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Sexual dysfunction in obese women is more affected by psychological domains than that of non-obese

Disfunção sexual em mulheres obesas é mais afetada por domínios psicológicos do que nas não obesas

Original Article

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Abstract

PURPOSE: To compare differences in the occurrence and changed domains of sexual dysfunction in obese and non-obese Brazilian women. **METHODS:** Female Sexual Function Index, based on six domains, to investigate 31 sexual dysfunction incidence for obese compared to 32 non-obese women, was used. Statistical analysis using ANOVA and MANOVA were performed to compare total scores of Female Sexual Function Index among groups and to identify the differences among domains, Student *t*test was used. Statistical significant level was established for all tests for $p<0.05$. **RESULTS**: No difference in female sexual dysfunction frequency between obese (25.8%) and non-obese women (22.5%) was found. However, an important distinction in which aspects of sexual life were affected was found. While the obese group was impaired in three domains of sexual life (desire, orgasm, and arousal), in the control group five aspects were dysfunctional (desire, orgasm, arousal, pain and lubrication). Future research exploring psychological outcomes in obese females, such as body image and measures of positive and negative effect, might better characterize the female sexual dysfunction in this group. **CONCLUSIONS**: Obesity does not appear to be an independent factor for allow quality of female sexual life. However, disturbance associated to obesity indicates a low frequency of disorder in physical domains, suggesting that psychological factors seem to be mainly involved in the sexual dysfunction in obese women.

Resumo

OBJETIVO: Comparar as diferenças na incidência de disfunção sexual nos seis diferentes domínios de mulheres brasileiras obesas e não obesas. **MÉTODOS**: Foi usado o *Female Sexual Function Index*, que discrimina seis domínios de disfunção, para investigar a incidência de disfunção sexual em 31 mulheres obesas e 32 mulheres não obesas. Foi realizada análise estatística utilizando ANOVA e MANOVA para comparar os escores totais do *Female Sexual Function Index* entre os grupos, bem como empregado o teste *t* para identificar as diferenças relacionadas aos domínios. O nível de significância estatística estabelecido para todos os testes foi de $p<0,05$. **RESULTADOS:** Não foi encontrada diferença significante nas diferentes incidências de disfunção sexual feminina entre o grupo de pacientes obesas (25,8%) e o grupo de não obesas (22,5%). Contudo, foi evidenciada uma importante distinção em quais aspectos da vida sexual foram afetados nos dois grupos. Enquanto as mulheres obesas foram impactadas em apenas três domínios subjetivos do *Female Sexual Function Index* (desejo, orgasmo e excitação), o grupo controle apresentou disfunção em cinco aspectos (desejo, orgasmo, excitação, dor e lubrificação). Pesquisas futuras explorando aspectos psicológicos em mulheres obesas, como a avaliação da autoimagem corporal e seus aspectos negativos ou positivos sobre as pacientes, deverão auxiliar na melhor caracterização da disfunção sexual feminina neste grupo. **CONCLUSÕES:** A obesidade não parece constituir um fator de risco independente para uma baixa qualidade de vida sexual feminina. Contudo, as disfunções associadas à obesidade foram menos evidenciadas em domínios fisiológicos, sugerindo que aspectos psicológicos parecem estar primariamente envolvidos na etiologia da disfunção sexual de mulheres obesas.

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Introduction

The rapid increase in the number of obese people around the world has caused an obesity epidemic, even while a significant number of nations have still not managed to eradicate poverty and malnutrition among their populations[1]. Studies have demonstrated that approximately 66% of the American population is overweight, and 32.2% are classified as obese[2]. Brazil has no reliable data on the number of overweight subjects among the population, but studies dated from 2009 have reported an incidence of 48% for women and 50.1% for men. In seeking obese patients (body mass index>30 kg/m^2), rates dropped to 16.9 and 12.5%, respectively[3].

It is widely known that obesity significantly affects the health of the population. Moreover, it is associated with several comorbidities, including type II diabetes, heart disease, hypertension, and some types of cancers[2,4,5]. Although rarely mentioned or investigated, sexual dysfunction might also be related to obesity. This situation can cause considerable anxiety for those involved in sexual activity since it disturbs the subject and his/her partner, becoming an important problem[2].

