

Received: 2018.10.14
Accepted: 2018.12.02
Published: 2019.04.27

Sexual Dysfunctions in Obese Women Before and After Bariatric Surgery

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABCDEF 1 **Dita Pichlerova**
CDEG 1 **Petr Bob**
B 2 **Jana Zmolikova**
B 3 **Jitka Herlesova**
G 1 **Radek Ptacek**
E 1 **Matthew K. Laker**
G 1 **Jiri Raboch**
B 4 **Tomas Fait**
B 5 **Petr Weiss**

1 Department of Psychiatry, First Faculty of Medicine, Charles University, Prague, Czech Republic
2 Department of Clinical Psychology, Na Homolce Hospital, Prague, Czech Republic
3 OB Clinic, Prague, Czech Republic
4 Department of Gynecology and Obstetrics, General Faculty Hospital, 1st Medical Faculty, Charles University, Prague, Czech Republic
5 Institute of Sexology, First Faculty of Medicine, Charles University Prague, Prague, Czech Republic

Corresponding Author: Petr Bob, e-mail: petrbob@netscape.net
Source of support: This work was supported by Charles University grants (Progress and SVV)

Background: Obesity and associated comorbidities increase the probability of sexual disorders. The present study evaluated sexual satisfaction levels in obese women prior to and following bariatric surgery, utilizing the validated Female Sexual Function Index (FSFI) to also evaluate the sexual satisfaction in obese and non-obese women.





Material/Methods: 60 obese women (mean initial BMI of 43.7 ± 5.9 kg/m²; mean age of 41.7 ± 10.8 years) were administered the questionnaire on sexual function (FSFI) preceding bariatric surgery (laparoscopic adjustable gastric banding, 22 women; gastric plication, 33 women; and biliopancreatic diversion, 5 women), 6 months and 12 months after the procedure, i.e., following substantial weight reduction (final mean BMI of 35.5 ± 5.5 kg/m²). The control group comprised 60 non-obese women (mean BMI of 22.2 ± 1.9 kg/m²; mean age of 36.4 ± 10.7 years).

Results: Our findings indicate that baseline sexual function in the preoperative obese females was significantly lower than in non-obese women, with $p < 0.01$ in each domain. Data gathered at the 6- and 12-month points following the procedure indicated no significant difference. Before the procedure, 31 obese subjects (51.6%) exceeded the cutoff for FSD, at the 6-month evaluation point, 17 women (39.5%) exceeded the cutoff, and at 12 months postoperatively, 18 subjects (41.9%) exceeded the cutoff, indicative of FSD. Among the non-obese controls, only 9 subjects (15%) exceeded the cutoff threshold.

Conclusions: These findings show that substantive weight reduction resulting from bariatric surgery results in reduced sexual dysfunction in female subjects.

MeSH Keywords: **Bariatric Medicine • Body Mass Index • Obesity, Abdominal • Sexual Dysfunctions, Psychological • Women's Health Services**

Full-text PDF: <https://www.medscimonit.com/abstract/index/idArt/913614>

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Background

An increasing number of people may be considered obese. Fully 66% of Americans are considered by criteria to be overweight or obese [1]. This condition in aggregate creates co-severe morbid health conditions, which in turn tax the health care systems. Associated comorbidities include a predisposition to: type 2 diabetes; dyslipidemia; cardiovascular disease; orthopedic and skin problems; hypertension; and increased prevalence of certain types of cancer. Additionally, the overall quality of life is affected, including psychological and emotional wellbeing. Morbid obesity is associated with psychosocial issues, including psychopathology and substantive reduction in quality of life [2–8]. Additionally, obesity has established correlations with: sexual dysfunctions, erectile dysfunction, hyperandrogenic syndrome: hypogonadism, irregular menstrual cycles, and reduced fertility [9–17]. Sexual dysfunction is probabilistically correlated with increases with class III obesity, female gender, and the act of seeking bariatric procedures (this stands in contradiction to patients undergoing a conservative treatment of obesity or alternately in obese people subjects who do not intend weight reduction) [2,18,19]. Weight reduction following a bariatric procedure has a significant positive effect on sexual behavior [2,20,21], which is independent of the degree of weight reduction [17]. Conversely, some subjects experience negative impacts on sexuality [22], likely attributable to dissatisfaction with the corporal changes following a large weight reduction, e.g., aesthetically displeasing “loose skin” remaining on the abdomen, thighs, and arms [19], and residual psychological effects of a long-term impaired body image [23], or as a consequence of escalated preoperative partnership problems [24].

