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Research Article

Comparing Health-Related Quality of Life and Stress Appraisal among Women with Overweight, Obesity, and a History of Bariatric Surgery

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Abstract

Objective: This study compared health-related quality of life (HRQoL) and stress appraisal among overweight, obese, and post-bariatric surgery women.

Method: We used a descriptive, causal-comparative design with 90 women. Each group—overweight, obese, and post-bariatric surgery—contained 30 participants. Participants were purposively sampled from Imam Reza Hospital. The Short Form Health Survey (SF-36) assessed physical (PCS) and mental (MCS) HRQoL. The Stress Appraisal Measure (SAM) evaluated perceived stress. We analyzed data using MANOVA and Tukey's post hoc tests in SPSS 26.

Results: MANOVA showed significant group differences ($F = 8.65$, $p < 0.001$, $\eta^2 = 0.23$). Tukey's post hoc tests found that overweight women had higher PCS and MCS scores and lower stress appraisal than both obese and post-bariatric groups. The post-bariatric group had higher PCS and MCS than the obese group. Stress appraisal did not differ significantly between these two groups.

Conclusion: Bariatric surgery improves HRQoL compared with obesity, but not to levels seen in the overweight. High stress remains after surgery. These findings highlight the need for psychological support and early interventions to maintain HRQoL and manage stress.

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Extended Abstract

Background and Objectives

This study aimed to directly compare the physical and mental components of HRQoL and stress appraisal among women who are overweight, obese, or post-bariatric surgery, using a causal-comparative design. Obesity is a global public health crisis contributing to over four million annual deaths from related complications. In Iran, 38.06% of the population is overweight and 24.96% is obese, highlighting the urgent need to address this issue. Obesity negatively affects health-related quality of life (HRQoL), impacting physical, mental, and social well-being, and is associated with heightened stress due to weight-related stigma and health challenges. Women face unique psychosocial pressures, such as body image concerns and social expectations, which can exacerbate these effects. While bariatric surgery is an effective intervention for severe obesity—leading to significant weight loss and improved physical HRQoL—its impact on mental health and stress appraisal remains less clear. Despite extensive research, few studies have used a causal-comparative design to examine HRQoL and stress appraisal among these groups of women.

Materials and Methods

This study utilized a descriptive, causal-comparative design to examine HRQoL and stress appraisal among 90 women, divided equally into three groups: overweight (BMI 25–29.9 kg/m²), obese (BMI 30–39.9 kg/m²), and post-bariatric surgery (at least 6 months post-surgery). Participants were purposively sampled from Imam Reza Hospital in Tabriz, Iran, with overweight and obese women recruited from the nutrition clinic and post-bariatric surgery women identified through the hospital's surgical registry. The inclusion criteria for the study were female, aged 18 or older, and meeting the BMI criteria for each group. The exclusion criteria included a diagnosis of type 2 diabetes, hypertension, other obesity-related comorbidities, and the use of psychiatric medication. Data were collected via face-to-face administration of two validated questionnaires. The Short Form Health Survey (SF-36) measured HRQoL, yielding Physical Component Summary (PCS) and Mental Component Summary (MCS) scores (0–100, higher scores indicating better health). The Stress Appraisal Measure (SAM), a 28-item questionnaire based on Lazarus and Folkman's transactional model, assessed perceived stress on a 5-point Likert scale (1–5; higher scores indicate greater stress). Both instruments demonstrated strong reliability in this study (SF-36: PCS $\alpha = 0.72$, MCS $\alpha = 0.80$; SAM: $\alpha = 0.84$) and were validated for use in the Iranian population. Ethical approval was obtained from the University of Tabriz Research Ethics Committee, and informed consent was secured from all participants, with data anonymized to ensure confidentiality. Statistical analyses were conducted using SPSS version 26. Multivariate analysis of variance (MANOVA) was employed to compare groups on PCS, MCS, and stress appraisal, with assumptions of normality, homogeneity of covariance matrices, and homogeneity of variances verified. Tukey's post hoc tests were used to identify specific group differences.

