

Effect of Moderate Weight Loss on Health-Related Quality of Life: An Analysis of Combined Data From 4 Randomized Trials of Sibutramine vs Placebo

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Objectives: To determine whether (1) patients who experience greater weight loss also experience correspondingly greater improvements in health-related quality of life (HRQOL); (2) the improvement in HRQOL is noticeable for patients achieving moderate (5%-10%) weight reduction; and (3) the relationship between weight reduction and HRQOL is similar for patients receiving sibutramine hydrochloride vs placebo.

Study Design: We combined data from 4 double-blind, randomized, controlled trials of administration of sibutramine (20 mg/d) vs placebo.

Patients and Methods: Patients (n = 555) were mildly to moderately obese and had type 2 diabetes mellitus, dyslipidemia, or hypertension that was well controlled with an angiotensin-converting enzyme inhibitor or calcium channel blocker. The HRQOL was operationalized using the Impact of Weight on Quality of Life (IWQOL) and the Medical Outcomes Study 36-Question Short-Form (SF-36) instruments. The main statistical technique was a patient-level analysis of variance predicting change in HRQOL from study, treatment, and weight change.

Results: Moderate weight loss was associated with a statistically significant improvement in HRQOL for approximately half of the subscales evaluated ($P < .05$). The greatest sensitivity to change was shown by the SF-36 general health perception and change in health since last year subscales and the IWQOL overall health, mobility, and total subscales. Greater weight loss was associated with the most improvement in HRQOL. Weight losses of 5.01% to 10.00% were associated with 2-unit changes in the SF-36 general health perception subscale and 10-unit changes in the IWQOL total subscale. Results were similar across study and treatment.

Conclusions: Moderate weight loss is associated with noticeably improved HRQOL. Improvements in HRQOL are achievable by patients receiving sibutramine.

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For editorial comment, see page 926.

Almost 100 million adult Americans are overweight or obese, with excessive weight substantially increasing the risk of hypertension, type 2 diabetes mellitus, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, respiratory problems, endometrial cancer, breast cancer, prostate cancer, colon cancer, and all-cause mortality.^{1,2} Weight reduction, even in moderate amounts (eg, 5% to 10%), can decrease these risks.^{1,2}

Until recently, randomized trials of weight reduction treatments have focused almost exclusively on weight loss and other physical parameters (eg, blood pressure), with health-related quality of life (HRQOL) outcomes being comparatively little studied. From first principles, the net impact of weight reduction treatments on HRQOL could be either positive or negative. If an intervention successfully promotes weight loss, positive impacts could include improved mobility, greater vitality, and improved self-image. Regardless of weight change, negative impacts could include the emotional toll of dieting and other lifestyle factors and adverse effects of medication use. The balance between positive and negative impacts is likely to become particularly del-

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icate when weight reduction is moderate rather than dramatic.

The Food and Drug Administration now encourages clinical trials to include measures of HRQOL. Nevertheless, sample size calculations in trials are almost always based on weight loss, implying that the power to detect improvements in HRQOL will tend to be low. This lack of statistical power provides the rationale for combining information across trials via techniques such as meta-regression and meta-analysis.

Using patient-level data from 4 randomized trials of administration of sibutramine hydrochloride vs placebo, we created a single data set of patients who achieved varying degrees of weight loss. We then asked 3 questions: (1) Regardless of treatment, was weight loss associated with improved HRQOL? (2) Regardless of treatment, did patients who achieved moderate (5% to 10%) weight reduction achieve noticeable improvements in HRQOL? (3) Were these relationships between weight reduction and HRQOL similar for the sibutramine and placebo groups?

... METHODS ...