Obese women typically experience low self-esteem and poor self-acceptance of body image, often experience difficulty with interpersonal relationships. Due to sexuality's intrinsic connection to these aspects, it is apparent that obese women experience a lower quality of sexual life. Obese women typically report a greater number of sexual partners [25] and less use of hormonal contraception, and subsequently experience a higher percentage of unwanted pregnancies [26–28]. Obese women experience the occurrence of sexual dysfunctions at a higher rate [25], and a higher prevalence of early-age sexual abuse and traumas are reported [29–32]. A negative correlation exists between measured body mass index (BMI) and the capacity to experience orgasm, although the desire for sexual activity and intercourse is not associated with BMI [33,34].

Weiss and Zverina in 2008 conducted research on sexual behavior in the Czech Republic [35], finding that fully 20% of surveyed respondents had experienced sexual dysfunction during their lives. No recent research has been conducted in the Czech Republic pertaining to the sexuality of obese women.

The only pertinent and available sources are the studies of Raboch and Danes [36,37]. Additionally, limited amounts of research have been conducted for the purpose of examining occurrence and mechanisms of sexual dysfunction in the obese, particularly in patients with class II and III obesity (BMI ≥ 35 kg/m²).

The current study's objective was to evaluate sexual function in obese female subjects (BMI ≥ 35 kg/m²) prior to and following a weight reduction induced by a bariatric surgical procedure. We used the FSFI, a validated measurement instrument, to assess the rate at which FSD was alleviated at postoperative 6- and 12-month evaluation points. Further, the present study examined the improvement of postoperative FSFI. We report our prospective analysis of female sexual function prior to and following a bariatric procedure, seeking an analysis in the change in sexual function following a substantive weight reduction.

Material and Methods

Participants and procedures

Our group consists of 120 women, all possessing a stable, sexually active intimate partner relationship. Sixty subjects are obese females (BMI ≥ 35 kg/m²) intending to undergo a bariatric surgery procedure. Between 2010 and 2011, these subjects underwent laparoscopic adjustable gastric banding (22 women), gastric plication (33 women), and biliopancreatic diversion (5 women). The control group comprised 60 non-obese women (BMI ≤ 25 kg/m²).

The subjects provided data on their health history, medication usage, and demographics and completed the FSFI prior to surgery and at 6- and 12-month evaluation points.

All subjects were requested to provide informed consent. No compensation was received for participation in the current study.

Measures

The previously validated FSFI [38] was utilized to evaluate the multidimensional aspects of sexual functioning. The FSFI consists of 19 questions comparing 6 sexual function domains: sexual arousal (4 items: frequency, level, confidence and satisfaction); sexual desire (2 items: frequency and desire level); sexual satisfaction (3 items: the level of closeness with the partner, sexual relationship, and overall sexual life); lubrication (4 items: frequency, difficulty, frequency of maintaining, and difficulty in maintaining); sexual pain (3 items: pain frequency during and after vaginal penetration, and level of pain) and

orgasm (3 items: frequency, difficulty, and satisfaction). The questions were all scored on a scale ranging from 0 (or 1.2) to 6, with lower scores implicating impaired sexual function. The maximum total score is 36. The subjects were asked to respond with their experiences over the preceding 4-week period. The FSFI was evaluated at 3 intervals: preceding surgery and at the postoperative 6- and 12-month evaluation points. The FSFI was also completed by the non-obese control subjects. We utilized the validated FSFI total cutoff score of 26.55 to classify the subject threshold for FSD [39].

Statistical analysis

Paired samples *t* tests were utilized to evaluate the preoperative and postoperative changes in the FSFI total and individual domain scores. We compared the obese subjects' FSFI scores to those of our non-obese control group.

