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Sexual Status In Obese Of Both Gender After Bariatric Surgery: Longitudinal Study

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Abstract:
Background: *To evaluate sexual function in obese men and women after bariatric surgery at two stages.*
Materials and Methods: *Descriptive and analytical prospective longitudinal study with 165 individuals undergoing bariatric surgery. The Female Sexual Function Index and the International Erectile Function Index were used at both times of collection – October 1st – 2020 to March – 2021 and October 2nd to December 2022. Continuous parameters were expressed by their means, deviations standard and qualitative ones by their frequencies. p≤0.05 was used to reject null hypothesis.*
Results: *Women represented 69.7% of respondents. Age ranged from 18 to 70 years old (40.7±10.1). Predominance of bypass surgery (68.5%) and significant reduction in body mass index (p<0.001). The female sexual function score did not vary between the two collection moments, but there was a significant increase in lubrication (p=0.000). All domains, except desire, had higher medians in the group of women with a partner (p<0.05). Erectile function was normal in most men and five became fathers.*
Conclusion: *An increase in lubrication was observed in women between the two collection moments. Among men, the perception of erectile function remained unchanged, with paternity recorded.*
Key Word*: Obesity; Bariatric surgery; Sexuality; Sexual dysfunction, physiological; Erectile dysfunction.*

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I. Introduction

Obesity is considered a global epidemic with a prevalence that varies by region and country, requiring individualized management[1]. This condition contributes to the development of sexual dysfunctions, representing a marker for the future occurrence of chronic non-communicable diseases (NCDs) such as metabolic and cardiovascular diseases[2].

The magnitude of this disease is associated with several causes, involving genetic, physiological, environmental and psychological aspects, requiring complex interventions that involve the individual as a whole, considering their lifestyle and the environment in which they are living[1].

Sexual health is based on a complex and multidimensional process coordinated by several biological systems and affected by genetic, emotional, mental, environmental, social, economic, religious and cultural aspects, decisively influencing quality of life[1,2,3,4]. Sexual dysfunctions in both genders represent a medical and psychological problem that adversely affects not only physical health and quality of life, but also produces impairment of sexual function with a detrimental effect on self-esteem, body image, interpersonal relationships and physical health in general, including fertility[2,5,6,7,8,9,10].

Several pathophysiological disorders are caused by obesity, and its implications for sexual function and health are reduced sexual desire, low sexual performance, reduced fertility and frequency of intercourse[11].

Obesity management begins in primary care, an important setting for the development of prevention, control and treatment with intersectional approaches and universal accessibility, as it is associated with modifiable risk factors such as sedentary lifestyle, smoking, excessive alcohol consumption and drugs and use of psychotropic substances, which favor the occurrence of sexual dysfunction. A healthy lifestyle and dietary changes can be a useful strategy to reduce the risk of erectile dysfunction (ED) in men and other sexual dysfunctions in both gender[2,12,13,14,15,16].

In obese patients undergoing bariatric surgery, weight loss and control of comorbidities are likely outcomes, but the impact on sexuality in both genders is still a matter of discussion[17,18,19,20,21,22,23]. Furthermore, the pharmaceutical industry has produced new medications that aim to reduce the gap between well-established surgical treatment and very promising clinical treatment[4].

The purpose of this investigation was to evaluate sexual status in obese people of both gender after bariatric surgery at two moments, as a longitudinal study.

II. Material And Methods

This prospective, analytical and longitudinal study was performed enrolling patients who underwent bariatric surgery at the Institute of Obesity and Endoscopic Surgery – ICOEP, from October 2020 to December 2022. A total of 165 adult individuals of both gender were considered in this study.

Study design: This is a prospective, analytical and longitudinal study.

Study Location: The study was performed at the Institute of Obesity and Endoscopic Surgery (ICOEP) in Paraiba, Campina Grande-PB, Brazil. Data were collected in two moments: from October – 2020 to March – 2021 (1st moment) and from October to December 2022 (2nd moment).

Study Duration: October 2020 to December 2022.

Sample size: 165 patients.

Sample size calculation: The sample size was calculated using the number of bariatric surgeries performed per year (n = 400) at ICOEP, taking into account that there is a fifty percent improvement in sexual function[24]. It was calculated using the Epi Info tool, accepting a 95% confidence interval.

Inclusion criteria:

1. Patients of both gender who underwent bariatric surgery.
2. Patients more than six months after bariatric surgery.
3. Patients interested in evaluating their sexual status and who accepted the invitation to respond to the specific self-administered questionnaire for each gender. The interviewer made no effort to differentiate between transgender individuals.

