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Sexual functioning in obese adults enrolling in a weight loss study

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Abstract

We assessed sexual functioning among treatment-seeking obese men (n = 91) and women (n = 134) using the comprehensive, validated, Sexual Functioning Questionnaire (SFQ). Scores were lower for women than for men, indicating reduced sexual functioning. Men's scores fell between those of a group of cancer survivors and a general population group, while women generally had lower scores than both of these groups. Increasing body mass index was associated with decreasing sexual functioning only for Arousal and Behavior. Sexual functioning was also reduced on most subscales for individuals who reported sexual inactivity in the past month.

Keywords

Obesity; Sexual Behavior; Sexual Dysfunction; Sexual Functioning Questionnaire (SFQ)

INTRODUCTION

The negative impact of obesity on physical health is well known, and there is increasing evidence that excess body mass also can reduce overall health-related quality of life (Fontaine & Barofsky, 2001; Karlsson, Taft, Ryden, Sjostrom, & Sullivan, 2007; R L Kolotkin, Crosby, Kosloski, & Williams, 2001; Kushner & Foster, 2000). There has been growing interest in exploring the relationship between obesity and sexual functioning.

In a recent review of sexual functioning and obesity, Larsen et al. (Larsen, Wagner, & Heitmann, 2007) found evidence from four prospective and seven cross-sectional studies for a direct association between obesity and erectile dysfunction, but evidence in only one cross-sectional observational study (Adolfsson, Elofsson, Rossner, & Unden, 2004) for a

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relationship between obesity and female sexual dysfunction. A case-control study from Italy demonstrated a strong negative association between body mass index (BMI) and sexual functioning scores on the Female Sexual Functioning Index (FSFI) for women diagnosed with female sexual dysfunction; however, for women without diagnosed sexual dysfunction, there was no association between BMI and FSFI (Esposito et al., 2007). In a comparative study of female bariatric surgery patients, female bariatric surgery patients reported significantly lower sexual functioning on five out of six domains of the FSFI than healthy controls (Assimakopoulos et al., 2006). In another study of female bariatric surgery patients, the prevalence of sexual dysfunction was reported to be 60%, based on cut-offs obtained on the FSFI (Bond et al., 2009). When 794 bariatric surgery candidates (85% women) were administered the Impact of Weight on Quality of Life-Lite (IWQOL-Lite) Questionnaire, women were found to have lower self-esteem and greater impairment in their sexual life (R. L. Kolotkin et al., 2008).

Although a population study in the US reported greater prevalence of sexual dysfunction for women (43%) than men (31%) (Laumann, Paik, & Rosen, 1999), the role of body weight was not considered. To our knowledge there are no published studies comparing obese men and women with respect to sexual functioning using specific and more detailed rating scales, perhaps because most available instruments are designed for either men or women.

In the present study, we assessed sexual functioning as a multidimensional construct using an instrument designed for both men and women (Syrjala, Schroeder, Atkins, Schubert, & Heiman, 2000) in a sample that includes both men and women enrolled in a weight loss study. Because gender differences have been reported with respect to sexual functioning in non-obese samples (Laumann et al., 1999; Syrjala et al., 2000), we hypothesized that women would report greater sexual dysfunction than men in the current study. We also hypothesized that increasing BMI would be associated with decreased sexual functioning.

MATERIALS AND METHODS

In conjunction with a study for an investigational weight loss drug, sexual functioning was assessed prior to study enrollment. The study was conducted at Duke University Medical Center in Durham, North Carolina. The protocol was approved by the institutional review board (IRB) and all subjects provided informed consent in accordance with the IRB policies. Included in the study were obese men and women, aged 18–65 years, with BMI 30–50 kg/m^2.

Key exclusion criteria were as follows: secondary obesity (e.g., drug-induced obesity), significant cardiovascular, neurological, hepatic, renal, or hormonal disease, diabetes mellitus, major depression and/or alcohol/drug abuse within the past 6 months; score of 11 or higher on the depression subscale of the Hospital Anxiety and Depression (HADS) scale (Zigmond & Snaith, 1983) at screening; history of bipolar disorder or psychosis; previous surgery for obesity (or planning to have surgery over the next year); a weight gain or loss >4 kg in the prior 3 months; severe physical disability that could interfere with lifestyle change recommendations; psychotropic drugs, antiepileptic drugs, carbonic anhydrase inhibitors, or other weight loss medications including herbs or dietary supplements. Subjects participating in a commercial diet or behavior modification program (or with plans to participate) and those following various diets were also excluded. Also excluded were women who were breast-feeding, pregnant or planning pregnancy in the next 13 months.