Trial Designs

The 4 trials under consideration were all multi-site, double-blind, randomized, controlled trials of the administration of sibutramine (20 mg/d) vs placebo in mildly to moderately obese patients.³⁻⁶ In brief, all trials recruited patients with a body mass index (calculated as weight in kilograms divided by the square of height in meters) of at least 27 (most patients had a body mass index of 27-40). Study A included 322 patients with dyslipidemia,³ study B

included 220 patients whose hypertension was well controlled with an angiotensin-converting enzyme inhibitor,⁴ study C included 224 patients whose hypertension was well controlled with a calcium channel blocker,⁵ and study D included 175 patients with type 2 diabetes mellitus.⁶ Patients were randomized to receive sibutramine or placebo in a 1:1 ratio in studies A and D and in a 2:1 ratio in studies B and C. All patients received minimal weight management counseling (consistent with standard office practice). Each study obtained informed consent from all participants and had institutional review board oversight.

Measurements of HRQOL were taken at weeks 0 (baseline), 12, and 24 for study A; at weeks 0, 8, 28, and 52 for studies B and C; and at weeks 0, 8, and 24 for study D. These schedules correspond to 3 intervals defined (before data analysis) relative to week 0 (baseline) as follows: short term is week 12 from study A and week 8 from studies B, C, and D; medium term is week 24 from studies A and D and week 28 from studies B and C; and long term is week 52 from studies B and C. Because long-term data were available from only 2 of the 4 studies, analyses of long-term data are less definitive than those of data for the short and medium term.

Instruments

Health-related quality of life was assessed using both generic and disease-specific approaches. The generic instrument was the Medical Outcomes Study 36-Question Short-Form (SF-36), which includes 8 individual subscales (physical function, physical role, emotional role, social function, bodily pain, mental health, vitality, and general health perceptions), one extra item (change in health since last year), and 2 summary scales (physical summary and mental summary). The higher the SF-36 score, the better the functioning.⁷ The disease-specific instrument was the Impact of Weight on Quality of Life (IWQOL) scale, which includes 7 individual subscales (health, social/interpersonal, work, mobility, self-esteem, sexual life, and activities of daily living [ADL]) and one summary score (ie, summated across all items). An eighth subscale regarding comfort with food was not reported (or

Table 1. Demographic Data for Both Treatment Groups, Combined Across Study

Variable	Placebo Group	Sibutramine Group
Sample size for Impact of Weight on Quality of Life analysis	231	321
Sample size for Medical Outcomes Study 36-Question Short-Form analysis	205	271
Race, white, %	79	72
Men, %	47	45
Age, mean (SD), y	49.8 (9.9)	49.6 (10.4)
Body mass index, mean (SD), kg/m ²	34.7 (5.1)	34.6 (4.6)
Weight, mean (SD), kg	99.6 (16.9)	98.3 (16.7)

included in the summary score) because it was incorrectly administered. The lower the IWQOL score, the better the functioning.^{8,9}

Missing values were treated in the usual way as recommended by the scale developers. At the scale level, missing items were replaced by the means of non-missing items. If the number of missing SF-36 items exceeded 50% or the number of missing IWQOL items exceeded 3, that dimension was treated as missing.

Statistical Methods

For clarity of exposition, if any IWQOL subscale score was missing for any point we deleted the patient from consideration in all analyses using the IWQOL scale (ie, the analysis used “completers” only). The SF-36 was treated in the same fashion. Patients with complete data on the IWQOL scale but incomplete data on the SF-36 were retained for the former analysis but not the latter, and vice versa. An analysis using all available data, regardless of the pattern of missing values, produced results that were substantively similar to those presented herein (data not shown).

We formed an analysis file containing one record per patient. The predictor variables were operationalized as indicators representing study (ie, 3 indicators denoting the 4 studies), treatment (ie, 1 indicator denoting sibutramine or placebo), and weight change (ie, 3 indicators denoting 4 levels of weight change, categorized as weight gain or no change, weight loss of 0.01% to 5.00%, weight loss of 5.01% to 10.00%, and weight loss $\geq 10.01\%$; these categories were defined before analysis as corresponding to cutoff points of clinical interest). Outcome variables included changes in each of the HRQOL scores. Separate analyses were performed for short-, medium-, and long-term data.