Exclusion criteria:

1. Patients with severe cognitive impairment that could affect the answers to questions included in the validated standard questionnaires.

Procedure methodology

For women, the Female Sexual Function Index (FSFI) was used with a cutoff point of 26.55[25,26,27] for good sexual function and for men the International Index of Erectile Function (IIEF) with a range normal from 26 to 30, both questionnaires validated for the Portuguese language[28,29].

The FSFI questionnaire contains 19 questions graded from 0 to 5 points that assess six domains of female sexual function: desire (questions 1–2), arousal (questions 3–6), lubrication (questions 7–10), orgasm (questions 11– 13), satisfaction (questions 14–16) and pain (questions 17–19). The FSFI domain scores were calculated by summing the questions that covered each domain and multiplied by the factor for that domain, providing the weighted score. The final score was obtained by summing the weighted scores for each domain, which can vary from a minimum of 2 to a maximum of 36[25].

The IIEF questionnaire consists of 15 questions graded from 1 to 5 points, covering five domains: erectile function, sexual satisfaction, orgasmic function, sexual desire and general satisfaction, which were classified according to their median.

The erectile function domain was classified with a score of 6 to 10 - severe dysfunction, 11 to 16 - moderate, 17 to 21 - mild to moderate, 22 to 25 mild and 26 to 30 without erectile dysfunction[29].

The initial interview was performed after explaining the investigation and signing the patient's consent. Information collection was done in a private room at the ICOEP outpatient department, using a semi-structured form containing questions relating to sociodemographic and clinical data to characterize the sample (gender, age, ethnicity, marital status, place from, level of education, profession, comorbidities, occurrence of self-reported depression before and after surgery); then, to assess sexuality after bariatric surgery, the questionnaire was applied individually, allowing the patient to respond in a more private manner, preserving the anonymity and confidentiality of the responses, and being used only for scientific purpose.

Secondary data recorded in systematized surgical records was used to obtain clinical data and information inherent to the surgical procedure, such as preoperative anthropometry, date of surgery and type of surgical procedure performed: sleeve or gastric bypass.

Statistical analysis

Continuous parameters were expressed as their means and standard deviations, and also as medians. Qualitative parameters were expressed by their absolute and relative frequencies.

The Statistical Package for the Social Sciences (SPSS) - version 22.0 was used to analyze all data. In all association analyses, a significance level of $p \leq 0.05$ was considered to reject the null hypothesis. Normal distribution was assessed using the Kolmogorov-Smirnov test.

Initially, the sample was described using measures of central tendency and dispersion through the mean and standard deviation, as well as the inferential test using the Mann-Whitney comparison test.

Pearson's chi-square test was applied to compare the frequencies of sociodemographic characteristics of study participants between males and females and Cochran's Q test was applied to compare the behavior of depression between the baseline (before surgery) and the 1st and 2nd moments (after surgery).

The comparison of the FSFI domains and female sexual function between the two evaluation moments was performed using the Wilcoxon test (Mann-Whitney U), also adopted to compare the domains of female sexual function and having or not having a partner.

The comparison of male erectile function between the two evaluation moments was performed using Fisher's exact test; sexual satisfaction, orgasmic function, sexual desire, general satisfaction and sexual function were compared using the Wilcoxon test.

The study was approved by the Ethics Research Committee of the Center for Higher Education and Development (CESED) – Campina Grande – Paraiba, Brazil, registration number 37984820.7.0000.5175. All recruited patients signed the consent form.

III. Result

Of 221 patients who underwent bariatric surgery and were evaluated at the first point, there were 56 losses (25.3%), being 53 (94.6%) females and three (5.4%) males, resulting in 165 patients. Of these, 113 (68.5%) underwent gastric bypass surgery and 52 (31.5%) underwent sleeve surgery. One hundred and fifteen (69.7%) were women and fifty were men (30.3%). The mean age at the first evaluation after surgery was 40.7±10.1 years, with a minimum of 18 and a maximum of 70 years. When categorizing age as less than or equal to 40 years old and greater than 40 years old, 83 (50.3%) were young adults, aged less than or equal to 40 years old.

The time between surgery and the two collection moments were 2.5 ± 1.7 years and 4.4 ± 1.7 years after surgery.

The patient loss occurred due to the fact that obese people undergoing bariatric surgery tend to follow postoperative follow-up from the first months to approximately one year. However, those who feel satisfied with the results obtained withdraw from postoperative follow-up. It should be noted that all those recruited for the study were contacted and invited to continue the scientific design of the study, in accordance with ethical procedures. It should also be added that some individuals refused to participate in the research.