Results

The overweight group reported the highest PCS ($M = 74.63$, $SD = 12.70$) and MCS ($M = 66.51$, $SD = 15.21$) scores, indicating higher physical and mental health, as well as the lowest stress appraisal ($M = 2.76$, $SD = 0.49$). In contrast, the obese group had the lowest PCS ($M = 47.59$, $SD = 12.17$) and MCS ($M = 36.35$, $SD = 15.90$) scores, along with higher stress appraisal ($M = 3.26$, $SD = 0.37$). Meanwhile, the post-bariatric surgery group showed intermediate outcomes, with PCS ($M = 57.99$, $SD = 18.25$), MCS ($M = 48.83$, $SD = 21.01$), and stress appraisal ($M = 3.21$, $SD = 0.54$) scores. MANOVA results indicated significant group differences ($F = 8.65$, $p < 0.001$, $\eta^2 = 0.23$), accounting for 23% of the variance in PCS, MCS, and stress appraisal. Further analysis using Tukey's post hoc tests confirmed that overweight women had significantly higher PCS and MCS scores than both the obese and post-bariatric surgery groups. In addition, the post-bariatric surgery group had higher PCS and MCS scores than the obese group. For stress appraisal, overweight women reported significantly lower scores than both obese and post-bariatric surgery groups, with no significant difference between the latter two.

Discussion and Conclusion

The findings highlight a graded relationship between BMI and HRQoL, with overweight women reporting better

physical and mental health than obese and post-bariatric surgery groups. The higher scores in HRQoL in the overweight group likely stem from fewer obesity-related comorbidities and less severe psychosocial stressors, such as stigma and functional limitations. Bariatric surgery significantly improves HRQoL compared to obesity, likely due to weight loss and reduced physical limitations. However, it does not achieve the levels of HRQoL observed in overweight women. The persistently elevated stress appraisal levels observed among post-bariatric surgery women, comparable to those of obese women, suggest ongoing psychological challenges, such as fear of weight regain and dietary restrictions. These results align with Lazarus and Folkman's stress appraisal model, which posits that perceptions of health as a threat rather than a challenge contribute to higher stress. The study underscores the need for integrated post-surgical psychological support to address these persistent stressors.

This study demonstrates that while bariatric surgery improves HRQoL compared to obesity, it does not achieve the levels observed in overweight women, and stress appraisal remains elevated post-surgery. These findings emphasize the importance of early interventions for overweight individuals to maintain HRQoL and manage stress, as well as comprehensive post-surgical care that includes psychological support. Future research should employ longitudinal designs and include normal-weight controls to clarify these relationships further and inform targeted interventions.

Introduction

Obesity is a chronic condition that results from an imbalance between energy intake and expenditure, leading to the excessive accumulation of fat. Over the past five decades, obesity prevalence has tripled, with over four million deaths attributed to obesity-related causes annually (Boutari & Mantzoros, 2022). In Iran, the prevalence is similarly concerning, with 38.06% of the population classified as overweight, and 24.96% categorized as obese (Djalalinia et al, 2022). Obesity and overweight thus represent critical public health challenges, serving as risk factors for numerous health complications, including coronary heart disease, type 2 diabetes, hypertension, stroke, and certain cancers (Chu et al., 2018). Obesity is also linked to increased risks for mental health issues, such as depression, anxiety, and stress (Wilson & Goldfield, 2014). Beyond its health implications, obesity imposes significant social and economic burdens, resulting in increased healthcare costs and reduced productivity (Neovius et al., 2012; Jo, 2014). These physical and psychological challenges impair individuals' daily functioning, limit their capacity for active lifestyles, and negatively impact their health-related quality of life (HRQoL; Donini et al., 2020).

