modest differences in utilities across factors we examined.

In summary, our study suggests that modest weight loss is valued by many patients seen in primary care, particularly those who are obese. However, two thirds of obese patients still do not value modest weight loss in a way that is measurable by utility assessment. Primary care clinicians should emphasize the health benefits of modest weight loss when counseling about weight.

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