Participants completed the Sexual Functioning Questionnaire (SFQ), originally developed by Syrjala and colleagues for cancer survivors, but also evaluated on matched controls from the general population (Syrjala et al., 2000). Sexual functioning is assessed and scored based

on 30 items that are grouped into nine different subscales: Interest, Desire, Arousal, Orgasm, Satisfaction, Behavior, Relationship, Masturbation, and Problems. The SFQ Overall Score is a mean of all items used to generate the nine subscales. For both Overall Score and each subscale, a higher number means better sexual functioning. The SFQ may be used with both men and women, as the items for eight of the nine domains are applicable to both genders. Only the Problems subscale includes different questions for men and women, for example, erection and ejaculation items for men and lubrication and vaginal penetration items for women. Cronbach's alpha for all scales is over 0.80, including the Problems scale (0.84 for men and 0.81 for women). The SFQ has been shown to be a reliable and valid measure for use in medical patients as well as in the general population (Syrjala et al., 2000).

To calculate Body Mass Index (BMI = kg/ m^2), weight was measured in light clothing on a calibrated electronic scale and height without shoes was measured using a stadiometer. BMI was categorized into Obesity Class 1 (30–34.9), Class 2 (35–39.9) and Class 3 (40+). The following covariates were also collected: gender, whether the respondent had been sexually active in the last month, age, race (white vs. black/African American/Hispanic), marital status (married vs. single), and education level (grade 1–12, college, or postgraduate).

Statistical Analysis

Stratified by gender, means and standard deviations for Overall SFQ score was tabulated for each obesity category and each of the covariates considered (age group, race, marital status, education level, and sexual activity). Unpaired t-tests were used to compare men and women in each subcategory defined by the covariates. Means and standard deviations for each of the sexual functioning subscales were also calculated for each subscale by gender, and, again using unpaired t-tests, comparisons between men and women were made.

Using backwards stepwise linear regression, BMI and the other covariates were used to model both Overall SFQ, and in separate models, each of the nine sexual function subscales

To put our findings in a broader context, we also compared the levels of sexual functioning observed in our study (Overall and each subscale) with SFQ instrument general adult norms and cancer patients. SPSS 12.0.1 was used for data management and analysis.

RESULTS

Table 1 presents subject characteristics. More women participated than men. Men weighed more on average (mean [SD] weight in kg: 119 [16] vs. 105 [18]) whereas women had a somewhat higher BMI (38.33 [5.05] vs. 36.85 [4.56]). Most of the men were white, while approximately half the women were African American. Most of the men and half the women were married, and relatively more men than women reported being sexually active.

Table 2 presents the bivariate relationships between the independent variables and SFQ Overall scores separately for men and women. Men reported higher Overall SFQ scores (i.e. better sexual functioning) than women in all subgroups, and these differences were statistically significant in nearly all subgroups (except for those aged 20–29, African Americans, and those not sexually active in the last month). SFQ decreased with increasing age in women; a similar trend was seen for SFQ and increasing BMI, more clearly in men than in women. There was little difference between black and white. For women, higher education was also associated with higher SFQ scores.

Table 3 presents the means for the subscales of SFQ by gender. Across all subscales except Relationship and Problems, men reported significantly higher scores than women, again indicating better sexual functioning.

The study subjects were also compared to cancer survivors and matched population controls (Syrjala et al., 2000). The male obese group from our study had higher mean scores for Arousal than both of the comparison groups, but lower Orgasm and Problem scores (i.e. more problems). Otherwise, the obese men, especially those in the heaviest obesity class, were more similar to the male cancer survivors than to the population controls. Among women, the contrast between the obese women and the two comparison groups were starker than among the men. Women reported lower scores than not only the female general population controls, but also lower scores than cancer survivors for Interest, Desire, Orgasm, Satisfaction, Behavior, Problems, and overall SFQ. Only for Masturbation did obese women report better functioning than the two comparison groups; nevertheless, all female groups reported low functioning on this subscale.