Meta-regressions were operationalized using analysis of variance (ANOVA), with predictors and outcomes as described in the previous paragraph. As a preliminary analysis, we considered models with the predictor variables of study, treatment, and weight change and a treatment \times weight change interaction. This interaction was not statistically significant in 53 of 57 analyses ($P > .05$); in the other 4 analyses, $P > .01$ (data not shown). Accordingly, we then fit and reported on main effects models with the predictor variables of study, treatment, and weight change.

Our primary intention is *not* to analyze the *efficacy* of sibutramine treatment in

either achieving weight reduction or generating improvements in HRQOL. Instead, we postulated that the effect of sibutramine use on HRQOL is entirely mediated by its potential to facilitate weight loss and that the most fundamental construct of interest is thus the relationship between weight loss and HRQOL regardless of treatment.

... RESULTS ...

Baseline data were similar across study (and across treatment group within study). For brevity, we report descriptive data after collapsing across study (ie, for all patients, regardless of study). (More extensive versions of all the tables are available on the Internet at the following address: <http://clinpol.mc.duke.edu>.) Most subjects were white and middle aged (mean age, 50 years), with similar numbers of men and women (Table 1). Average weight was slightly less than 100 kg. Table 2 shows a detailed summary of HRQOL at baseline.

Table 3 presents the number of patients in each weight loss category. Most patients achieving weight

Table 2. Group Mean (SD) Subscale Scores at Baseline, Combined Across Study

Subscale	Placebo Group	Sibutramine Group
Medical Outcomes Study 36-Question Short-Form		
Mental summary	53.26 (7.66)	52.54 (8.29)
Physical summary	49.48 (8.38)	50.09 (7.36)
Emotional role	86.67 (26.68)	85.73 (29.05)
General health perception	72.92 (16.42)	73.09 (16.68)
Change in health since last year	58.05 (18.26)	58.21 (19.98)
Mental	81.13 (13.37)	79.95 (13.61)
Pain	81.45 (20.78)	81.24 (20.02)
Physical function	80.65 (21.16)	81.46 (21.14)
Physical role	84.51 (30.03)	87.05 (24.49)
Social function	90.73 (17.19)	89.71 (19.00)
Vitality	62.08 (20.76)	62.21 (20.44)
Impact of Weight on Quality of Life scale		
Total	115.13 (36.97)	113.42 (34.64)
Activities of daily living	12.22 (4.96)	11.91 (4.70)
Self-esteem	19.98 (8.49)	20.02 (8.38)
Health	25.09 (6.77)	25.08 (6.24)
Mobility	17.21 (8.03)	16.73 (7.46)
Sexual life	12.57 (5.64)	12.07 (5.38)
Social/interpersonal	16.43 (6.15)	16.33 (6.31)
Work	11.63 (4.93)	11.30 (4.56)

Table 3. Patients in Each Weight Loss Category by Interval and Treatment Group*

Interval and Treatment Group	Weight Loss Category			
	Gain/0%	0.01%-5.00%	5.01%-10.00%	≥10.01%
Short term				
Placebo	108	152	8	2
Sibutramine	27	237	84	13
Medium term				
Placebo	121	123	15	6
Sibutramine	32	143	128	56
Long term				
Placebo	41	37	5	4
Sibutramine	26	60	62	30

*Data, given as number of patients, are collapsed across study (4 studies for short and medium term and 2 studies for long term). Short term is 8 to 12 weeks after baseline, medium term is 24 to 28 weeks after baseline, and long term is 52 weeks after baseline.