The most common ethnicity was brown with 92 (55.8%), followed by white 63 (38.2%), five black (3.0%) and five yellow (3.0%).

Regarding education level, 93 (56.4%) had completed university education, while 28 (17.0%) had incomplete university education, 34 (20.6%) had completed middle school, five had incomplete middle school (3.0%) and five (3.0%) completed primary school.

Regarding marital status, 120 (72.7%) were married, 31 (18.8%) were single, 13 (7.9%) were divorced and one (0.6%) was widow. It was observed that the number of individuals with a partner increased in the second assessment, going from 120 (72.7%) to 143 (86.7%) of the total [$p<0.001$; relative risk (RR) 0.095; confidence interval (CI) 0.034 - 0.265].

The majority (119 - 72.1%) lived in Campina Grande, while 46 (27.9%) came from nearby cities or neighboring states.

In relation to profession, 22 (13.3%) were teachers and 11 (6.7%) business people. The rest works in different professions (132 - 80.0%).

One hundred and forty-two did not have children after surgery (86.1%). Eighteen women had children and five men (13.9%) were fathers.

The mean height was 1.7 ± 0.1 meters, the mean weight before surgery was 118.5 ± 22.2 kg and after surgery 78.8 ± 16.9 kg. There was a significant reduction in weight measurement, equivalent to 39.7 kg ($z = -11.143$; $p<0.001$), and in body mass index (BMI), 14.3 kg/m2 ($z = -11.151$; $p< 0.001$)*, a reduction that varied between 11.0 and 48.0%.

There was a predominance of individuals with both type 2 diabetes and high blood pressure (73 - 44.2%); the majority had control of associated morbidities, including anxiety and depression, which was absent in 121 (73.3%) individuals before surgery, 126 (76.4%) in the first moment and 142 (86.1%) in the 2nd collection moment, with a significant reduction between the 1st post-surgery point and the baseline ($p = 0.000$; IQ: 4.446 - 22.746).

Sexual relationship before surgery was present (121 - 73.3%) and did not influence the option of choosing surgery (99 - 60.0%). Regarding hormone replacement, 148 (89.7%) were not taking replacement before surgery and 159 (96.4%) were not taking it after the procedure.

The descriptive and inferential data from the comparison between female sexual function scores in the first and second moments of collection after bariatric surgery tend to be mild, with a statistically significant difference being observed only in the lubrication domain, observed in an increased (Table 1). The final FSFI score did not vary between the two collection moments.

Table 1: Domains related to the evaluation of female sexual function between the two moments of data collection.

Domains	1st moment	2nd moment	p†
	Mean ± SD*	Mean ± SD*	
Desire	3.7 ± 1.3	3.5 ± 1.4	0.102
Arousal	3.5 ± 2.0	3.6 ± 1.8	0.624
Lubrication	3.0 ± 1.7	4.3 ± 1.9	0.000
Orgasm	4.0 ± 2.0	4.0 ± 2.0	0.539
Satisfaction	4.4 ± 1.6	4.3 ± 1.6	0.451
Pain	4.1 ± 2.4	4.4 ± 2.0	0.367
Sexual function (FSFI total score)	22.7 ± 9.7	24.0 ± 9.5	0.185

*SD= Standard Deviation; †p = significance level.

The comparison of the domains referring to the assessment of female sexual function between the two moments of data collection and the sociodemographic data of the presence or absence of a partner is described in Table 2.

Table 2: Domains related to female sexual function and the presence or absence of a partner.

Domains	1st moment		2nd moment	
	Median (IQ)*	p†	Median (IQ)*	p†
Desire		0.817		0.179
With partner	3.6 (3.0-4.8)		3.6 (2.4-4.8)	
No partner	3.6 (2.4-4.8)		3.0 (1.8-4.8)	
Arousal		0.004		0.001
With partner	4.5 (3.3-5.1)		4.2 (3.0-5.1)	
No partner	3.0 (0.0-4.8)		3.6 (0.0-4.8)	
Lubrication		0.022		0.009
With partner	3.9 (2.5-4.2)		5.1 (3.9-6.0)	
No partner	1.8 (0.0-4.5)		4.5 (0.0-5.7)	
Orgasm		0.007		0.012
With partner	4.8 (3.6-5.6)		4.8 (3.6-5.6)	
No partner	3.2 (0.0-5.6)		4.0 (0.0-5.2)	
Satisfaction		0.010		0.003
With partner	5.2 (3.7-6.0)		4.8 (3.7-5.6)	
No partner	4.0 (2.4-5.6)		4.0 (2.4-5.6)	
Pain		0.006		0.005
With partner	5.6 (3.6-6.0)		5.2 (4.0-6.0)	
No partner	2.0 (0.0-6.0)		4.8 (0.0-6.0)	
FSFI total score		0.019		0.001
With partner	27.4 (21.5-29.9)		28.6 (20.2-31.6)	
No partner	18.5 (5.8-31.0)		24.8 (6.0-30.2)	

*IQ = Interquartile range; †p = significance level.