Table 4 provides a summary of the multiple linear regression models. Only statistically significant values ($p<0.1$) after stepwise backwards elimination are presented. Gender was significant on all subscales (women reported lower scores than men), with the exception of Relationship. As may be expected, respondents not sexually active reported much lower functioning on all subscales. Age was negatively associated with Desire and Arousal and positively with Relationship, but these effects were very small. Higher BMI was only associated with lower Arousal and Behavior scores. Race was only significantly associated with Masturbation. Not being married was positively associated with Interest, Masturbation and Problems (fewer problems). Higher education was only associated with a higher Masturbation score.

DISCUSSION

In this sample of obese individuals enrolled in a weight loss study, women reported lower sexual functioning than men on nearly all subscales as well as Overall score of a validated, multidimensional instrument. For obese men, sexual functioning was generally intermediate between cancer survivors and the general population, while for obese women, sexual functioning was lower overall, with most subscales being lower than scores obtained by the group of cancer survivors (Syrjala et al., 2000).

This study is unique in that sexual functioning was assessed for both men and women enrolled in the same weight loss study with a detailed multidimensional self-report questionnaire. Previous studies have evaluated either men (e.g. (Dallal et al., 2008; Kaukua, Pekkarinen, Sane, & Mustajoki, 2003)) or women (e.g. (Assimakopoulos et al., 2006; Bond et al., 2009; Esposito et al., 2007)), or have used physiological indicators (e.g. (Chung, Sohn, & Park, 1999) or single items (Bacon et al., 2003) instead of multidimensional self-report measures. Other research, including our own (Hammoud et al., 2009; R. L. Kolotkin et al., 2006), has assessed the impact of weight on sexual quality of life with respect to factors such as desire, performance, avoidance, and enjoyment. Although results of all of the above studies contribute to our understanding of the sexual issues and concerns faced by obese persons, we believe that sexual functioning is best studied using a multidimensional instrument that includes the four phases of the sexual response cycle, actual sexual behaviors, specific problems, and sexual partner relationship (Derogatis & Conklin-Powers, 1998; Syrjala et al., 2000).

Another strength of this study is that we had data on the presence or absence of recent sexual activity, which allowed us to note a strong association between reduced sexual functioning and absence of sexual activity. Although this association may seem intuitively obvious, most sexual functioning questionnaires do not ask participants to indicate whether or not they have engaged in recent sexual activity, thus potentially biasing the results. An additional strength of the current paper is that norms for cancer survivors and individuals in the general

population (Syrjala et al., 2000) were available for interpretation of our findings. Nevertheless, we must interpret comparisons cautiously since both the cancer survivors and the general population controls were somewhat younger than our sample.

Although we hypothesized that higher BMI's would be associated with reduced sexual functioning, there was little decrease in SFQ with increasing BMI, especially after adjustment for covariates. However, it should be noted that the sample consisted only of obese individuals with BMI's between 30 and 50, perhaps masking the true relationship between BMI and sexual functioning had the data included a wider BMI range.

Relative to the obese men, sexual functioning decreased more steadily with increasing age for obese women. Other studies have reported decreased sexual functioning with increasing age (Bacon et al., 2003; Cheng & Ng, 2007; Laumann et al., 1999).

Our findings support a growing body of research that indicates that obesity is associated with reduced sexual functioning or sexual quality of life for both men and women (Adolfsson et al., 2004; Assimakopoulos et al., 2006; Bond et al., 2009; Derby et al., 2000; Esposito et al., 2007; R. L. Kolotkin et al., 2006; Larsen et al., 2007).

With the increasing occurrence of obesity worldwide, difficulties with sexual functioning may become more widespread. Because obese individuals frequently experience stigmatization, discrimination, and prejudice (R. Puhl & Brownell, 2001; R. M. Puhl, Andreyeva, & Brownell, 2008), they may be particularly hesitant to discuss sensitive topics such as sexual functioning, even with a healthcare provider (R. M. Puhl & Brownell, 2006; Schwartz, Chambliss, Brownell, Blair, & Billington, 2003). If the clinician creates an atmosphere of acceptance and willingness to discuss these concerns, perhaps by asking a validating and normalizing open-ended question about sexual functioning, the patient may more freely discuss topics that would otherwise feel embarrassing to raise. We have found it useful to begin this discussion with a statement that "sexual function is an important part of quality of life for many people, and we know that many people have some difficulty with sexual function. How is it for you?"

