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Sexual Functioning of Men and Women with Severe Obesity Prior to Bariatric Surgery

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Abstract

Background: Obesity may impair sexual function through multiple mechanisms, but little is known about sexual dysfunction among adults with severe obesity seeking bariatric procedures.

Objectives: To describe sexual functioning, and associated factors, before bariatric surgery.

Setting: 10 US clinical facilities.

Methods: Before bariatric surgery, 2,225 Longitudinal Assessment of Bariatric Surgery-2 study participants (79% female; median age of 45 years and body mass index of 46 kg/m²) completed a survey about past month sexual function. Mixed effects ordinal logistic regression models were used to identify factors independently related to four domains of sexual function, each on a five point scale.

Results: Twenty-six percent of women and 12% of men reported no sexual desire. One third of women (34%) and a quarter of men (25%) were not sexually active, alone or with a partner. Physical health limited sexual activity at least moderately in 38% of women and 44% of men. About half of women (49%) and men (54%) were moderately or very dissatisfied with their sexual life. Among women, older age, white race, urinary incontinence, depressive symptoms and

antidepressant medication use were associated with poorer sexual function in multiple domains. In men, older age, not being married, depressive symptoms, and antidepressant medication use were associated with poorer sexual function in multiple domains.

Conclusions: Before bariatric surgery, approximately half of men and women with severe obesity are dissatisfied with their sexual life. Older age, severity of depressive symptoms and antidepressant medication use is associated with poorer sexual function in both sexes.

INTRODUCTION

Over 40% of women and 30% of men in the U.S. general population experience problems with at least one aspect of sexual functioning¹. Higher rates of sexual dysfunction are reported among individuals who have poor physical and emotional health¹. Several studies also suggest an inverse relationship between body mass index (BMI) and sexual function.² In particular, obesity, and/or several obesity-related comorbidities, can impair sexual function and sexual quality of life^{2,3}. Additionally, some data suggest that sexual quality of life may be worse among adults seeking bariatric surgery, compared to individuals with obesity not seeking surgical treatment, even after controlling for BMI^{4,5}.

Definitions and assessments used to describe sexual function vary widely across studies, complicating direct comparison of prevalence rates. Nevertheless, studies examining sexual functioning prior to bariatric surgery have consistently reported high levels of impairment. For example, Bond and colleagues⁶ reported that approximately 60% of bariatric surgery seeking women (N=102) experienced sexual dysfunction. In addition, comparison studies have reported higher degrees of sexual dysfunction in surgical groups. For example, Assimakopoulos and colleagues⁷ found that women seeking bariatric surgery (N=60) reported greater impairment in most domains of sexual function relative to healthy control participants. Likewise, Dallal and colleagues⁸ found that sexual function scores were significantly worse on all domains in men seeking bariatric surgery (N=97) relative to published reference controls.

In addition to elevated BMI, several psychiatric and medical conditions are common among adults seeking bariatric surgery, which may contribute to poor sexual function³. For example, mood disorders and resultant antidepressant use, hypertension and associated antihypertensive use, diabetes, cardiovascular disease, obstructive sleep apnea, and urinary incontinence, which are common among pre-surgical patients^{9,10}, have been associated with sexual dysfunction in other populations¹¹⁻¹⁷. However, the contribution of these comorbidities to sexual dysfunction among adults seeking bariatric surgery has not been thoroughly evaluated, in part because the sample sizes in previous studies in this population have not provided sufficient statistical power for modeling.

This study fills a gap in the literature by not only describing the frequency of sexual desire and activity, the degree to which physical health interferes with sexual activity, satisfaction with sexual life, and weight-related sexual quality of life in a large cohort of men and women with severe obesity prior to bariatric surgery, but also identifying factors (e.g., demographics, substance use, comorbid conditions, medication use) associated with each domain of sexual function.

METHODS

Participants

Between February 2006 and February 2009, patients at least 18 years old preparing to undergo their first bariatric surgical procedure from participating surgeons at 10 centers throughout the United States were recruited to participate in LABS-2. Characteristics of the LABS-2 sample (n=2,458) who underwent a bariatric surgical procedure by April 2009 have been previously reported¹⁸. The institutional review boards (IRBs) at each center approved the protocol and all participants gave written informed consent to participate in the study. This report utilizes the baseline research assessment, conducted within 30 days prior to scheduled surgery dates.

