

ORIGINAL ARTICLE

Improvements in sexual quality of life after moderate weight loss

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We evaluated changes in sexual quality of life as they relate to weight loss over a 2-year period in individuals undergoing weight loss treatment. Six dimensions of sexual quality of life were measured using items from the Impact of Weight on Quality of Life questionnaire (feeling sexually unattractive, lacking sexual desire, reluctance to be seen undressed, difficulty with sexual performance, avoidance of sexual encounters and lack of enjoyment of sexual activity). At baseline women were more likely than men to report lack of sexual enjoyment and reluctance to be seen undressed in spite of lower body mass index (BMI). Weight loss averaged 13.1% and was significantly associated with improvements in all sexual quality of life dimensions. A 3–4% regain did not appear to negatively affect sexual quality of life. The greatest improvements for women had occurred by 3 months and were observed in all dimensions, whereas for men only ‘not feeling sexually attractive’ showed marked improvement in this short time frame.

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Introduction

Numerous studies have described the negative impact of obesity on health-related quality of life.^{1–3} A particular aspect of health-related quality of life, sexual quality of life, has become a recent topic of interest in studies of obese populations, with reports of decreased sexual quality of life among obese persons.^{4,5} There has also been a consistent association between erectile dysfunction and obesity in both prospective and cross-sectional studies.⁶

Studies on obese patients undergoing weight loss surgery have described improved sexual quality of life, as assessed by interview and study-specific questionnaires.^{7–11} Three recent randomized trials have also examined the effects of weight loss on

sexual quality of life. In a randomized trial of weight loss/lifestyle change in Italian men with erectile dysfunction, about one third of men reported improved sexual function after the intervention.¹² In a randomized trial of a very low energy diet and behavior modification, obese Finnish men (not necessarily with erectile dysfunction) who lost weight showed increased serum testosterone, but no significant improvement in sexual function scores.¹³ A randomized trial in Korea of sibutramine for weight reduction in overweight and obese women found significant improvements on the Female Sexual Function Index total score and the domain scores relating to arousal, orgasm and sexual satisfaction in the sibutramine participants relative to control subjects.¹⁴ Regardless of treatment group, decreases in body mass index (BMI) were associated with improvements in arousal and orgasm. These trials are noteworthy in their use of validated instruments to assess sexual quality of life. However, they are limited by their focus on the physical aspects of sexual quality of life (for example, erectile dysfunction, arousal, orgasm) and exclusion of salient subjective aspects of the human sexual experience such as sexual enjoyment and desire.

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The objective of the current study was to evaluate changes in sexual quality of life as they relate to weight loss over a 2-year period. We used a broad conceptualization of sexual quality of life, assessing feelings of sexual attractiveness and desire, sexual performance and enjoyment, as well as avoidance of sexual encounters and reluctance to be seen undressed.

Materials and methods

Participants

Data for this study were collected from 199 adult participants enrolled in an open-label weight reduction trial combining medication (phen-termine-fenfluramine) and dietary counseling.¹⁵ Patients were recruited from a primary care setting and an endocrinology clinic. Treatment consisted of regular meetings with a registered dietitian, individualized diets, exercise recommendations and medication. Individuals were eligible for participation if their weight was 130% of ideal weight and they met stringent medical and psychological exclusion criteria: pregnancy; uncontrolled hypertension; lifetime history of pulmonary hypertension, glaucoma, symptomatic cardiovascular disease; or serious psychiatric illness. Individuals with current major depressive disorder were excluded from the study, but those with a past history of major depressive disorder were not excluded. The analysis sample for this report included 187 participants (161 women and 26 men) who completed the sexual quality of life assessment at entry to the study.