HRQoL refers to the impact that a medical condition, such as obesity, has on a person's physical, mental, and social well-being (Pearl et al., 2020). This concept encompasses subjective, dynamic, and multidimensional elements. From a subjective standpoint, every person assesses their quality of life based on their feelings, expectations, and values. Its dynamic nature highlights how HRQoL evolves in response to shifting priorities and objectives (Theofilou, 2013), while its multidimensional nature encompasses physical, psychological, and social aspects (Kolotkin & Andersen, 2017).

The relationship between obesity and HRQoL is a focal point for researchers and clinicians. Studies consistently demonstrate a negative association between obesity and the physical component summary (PCS) of HRQoL. For example, Keramat et al. (2022) found that individuals with obesity scored significantly lower on the PCS than those with normal weight. This reduction is primarily attributed to a higher prevalence of chronic conditions among obese individuals, resulting in increased pain and physical limitations. Svärd et al. (2017) also observed that a higher BMI is associated with impairments across various physical health

domains, thereby increasing the adverse effects of obesity on physical well-being. The mental component summary (MCS) of HRQoL, a measure of psychological well-being, similarly declines with increasing severity of obesity (Rozjabek et al., 2020). Higher BMI levels are associated with declines in vitality and social functioning, resulting in lower MCS scores (Wang et al., 2013). The psychological impact of obesity manifests in symptoms such as anxiety, depression, sleep disturbances, low self-esteem, eating disorders, and negative body image (Chu et al., 2019). This burden is further intensified by social stigma and the difficulties associated with managing chronic illnesses (Cuauro et al., 2023).

Research shows that obese women experience a lower quality of life than obese men. Factors contributing to this disparity include social expectations, psychosocial stressors, and the physical impact of obesity (Kapoor et al., 2021). These factors may lead some obese women to consider interventions like bariatric surgery for weight loss and health improvement (Aly et al., 2020). Bariatric surgery is one of the most effective treatments for severe obesity, with patients often losing up to 70% of excess weight within the first year post-surgery (Nguyen & Varela, 2017; Chang et al., 2014). Beyond weight loss, studies have shown significant improvements in PCS scores following bariatric surgery, with patients reporting enhanced physical functioning and fewer limitations in daily activities previously affected by obesity (Kolotkin & Andersen, 2017). Although improvements in MCS post-surgery are generally less pronounced than those in PCS, they remain significant. Bariatric surgery can help reduce psychological issues associated with obesity, leading to better mental health outcomes over time. However, the extent of these improvements can vary based on pre-surgery psychological conditions and access to social and psychological support (Jumbe et al., 2016).

On the other hand, stress appraisal is critical for understanding how individuals manage weight-related challenges across overweight, obese, and post-bariatric surgery populations. According to Lazarus and Folkman (1984), stress appraisal consists of two main components: primary appraisal and secondary appraisal. During primary appraisal, individuals evaluate situations as either threats (potential harm) or challenges (opportunities for growth). In secondary appraisal, they assess their available coping resources. Stress is more likely to arise when people perceive the demands of a situation as overwhelming (Lazarus, 1991). Obese individuals tend to view weight-related stigma and health issues as threats, which can lead to maladaptive coping strategies such as emotional eating. For instance, Boniecka et al. (2017) found that bariatric surgery candidates reported increased snacking on unhealthy foods when stressed. In addition, Bąk-Sosnowska et al. (2013) found that stress appraisal scores decrease as BMI decreases in individuals participating in weight-loss programs, suggesting that stress appraisal may vary across obese, overweight, and post-bariatric surgery groups, with each group experiencing different stress and coping mechanisms. Bariatric surgery patients often perceive the procedure as a challenge and a threat. On the one hand, it presents an opportunity for significant health benefits, including substantial weight loss and a reduction in comorbidities; on the other hand, it raises concerns such as surgical complications, postoperative pain, and the fear of regaining weight. Psychological factors further complicate these complex appraisals; for instance, elevated stress levels before surgery have been linked to poorer weight loss outcomes (Stromberg et al., 2020).