Results

Participants

We included 120 women and their characteristics are indicated in Table 1. All, per report, were involved in a sexually active, stable intimate partner relationship. Sixty subjects were considered obese (BMI ≥ 35 kg/m²) with a mean age of 41.7 \pm 10.8 years (range 21 to 63 years) and mean initial BMI of 43.7 \pm 5.99 kg/m² (range 35 to 57 kg/m²), while average waist circumference was 119 cm (range 92 to 165 cm). Secondary or university education had been completed by 61.7% of them. The average duration of their relationship was 16.7 years, and the average number of children was 1.8. The most frequently reported diagnoses were hypertension (30 patients or 50%), dyslipidemia (19 patients or 31.6%), and diabetes mellitus type 2 (18 patients or 30%).

The control group consisted of 60 non-obese women (BMI ≤ 25 kg/m²) with a mean age of 36.4 \pm 10.7 years (range 21 to 59 years), mean BMI of 22.2 \pm 1.9 kg/m² (range 18 to 25 kg/m²), and average waist circumference 73 cm (range 60 to 88 cm). Secondary or university education had been completed by 91.6% of them. The average duration of the relationship was 11 years, and the average number of children was 0.93. This group was healthy, with the most frequently reported diagnosis being abnormal thyroid function.

The participants completed all evaluations 3 times: before surgery and again at the 6- and 12-month postoperative evaluation points. Mean BMI was reduced from 43.7 kg/m² to 36.4 kg/m² at the 6-month evaluation, and to 35.7 kg/m² at the 12-month postoperative evaluation. The prevalence of treated hypertension and diabetes decreased to 30% and 10%, respectively.

Table 1. Participant characteristics.

Characteristic	Obese group	Control group
	Value	Value
Age (y)	41.7 \pm 10.8	36.4 \pm 10.7
BMI (kg/m ²)	43.7 \pm 5.9	22.2 \pm 1.9
Weight (kg)	120.6 \pm 19.4	64.0 \pm 7.3
Marital status (%)		
Married	66.7	58.3
Divorced	16.7	10.0
Single	11.7	31.7
Widowed	5.0	0
Education (%)		
Basic education	38.3	8.3
High school or University	61.6	91.6
Menopause (%)	28.3	16.6
Frequently reported health conditions (%)		
Hypertension	50.0	5
Dyslipidemia	31.6	0
Diabetes	30.0	0
Abnormal thyroid	23.3	10.0
Depression	18.3	1.7
Frequently reported medications (%)		
Antihypertensive	40.0	3.3
Diabetes medications	25.0	0
Thyroid	23.3	10.0
Hormonal contraception	21.7	25.0
Antidepressants	16.7	1.7

No deaths occurred during the course of the study. Seventeen patients declined participation at the 6-month evaluation point. The follow-up rate was 71.7%.

Female sexual function

Preoperatively, the average FSFI total score of obese subjects was 20.1 \pm 11.7 of a maximum score of 36. Using the validated cutoff threshold of 26.55, 31 of 60 (51.6%) participants were classified as having FSD. The average FSFI total score in our group of non-obese subjects was 30.3 \pm 3.5 ($p < 0.01$), and only 9 of 60 (15%) participants were classified as having FSD

Table 2. (A–C) Comparison of participants' BMI, FSFI total scores and FSD.

A	Controls	Obese pre-surgery	P value
N	60	60	
BMI (kg/m ²)	22.2±1.9	43.7±5.9	0.01
FSFI – total score	30.3±3.5	20.1±11.7	0.01
FSD (%)	15	51.6	
B	Obese pre-surgery	6 months post-surgery	P value
N	60	43	
BMI (kg/m ²)	43.7±5.9	36.3±5.3	0.01
FSFI – total score	20.1±11.7	22.9±12.0	ns
FSD (%)	51.6	39.5	
C	6 months post-surgery	12 months post-surgery	P value
n	43	43	
BMI (kg/m ²)	36.3±5.3	35.5±5.5	Ns
FSFI – total score	22.9±12.0	23.7±11.5	Ns
FSD (%)	39.5	41.9	

($p < 0.01$, Table 2). FSFI total score values of our group of non-obese subjects matched the published normative control values [38]. At the 6-month postoperative evaluation point, the average FSFI total score increased to 22.9 ± 12.0 , and the rate of FSD in this sample decreased to 39.5% (17 of 43 participants). At the 12-month postoperative evaluation point, the mean FSFI total was 23.7 ± 11.5 , and the rate of FSD was 41.9% (17 of 43 participants).