Table 4. Impact of Weight Loss on Short-Term Change Scores*

	Weight Loss Category				P [†]
	Gain/0%	0.01%-5.00%	5.01%-10.00%	≥10.01%	
Medical Outcomes Study 36-Question Short-Form[‡]					
General health perception	-2.00	0.73	4.63	1.87	.03
Physical function	5.21	9.43	14.26	18.11	.08
Physical role	-4.51	1.07	5.41	-0.98	.32
Emotional role	-1.42	0.56	4.63	-4.25	.63
Social function	-1.27	-1.31	-2.43	-3.72	.94
Pain	-3.44	-0.65	3.27	3.28	.24
Vitality	-0.33	0.29	4.94	6.28	.15
Mental	-0.76	-2.58	-0.88	1.23	.46
1-year change	-2.03	4.32	17.51	32.94	<.001
Physical summary	-1.20	0.64	2.43	1.14	.03
Mental summary	-0.15	-0.89	-0.24	-0.28	.81
Impact of Weight on Quality of Life scale[§]					
Health	-0.30	-0.62	-1.07	-3.15	.04
Social/interpersonal	0.38	0.17	-0.27	-2.32	.23
Work	-0.07	-0.32	-0.95	-0.69	.54
Mobility	-0.08	-0.82	-2.20	-3.82	.02
Self-esteem	-0.83	-1.10	-2.49	-3.13	.11
Sexual life	-0.66	-0.47	-1.44	-1.48	.12
Activities of daily living	-0.30	-0.75	-1.39	-1.62	.09
Total	-1.27	-3.93	-9.85	-16.23	.01

*Data are given as least squares means and represent the average change in health-related quality of life (HRQOL), for a typical patient, after controlling for study and treatment. Short-term is 8 to 12 weeks after baseline.

[†]The P quantifies the level of statistical significance for weight change in a model including study and treatment, neither of which are statistically significant for any measure.

[‡]Improvement in HRQOL is represented by increasing scores (ie, positive changes).

[§]Improvement in HRQOL is represented by decreasing scores (ie, negative changes).

Table 5. Impact of Weight Loss on Medium-Term Change Scores*

	Weight Loss Category				P [†]
	Gain/0%	0.01%-5.00%	5.01%-10.00%	≥10.01%	
Medical Outcomes Study 36-Question Short-Form[‡]					
General health perception	-3.05	-0.78	1.99	5.97	.004
Physical function	7.00	7.76	14.53	20.14	.001
Physical role	-5.65	-2.64	6.74	11.59	.005
Emotional role	-2.32	-4.15	4.50	8.06	.047
Social function	-4.80	-3.64	-1.65	1.53	.32
Pain	-1.41	-4.57	2.77	0.51	.04
Vitality	-1.63	0.69	8.28	8.73	.001
Mental	-2.78	-2.44	0.94	-3.87	.11
1-year change	-1.72	4.56	16.15	21.42	<.001
Physical summary	-0.83	-0.22	2.31	3.31	.001
Mental summary	-1.04	-0.05	0.90	-1.38	.23
Impact of Weight on Quality of Life scale[§]					
Health	-0.30	0.03	-1.05	-2.56	.003
Social/interpersonal	0.30	0.11	-0.10	-1.81	.033
Work	0.13	-0.81	-0.70	-0.82	.18
Mobility	-0.05	-0.85	-2.32	-3.48	.001
Self-esteem	-0.86	-1.59	-2.39	-3.37	.04
Sexual life	-0.41	-0.75	-1.41	-1.60	.17
Activities of daily living	-0.14	-0.81	-2.25	-2.40	<.001
Total score	-1.33	-4.69	-10.23	-16.06	.001

*Data are given as least squares means and represent the average change in health-related quality of life (HRQOL), for a typical patient, after controlling for study and treatment. Medium term is 24 to 28 weeks after baseline.

[†]The P quantifies the level of statistical significance for weight change in a model including study and treatment, neither of which are statistically significant for any measure.

[‡]Improvement in HRQOL is represented by increasing scores (ie, positive changes).

[§]Improvement in HRQOL is represented by decreasing scores (ie, negative changes).

losses of 5.01% to 10.00% were in the sibutramine group (eg, for medium-term data, 128 of 143 such patients received sibutramine; the corresponding figures for the medium-term weight gain/0%, 0.01% to 5.00% weight loss, and ≥10.00% weight loss categories were 32/153, 143/266, and 56/62, respectively).