Measures and procedures

At entry into the study and 3-month intervals over a 2-year period, participants' BMI was obtained and they completed a comprehensive assessment, which included a measure of sexual quality of life. Participants completed the original Impact of Weight on Quality of Life (IWQOL) questionnaire,¹⁶ which contains six items assessing different dimensions of sexual quality of life *attributed to one's weight*: 'not feeling sexually attractive,' 'having little sexual desire,' 'not wanting to be seen undressed,' 'difficulty with sexual performance,' 'avoidance of sexual encounters' and 'not enjoying sexual activity.' Each item has five response options: 'never true,' 'rarely true,' 'sometimes true,' 'usually true' and 'always true.' Although the IWQOL short form [IWQOL-Lite¹⁷] is usually recommended for assessing weight-related quality of life, use of the long form allowed us to examine six, rather than four, dimensions of sexual quality of life (the IWQOL-Lite does not include the items pertaining to 'not feeling sexually attractive' and 'not wanting to be seen undressed').

Statistical analyses

Men and women were compared at entry into the study on age and BMI using independent samples *t*-tests. Fisher's exact tests were used to compare the proportions of female and male participants reporting baseline impairments in sexual quality of life at least 'sometimes'. Spearman rank order correlations were calculated at baseline between sexual quality of life responses and BMI and age grouping. A mixed-effects regression model with random intercept¹⁸ was used to evaluate the relationship between BMI and each of the sexual quality of life items across assessments using all of the available data. No imputation of missing observations was performed.

Statement of ethics

Written informed consent was obtained from all participants and the protocol was approved by the appropriate institutional review boards. We certify that protocols for the Declaration of Helsinki were followed during this research.

Results

Demographic and weight characteristics

Participants included 161 women (mean age = 44.3, s.d. = 9.1, range = 23–65) and 26 men (mean age = 48.7, s.d. = 9.6, range = 29–65). All participants were Caucasian. BMI at entry into the study averaged 40.3 for women (s.d. = 6.6, range = 29.2–62.6) and 43.3 for men (s.d. = 8.6, range = 31.7–67.0). Body weight averaged 109.2 kg for women and 134.4 kg for men at study entry. Men were significantly older ($t = 2.24$, d.f. = 185, $P = 0.026$) and had higher BMI at baseline ($t = 2.05$, d.f. = 185, $P = 0.042$) than women.

Baseline sexual quality of life

Table 1 presents the proportions of participants reporting baseline sexual impairments at least 'sometimes' in each of the six areas separately by gender. A higher percentage of women than men reported not wanting to be seen undressed (62.7 versus 30.8%) and not enjoying sexual activity (20.6 versus 4.0%) because of their weight. Two of the sexual quality of life items were significantly associated with baseline BMI for the combined sample: 'not feeling sexually attractive' (Spearman's $\rho = 0.235$, $P < 0.001$) and 'difficulty with sexual performance' (Spearman's $\rho = 0.199$, $P = 0.008$).

Table 2 presents the percentage of participants reporting baseline sexual impairments at least 'sometimes' in each of the six domains by age group. Age was unrelated to impairments on any of the sexual quality of life items.

Table 1 Participants reporting baseline sexual quality of life impairments at least ‘sometimes’ by gender

Sexual quality of life dimension	Gender		Total (n = 187)	Fisher's exact ρ
	Women (n = 161)	Men (n = 26)		
Do not feel sexually attractive	109 (67.7%)	15 (57.7%)	124 (66.3%)	0.372
Do not want to be seen undressed	101 (62.7%)	8 (30.8%)	109 (58.3%)	0.003
Have little sexual desire	62 (38.5%)	6 (23.1%)	68 (36.4%)	0.187
Avoid sexual encounters	44 (29.1%)	5 (19.2%)	49 (27.7%)	0.351
Difficulty with sexual performance	41 (27.3%)	5 (19.2%)	46 (26.1%)	0.474
Do not enjoy sexual activity	32 (20.6%)	4 (4.0%)	33 (18.3%)	0.051

Table 2 Participants reporting baseline sexual quality of life impairments at least ‘sometimes’ by age group