Although the relationship between obesity and HRQoL has been widely studied, there is limited focus on how stress appraisal varies across weight categories. Much of the literature centers on the physical and psychological consequences of obesity, with less attention to how individuals perceive and manage weight-related stress. High rates of stress-related mental health conditions among those pursuing bariatric surgery

highlight the psychological burden associated with severe obesity (Dawes et al., 2016). Although bariatric surgery often leads to lasting improvements in physical HRQoL and reductions in obesity-related issues, the persistence of anxiety and depression can shape patients' perceptions of surgical success. For instance, Ghanbari et al. (2018) found that post-operative anxiety and depression, often triggered by side effects like hair loss or lethargy, significantly influence patients' emotional feedback about the effectiveness of surgery. While physical well-being may remain enhanced over the long term, psychological health appears inconsistent (Kolotkin et al., 2012). These patterns indicate that surgical intervention may not adequately address the stress linked to obesity, emphasizing the need to explore stress appraisal as a distinct factor that influences both weight loss maintenance and overall well-being.

Despite extensive research on the impact of overweight and obesity on HRQoL and stress appraisal, significant gaps remain, particularly in direct comparisons among women who are overweight, obese, or post-bariatric surgery. Most studies examine these groups separately, which limits our understanding of variations in HRQoL and stress appraisal. Moreover, women who face unique challenges such as body image concerns, weight stigma, and emotional eating, and are more likely to undergo bariatric surgery, are rarely analyzed as a distinct subgroup. Additionally, few studies directly compare all three groups, and even fewer employ a causal-comparative design to analyze the differences between them. Although bariatric surgery often improves physical HRQoL, its effects on mental well-being and stress appraisal are mixed. These gaps hinder the development of targeted interventions. Understanding how women at different weight statuses perceive and manage stress is crucial for optimizing post-surgical care, designing effective psychosocial interventions, and informing health policies. Accordingly, this study aimed to compare the physical and mental components of HRQoL and stress appraisal among overweight, obese, and post-bariatric surgery women.

Method

Participants and Procedure

This study employed a descriptive, causal-comparative design to examine HRQoL and stress appraisal across three groups of women based on weight status: overweight, obese, and post-bariatric surgery. A priori power analysis was conducted using G*Power software (version 3.1) to determine the minimum sample size needed for sufficient statistical power. A MANOVA design with three groups was used, and based on an anticipated medium effect size ($f^2(V) = 0.25$), a total sample of 73 participants was determined to achieve 95% power with an alpha level of 0.05. To enhance the robustness of the study and account for possible dropouts while ensuring sufficient statistical power to detect significant differences, a total of 90 participants were recruited, with 30 women in each of the three groups.

Participants were selected using purposive sampling from Imam Reza Hospital in Tabriz, Iran. The post-bariatric surgery group was identified through the hospital's surgical registry, comprising individuals who had undergone surgery at least six months prior to the study, to account for recovery-related effects on psychological and health-related outcomes. Overweight and obese participants were recruited from the hospital's nutrition clinic during routine dietary consultations.

Inclusion criteria required participants to be female, aged over 18 years, with a BMI of 25–29.9 kg/m² for the overweight group and 30–39.9 kg/m² for the obese group. Exclusion criteria were applied to control

for potential confounding variables and included a current diagnosis of type 2 diabetes, hypertension, other obesity-related comorbidities, or the use of psychiatric medications. Demographic variables such as age and education level were recorded to ensure comparability between groups, and participants were selected to match as closely as possible on these factors.

Ethical approval was obtained from the Research Ethics Committee of the University of Tabriz prior to data collection. Researchers submitted a detailed protocol outlining the study's objectives, required data, and procedures for obtaining informed consent. After meeting all ethical and procedural requirements, a formal data access license was granted. The license required secure data storage and prohibited data sharing with third parties, as mandated by institutional policies and the Declaration of Helsinki.