Measures

Sexual Function—Structured, self-administered questionnaire items were used to assess sexual activity and function in all LABS-2 participants, regardless of history of sexual activity. The sexual function questionnaire was administered as part of a larger packet of self-report questionnaires and was accompanied by verbal instructions or a cover page reminding the participant that information they provided would be kept strictly confidential. Questionnaire items were compiled from The Sexual Function Questionnaire (SFQ)¹⁹, the PRIDE sexual function questionnaire²⁰, and the Female Sexual Function Index²¹, and standardized to assess the past month. Frequency of sexual desire was assessed with six response options, ranging from “not at all” to “more than once a day.” The same six response options were used to assess frequency of sexual activity, which was defined as engaging in any activity that was arousing, with or without a partner. Responses to “once a day” and “more than once a day” were rare and combined into one category, “at least once a day”. The degree to which physical health limited sexual activity was assessed with five response options, ranging from “not at all” to “extremely.” In addition, participants were asked yes/no questions to indicate whether various aspects of their physical health (e.g., fatigue, embarrassment, pain, difficulty with function) limited their sexual activity, and among those reporting no sexual activity, reasons for no sexual activity (e.g., no partner, partner not interested). Satisfaction with sexual life was assessed by asking participants to report how satisfied they were with their overall sexual function, using one of five response options ranging from “very dissatisfied” to “very satisfied”. Weight-related sexual quality of life was also examined with the Impact of Weight on Quality of Life-Lite (IWQOL-Lite) questionnaire’s sexual life subscale²². This subscale contains 4-Likert-scale items which assesses the degree to which weight impacts sexual activity and function. Possible scores range from 0–100, where a higher score indicates better sexual function.

Medication Use.—Using a study-specific medication form²³, participants recorded the names and frequency of use of all prescribed medications taken within the past 90 days. Medication(s) from specified therapeutic classes thought to influence sexual function were identified based on prior literature^{24,25}. Due to the low frequency of individual therapeutic classes of medications, medications were grouped into broader categories, some of which were sex-specific. Among men and women, antidepressant medications other than bupropion, trazodone, mirtazapine or nefazodone were categorized as antidepressant

medications that may impair sexual function. Among men, beta-adrenergic blockers and diuretics were categorized as antihypertensive medications that may impair sexual function. Among men, phosphodiesterase type 5 inhibitors, bupropion, and androgens were categorized as medications that may improve sexual function. Among women, phosphodiesterase type 5 inhibitors and bupropion were categorized as medications that may improve sexual function. In addition, among women, estrogens, progestins, and androgens, either alone or in combination, were categorized as medications that may impact sexual function (direction unknown).

Sociodemographics, Body Mass Index, Comorbid Conditions—Questionnaires created specifically for LABS-2 were used to collect data on age, sex, race, ethnicity, education, marital status, smoking status, menopausal status, pregnancy and prior live or still birth²⁰. While participants were in light-weight clothing with bare feet, a wall-mounted stadiometer was used to measure height to the nearest inch and a calibrated scale (model TBF-310, Tanita, Arlington Heights, IL) was used to measure weight to the nearest pound. Measurements were then converted to meters and kilograms, respectively, and BMI was calculated as weight (kg) divided by height squared (m²). The Alcohol Use Disorder Identification Test (AUDIT)²⁶ was used to determine presence of alcohol use disorder symptoms²⁷. Depression symptoms over the past week were determined with the Beck Depression Inventory, version 1 (BDI-1)²⁸. Scores on the BDI-1 range from 0–63, with higher points indicating greater severity of symptoms. No points were assigned to the BDI item assessing weight loss (e.g. I have lost more than 5 pounds) for participants who endorsed the statement, “I am purposefully trying to lose weight by eating less.” Data sources for assessment of medical comorbidities (i.e., diabetes with and without insulin, dyslipidemia, sleep apnea, cardiovascular disease, urinary incontinence) included self-report, abstraction from medical records, patient interview, physical examination, and laboratory assays; comorbidity and assay descriptions have been published previously¹⁸.

Analysis

Analyses were stratified by sex. Descriptive statistics were used to summarize baseline characteristics, including frequencies and percentages for categorical data, and medians and 25th–75th percentiles for continuous data.