Sexual quality of life dimension	Age group				Spearman's rho (ρ)
	20–34 (n = 32)	35–45 (n = 59)	46–54 (n = 70)	55+ (n = 26)	
Do not feel sexually attractive	22 (68.8%)	43 (72.9%)	41 (58.6%)	18 (69.2%)	–0.066 (0.363)
Do not want to be seen undressed	17 (53.1%)	36 (61.0%)	40 (57.1%)	16 (61.5%)	0.025 (0.734)
Have little sexual desire	11 (34.4%)	23 (39.0%)	23 (32.9%)	11 (42.3%)	0.010 (0.131)
Avoid sexual encounters	9 (31.0%)	18 (31.0%)	15 (22.4%)	7 (30.4%)	–0.051 (0.506)
Difficulty with sexual performance	7 (23.3%)	17 (29.8%)	15 (22.4%)	7 (31.8%)	0.004 (0.961)
Do not enjoy sexual activity	5 (17.2%)	10 (17.2%)	12 (17.4%)	6 (25.0%)	0.043 (0.574)

Weight loss

The percentage of baseline weight loss at each assessment is presented in Table 3 for the entire sample and by gender. Weight loss at 6 months averaged 15.5% for women (mean reduction of 16.9 kg) and 15.1% for men (mean reduction of 21.6 kg). At 1 year, the average percentage of baseline weight loss was 17.4% for women (mean reduction of 19.0 kg) and 18.1% for men (mean reduction of 26.8 kg) and at 2 years was 13.3% for women (mean reduction of 14.2 kg) and 11.6% for men (mean reduction of 15.8 kg).

Changes in sexual quality of life by BMI and gender

Changes in BMI were significantly associated with changes in all sexual quality of life dimensions (all P values < 0.0001) for the combined sample: as BMI decreased, participants reported corresponding improvements in sexual quality of life. The percentage of weight loss and mean sexual life impairment scores by study month are presented separately for women (Figure 1) and men (Figure 2) based upon all available data. The percentage of weight loss is depicted with a dashed line and is referenced in the left hand vertical (Y) axis. The remaining lines depict the average score for the sample and are referenced in the right hand vertical (Y) axis (‘Never True’ = 1, ‘Rarely True’ = 2, ‘Sometimes True’ = 3). For women (Figure 1), most of the improvements in sexual quality of life were experienced between study entry and the 3-month assessment, with levels remaining relatively stable thereafter. All of the individual sexual quality of life items show marked

Table 3 Percent weight loss from baseline by gender

Study month	Percent weight loss from baseline			
	Gender		Total	
	Women	Men		
0	(n = 161)	(n = 26)	(n = 187)	
3	11.7% (n = 138)	12.3% (n = 23)	11.8% (n = 161)	
6	15.5% (n = 154)	15.1% (n = 24)	15.4% (n = 178)	
9	16.8% (n = 145)	16.5% (n = 24)	16.7% (n = 169)	
12	17.4% (n = 144)	18.1% (n = 20)	17.5% (n = 164)	
15	16.9% (n = 127)	15.8% (n = 18)	16.8% (n = 145)	
18	15.5% (n = 120)	14.3% (n = 18)	15.4% (n = 138)	
21	14.7% (n = 99)	13.7% (n = 15)	14.6% (n = 114)	
24	13.3% (n = 85)	11.6% (n = 12)	13.1% (n = 97)	

evidence of early improvement for women. In contrast, for men (Figure 2) only one sexual quality of life item (‘Do not feel sexually attractive’) improved markedly from study entry to the 3-month assessment. Several of the dimensions show much more modest improvements during this interval, and one (‘Do not enjoy sexual activity’) shows minimal levels of impairment across the entire assessment period.