The World Health Organization's (WHO) International Classification of Diseases defines human sexual dysfunction as the various ways in which an individual is unable to participate in a sexual relationship as he or she would wish[6]. According to the model proposed by Masters and Johnson, such inability can result in difficulties during any phase of human sexual response, which includes the phases of desire, arousal, plateau, orgasm, and resolution[6,7]. Kaplan modified this model into a three-phase response: desire, arousal, and orgasm[6,8]. Both standards proposed a linear model, but the female sexual response appears to be complex and nonlinear. Thus, different phases seem to overlap, combining physiological and psychological components[9].

In fact, sexual dysfunction involves psychosomatic and/or physiological disorders that act in one or more phases of the sexual response, making it impossible for the individual to perform coitus and/or feel pleasure during it[10]. Specifically, female sexual dysfunction is a multi-causal problem, including organic and psychological aspects. Cultural, religious, and social issues also seem to be involved because these features have an impact on human sexual life[11,12]. Among women, sexual disorders apparently fit into four categories: hypoactive sexual disorders, female sexual arousal disorder, female orgasm disorder, and pain disorder[13]. Such dysfunctions seem to bring greater impact on women's quality of life: several studies have indicated a low body self-image, high prevalence of sexual difficulties, and hesitation toward sexual encounters, besides reduced quality of life and physical health in obese women, as compared with obese men[4,14,15]. Moreover, obese women more frequently avoid being seen naked and enjoy sex less compared with men[15].

In contrast, women do not seem to be affected in a global manner in their sexual life because some aspects appear to have more impact than others. In this sense, correlation between high body mass index (BMI) scores and lower levels of the aspects of arousal, orgasm, lubrication and sexual satisfaction were described, but the aspects of desire and pain were not affected[16,17].

Therefore, this study determines whether the incidence of female sexual dysfunction (FSD) is higher in obese women and investigates which domains are mainly disturbed in obese women in relation to a control group of non-obese women.

Methods

This is a case control study involving patients managed at health services at Universidade Federal do Rio Grande do Norte, Natal, Brazil. The inclusion criteria were: age between 20 and 50 years, presence of regular menstrual cycle and sexual activities during the last four weeks. Exclusion criteria included the following: age beyond the established range, pregnancy or breast-feeding, amenorrhea exceeding six months and/or signs and symptoms of menopause, no sexual activities during last four weeks, systemic arterial hypertension (SAH) and/or uncontrolled diabetes mellitus (DM), symptomatic cardiovascular disease, history of pulmonary hypertension, severe psychiatric disorders, gynecological surgeries performed less than five years previously, current major depression, alcohol abuse, tobacco and/or illicit drug use, and use of hormonal contraceptives.

The overweight women, with BMI over 30 kg/m^2 and waist circumference above 95 cm, were registered under ambulatory surgery of Onofre Lopes University Hospital (HUOL) and were waiting for bariatric surgery. They were contacted by phone call made by the researcher, who invited them to participate in a clinical survey. If the patient showed interest, a clinical interview was programmed in HUOL, during which the researcher exposed the study content, as well as your objectives. In case the patient agreement, a clinical interview addressing signs and symptoms that could indicate menopause, depression, or other exclusion criteria was conducted, and the patient's weight, height, blood pressure, and waist circumference were

measured by a qualified doctor. The BMI was calculated by dividing weight in kilograms by height in meters and squaring (kg/m^2) the resulting answer. Then, the participants were led to a private room where they answered the questionnaire with the help of a female medical student, to decrease any constraints during the completion of standardized surveys. Patients had their transports expenses refunded.

The control group consisted of 32 patients from the ambulatory of family planning clinic of Januário Cicco Maternity School (JCMS). They were matched by age with the obese group, but had BMI below 30 kg/m^2 and waist circumference below 85 cm. The participants were approached individually while waiting to ambulatory consult and invited to a private room, where the researcher asked her to participate in a clinical survey and exposed the study content, as well as it objectives. In case the patient agreement, same procedures adopted in obese group were conducted.

The Female Sexual Function Index (FSFI) questionnaire, proposed by Rosen et al.[18] for the diagnosis of FSD was administered to the subjects. This instrument was validated and adapted to the Portuguese language by Pacagnella et al.[19,20]. The instrument consists of 19 issues that assess sexual function during the past four weeks, showing responses in multiple-choice format, associated with six domains and possible types of dysfunction: disorders of (a) desire, (b) arousal, (c) lubrication, (d) orgasm, (e) satisfaction with sexual life, and (f) pain during or after intercourse.