Mixed effects ordinal logistic regression models were used to identify the factors independently related to frequency of sexual desire, frequency of sexual activity, degree to which physical health limits sexual activity and satisfaction with sexual life (each on a five point scale). Linear mixed models were used to identify factors independently related to IWQOL-Lite sexual life score. Correlation among patients in the same site was accounted for by the inclusion of different random intercepts for sites. Based on prior literature^{29,30} the following variables were included in each model: age, race, ethnicity, BMI, depressive symptoms, marital status, medications that may impair sexual function, medications that may improve sexual function, and menopause. In addition, the following variables were entered and retained through backward elimination if they reached statistical significance ($P < .05$) given either prior established or anticipated associations with sexual functioning: education, smoking status, alcohol use disorder symptoms, prior live or still birth,

hypertension, diabetes with and without insulin, dyslipidemia, sleep apnea, cardiovascular disease, urinary incontinence, and medications that might impact (direction unknown) sexual function. Menopausal status, prior live or still birth and medications that might impact sexual function (direction unknown) were considered among women only. Adjusted odds ratios (OR) or beta coefficients and 95% CI are reported. Because the parallelism assumption was met in the ordinal logistic regression models, one coefficient, the odds of being in the next lower category, is reported for each independent variable³¹.

Analyses were conducted using SAS versions 9.3 and 9.4 (SAS Institute Inc., Cary, NC). All reported p-values are two-sided; p-values less than 0.05 are considered to be statistically significant.

RESULTS

Baseline Characteristics

This report includes 2225 of 2458 (90.5%) LABS-2 participants, whose sexual function was assessed prior to surgery. The median age was 46 years (25th, 75th percentile: 37, 54) and median BMI was 46 kg/m² (25th, 75th percentile: 42, 51). The majority of participants were female (78.7%) and white (86.2%). Participant demographic and comorbidity characteristics are shown in Table 1 by sex. About two-thirds were married or living as married (62.1% women, 71.5% men).

Domains of Sexual Function

Table 2 shows parameters of sexual function by sex. Approximately half of women (49.1%) and one fifth of men (21.5%) reported either experiencing no sexual desire at all (25.6% and 11.7%, respectively) or desire once in the last month (23.5% and 9.8% respectively). Approximately a third of women (34.2%) and a fourth of men (24.5%) reported no sexual activity, alone or with a partner, over the past month. The most common reason reported for no sexual activity in the past month by women and men, respectively, was being too tired/not interested (55.8%) and physical problems (52.3%). Almost half of women (48.9%) and over half of men (53.9%) were moderately or very dissatisfied with their sexual function. Physical health limited sexual activity at least moderately in 38.3% of women and 43.5% of men, most commonly due to fatigue, low energy, or not being interested (88.2% women, 71.3% men) and difficulty becoming aroused, achieving orgasm, or having another functional difficulty (63.4% women, 69.5% men).

Factors Associated with Sexual Function Domains

Women—Associations between demographic and clinical characteristics and sexual function among women are shown in Table 3. Greater depressive symptoms were associated with poorer sexual function for all four domains (desire, frequency, satisfaction, physical health-related limitations on sexual activity). Older age, white race marital status, having urinary incontinence, and antidepressant medication use were also related to poorer sexual function in multiple domains, while less education, alcohol use disorder symptoms, higher BMI, cardiovascular disease, being menopausal, and hormonal medication use were related to poorer sexual function in one domain. Many of the same factors were related to the

IWQOL-Lite sexual life score (i.e., white race, depressive symptoms, cardiovascular disease, urinary incontinence, antidepressant medication use). Additionally, no prior live or still birth was associated with a lower IWQOL-Lite sexual life score.

Men—Associations between demographic and clinical characteristics and sexual function among men are shown in Table 4. Older age was associated with poorer sexual function for all four domains. Not being married, greater depressive symptoms, and antidepressant medication use were also related to poorer sexual function in multiple domains, while less education, higher BMI and diabetes were each related to poorer sexual function in one domain. Older age, not being married, higher BMI, and depressive symptoms were associated with a lower IWQOL-Lite sexual life score.

Hispanic ethnicity, smoking status, hypertension, dyslipidemia, sleep apnea, and “medications that may improve sexual function” (i.e., phosphodiesterase type 5 inhibitors or bupropion; among men only, also androgens) were not independently related to any sexual function domains among women or men.