Discussion

The primary finding in this study was that moderate weight loss was significantly associated with

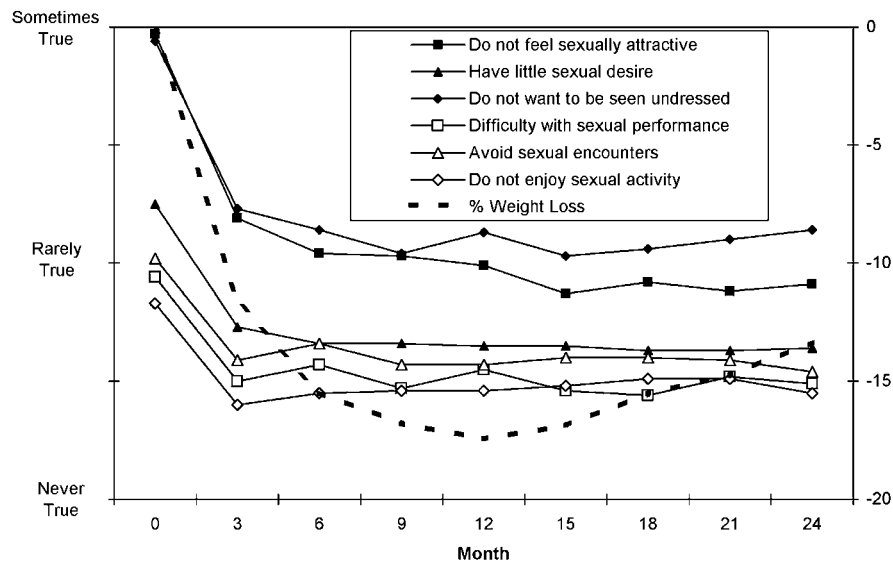


Figure 1 Percent weight loss and sexual quality of life impairment by study month for female participants.

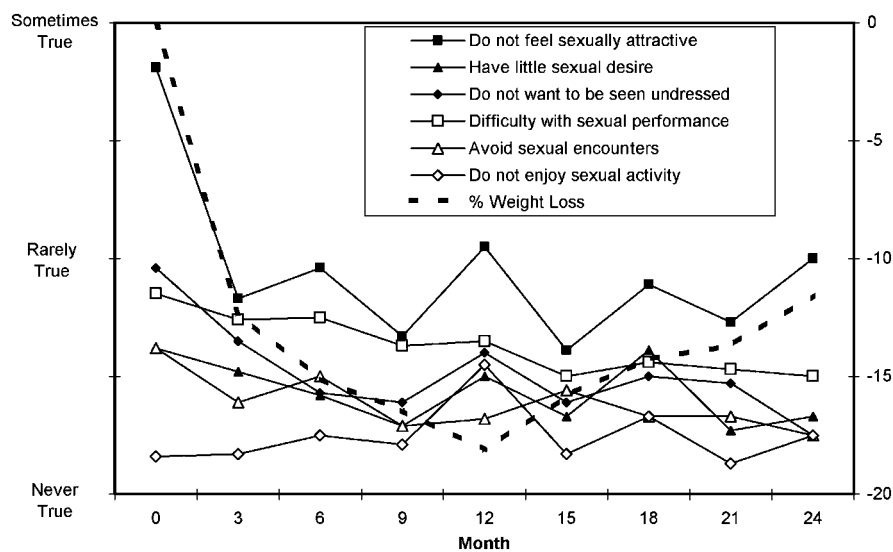


Figure 2 Percent weight loss and sexual quality of life impairment by study month for male participants.

improved sexual quality of life in all dimensions assessed. Furthermore, a modest weight regain of 3–4% did not appear to have a negative impact on the observed improvements in sexual quality of life for either women or men.

For women, the greatest improvements in sexual quality of life occurred between study entry and 3-month assessment, at which point there was a mean weight loss of 11.7%. Improvements were substantial across all dimensions assessed (sexual attractiveness, desire, performance and enjoyment; being seen undressed and avoidance of sexual encounters) despite BMI remaining in the obese range (mean BMI=35.4). The fact that moderate weight loss led to such dramatic improvements in sexual quality of life, coupled with the finding that

modest regain did not negatively impact these improvements, is both encouraging and suggestive of the fact that factors other than achieving some unrealistically thin ‘ideal weight’ may be influencing improvements in women’s sexual quality of life during weight loss. For men, only one dimension (not feeling sexually attractive) showed marked improvement from baseline to 3 months, but similar to women, improvement was observed with only moderate weight loss (12.3% weight loss).

