



Impacts of obesity and comorbidities on sexual dysfunction in men and women: a systematic review

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Abstract

Introduction: Obesity, with more than 2.0 billion people worldwide, is associated with numerous comorbidities, affecting male and female sexual and reproductive function. **Objective:** This study explored the main clinical studies on the impacts of obesity on sexual dysfunction in men and women, as well as treatment proposals in an attempt to mitigate or resolve this condition. **Methods:** The systematic review rules of the PRISMA Platform were followed. The search was carried out from September to October 2024 in the Web of Science, Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument. **Results and Conclusion:** A total of 95 articles were found. A total of 30 articles were evaluated in full and 14 were included and developed in the present systematic review study. Considering the Cochrane tool for risk of

bias, the overall assessment resulted in 23 studies with high risk of bias and 25 studies that did not meet GRADE and AMSTAR-2. Most studies showed homogeneity in their results, with $X^2=72.5\%>50\%$. It was concluded that obesity is associated with substantial and significant impairments in quality of life. Weight loss has been shown to improve sexual function in men and women with obesity. The impact of weight loss medications and the long-term effect of bariatric surgery on sexual function require further studies. Higher visceral adiposity index is independently related to the risk of erectile dysfunction and that early intervention is necessary to reduce the progression of erectile dysfunction with high levels of visceral adiposity index. It was shown that BMI, age, smoking, diabetes and hypertension were associated with higher odds of reporting decreased sexual function.

Keywords: Obesity. Comorbidities. Sexual dysfunction.

Introduction

Obesity, which affects more than 2.0 billion people worldwide, is associated with numerous comorbidities, affecting male and female sexual and reproductive function. However, perhaps due to the focus on cardiovascular and metabolic health, the gonadal aspects of obesity medicine have not received due attention [1]. This directly impacts the quality of life of patients with obesity.

In this regard, obesity constitutes an important predictor of sexual dysfunction. Thus, it is imperative to understand the relationship between overweight/obesity and sexual dysfunction, to elaborate the possible mechanisms that explain this association and to discuss the effects of weight loss on sexual function in people with obesity. However, as an information gap, the relationship between obesity and female sexual function is not consistent across studies. Although women with obesity are more likely to have poorer sexual function and avoid sexual activity, many studies have failed to identify these associations.

Lifestyle changes that result in weight loss lead to improved sexual function, and bariatric surgery has been shown to improve sexual function in the first years after the procedure [2]. In this sense, obesity emerges as a global concern in the reproductive system and sexual function. Both men and women affected by obesity face an increased risk of fertility challenges and sexual dysfunction. Although fertility and sexual function are distinct topics, they are intrinsically linked and mutually influential in medical and social contexts.

Bariatric surgery has yielded promising results in alleviating sexual dysfunction and increasing fertility, results that are often gender-specific. In men, improvements in sexual function can often be attributed to weight loss and subsequent optimizations in sex hormone levels. However, improvements in female sexual function may be related to a number of factors beyond weight loss. Bariatric procedures have shown limited benefits for male fertility, and may lead to a decrease in sperm count and quality. However, bariatric surgery may positively impact female fertility, improving pregnancy and neonatal outcomes [3].

In view of this, the present study carried out a concise systematic review to explore the main clinical studies on the impacts of obesity on sexual dysfunction in men and women, as well as treatment proposals in an attempt to mitigate or resolve this condition.

METHODS

Study Design

The present study followed the international systematic review model, following the PRISMA (preferred reporting items for systematic reviews and meta-analysis) rules. Available at: <http://www.prisma-statement.org/?AspxAutoDetectCookieSupport=1>. Accessed on: 09/20/2024. The AMSTAR-2 (Assessing the methodological quality of systematic reviews) methodological quality standards were also followed. Available at: <https://amstar.ca/>. Accessed on: 09/20/2024.

Research Strategy and Search Sources

The literature search process was carried out from September to October 2024 and developed based on Web of Science, Scopus, PubMed, Science Direct, Scielo and Google Scholar, addressing current clinical studies. The descriptors (DeCS / MeSH Terms) were used: "Obesity. Comorbidities. Sexual dysfunction", and using the Boolean "and" between the MeSH terms and "or" between the historical findings.