DISCUSSION

In this large, multicenter, observational study of both men and women with severe obesity, self-reported rates of impairment in sexual function were very high. Approximately half of men and women reported at least moderate dissatisfaction with their sexual life. This finding is consistent with high rates of sexual dysfunction and dissatisfaction observed in previous smaller studies of adults seeking bariatric surgery⁶⁻⁸. Additionally, the median IWQOL-Lite sexual life scores in women (50.0?) and men (62.5), were substantially lower than mean IWQOL-Lite sexual life scores from community based samples (mean 95.1 ± 13) and are similar to other bariatric surgery samples (45.8 ± 31.8)³². Collectively, these data provide convincing evidence that impairment in sexual function among bariatric surgery seeking men and women is prevalent.

About one-third of women and one-fourth of men reported no sexual activity in the past month. Women most commonly attributed no sexual activity to being too tired/not interested or not having a partner/having a partner who is not physically present, while men most commonly attributed no sexual activity to physical problems. Approximately 40% of all women and men reported that physical health limited their sexual activity to at least a moderate degree, most commonly as a result of 1) fatigue/low energy/not being interested and 2) difficulty becoming aroused/achieving orgasm/having another functional difficulty. These data suggest that a sizable portion of men and women with severe obesity consider their physical health a barrier to sexual activity.

Factors independently associated with sexual function outcomes in multivariable analysis differed by sex and domain of sexual function. Still, older age, not being married, depressive symptoms and antidepressant medication were negatively related to multiple domains of sexual function among women and men. In particular, severity of depressive symptoms was related to all outcomes among women and three of five outcomes among men. Likewise, prior smaller studies have shown an association between depression and some aspects of

sexual function among bariatric surgery candidates^{7,33}. A causal relationship wherein depressive symptoms lead to worse sexual function cannot be established from these data. However, a bidirectional relationship between depression and sexual dysfunction has been supported by a recent meta-analysis¹⁴.

We also found that antidepressant use (excluding bupropion, mirtazapine, nefazodone and trazodone) was associated with significantly less frequent sexual desire, less frequent sexual activity, and higher degree of physical limitations to sexual activity among both women and men. Among women only, antidepressant medication use was also significantly associated with lower IWQOL-Lite sexual life score. While it is well-established that the majority of commonly used antidepressant medications cause impairment in most domains of sexual functioning¹³, the association between medication use and sexual function in bariatric samples has previously received very limited attention. In this study, we show that the association is independent of depressive symptoms, which may continue even with the use of antidepressants. However, a limitation in interpretation of cross sectional data is that temporality cannot be established (i.e., antidepressant use could have occurred following poor sexual function). Nevertheless, given that over a third of women and a quarter of men in this study reported taking relevant antidepressant medications, it is possible that a significant number of adults seeking bariatric surgery experience sexual dysfunction secondary to the use of these medications.

Specific physical comorbidities were also related to specific aspects of sexual function. For example, among women, cardiovascular disease was related to lower desire and a lower IWQOL-Lite sexual life score, while urinary incontinence was related to higher degree that physical health limits sexual activity, lower sexual life satisfaction and lower IWQOL-Lite sexual life score. Among men, diabetes was related to higher degree that physical health limits sexual activity, although surprisingly, the association was only significant among those not taking insulin. While BMI was associated with degree that physical health limits sexual activity in both sexes, and lower IWQOL-Lite sexual life score among men, BMI was not independently associated with frequency of sexual desire, sexual activity, or satisfaction with sexual life in either sex. Some prior studies of patients planning to undergo bariatric surgery have shown a relationship between BMI and sexual function^{7,8}, whereas other research has not shown this association⁶. However, our statistical modeling included several potential confounders of weight status and sexual function, i.e., depressive symptoms, medical comorbidities, and medication use, many of which have not been comprehensively evaluated in prior research. Thus, it is unclear from most of the available literature whether obesity independently contributes to sexual dysfunction or whether obesity-related comorbidities are responsible for this association. It is also possible that among adults presenting for bariatric surgery, who generally have a BMI of at least 40 kg/m² or a BMI of at least 35 kg/m² with a serious weight-related comorbidity, additional increases in BMI are not associated with several aspects of sexual function.