Although some individuals would likely find it difficult to openly discuss sexual concerns due to their highly personal nature, the present study had very few missing data. Syrjala and colleagues, who developed the Sexual Functioning Questionnaire, emphasize the importance of administering this type of questionnaire with an assurance of confidentiality and a clear rationale for honest and thoughtful reflection (Syrjala et al., 2000). They indicate that once they began introducing the form with a statement addressing the sensitive nature of the questions, they also found that missing data were rare. We believe similar sensitivity should be applied in clinical situations, both relating to non-obese and obese patients.

This study's cross-sectional design limits the causal conclusions we are able to draw. Further, because our participants were enrolled in a weight loss study, our findings may not generalize to obese men and women who are not seeking weight loss treatment. Indeed, previous research on obese persons has reported significant differences in the impact of weight on quality of life, including sexual quality of life, depending on whether or not subjects were enrolled in weight loss treatment and what type of treatment was being sought (R. L. Kolotkin, Crosby, & Williams, 2002). While men report better functioning than women, it was not possible to determine to what extent this was due to actual better functioning, better subjective impression of functioning or less willingness to report poor functioning.

A fruitful direction for further research is the *longitudinal* assessment of sexual functioning, particularly in patients undergoing various weight loss treatments (our group is planning to

re-evaluate changes in sexual functioning in the current cohort after completion of the one-year weight loss intervention).

Only 48% of women in our sample were married compared with 81% among men, which may have influenced our findings. This discrepancy in marriage prevalence is in line with prior findings that obesity reduces the likelihood for women of getting married (Gortmaker, Must, Perrin, Sobol, & Dietz, 1993) and that heavier women were judged by their male partners as lower in attractiveness(Boyes & Latner, 2009).

In conclusion, interest in exploring the relationship between sexual functioning and obesity is growing. Using a multidimensional instrument to assess sexual functioning in men and women enrolled in a weight loss clinical trial, this study found impaired sexual functioning for both genders compared to general population norms. However, as hypothesized, women's degree of impairment was much greater than men's, suggesting that this is an area of particular concern for obese women in weight loss treatment. Our second hypothesis that BMI would be associated with reduced sexual functioning only held true for the Arousal and Behavior subscales. We believe our findings have implications for clinicians who treat obese patients and recommend that clinicians be open to discussing issues pertaining to sexual functioning with their patients as part of comprehensive care.

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Table 1

Participant characteristics by gender (%(n) except where noted)

	Men	Women
Age (mean ± SD)	43.69±11.05 (91)	43.12±9.46 (134)
BMI		
mean ± SD	36.85±4.56 (91)	38.33±5.05 (134)
30–34.9	40.7 (37)	31.3 (42)
35–39.9	36.3 (33)	37.3 (50)
40+	23.1 (21)	31.3 (42)
Race		
White	84.6 (77)	49.3 (66)
Black/African American/Hispanic	15.4 (14)	50.7 (68)
Marital status		
Married	81.3 (74)	48.5 (65)
Single/Divorced	18.7 (17)	51.5 (69)
Education level		
Grade 1–12	9.9 (9)	17.2 (23)
College 13–16	67.0 (61)	60.4 (81)
Postgraduate >16	23.1 (21)	22.4 (30)
Sexual Activity		
Active in the past year (%yes)	94.5 (86)	83.6 (112)
Active in the past month (% yes)	92.3 (84)	73.1 (98)

Table 2

SFQ Overall Score (mean ± SD (n)) for men and women by age, BMI, race, marital status, education, and sexual activity