Consistent with previous research,⁴ there was a tendency for women to report more impairments in baseline sexual quality of life than men, with two items demonstrating statistical significance (‘not enjoying sexual activity’ and ‘not wanting to be seen undressed’). This finding of greater sexual

impairment in women is also consistent with previous reports of poorer body image,¹⁹ higher prevalence of sexual difficulties²⁰ and reduced health-related^{21,22} and weight-related quality of life²³ in women. Age was unrelated to sexual quality of life in this study. Although in the general US population increasing age has been associated with increasing erectile problems and loss of desire for men and decreasing sexual problems for women (except for those who report trouble with lubrication),²⁰ the oldest participants in our sample were 65 years of age and we assessed more than the physical aspects of sexual quality of life.

Other weight loss studies, using a variety of weight loss interventions, have reported improved sexual quality of life after weight loss,^{7–10,12,14} however, it is difficult to compare results across studies because of the varying types of treatment, assessment methods and follow-up periods.

Sexual quality of life is a multidimensional construct that includes arousal, desire, satisfaction, physical functioning, beliefs and values, comfort with sexual and emotional intimacy, body image and self-esteem. This study used a multidimensional, but relatively simple and quick to complete, 6-item scale from a measure of weight-related quality of life (IWQOL), which was still sensitive to change in weight. Although the IWQOL and its short-form successor (IWQOL-Lite) are validated instruments for assessing weight-related quality of life in multiple dimensions,^{24,25} the sexual life dimension of the IWQOL has not been evaluated psychometrically. However, the sexual life dimension of the IWQOL-Lite (which contains 4 of the 6 IWQOL sexual life items) exhibited good psychometric properties: correlation of 0.575 with ratings of sexual function, Cronbach's α (internal consistency) of 0.91 and test–retest reliability of 0.849.²⁴

Instruments with strong psychometric properties have been developed to assess sexual functioning from a multidimensional perspective,^{26–28} but they tend to focus on the physical aspects of sexual quality of life, are gender-specific, and cannot assess the perceived impact of one's weight on sexual quality of life. Kaukua *et al.*¹³ used the International Index of Erectile Function,²⁶ which assesses erectile function, orgasmic function, sexual desire, intercourse satisfaction and overall satisfaction, but is limited to men only. Esposito *et al.*¹² used only the erectile dysfunction items of the International Index of Erectile Function. Kim *et al.*¹⁴ used the Female Sexual Function Index,²⁷ which assesses desire, arousal, lubrication, orgasm, satisfaction and pain, but is limited to women.

One of the limitations of this study is the small sample size for men and lack of ethnic diversity of participants, which may limit the generalizability of the findings. As this was an open-label trial with no control or comparison groups, we cannot determine that changes in sexual quality of life were due solely

to weight loss *per se* as opposed to related factors, such as the pharmacologic effects of phentermine–fenfluramine, the passage of time or a reaction to the monitoring of health-related quality of life over time. Another limitation of this study is that 2-year follow-up data were available for only approximately half of the enrolled sample. This was due in large part to the cessation of the trial when adverse cardiac effects associated with the use of phentermine–fenfluramine were identified. The strengths of this study are its length of follow-up, frequency of assessments, analysis of results at all time points and the magnitude of weight loss, which is greater than that typically seen in the currently available weight loss medication literature.

A possible future research direction is to compare subgroups of obese persons (for example, individuals with polycystic ovary disease, type 2 diabetes or metabolic syndrome and/or participants in diverse weight loss interventions) with respect to baseline sexual quality of life as well as changes in sexual quality of life that occur with weight loss.

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