Women completed standardized surveys by choosing among the existing options the one that best described their situation. Each alternative was associated with a value that corresponds to a degree of patient satisfaction with each questioned function. The alternative 0 indicates no sexual activity in the last four weeks, and the others, numbered from 1 to 5, were arranged in ascending scale. Only in the pain domain, the range of values from 1 to 5 was reversed[19-21].

The values indicated by Rosen et al.[18] were used to calculate the score of each domain. Individual values of each item were summed and multiplied by the corresponding factor, seeking to homogenize the influence of each domain on the total score. The sum of the final values of each domain generated the final score of the patient, in which a value lower than 26, in a total score of 36, was diagnosed as dysfunctional. Additionally, a section containing 17 questions asking about age, color, school years, marital status, years of relationship, family incoming, menstrual cycle, tobacco, alcohol and drugs use was introduced to obtain the socioeconomic profile of the sample.

A total of 92 Brazilian women were invited to participate and no one refused contribute with the survey. However, 29 were excluded (5 had menopause diagnosis, 4 reported symptoms of depression, 5 were using hormonal contraceptive medications and 15 were in sexual abstinence during the last month), resulting in 63 participants included in the final analyses: 32 normal weight and 31 obese. Both groups had similar socioeconomics data, presenting analogous distribution in analyzed information (age, color, school years, family incoming, marital status and years of relationship).

This study was approved by the Onofre Lopes University Hospital Ethics Committee, and all participants signed informed consent term to participate in the study (protocol number CAAE-0059.0.294.000-09).

Statistical analysis

To calculate measures of central tendency and dispersion, the descriptive method was used to find differences between the means of the groups. In addition, we used a multivariate ANOVA (MANOVA) to analyze possible differences among the averages of the six FSFI domains. For this analysis, post hoc Pillai's trace test was used; it is considered the most reliable of the multivariate measures that assures better safety in case of type I errors with small sample sizes. Univariate analysis of variance (ANOVA), using the *t*-test, were performed for each domain to confirm the graphical analysis. The significance level of p was established at 5%.

Results

Socioeconomic data of the sample are indicated in Table 1, indicating social and economic similarity between obese and control groups.

Table 2 presents the means of the total scores of the different domains for obese and non-obese women. No statistical differences were observed concerning different levels of BMI and sexual function scores of the FSFI. The mean score of the FSFI in obese patients was 28.01±4.52, whereas it was 28.00±5.15 (p>0.05) in the control group. No difference between groups was found even when the analysis was performed by splitting the six different domains covered by the FSFI.

Eight obese patients (25.8%) and seven women in the control group (22.5%) had scores lower than 26, resulting in diagnose of sexual dysfunction. Statistically significant differences were found when comparing the mean of the six domains of FSFI between women with a total score <26, indicating sexual dysfunction (SD), and those with a total score>26, indicating no sexual dysfunction (NSD) (Table 3). These data demonstrate

Table 1. Social and economic data of the groups

Data analyzed	Obese patients n=31	Control group n=32
Age (mean±standard deviation) [years]	36.10±6.60	32.41±8.54
Color (%)		
White	35.48	21.87
Black	19.36	18.75
Pardo	45.16	59.37
Family income (mean±standard deviation) [salary/family individual]	0.81±0.61	0.81±0.48
School years (%)		
Primary school	29.03	34.37
High school	45.16	50.00
College	25.81	15.62
Marital status (%)		
Single	25.81	21.87
Married	64.51	71.87
Divorced	9.68	6.25
Lenght of relationship (mean±standard deviation) [Years]	11±10	8±7

Table 2. Scores in Female Sexual Functional Index

Scores	Obese patients n=31 (mean±StD)	Control group n=32 (mean±StD)	p-value
FSFI total score	28.01±4.52	28.00±5.15	NS
Desire	3.96±1.23	4.12±1.11	NS
Arousal	4.44±1.05	4.50±0.81	NS
Lubrication	4.92±1.27	5.10±1.12	NS
Orgasm	4.72±1.25	4.55±1.30	NS
Satisfaction	4.66±0.99	4.99±0.88	NS
Pain	5.30±0.91	4.73±1.43	NS

NS: Not significant; FSFI: Female sexual functional index; StD: standard deviation