	Men	Women	p-value
Overall	3.47±0.89 (91)	2.46±1.09 (133)	p<.0001
Age			
20–29	3.08±1.24 (8)	2.87±0.91 (12)	p =.696
30–39	3.74±0.74 (30)	2.51±1.12 (34)	p<.001
40–49	3.66±0.63 (21)	2.45±1.24 (51)	p<.001
50–60	3.20±0.89 (32)	2.26±0.88 (36)	p<.001
BMI			
30–34.9	3.56±0.70 (37)	2.47±1.11 (41)	p<.001
35–39.9	3.50±0.92 (33)	2.57±1.12 (50)	p<.001
40+	3.30±1.14 (21)	2.28±1.06 (41)	p=.002
Race			
White	3.50±0.77 (77)	2.42±1.11 (66)	p<.001
Black/African American	3.32±1.44 (14)	2.49±1.09 (67)	p=.058
Marital status			
Married	3.47±0.85 (74)	2.55±0.93 (65)	p<.001
Single/divorced	3.50±1.10 (17)	2.37±1.23 (68)	p=.001
Education level			
Grade 1–12	3.51±0.81 (9)	2.25±1.19 (23)	p=.002
College 13–16	3.38±0.97 (61)	2.43±1.07 (80)	p<.001
Postgraduate >16	3.73±0.65 (21)	2.68±1.08 (30)	p<.001
Sexual activity			
Active in the last month	3.62±.69 (84)	2.88±.91 (98)	p<.001
Not active in the last month	1.69±1.20 (7)	1.28±.60 (35)	p = .18

Table 3

SFQ Subscale by Gender

SFQ Subscore	Men	Women	P-value	*Male Cancer Survivors	*General Population Males	*Female Cancer Survivors	*General Population Females
Interest	3.60±1.37 (91)	2.12±1.35 (133)	p <.001	3.62± 1.30	3.73± 1.33	2.13± 1.44	2.63± 1.32
Desire	3.70±1.38(91)	2.67±1.65(133)	p <.001	3.93± 1.66	4.67± 1.12	3.15± 1.79	3.91± 1.30
Arousal	2.98±1.51(91)	1.73±1.55(131)	p <.001	2.12 ±1.24	2.69 ±0.87	1.36 ±1.20	2.00 ±1.03
Orgasm	4.01±1.15(91)	2.78±1.83(133)	p <.001	4.32± 2.27	5.46± 0.88	2.97± 2.03	3.94± 1.77
Satisfaction	3.99±1.19(90)	2.78±1.85(133)	p <.001	3.52± 1.62	4.20± 1.12	3.40± 1.61	4.07± 1.21
Masturbation	2.39±1.53(91)	1.02±1.36(133)	p <.001	1.55±1.41	1.96±1.65	0.62±1.09	0.89±1.18
Relationship	3.82±1.12(88)	3.72±1.22(101)	p=.57	3.27± 2.06	4.19± 1.47	3.12± 2.03	3.91± 1.54
Behavior	2.44±1.33(89)	1.66±1.46(133)	p <.001	2.49± 1.68	3.40± 1.35	2.23± 1.68	2.89± 1.47
Problems	4.53±0.67(89)	4.27±0.75(127)	p=.012	5.19± 0.95	5.40± 0.68	4.50± 1.09	5.04± 0.67
SFQ overall	**3.47±0.89(91)**	**2.46±1.09(133)**	p <.001	**3.23±1.24**	**3.93±0.80**	**2.62±1.28**	**3.33±1.03**

Table 4

Summary of Linear Regression Models

	Female[1]	Sexually inactive in past month[2]	Age[3]	Baseline BMI[4]	Non-White[5]	Not married[6]	Education Level[7]
Dimension	B						
Interest	−1.65	−1.12	-	-	-	0.54	-
Desire	−1.11	−1.19	−0.03	-	-	-	-
Arousal	−1.14	−1.66	−0.03	−0.05	-	-	-
Orgasm	−0.78	−3.11	-	-	-	-	-
Satisfaction	−0.73	−3.15	-	-	-	-	-
Behavior	−0.55	−1.88	-	−0.04	-	-	-
Relationship	-	−1.24	0.02	-	-	-	-
Masturbation	−0.77	−0.98	-		−0.68	0.89	0.34
Problems	−0.38		-	-	-	0.38	-
SFQ Overall Scores	−0.80	−1.69	-	-	-	-	-

"–" Not significant

Reference group:

1. Male
2. Sexually active in past month
3. Per year
4. Per BMI unit
5. White
6. Married
7. Per level of education