Study Quality and Risk of Bias

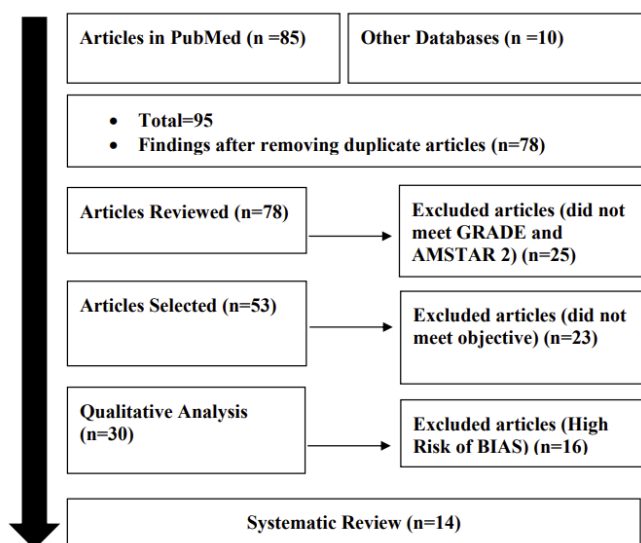
The quality was classified as high, moderate, low or very low regarding the risk of bias, clarity of comparisons, precision and consistency of the analyses. The most evident emphasis was on systematic review articles or meta-analysis of randomized clinical trials, followed by randomized clinical trials. Low quality of evidence was attributed to case reports, editorials and brief communications, according to the GRADE instrument. The risk of bias was analyzed according to the Cochrane instrument by analyzing the Funnel Plot graph (Sample size versus Effect size), using Cohen's test (d).

Results and Discussion

Summary of Findings

As a corollary, 95 articles were found that were submitted to eligibility analysis, and 14 final studies were selected to compose the results of this systematic review. The studies listed were of medium to high quality (Figure 1), considering the level of scientific evidence of studies such as meta-analysis, consensus, randomized clinical, prospective, and observational. Biases did not compromise the scientific basis of the studies. According to the GRADE instrument, most studies presented homogeneity in their results, with $X^2=72.5\%>50\%$. Considering the Cochrane tool for risk of bias, the overall assessment resulted in 23 studies with a high risk of bias and 25 that did not meet GRADE and AMSTAR-2.

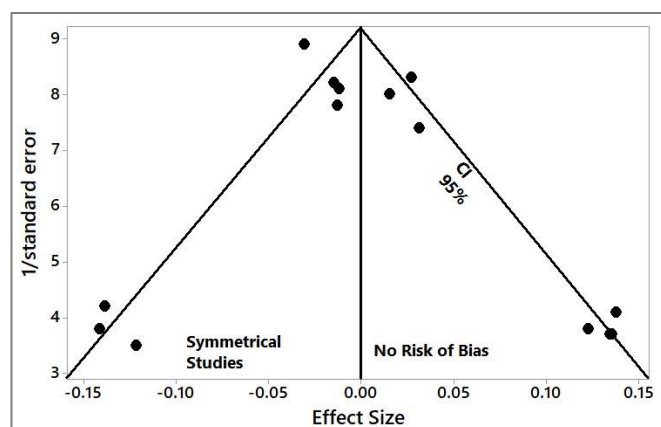
Figure 1. Flowchart showing the article selection process.



Source: Own authorship.

Figure 2 presents the results of the risk of bias of the studies using the Funnel Plot, showing the calculation of the Effect Size (Magnitude of the difference) using Cohen's Test (d). Precision (sample size) was determined indirectly by the inverse of the standard error (1/Standard Error). This graph had a symmetrical behavior, not suggesting a significant risk of bias, both among studies with small sample sizes (lower precision) that are shown at the base of the graph and in studies with large sample sizes that are presented at the top.

Figure 2. The symmetrical funnel plot does not suggest a risk of bias among the studies with small sample sizes that are shown at the bottom of the graph. Studies with high confidence and high recommendation are shown above the graph (n=14 studies).



Source: Own authorship.

Key Clinical Findings

According to the literature, obesity appears to have a detrimental impact on sexual functioning [4,5].

Obesity and its comorbidities can impair sexual function and sexual quality of life. Obesity is associated with mild to moderate symptoms of erectile dysfunction, as assessed by the International Index of Erectile Function (IIEF), in most studies of men with obesity [4]. Authors found that approximately 60% of women seeking bariatric surgery reported sexual dysfunction [6]. Furthermore, men presenting for bariatric surgery reported impaired sexual functioning across several relevant domains and compared with published reference controls [7].

A clinical study analyzed 2,225 bariatric surgery candidates who completed a self-report survey of sexual functioning in the previous month [8]. A total of 26% of women and 12% of men reported no sexual desire, and 33% of women and 25% of men reported no sexual activity. Approximately half of women (49%) and men (54%) were moderately or very dissatisfied with their sex lives. Physical health limited sexual activity at least moderately in 38% of women and 44% of men. Among women, older age, white race, urinary incontinence, depressive symptoms, and use of antidepressant medications were associated with poorer sexual function. In men, older age, never being married, depressive symptoms, and use of antidepressant medications were associated with poorer sexual function.

The specific nature of the relationship between BMI and sexual dysfunction is unclear. For some individuals, concerns about physical appearance and body image can negatively impact sexual desire and activity. Physical limitations associated with extreme obesity can make sexual activity unpleasant, difficult, painful, or even impossible [1-3]. However, it is important to realize that sexual dysfunction, although often characterized as a condition of an individual, occurs in the context of a relationship. Other problems or issues in a romantic relationship can contribute to the development and maintenance of sexual dysfunction, just as the presence of dysfunctional sexual behavior can negatively impact the quality of a romantic relationship.