Table 3. Scores of Female Sexual Function Index domains divided by presence or absence of sexual dysfunction*

Domains	SD n=15 (mean±StD)	NSD n=48 (mean±StD)	p-value
Desire	2.68±0.72	4.61±0.82	0.001
Arousal	3.32±0.75	5.01±0.60	0.001
Lubrication	3.68±1.02	5.78±0.87	0.001
Orgasm	3.01±1.10	5.18±0.74	0.001
Satisfaction	4.29±0.73	5.07±0.71	0.010
Pain	4.05±1.02	5.65±0.85	0.001

*Both obese and non-obese women were pooled for analysis; SD: sexual dysfunction; NSD: no sexual dysfunction; StD: standard deviation

that women seem to be globally affected in their sexual function, and the satisfaction domain indicates a weak statistical difference among the six aspects of FSFI.

Analyses were also performed for the different domains of sexual response, including patients with SD and without sexual dysfunction in control and obese groups. The group of obese patients with no sexual dysfunction (NSDO) was composed of 23 women; the group of obese patients with sexual dysfunction (SDO) was composed of eight subjects. The control group included seven subjects reporting sexual dysfunction (SDC group) and 25 who achieved a total score >26 on the FSFI (NSDC group).This result indicated that the domains affected by dysfunction differed between groups. Obese patients appeared to be more greatly impacted by the functions of arousal, desire, and orgasm (Table 4), while patients in the control group were impacted by two more domains (pain and lubrication), in addition to the previous three (Table 5).

Table 4. Scores of Female Sexual Function Index domains separated by presence or absence of sexual dysfunction in obese women

Domains	SDO n=8 (mean±StD)	NSDO n=23 (mean±StD)	p-value
Desire	2.47±0.81	4.53±0.82	<0.01
Arousal	3.00±0.70	4.96±0.49	<0.05
Lubrication	3.97±1.53	5.26±0.89	NS
Orgasm	3.20±1.09	5.28±0.69	<0.01
Satisfaction	3.90±0.93	4.95±0.82	NS
Pain	5.15±0.81	5.39±0.88	NS

NS: Not significant; SDO: sexual dysfunction related to obese patients; NSDO: no sexual dysfunction related to obese patients; StD: standard deviation

Table 5. Scores of Female Sexual Function Index domains separated by presence or absence of sexual dysfunction in non-obese women

Domains	SDC n=7 (mean±StD)	NSDC n=25 (mean±StD)	p-value
Desire	2,91±1,17	4,53±0,81	<0.05
Arousal	3,68±0,63	4,75±0,67	<0.05
Lubrication	3,77±0,79	5,48±0,84	<0.01
Orgasm	2,80±1,06	5,08±0,77	<0.01
Satisfaction	4,74±1,07	5,07±0,76	NS
Pain	2,80±1,38	5,32±0,82	<0.01

NS: Not significant; SDC: sexual dysfunction related to control subjects; NSDC: no sexual dysfunction related to control subjects; StD: standard deviation

Discussion

Reproduction is fundamental in humans[22,23], and sexuality is present in many different ways among individuals, far surpassing the mere biological impulse of procreation. Thus, several studies have demonstrated that the quality of sexual life is a determining factor in the quality of human life, and this aspect should be properly considered[8,14,24,25].

Even at the present time, whether obesity is an independent risk factor for allow quality of female sexual life remains unclear[5]. Although some studies indicate higher rates of sexual dysfunction among obese women, other studies failed to find similar results[26]. In a series of studies, Kolotkin et al.[14,15,26] demonstrated obesity as an important risk factor for increasing subjects' degree of sexual dysfunction although these disorders might be more associated with emotional aspects involving low self-esteem and low body self-image. On the other hand, a census study in Sweden[27] found no associations between BMI and a higher rate of sexual dysfunction, similarly to a Turkish study that found no statistically significant differences in rates of FSD between obese and no obese women[2]. However, it is an important point in these studies that obese patients were not separated according to their different levels of obesity (classes I, II, and III). This might have affected the final interpretation of the results because subjects in obesity classes I and II appear to behave as non-obese subjects in quality of sexual life[26]. Still, a study found results very similar to these researchers, except that these researchers categorized the patients into classes I, II and III, according to BMI[28].