Data were collected through face-to-face administration of standardized questionnaires at Imam Reza Hospital. Before participating, participants were informed about the study's purpose, procedures, and confidentiality and provided informed consent. Statistical analyses were performed using SPSS version 26. MANOVA was chosen to compare the three groups across multiple dependent variables while controlling for Type I error across comparisons. Assumptions of MANOVA, including normality, homogeneity of covariance matrices, and homogeneity of variances, were verified before analysis. Tukey's post hoc test was planned to follow significant group differences due to its robustness in controlling Type I error rates when comparing multiple groups and its suitability for equal sample sizes.

Ethical Statement

This study used the principles outlined in the Declaration of Helsinki and received approval from the Research Ethics Committee at the University of Tabriz (IR.TABRIZU.REC.1403.075). Written informed consent was obtained from all participants. Each individual was made aware of the study's purpose and procedures, and it was ensured that their information would remain anonymous and confidential. Participants were also informed of their right to withdraw from the study at any time.

Measures

Stress Appraisal Measure (SAM): The SAM is a 28-item questionnaire that assesses cognitive appraisals of stress based on Lazarus and Folkman's (1984) transactional model. It evaluates three components: primary appraisal (perceived threat or challenge), secondary appraisal (perceived coping resources), and overall perceived stressfulness. Participants respond on a five-point Likert scale (1 = not at all, 5 = extremely), with total scores ranging from 1 to 5, where higher scores indicate greater stress appraisal. The SAM has strong reliability, with Cronbach's alpha values ranging from 0.74 to 0.90 (Peacock & Wong, 1990). In this study, a reliability coefficient of 0.84 was achieved. The SAM was selected for its alignment with stress and coping theory, its focus on cognitive appraisal relevant to weight-related stress, and its reliable performance in diverse populations, including the study's Iranian context. (Shokri et al., 2016)

Short Form Health Survey (SF-36): The Short Form Health Survey (SF-36) is a standardized 36-item questionnaire that measures HRQoL across physical and mental health domains. It includes eight subscales: physical functioning, role limitations due to physical health, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and emotional well-being. These are aggregated into two composite scores: the Physical Component Summary (PCS) and the Mental Component Summary

(MCS), each scored from 0 to 100, with higher scores indicating better health or functioning. The SF-36 is well-validated, with Cronbach's alpha values typically above 0.70 in similar populations (Al-Amer et al., 2018). The reliability coefficients for this study were 0.72 for PCS and 0.80 for MCS. The SF-36 was chosen because it effectively measures both physical and mental HRQoL, is widely used in obesity and bariatric surgery research, and has been validated in Persian, making it suitable for the study's Iranian participants (Montazeri et al., 2006).

Results

Participant demographics are presented in Table 1.

Table 1. Demographic Characteristics of Participants

Group	Mean Age (years)	Mean BMI	Educational Level (%)		
			Diploma	Bachelor	Master
Overweight	29	27	30	43.3	26.7
Obese	29	35	26.7	40	33.3
Post-bariatric surgery	32	29	40	40	20

The demographic characteristics of participants indicate a mean age of 29 for the overweight group, 29 for the obesity group, and 32 for the bariatric surgery group. The mean BMI values were 27 for the overweight group, 35 for the obese group, and 29 for the bariatric surgery group. Most participants held a bachelor's degree, followed by a diploma or master's degree. Table 2 summarizes descriptive statistics for the primary research variables, including the PCS, MCS, and stress appraisal scores.

Table 2. Mean and Standard Deviation for Research Variables across Groups

Group	PCS	MCS	Stress Appraisal
	Mean (SD)	Mean (SD)	Mean (SD)
Overweight	74/63 (12/70)	66/51 (15/21)	2/76 (0/49)
Obese	47/59 (12/17)	36/35 (15/90)	3/26 (0/37)
Post-bariatric surgery	57/99 (18/25)	48/83 (21/01)	3/21 (0/54)

The overweight group reported the highest PCS (74.63) and MCS (66.51) scores, indicating better physical and mental health, as well as the lowest stress appraisal (2.76). The obese group exhibited the lowest PCS (47.59) and MCS (36.35) scores, with a higher stress appraisal (3.26). The post-bariatric surgery group fell between the two, with moderate PCS (57.99), MCS (48.83), and stress appraisal (3.21) scores.