There are several limitations to consider when interpreting these data. Data were collected up to 30 days prior to undergoing a major surgical procedure, which could have altered sexual function in the previous month. With the exception of the IWQOL-Lite, the questionnaires used to assess sexual function in this study were not validated in their present

form, although the questions were adapted from validated instruments. Relationship quality and history of sexual abuse may also impact sexual function and could not be addressed with these data. Finally, this was a cross sectional analysis which precludes establishing causality. Associations between sexual function and medication use should be tested using rigorous, randomized, interventional designs to confirm findings.

Overall, these data demonstrate high rates of impairment in multiple domains of sexual function among men and women with severe obesity who are planning to undergo bariatric surgery. Symptoms of depression and antidepressant use are independently negatively associated with most domains of sexual function among bariatric surgery seeking men and women and should be specifically examined in future research.

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Table 1.

Demographic and clinical characteristics of adults with severe obesity prior to bariatric surgery, by sex.

Characteristic	Female (N=1751) ^a		Male (N=474) ^a	
	n	% ^b	n	% ^b
Age, years, median (25 th , 75 th percentile)	45.0	(36.0, 53.0)	48.0	(39.0, 57.0)
Age group, years				
<30	158	9.0	28	5.9
30–39	452	25.8	99	20.9
40–49	494	28.2	126	26.6
50–59	474	27.1	133	28.1
60	173	9.9	88	18.6
Race				
White	1483	85.6	434	92.7
Black	191	11.0	26	5.6
Other	59	3.4	8	1.7
Hispanic/Latino ethnicity				
Yes	93	5.3	18	3.8
No	1657	94.7	455	96.2
Education				
High school or less	399	22.9	106	22.5
Some college/post high school education	713	40.9	186	39.4
College degree or higher	630	36.2	180	38.1
Marital status				
Married/living as married	1081	62.1	338	71.5
Divorced/separated	332	19.1	62	13.1
Widowed	43	2.5	3	0.6
Never married	285	16.4	70	14.8
Current or recent smoker				
Yes	239	13.7	52	11.0
No	1510	86.3	421	89.0
Alcohol use disorder symptoms				
Yes	111	6.4	34	7.2
No	1629	93.6	438	92.8
Body mass index, kg/m ² , median (25 th , 75 th percentile)	45.6	(41.6, 50.9)	47.3	(42.6, 53.0)
Beck Depression Inventory Score, median (25 th , 75 th percentile)	6.0	(3.0, 11.0)	5.0	(2.0, 10.0)
missing	98		29	
Diabetes				
Yes	527	31.2	216	47.1
Without insulin	336	20.2	109	24.7
With insulin	163	9.8	90	20.4
No	1164	68.8	243	52.9

Characteristic	Female (N=1751) ^a		Male (N=474) ^a	
	n	% ^b	n	% ^b
Hypertension				
Yes	1120	64.7	378	80.4
No	610	35.3	92	19.6
Dyslipidemia				
Yes	975	61.7	355	75.1
No	604	38.3	118	24.9
Sleep apnea				
Yes	821	46.9	355	75.1
No	929	53.1	118	24.9
Cardiovascular disease				
Yes	91	5.2	86	18.2
No	1653	94.8	387	81.8
Urinary Incontinence				
Yes	849	48.8	100	21.4
No	891	51.2	368	78.6
Menopausal status			NA	NA
No	934	53.3		
Yes	511	29.2		
Unknown	306	17.5		
Number of prior live or still births			NA	NA
0	423	26.5		
1	263	16.5		
2	496	31.1		
3 or more	412	25.8		
Medications that may improve sexual function ^a	121	7.0	34	7.4
Antidepressant medications that may decrease sexual function ^b	621	36.3	116	25.3
Antihypertensive medications that may decrease sexual function ^c	NA	NA	160	34.9
Other hormonal meds that may affect sexual function ^d	114	6.6	NA	NA

NA= not applicable

Values are expressed as number (%) unless otherwise indicated. The number of participants across categories may not sum to the total number of participants due to missing data.

^aPhosphodiesterase type 5 inhibitors and bupropion. Among men only, also androgens.

^bAntidepressant medications other than bupropion, trazodone, mirtazapine or nefazodone.

^cBeta-adrenergic blockers and diuretics.

^dEstrogens, progestins, and androgens, either alone or in combination.

Table 2.