Baseline sexual function in the preoperative obese female was significantly lower than that in the referenced control ($p < 0.01$) in each domain (Table 3). The obese women scored significantly lower in every domain: desire (3.1 ± 1.08 versus 4.1 ± 0.89), arousal (3.1 ± 2.05 versus 4.9 ± 0.92), lubrication (3.7 ± 2.48 versus 5.7 ± 0.44), orgasm (3.4 ± 2.27 versus 5.1 ± 1.21), satisfaction (3.1 ± 2.43 versus 5.2 ± 1.13), and pain (3.7 ± 2.62 versus 5.5 ± 1.09).

Average postoperative FSFI domain scores increased from preoperative levels in all domains (Table 4), but significantly only in the domain of desire. Results at 6 and 12 months after the bariatric surgery did not show significant differences (Table 5). Figure 1 shows a similar pattern of findings across each of the individual FSFI domains.

Table 3. FSFI domain in obese versus controls.

	Obese	Controls	
n	60	60	P value
Domain	Mean ±SD	Mean ±SD	
Desire	3.1 ± 1.08	4.1 ± 0.89	0.01
Arousal	3.1 ± 2.05	4.9 ± 0.92	0.01
Lubrication	3.7 ± 2.48	5.7 ± 0.44	0.01
Orgasm	3.4 ± 2.27	5.1 ± 1.21	0.01
Satisfaction	3.1 ± 2.43	5.2 ± 1.13	0.01
Pain	3.7 ± 2.62	5.5 ± 1.09	0.01

Table 4. FSFI domain in obese pre-surgery vs. post-surgery patients.

	Obese	Obese 12 months post-surgery	
n	60	43	P value
Domain	Mean ±SD	Mean ±SD	
Desire	3.1 ± 1.08	3.7 ± 1.02	0.01
Arousal	3.1 ± 2.05	3.6 ± 2.06	ns
Lubrication	3.7 ± 2.48	4.2 ± 2.27	ns
Orgasm	3.4 ± 2.27	3.8 ± 2.17	ns
Satisfaction	3.1 ± 2.43	4.0 ± 2.25	ns
Pain	3.7 ± 2.62	4.4 ± 2.32	ns

Table 5. FSFI domain in post-surgery patients.

	Obese 6 months post-surgery	Obese 12 months post-surgery	
n	43	43	P value
Domain	Mean ±SD	Mean ±SD	
Desire	3.6 ± 0.98	3.7 ± 1.02	ns
Arousal	3.6 ± 1.99	3.6 ± 2.06	ns
Lubrication	4.0 ± 2.43	4.2 ± 2.27	ns
Orgasm	3.8 ± 2.32	3.8 ± 2.17	ns
Satisfaction	3.8 ± 2.46	4.0 ± 2.25	ns
Pain	4.1 ± 2.57	4.4 ± 2.32	ns