Tables 4, 5, and 6 present the results of the ANOVA for short-, medium-, and long-term data, respectively. (The least squares means reported in these tables represent the average change in HRQOL, for a typical patient, after controlling for study and treatment.) For short-term data, a statistically significant relationship between weight change and HRQOL was observed in the general health perception subscale of the SF-36; the change in health since last year item of the SF-36; the physical summary scale of the SF-36; the health and mobility subscales of the IWQOL; and the total IWQOL score.

For medium-term data, statistically significant relationships were observed for the general health perception, physical function, physical role, emotional role, pain, and vitality subscales of the SF-36; the change in health since last year item of the SF-36; the physical summary scale of the SF-36; the health, social, mobility, self-esteem, and ADL subscales of the IWQOL; and the total IWQOL score. For long-term data, statistically significant relationships were observed for the physical function, physical role, and vitality subscales of the SF-36; the change in health since last year item of the SF-36; and the mobility and ADL subscales of the IWQOL.

With trivial exceptions, all of the previously mentioned subscales evidenced a consistent dose-response pattern, with greater weight loss associated with increasing improvements in HRQOL. The association between weight change and HRQOL was

Table 6. Impact of Weight Loss on Long-Term Change Scores*

	Weight Loss Category				P [†]
	Gain/0%	0.01%-5.00%	5.01%-10.00%	≥10.01%	
Medical Outcomes Study 36-Question Short-Form[‡]					
General health perception	-0.28	-1.09	0.96	7.44	.05
Physical function	0.84	8.03	10.91	16.79	.03
Physical role	-8.40	-1.34	8.11	13.58	.04
Emotional role	-7.72	-3.08	1.89	2.65	.58
Social function	-7.85	-5.38	2.47	-2.24	.15
Pain	-2.63	-1.71	-6.35	3.48	.30
Vitality	-1.99	1.90	4.90	11.08	.005
Mental	-4.90	-1.38	-0.47	0.37	.47
1-year change	-3.16	4.95	10.53	32.74	<.001
Physical summary	-0.70	0.12	1.48	3.76	.12
Mental summary	-1.77	-1.13	0.63	-1.38	.65
Impact of Weight on Quality of Life scale[§]					
Health	0.46	-0.45	-1.85	-1.64	.16
Social /interpersonal	0.18	0.22	-1.00	-0.84	.43
Work	-0.20	-0.55	-0.20	0.00	.94
Mobility	0.76	-1.25	-3.11	-2.66	.004
Self-esteem	-0.42	-2.26	-2.79	-2.56	.19
Sexual life	-1.21	-1.21	-1.68	-1.82	.88
Activities of daily living	0.18	-1.56	-1.88	-1.27	.04
Total score	-0.25	-7.08	-12.55	-10.81	.07

*Data are given as least squares means and represent the average change in health-related quality of life (HRQOL), for a typical patient, after controlling for study and treatment. Long term is 52 weeks after baseline (includes only 2 studies).

[†]The P quantifies the level of statistical significance for weight change in a model including study and treatment, neither of which are statistically significant for any measure.

[‡]Improvement in HRQOL is represented by increasing scores (ie, positive changes).

[§]Improvement in HRQOL is represented by decreasing scores (ie, negative changes).

independent of treatment group (ie, $P > .05$ for treatment effect for all). Thus, on average, patients with similar weight losses had similar changes in HRQOL regardless of whether they received sibutramine or placebo. The previously mentioned ANOVAs describe average population-level relationships—indeed, HRQOL changes were heterogeneous, and the proportion of variation explained by the previous models seldom exceeded 10%.

The **Figure** recapitulates the data in Table 5 for the change in health since last year item of the SF-36; the physical summary subscale of the SF-36; and the IWQOL total score (these were chosen because they represent multidimensional constructs and because of their noteworthy relationship with weight loss). Recalling that long-term data are based on 2 rather than 4 studies, the impact of weight change on HRQOL seems similar regardless of the

time frame considered. For example, among patients with weight losses of 5.01% to 10.00%, the average decrease in the IWQOL total score was approximately 10% in the short term, 10% in the medium term, and 13% in the long term. On average, the greater the weight loss, the greater the improvement in HRQOL.

... DISCUSSION ...