Before conducting the multivariate analysis of variance (MANOVA), the assumptions were evaluated. The Kolmogorov-Smirnov test confirmed that the data were normally distributed across all groups ($p > 0.50$). The M-Box test indicated homogeneity of covariance matrices ($p = 0.52$), and Levene's test supported equality of variances for PCS ($F = 1.03$, $p = 0.35$), MCS ($F = 1.03$, $p = 0.35$), and stress appraisal ($F = 1.19$, $p = 0.30$). The MANOVA results, using Wilks' Lambda, revealed significant differences between groups ($F = 8.65$, $p < 0.001$, $\eta^2 = 0.23$), with 23% of the variance in the linear combination of PCS, MCS, and stress appraisal

attributable to group differences. Detailed MANOVA results are presented in Table 3.

Table 3. MANOVA Results for PCS, MCS, and Stress Appraisal across Groups

Dependent Variables	SS	Df	MS	F	P-value	Effect Size
PCS	11158.38	2	5579.19	26.03	0.001	0.37
MCS	13778.75	2	6889.37	22.32	0.001	0.33
Stress Appraisal	4.50	2	2.25	9.89	0.001	0.18

Table 3 demonstrates significant group differences in PCS, MCS, and stress appraisal ($p < 0.05$). Notably, 37% of the between-group variance in PCS, 33% in MCS, and 18% in stress appraisal were attributable to intergroup differences. Tukey's post hoc analysis further examined specific group differences, as summarized in Table 4.

Table 4. Tukey's Post Hoc Test Results for Group Mean Comparison

Dependent Variables	Group	Mean Difference	Error	Significance Level
PCS	Bariatric Surgery - Obesity	10.40	3.78	0.001
	Bariatric Surgery - Overweight	-16.64	3.78	0.001
	Obesity - Overweight	-27.04	3.78	0.001
MCS	Bariatric Surgery - Obesity	12.48	4.53	0.020
	Bariatric Surgery - Overweight	-17.68	4.53	0.001
	Obesity - Overweight	-30.16	4.53	0.001
Stress appraisal	Bariatric Surgery - Obesity	-0.05	0.12	0.912
	Bariatric Surgery - Overweight	0.45	0.12	0.001
	Obesity - Overweight	0.50	0.12	0.001

Table 4 presents the results of Tukey's post hoc comparisons. Overweight participants had significantly higher PCS and MCS scores than both obese and post-bariatric surgery participants. Additionally, bariatric surgery participants reported better physical and mental health than obese individuals. For stress appraisal, overweight individuals reported significantly lower stress compared to both other groups; however, there was no significant difference in stress between the obese and post-bariatric surgery groups.

Discussion and Conclusion

This study aimed to compare the physical and mental health components of HRQoL and stress appraisal among women with overweight, obesity, and those who have undergone bariatric surgery. The findings reveal significant differences across weight status groups. Overweight individuals consistently reported higher PCS and MCS scores compared to both obese and post-surgical groups, along with lower stress appraisal. These results underscore the graded relationship between BMI and HRQoL (Bottone et al., 2013), indicating that increasing adiposity is associated with greater biological and psychosocial burdens (Stephenson et al., 2021). Notably, post-bariatric surgery patients, despite achieving weight loss, did not reach HRQoL or stress appraisal levels comparable to those of overweight individuals, emphasizing the ongoing challenges they face after surgery (Caltabiano, 2020).