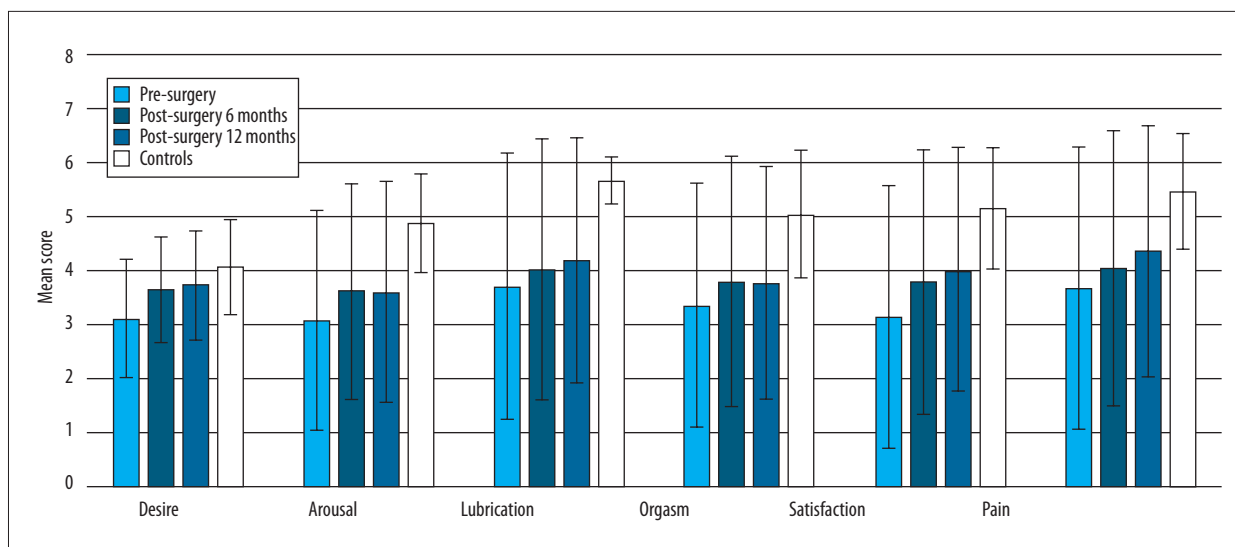


Figure 1. Pattern of findings across each of the individual FSFI domains.

Discussion

In this study we assessed female sexual function utilizing validated measures of obese women. The current study shows that the degree of sexual dysfunction is significantly greater in obese women than in non-obese control subjects. More than 50% of obese subjects exceeded the cutoff threshold indicating the presence of FSD, while in the control subjects it was only 15%. A significant difference in all domains was found. Our findings support the findings of previous studies indicating that women who are overweight or obese exhibit lower sexual functioning than normal-weight women [19,33,40,41]. Bond [18], for example, suggests that the prevalence of sexual dysfunction in women seeking bariatric surgery may approach 60%. Although FSD is a complex problem, it appears that obesity plays an important role.

We also evaluated whether FSD resolves postoperatively. Previous studies have indicated a significant increase in sexual function following bariatric surgery [17,22,23]. The result of the current study indicates a substantive improvement in FSD following bariatric surgery (51.6% before vs. 39.5% after). However, it remained at a level exceeding 200% of the control group's scores.

Parameters across the domains exhibited substantive improvement. However, examination of the differential in mean value between the heterogeneous sets of characteristics reveals differences which are not obvious in the individual parameters of FSFI. However, given the large number of study participants, we may assume that the results would be significant in all domains.

The current study and analysis has several inherent limitations. The mechanisms of obesity-related sexual dysfunction are multifactorial. Obese persons suffer from metabolic syndrome, diabetes, and hypertension, as well as additional comorbidities that may be associated with sexual dysfunction. The relationship between short-term improvements of these comorbidities and improved sexual function remains unclear. Additional research method enhancements such as utilizing larger sample sizes with standardize measures and with longer postoperative intervals, are lacking. Additionally, females tend to have a more complex sexuality than males, and the effects of body image, depression, and other psychopathology remain unclear. Morbidly obese patients who are seeking bariatric surgery may have higher levels of medical comorbidity and may experience lower quality of life than morbidly obese patients not seeking bariatric surgery [42]. Therefore, these subjects may experience a higher degree of sexual dysfunction.

In summary, recent findings strongly imply that obesity is positively correlated with diminishment of sexual function [17,22,23] and also with changes in reproductive hormones in women [43,44]. However only a small number of studies have investigated these specific pathological changes that may occur after a bariatric procedure. Future research directions may include detailed associations of psychosocial variables, psychopathological symptoms, and sexual dysfunctions with neuroendocrine and neuroimmunological changes, and metabolic parameters seem to be particularly important.

Conclusions

Obesity appears to be strongly associated with sexual dysfunction, and sexual function in obese females appears to be

improved by substantial weight reduction. Obesity-related sexual dysfunction appears to be a complex condition linked to a range of psychological, biological, and social factors. Clinicians are encouraged to routinely evaluate the sexual functioning of this patient population to identify patients in need of psychological intervention. Obese subjects who experience substantial weight loss following a bariatric procedure provide an excellent opportunity to study obesity-related sexual dysfunction. Further research utilizing standardized measurement instruments are needed to evaluate larger samples and longer post-operative intervals. A limitation of this clinical psychometric

study is that it did not address general findings related to metabolic disorders in included participants. Nevertheless, this limitation with respect to the study design does not limit the validity of the main results about positive influences of bariatric treatment and their implications for treatment of sexual dysfunctions, and further research is warranted.

Conflict of interest

None.

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