Weight management is a vexing clinical management problem, and most patients tend to relapse.^{1,2} Given the difficulties in achieving and maintaining weight loss, perhaps the most fundamental question addressed by this study is “How important are weight losses of the order of magnitude of 5% to 10%?” From the perspective of clinical epidemiology

gy, we would argue that such weight losses do in fact matter, that is, small shifts in the overall distribution of body weight can induce corresponding small improvements in glycemic control, reduction in blood pressure, and improvements in cholesterol levels. In turn, because of the high prevalence of these risk factors, even small shifts in their distribution can lead to large benefits at the population level. Indeed, using reasoning such as this, the World Health Organization has declared weight losses of 5% to be clinically significant.¹⁰

We addressed the question of whether such weight losses matter from a complementary perspective, namely, whether these reductions in weight will be noticed by the patient in the sense of translating into improved HRQOL. We found the relationship between weight change and change in HRQOL to be statistically significant for many of the HRQOL measures used here. For the SF-36, the physically related subscales were more likely to show changes than the mental/social scales. For these physically related subscales, a 5.01% to 10.00% weight loss was typically associated with HRQOL improvements exceeding the 3 to 5 points that has been reported as representing a clinically meaningful effect.¹¹ For the IWQOL scale, the health, mobility, ADL, and total subscales were more likely to show changes than the social, work, self-esteem, and sexuality subscales. The IWQOL scale has not been extensively normed, as has the SF-36, but we can nevertheless conservatively estimate the effect size for patients with 5.01% to 10.00% weight loss as the mean HRQOL change divided by the standard deduction of the HRQOL measure at baseline. For example, for the IWQOL total score, this effect size is approximately $10/35 = 0.29$. A similar effect size is obtained for individual subscales. Such effect sizes are considered to be in the small to moderate range and exceed the threshold of a difference that is noticeable and clinically important.^{11,12}

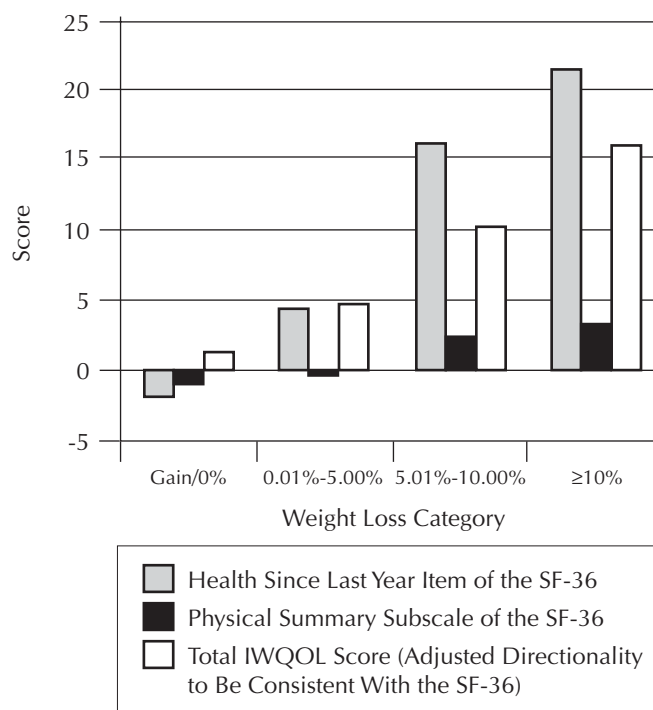
This study has several potential limitations. First, only 4 trials were available for analysis, only 2 of which included a long-term assessment. Nevertheless, the available trials included a variety of patients (eg, those with hypertension, type 2 diabetes mellitus, and hyperlipidemia), and the results were consistent from trial to trial (eg, for study, $P > .05$, ANOVA, in all analyses). Also, the magnitude of weight loss with sibutramine treatment observed in these trials was consistent with previous reports as

well as the conclusions of an expert panel.^{1,2,13-15} This note is not intended as a commentary on the efficacy of sibutramine treatment, as our focus is on the relationship between weight loss and improvement in HRQOL, but rather as a preliminary demonstration of the generalizability of the 4 trials included herein.