Moreover, our study did not find any association between BMI and total scores of the FSFI, even when questions were analyzed according to different domains. The similarity between the percentage of sexual dysfunction (25.8% for the obese group and 22.5% for the control group) and the total mean FSFI score for the groups suggests that obesity is not a factor that independently increases the risk for development of sexual dysfunction among women. The analyses of the six domains pooled for women from both groups with sexual dysfunction indicated that obese and control subjects were affected in all aspects of the FSFI. However, after the subjects were separated into obese and non-obese, in the psychophysiological domains, such as arousal, desire, and orgasm, obese women were affected; in addition to these domains, pain and lubrication disturbances affected the control group. However, a curious finding was observed for the satisfaction domain in which differences were apparent only when the data was pooled for the two groups. When patients in both groups with SD (n=15) were separated by BMI, considering obese (n=8) and non-obese (n=7) women, the statistical result for the satisfaction domain was insignificant for either group, probably due to sample size.

Several studies have focused on defining aspects of females' sexual lives affected in conditions of sexual dysfunction. Although the literature indicates that desire and orgasm disorders are prevalent in women[10,29], such data was not consistently replicated with obese women. Esposito et al.[17] found that women with sexual dysfunction had lower scores in all domains of FSFI, compared with patients without dysfunction. The same study indicated a strong negative correlation among the levels of BMI in four domains (arousal, lubrication, orgasm, and satisfaction) of six measured by FSFI. Some authors analyzed woman who underwent bariatric surgery, reporting an increase in scores of all domains of sexual functions, except orgasm, one year after surgery[16], while another study demonstrated an improvement in only three domains (orgasm, desire and satisfaction)[30].

The data from our study indicated that obesity does not seem to affect the sexual life of women as independent factor. Indeed, bearing in mind the evidence from different aspects affected in both obese and non-obese groups, it appears that obese patients showed less disturbance in physiological problems (lubrication and pain), but with more psychological dysfunction (desire and satisfaction). In contrast, no obese women had their sexual lives affected globally. Pondering the different results reported in the literature, in which there is no consensus regarding obesity as an independent risk factor for female sexual dysfunction, further studies should be conducted by analyzing not only BMI but also body self-image, contexts, and quality of life as a whole. Studies reported that female sexual dysfunction seems to be related more to body self-image than to BMI *per se*, even when other factors, such as physical exercise, are equalized[31]. Furthermore, women with positive body self-images had low BMIs and less overweight preoccupations, in addition to higher sexual self-esteem and better general sexual function[32], while obese women seems to evaluate themselves with low scores in appearance in evaluation questionnaires, and females with the highest weight usually represents the lowest levels of self-satisfaction[33]. In contrast, studies that found no association between BMI and difficulties related to sexual performance itself reported greater concern of women about their bodies not looking attractive to their partners, provoking higher incidence of avoidance of sexual encounters[34]. Such aspects reinforce the importance of analyzing the impact of obesity on women's sexual lives, especially because body weight seems to be the most important element of female body image[33].

Other influences on women's sexual dysfunctions are associated with cultural contexts, especially because

woman's sexuality has been demonstrated to be more affected compared with that of men[35]. Studies analyzing female sexual function within closed cultures evidenced that 42% of Iranian Kurdish women[11] and 50% of Nigerian women indicate orgasmic disorders[12], contrasted with 21% of Brazilian women[29]. Thus, cultural characteristics, like restrictive sexual education, negative beliefs, or even marital intimacy, could partially explain such differences. Such a view gains importance because considering a genetic influence on behavioral aspects such as sexual function and individual differences, they follow a Gaussian distribution, indicating a multiple interaction between genes and environmental factors, resulting in cumulative effects on the phenotype[36]. Such argument is important to explain diverse expressions of sexual function, considering some aspects with which physiological bases are closely connected such as lubrication.

Some limitations of this study should be highlighted. The sample size might have contributed to absence of statistical significance in the association between sexual dysfunction and socioeconomic features, such as low education, as demonstrated in other studies[2]. Indeed, the lack of investigation of body image and self-satisfaction, which seems to be critical for the better understanding of the data found, was not performed. However, the strong statistical significance of our results strongly suggests the consistency of our findings, emphasizing different aspects of obese women's sexual lives need to be better examined because distinct domains appear to be affected in these population. Therefore, future studies regarding the relationships among BMI, body image, and cultural and social contexts should be performed to improve the knowledge regarding this topic, intending to provide these patients a better quality of life.

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