Sexual function of adults with severe obesity prior to bariatric surgery, by sex

Characteristic	Female (N=1751) ^a		Male (N=474) ^a	
	n	% ^b	n	% ^b
Frequency of sexual desire in past month				
Not at all	437	25.6	55	11.7
Once a month	401	23.5	46	9.8
Once a week	346	20.3	86	18.3
A few times a week	402	23.6	170	36.2
At least once a day	118	6.9	113	24.0
Frequency of sexual activity in past month				
Not at all	586	34.2	115	24.5
Once a month	387	22.6	66	14.1
Once a week	399	23.3	111	23.7
A few times a week	293	17.1	138	29.4
At least once a day	47	2.7	39	8.3
Reasons for no sexual activity in past month				
Not applicable	1165		359	
Too tired/ not interested	310	55.8	38	35.8
Physical problems	123	22.4	56	52.3
No partner or partner not physically present	250	44.9	35	32.7
Partner not interested	97	18.0	31	29.5
Physical health limited sex in past month				
Not at all	653	39.5	162	35.8
Slightly	368	22.3	94	20.8
Moderately	239	14.5	75	16.6
Quite a bit	205	12.4	65	14.3
Extremely	188	11.4	57	12.6
Ways physical health limited sexual activity				
Not applicable	751		183	
Fatigue or low energy/not interested	865	88.2	201	71.3
Difficulty becoming aroused/ having orgasm/functional difficulty	611	63.4	198	69.5
Embarrassment/fear of hurting partner	526	54.6	137	49.5
Pain/discomfort/fear of damaging health	333	34.9	67	24.8
Satisfaction with sex life				
Very dissatisfied	470	29.0	167	36.6
Moderately dissatisfied	323	19.9	79	17.3
About equally satisfied and dissatisfied	335	20.7	89	19.5
Moderately satisfied	261	16.1	79	17.3
Very satisfied	232	14.3	42	9.2
IWQOL-Lite Sexual Score (median, IQR)				
	50.0	(25.0, 75.0)	62.5	(31.3, 87.5)
missing	88		10	

Values are expressed at number (%) unless otherwise indicated. The number of participants across categories may not sum to the total number of participants due to missing data.

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Associations^a between sociodemographic and clinical characteristics and sexual function among women with severe obesity prior to bariatric surgery.

Table 3.

	Lower frequency of sexual desire		Lower frequency of sexual activity		Higher degree physical health limits sexual activity		Lower satisfaction with sex life		Lower IWQOL-Lite sexual life score	
	OR (95%CI)	P	OR (95%CI)	P	OR (95%CI)	P	OR (95%CI)	P	β (95%CI)	P
Age, per 10 year	1.56 (1.31–1.86)	<0.001	1.60 (1.35–1.90)	<0.001	1.11 (0.93–1.33)	0.23	1.00 (0.84–1.19)	0.98	1.06 (–0.89–3.02)	0.29
White race (Ref.=black/other race)	1.61 (1.09–2.36)	0.02	1.53 (1.04–2.25)	0.03	1.19 (0.80–1.76)	0.39	1.58 (1.07–2.33)	0.02	10.03 (5.77–14.30)	<.0001
Hispanic ethnicity (Ref.=No)	0.69 (0.36–1.32)	0.26	1.22 (0.64–2.32)	0.55	1.00 (0.53–1.92)	0.99	0.79 (0.42–1.50)	0.48	3.90 (–3.77–11.57)	0.32
Education (Ref.= College degree)		0.001								
Some college	1.22 (0.92–1.63)									
High school degree or less	1.92 (1.36–2.71)									
Not married/living as married (Ref.=Yes)	1.26 (0.96–1.66)	0.09	2.45 (1.86–3.23)	<0.001	0.28 (0.21–0.37)	<.0001	1.00 (0.76–1.31)	0.97	0.10 (–2.98–3.19)	0.95
Alcohol use disorder symptoms (Ref.=Yes)			1.98 (1.18–3.32)	0.01						
BMI, per 5 kg/m ²	0.94 (0.86–1.03)	0.16	1.06 (0.97–1.16)	0.19	1.14 (1.04–1.25)	0.004	0.94 (0.86–1.03)	0.19	–0.29 (–1.29–0.72)	0.58
Beck Depression Inventory score, per 5 points	1.33 (1.20–1.48)	<.0001	1.25 (1.13–1.39)	<.0001	1.89 (1.70–2.11)	<.0001	1.84 (1.65–2.05)	<.0001	9.52 (8.36–10.68)	<.0001
Cardiovascular disease (Ref.=No)	2.35 (1.30–4.25)	0.005							12.64 (5.83–19.45)	0.0003
Urinary incontinence (Ref.=No)	1.49 (0.96–2.30)	0.07	1.69 (1.09–2.62)	0.02	1.68 (1.29–2.19)	0.0001	1.64 (1.26–2.13)	0.0002	7.90 (4.95–10.84)	<.0001
Menopausal (Ref.=No)					1.02 (0.66–1.59)	0.92	0.99 (0.64–1.54)	0.98	–4.15 (–9.05–0.75)	0.10
Prior live or still birth (Ref.=No)									–3.68 (–6.89–0.48)	0.02
Antidepressant medications that may decrease sexual function (Ref.=No)	1.61 (1.22–2.12)	0.001	1.60 (1.21–2.12)	0.001	1.42 (1.07–1.87)	0.01	1.30 (0.98–1.72)	0.07	4.54 (1.42–7.66)	0.004
Medications that may increase sexual function (Ref.=No)	0.87 (0.53–1.42)	0.57	1.05 (0.64–1.73)	0.85	0.72 (0.44–1.19)	0.20	1.64 (1.26–2.13)	0.19	1.31 (–4.28–6.91)	0.65
Hormonal medications with unknown impact on sexual function ^d					2.02 (1.21–3.37)	0.01				