Except for desire, which showed no difference, all other domains had higher medians associated with the presence of a partner.

Regarding the comparison of the male sexual function domains, no statistical differences were identified between the two moments (Table 3).

Table 3: Domains related to the evaluation of male sexual function between the two moments of data collection.

Domains	1st moment	2nd moment	p†
	Mean ± SD*	Mean ± SD*	
General satisfaction	8.7 ± 1.7	8.5 ± 2.1	0.314
Sexual desire	7.8 ± 1.6	8.0 ± 1.7	0.311
Orgasm	9.2 ± 1.7	9.1 ± 2.2	0.750
Sexual satisfaction	11.4 ± 2.7	11.2 ± 3.4	0.792
Erectile function	26.7 ± 5.0	25.9 ± 6.7	0.919
Sexual function	37.1± 5.9	36.7 ± 7.3	0.774

*SD=Standard Deviation; †p = significance level.

Table 4 shows the classification of erectile dysfunction[29], so that 80% of men reported not having erectile dysfunction at the 1st point, with a decrease at the 2nd moment to 72.0%. Additionally, five men (10.0%) became fathers after surgery.

Table 4: Classification of male erectile dysfunction at the two collection moments.

Category	Scores	1st moment n* (%)	2nd moment n* (%)
Severe	6 - 10	1 (2.0)	3 (6.0)
Moderate	11 - 16	2 (4.0)	1 (2.0)
Mild to moderate	17 - 21	2 (4.0)	2 (4.0)
Mild	22 - 25	5 (10,0)	8 (16.0)
No erectile dysfunction	26 - 30	40 (80.0)	36 (72.0)

*n = number.

No significant difference was observed between the state of erectile dysfunction in the 1st moment when compared to the 2nd moment (p=0.4916; RR = 1.224; CI 0.7514 – 1.993).

IV. Discussion

Investigating the sexual health of obese individuals is of fundamental importance for the promotion of the quality of life and health of this population. Among the health professionals that perform bariatric surgery care team, the nurse stands out for being next to the patients and its family, and for having a systematic look at their care, as well to improve the perceptions and expectations of individuals regarding their physical and mental health after surgery[30].

As it was done in the present investigation, nurses play an active role in extracting correct and sufficient data for the sexual health situation, assessing the sexual health vulnerability index from the period of illness or condition, providing comprehensive care and diagnosing sexual problems and concerns. In this way, nursing professionals contribute to improving the quality of life of men and women and preventing permanent health problems[30].

The investigation is justified by the fact that obesity interferes with sexual function and requires multiple approach treatment and by the hypothesis that bariatric surgery could improve sexual function, since this condition negatively impacts the individual's physical and psychosexual health[2]. However, more clinical studies are required that explore the relationship between bariatric surgery and sexual function, as aspects of quality of life in different systems are still controversial and have not been well elucidated. Furthermore, studies do not show an association between possible changes in sexuality when comparing women and men[2]. This is especially relevant when considering the patriarchal society present in Brazil, especially with regard to the northeast region, where the city of Campina Grande is located.

The contributions related to anthropometric and metabolic changes after bariatric surgery in sexual function are still incipient, although studies indicate that it has generated both physical and psychosexual improvements[11,18], especially when using validated questionnaires[25]. Therefore, they are essential for better understanding this relationship.

Similar to what is described in the literature[24,31], the sample included more women than men. This finding is observed in the study of several diseases, probably due to the fact that women seek health services more and are more concerned with their self-image[2,37].

Similar to the reported in the literature, in the present study, the control variables are predominantly composed of mixed race, young people[7,8,20,22,30], married individuals[7,30,32], with a high level of education[7,30,32]

and good socioeconomic status[30]. The high socioeconomic status is probably due to the fact that these recruited individuals underwent bariatric surgery at a private obesity treatment centre.