Second, not all patients completed follow-up, and not all who did had complete data on HRQOL. Our analysis implicitly assumes that the approximately 60% of patients with complete data on HRQOL are sufficiently representative of the target populations from which patients were initially recruited. Results were similar when all possible observations were included (data not shown).

Finally, interpretation of these data is complicated by the lack of definitive benchmarks regarding the magnitude of change in the IWQOL that represents a clinically significant effect. Much of the

Figure. Medium-Term Changes in Health-Related Quality of Life by Weight Loss Category



Presents covariate-adjusted means within an analysis of variance model including treatment, study, and weight loss category. SF-36 indicates Medical Outcomes Study 36-Question Short-Form; IWQOL = Impact of Weight on Quality of Life.

information that could potentially be used to form benchmarks for the IWQOL comes from non-placebo-controlled studies^{8,9} and thus may not be directly relevant. Accordingly, we applied generic effect size benchmarks.^{11,12} In particular, effect sizes near 0.20 are consistent with the magnitude of differences that are discernible when making cross-sectional comparisons between populations and provide a conservative estimate of the benefits actually perceived by the patient within a longitudinal design.¹¹

Our findings are generally consistent with those of previous analyses of HRQOL in obesity using the SF-36.¹⁶⁻²³ Briefly, HRQOL has been found to vary directly with the severity of obesity in individuals seeking weight loss treatment, with the most obese individuals having the poorest HRQOL and those reporting pain showing the greatest impairment. Obese persons seeking treatment tend to be more physically impaired than those who are not trying to lose weight. Increasing overweight has been associated with deteriorated physical well-being, and weight loss has been associated with improvement in this component of HRQOL. Health-related quality of life has been shown to improve after treatment.

Although generic instruments for measuring HRQOL such as the SF-36 provide useful information, they are not designed to measure the specific range of health-related problems experienced by individuals with obesity. The IWQOL scale was the first validated instrument designed to assess the specific effects of obesity on those aspects of HRQOL that are of greatest concern to obese persons seeking treatment.^{8,9} Additional obesity-specific HRQOL instruments have now been proposed²⁴⁻²⁸ and are in various stages of validation and use. In any event, the most comprehensive approach to measuring HRQOL is to apply both generic and condition-specific measures. The former measures facilitate comparisons across conditions, and their broad scope has the potential to identify effects that may not have been anticipated beforehand. The latter measures tend to provide more detail on the dimensions of particular relevance to the condition at hand and thus will usually be more focused and sensitive.

What are the implications of these results for managed care? Almost any capitulated population will contain large numbers of persons who are overweight or obese and thus are potential candidates for weight management programs. These programs will have costs and benefits. Without attempting a formal cost-effectiveness analysis, it may be noted that the benefits are of 2 types: (1) long-term

improvement in health outcomes and (2) more immediate improvement in HRQOL. Precisely how to account for these long-term improvements in health—particularly since the cost outlays occur in the present and the health benefits occur in the future, perhaps when the patient is no longer enrolled in a particular health plan—is one of the most fundamental economic (and, indeed, ethical) issues in managed care. Regardless of how long-term benefits are accounted, a weight management program would certainly come into stronger consideration if it also had short-term benefits that were perceived as important by patients. Putting aside the nontrivial question of the economic value that should be placed on such benefits, perhaps the primary implication of the present research is that weight loss need not be extensive for improvements in HRQOL to reach a level that is perceptible to the patient.

In conclusion, excessive weight is a major public health problem that is often refractory to treatment. Health-related quality of life in obesity is relatively little studied. Using both generic and disease-specific instruments, we found that patients experiencing greater weight loss attained the greatest improvements in HRQOL; that the improvement in HRQOL associated with moderate (5.01%-10.00%) weight loss was noticeable and clinically significant; and that the relationship between weight loss and HRQOL was similar regardless of whether the patient received sibutramine or placebo. The importance of moderate weight loss on HRQOL is not to be underestimated.

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