^a Adjusted odds ratios (OR) from mixed effects ordinal logistic regression models or Beta coefficients from a generalized linear mixed model and 95% CI are reported. OR represent the odds of being in the next lower category

^b Antidepressant medications other than bupropion, trazodone, mirtazapine or nefazodone.

^cPhosphodiesterase type 5 inhibitors and bupropion.
^dEstrogens, progestins, and androgens, either alone or in combination.

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Associations between sociodemographic and clinical characteristics and sexual function among men with severe obesity prior to bariatric surgery.

Table 4.

	Lower frequency of sexual desire		Lower frequency of sexual activity		Higher degree physical health limits sexual activity		Lower satisfaction with sex life		Lower IWQOL-Lite sexual life score	
	OR	P	OR	P	OR	P	OR	P	β	P
Age, per 10 year	2.07	<0.0001	2.08	<0.0001	1.43	0.01	1.85	<0.0001	8.32	<0.0001
White race (Ref.=black/other race)	0.94	0.91	1.83	0.23	0.80	0.66	0.56	0.25	-0.70	0.90
Hispanic ethnicity (Ref.=No)	0.60	0.55	0.98	0.97	1.46	0.61	1.17	0.82	-1.94	0.80
Education (Ref.= College degree)										
Some college			1.70	0.02						
High school degree or less			2.48							
Not married/living as married (Ref.=Yes)	1.73	0.12	1.87	0.04	0.66	0.19	1.93	0.03	6.75	0.049
BMI, per 5 kg/m ²	1.09	0.37	1.02	0.86	1.25	0.01	1.05	0.54	2.19	0.02
Beck Depression Inventory score, per 5 points	1.22	0.07	1.00	0.96	1.74	<0.0001	1.93	<0.0001	7.46	<0.0001
Diabetes (Ref.=No diabetes)										
Without insulin					2.98	0.01				
With insulin					1.41					
Anti-depressant medications that may decrease sexual function ^b (Ref.=No)	1.97	0.04	2.40	0.003	1.74	0.07	1.11	0.73	7.12	0.03
Anti-hypertensive medications that may decrease sexual function (Ref.=No)	0.81	0.49	0.90	0.69	1.22	0.49	1.11	0.70	3.11	0.31
Medications that may increase sexual function ^d (Ref.=No)	1.28	0.65	0.68	0.45	0.79	0.63	0.70	0.49	0.99	0.86

^a Adjusted odds ratios (OR)^a from mixed effects ordinal logistic regression models or Beta coefficients from a generalized linear mixed model and 95% CI are reported. OR represent the odds of being in the next lower category

^b Antidepressant medications other than bupropion, trazodone, mirtazapine or nefazodone.

^c Beta-adrenergic blockers and diuretics were categorized as antihypertensive medications that may impair sexual function.

Phosphodiesterase type 5 inhibitors, bupropion, and androgens

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