In the majority of studies, there is a predominance of white ethnicity[7,8,22,32], which differs from the findings of the present study. The likely explanation for this finding is the fact that the Brazilian population is multi-racial, with a strong component of Afro-descendants, particularly in the Northeast of Brazil[33].

A significant reduction in BMI was observed in the postoperative period of bariatric surgery in the present investigation, similar to which was also described in other studies[8,22,34,35].

Obesity and related morbidities can impair sexual function and quality of life[4,36]. The morbidities recorded in the present sample were predominantly: type 2 diabetes, systemic arterial hypertension, often being associated in the same individual; similar data were also observed in other studies[13,32].

Maintaining weight loss is the biggest challenge in managing obesity and bariatric surgery promotes lasting weight reduction and associated health gains[1]. The surgical technique most commonly performed in the present study was the bypass type, similar data found in the literature[8,22,34].

Female sexual function assessed after bariatric surgery, using the FSFI, did not show a significant difference between the two moments, as found in other studies[8,30,37]. However, there is investigation showing improvement in female sexual function after this kind of surgery[22,35], but this is not maintained four years after the procedure[22].

When evaluating the domains of female sexuality, a significant increase in lubrication was observed between the first and second moments of present data collection, as found in other studies[37,38], contrasting with other studies that showed a significant increase in the desire domain[35,37], excitement, satisfaction and pain[37].

It is likely that there are other contributors to the relationship between obesity and impaired sexual function, such as excessive skin laxity and social or mental aspects, especially depression, which may be important for the sexual life of individuals after bariatric surgery[31,35] . Furthermore, women tend to have more complex sexuality than men and the effects of factors such as body image, depression and other psychological disorders remain unclear[35].

The detailed analysis of the FSFI domains revealed that, although sexual desire did not present a statistical difference between the two collection moments in the current study, all other domains presented higher medians among the group of those who had a partner, as shown in other studies[35,38].

Obesity-related sexual dysfunction is a complex condition linked to a series of psychological, biological and social factors. Health professionals are encouraged to routinely assess the sexual function of the obese patient population to identify those in need of psychological intervention[2,3,10]. More research using standardized measurement instruments is needed to evaluate larger samples.

In women, the improvement in physical aspects that impact lubrication, orgasm and dyspareunia as a result of weight loss, as well as improved self-esteem, can result in more interest in sex, involving the emotional aspect and impacting excitement and desire[37].

Good erectile function is one of the most commonly discussed issues in achieving satisfactory sexual performance. It is noteworthy that the majority of men in the current study did not experience post-surgical erectile dysfunction, which indicates that weight loss through bariatric surgery and management of morbidities can enhance erectile function[18,20,34]. Therefore, bariatric surgery can be an effective approach to improve sexual function in obese men[19].

The changes in the sexual function of both genders are variable, both with regard to the domains evaluated and the magnitude of the effect[2]. Although the hormonal function of both genders was not assessed, it can be inferred that there was an improvement in male fertility after surgery, as evidenced by reports of fatherhood after the surgical procedure. This finding may be attributed to the patriarchal and sexist society prevalent in the northeastern region of Brazil.

Regarding the current study, the design and sample size do not compromise the validity of the main findings regarding the positive impacts of bariatric treatment. However, limitations of the study include the use of a sample limited to an obesity treatment center, consisting of patients from higher socioeconomic backgrounds compared to users of the Unified Health System (SUS), as well as the lack of evaluation of other aspects of sexuality, such as hormonal function.

Furthermore, this research contributes to the field of health from a scientific perspective, as nursing care in the management of obesity is essential. Understanding the various factors that influence sexual function and the expression of sexuality enables a more effective approach by the multidisciplinary team, leading to a review of health policies and practices aimed at providing inclusive care and promoting a higher quality of life. Future research directions could include investigating the implications for treating sexual dysfunctions in obese patients, with larger sample sizes that encompass hormonal changes and their impact on fertility, as well as psychological, neuroendocrine, and neuroimmunological alterations.

V. Conclusion

Apparently, women did not show any statistically significant differences between the two evaluation periods after bariatric surgery. However, the perception of the lubrication domain showed a significant positive improvement. Among men, the perception of erectile function remained unchanged, and there were reports of fatherhood, supporting the better surgical outcomes. Therefore, bariatric surgery has a direct relationship with improving male sexual function. However, female sexual function requires a specific set of factors that promote achieving pleasurable and safe sexual health. Predictors of improvement and maintenance of quality of life, as well as more accurate investigation tools, body self-image and sexual function should be explored.

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