As a corollary to this, excess body weight has negative effects on several hormones that contribute to sexual behavior and reproductive potential. Adipose tissue is the site of aromatization of sex steroids where androgens are converted to estrogens. This conversion leads to androgen deficiency, which can influence erectile dysfunction [9,10]. In women with obesity, levels of sex hormone-binding globulin are reduced, which results in an increased clearance of free sex steroids, including testosterone, dihydrotestosterone, and androstenediol.

As a result, a compensatory mechanism is

activated, which results in a hyperandrogenic state and can have a negative effect on menstruation and ovarian function [11]. Several adipokines such as interleukin-6 and tumor necrosis factor alpha are believed to be linked to oxidative stress, which can have detrimental effects on sperm function and overall fertility in both men and women. These adipokines are at increased levels in people with obesity [12].

Furthermore, the visceral adiposity index (VAI) is a brief and reliable indicator of visceral obesity measurement. However, the association between VAI and erectile dysfunction (ED) is not completely understood. VAI was calculated using body mass index (BMI), waist circumference (WC), triglycerides (TG), and high-density lipoprotein (HDL) cholesterol. A total of 3,380 participants were included in the study, including 900 with ED and 2,480 without ED. Participants with ED generally had higher VAI levels (1.76 vs. 1.53). Higher odds of developing ED were observed in VAI participants. Furthermore, higher VAI was associated with higher odds of developing ED only in the current smokers group (OR=1.092; 95% CI, 1.021–1.167; $p=0.010$) [13].

Therefore, obesity, diabetes, hypertension, and smoking are independent risk factors for erectile dysfunction, while cardiorespiratory fitness is protective. Less is known about the role of muscle strength in male sexual function. One study examined the association between male sexual function and typical cardiovascular risk factors, together with exercise and muscle strength. A total of 2116 men aged 48–75 years from four Nordic-Baltic countries were included. It was found that BMI, age, smoking, diabetes, and hypertension were associated with higher odds of reporting decreased sexual function while reporting intact muscle strength was associated with lower odds [14].

Conclusion

It was concluded that obesity is associated with substantial impairments in quality of life. Weight loss has been shown to improve sexual function in both men and women with obesity. The impact of weight loss medications and the long-term effect of bariatric surgery on sexual function requires further study. A higher visceral adiposity index is independently related to the risk of erectile dysfunction and early intervention is necessary to reduce the progression of erectile dysfunction with high levels of visceral adiposity index. It was shown that BMI, age, smoking, diabetes, and hypertension were associated with higher odds of reporting decreased sexual function.

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Author contributions: **Conceptualization** - Deangelo Cláudio Gomes de Lima, Rafael Tinoco Alves, Jose Manuel Torres Garcia, Iuri Sanzio Souto, Karlla Vieira Campos Ricatto, Luciene Pereira de Oliveira, Renatto Souza Nunes Cabral; **Data curation**- Deangelo Cláudio Gomes de Lima, Rafael Tinoco Alves; **Formal Analysis** - Deangelo Cláudio Gomes de Lima, Rafael Tinoco Alves, Jose Manuel Torres Garcia, Iuri Sanzio Souto, Karlla Vieira Campos Ricatto, Luciene Pereira de Oliveira, Renatto Souza Nunes Cabral, Celso Alexandre Alves, Natashira Soares Torres, Jussara Santos Sousa; **Investigation** - Deangelo Cláudio Gomes de Lima, Natashira Soares Torres, Jussara Santos Sousa; **Methodology**- Deangelo Cláudio Gomes de Lima; **Project administration**- Deangelo Cláudio Gomes de Lima; **Supervision**- Deangelo Cláudio Gomes de Lima; **Writing - original draft**- Deangelo Cláudio Gomes de Lima, Rafael Tinoco Alves, Jose Manuel Torres Garcia, Iuri Sanzio Souto, Karlla Vieira Campos Ricatto, Luciene Pereira de Oliveira, Renatto Souza Nunes Cabral, Celso Alexandre Alves, Natashira Soares Torres, Jussara Santos Sousa ; **Writing-review & editing**- Deangelo Cláudio Gomes de Lima, Rafael Tinoco Alves, Jose Manuel Torres Garcia, Iuri Sanzio Souto, Karlla Vieira Campos Ricatto, Luciene Pereira de Oliveira, Renatto Souza Nunes Cabral, Celso Alexandre Alves, Natashira Soares Torres, Jussara Santos Sousa.

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Informed Consent

It was applicable.

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Conflict of Interest

The authors declare no conflict of interest.

Similarity Check

It was applied by Ithenticate®.

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