Overweight individuals consistently report higher PCS scores compared to both obese individuals and those who have undergone bariatric surgery (Stephenson et al., 2021; Kolotkin et al., 2009). It indicates that, despite having a BMI above the normal range, the overweight group typically experiences fewer health complications

related to obesity, such as cardiovascular disease, diabetes, and osteoarthritis, compared to those in higher BMI categories (Fontaine & Barofsky, 2001). These conditions, common among individuals with obesity, often lead to decreased mobility and physical functioning, contributing to lower PCS scores. Additionally, individuals who have undergone bariatric surgery reported higher PCS scores compared to those with obesity, aligning with findings from Díaz-González et al. (2024) and Kolotkin et al. (2012). Improvements in physical health among post-surgical individuals are primarily attributed to significant weight loss, which reduces physical limitations and supports healthier lifestyle habits such as increased physical activity and improved nutrition. However, despite these gains, post-surgical patients may still face physical challenges, including musculoskeletal strain and metabolic changes resulting from rapid weight loss (Holanda et al., 2022; Naseer et al., 2024). Therefore, while bariatric surgery offers substantial physical health benefits over obesity, overweight individuals generally report better overall physical functioning.

In terms of mental health, overweight individuals also report higher MCS scores than both obese and post-bariatric surgery groups (Caltabiano, 2020). Research shows that obesity is strongly linked to increased psychological distress, including issues such as depression, anxiety, and body dissatisfaction (Fontaine & Barofsky, 2001). Many people choose bariatric surgery with the hope of improving both their physical and mental well-being; however, the post-operative period often presents significant psychosocial challenges. These challenges may include fears of weight regain and changes in social identity, which can negatively impact mental health and motivation (Kubik et al., 2013). While some improvements in self-esteem and social interaction have been observed after surgery, the mental health benefits might not entirely offset the psychological challenges that remain after the operation. As a result, overweight individuals, who are less likely to encounter such intense psychosocial disruptions, often report better mental health outcomes compared to obese and post-bariatric groups (Rindler et al., 2023). Moreover, the post-bariatric surgery group in this study scored higher in MCS compared to the obese group; achieving weight reduction fosters a sense of self-efficacy and increased confidence. In addition, psychosocial benefits, including improved self-esteem, enhanced body image, and increased social interaction, may improve mental health outcomes following surgery (Díaz-González et al., 2024; Kolotkin et al., 2012).

Overweight individuals consistently reported significantly lower stress appraisal compared to both obese and post-bariatric surgery groups. This finding aligns with research by Bąk-Sosnowska et al. (2013), which indicates that reductions in BMI are often associated with shifts in individuals' perceptions of health from viewing it as a threat to viewing it as a manageable challenge, thereby reducing perceived stress. While overweight individuals have a higher BMI, they tend to experience fewer psychosocial burdens, such as societal stigma, internalized shame, and daily functional limitations that are more common in individuals with obesity (Puhl & Heuer, 2009). According to Lazarus's transactional stress model (1998), one's perception of stress is influenced by how one interprets health-related challenges. Overweight individuals may see health concerns as manageable rather than threatening, resulting in lower levels of perceived stress.

In contrast, obese individuals are more likely to perceive health threats as overwhelming due to more severe physical and psychosocial limitations, which contribute to higher stress levels. Interestingly, even after significant weight loss, patients who have undergone bariatric surgery reported stress levels that remained statistically similar to those of the obese group. It may be attributed to the ongoing psychological and lifestyle demands after surgery, such as strict dietary restrictions, fear of weight regain, and dissatisfaction with body

image (ElBarazi, 2024; Jumbe et al., 2017). The stress associated with maintaining weight loss and adjusting to a transformed social identity can persist long after surgery, challenging the assumption that physical improvements automatically translate into psychological relief (Kubik et al., 2013). Lazarus and Folkman's (1984) model further clarifies this by suggesting that post-surgical individuals may perceive weight loss as a new source of threat rather than a challenge, particularly in cultural contexts where beauty standards are rigid (Suleymani, 2020).

Several limitations must be acknowledged. First, the use of non-random sampling and a focus solely on women within a specific age group limits the generalizability of the findings to other genders, age cohorts, and broader populations. Second, key factors, such as the time since bariatric surgery, the severity of obesity-related comorbidities, and pre-surgical psychological conditions, were not considered and may have influenced post-surgical HRQoL and stress appraisal. The study's cross-sectional design further restricts the ability to draw causal interpretations. Lastly, the absence of a normal-weight comparison group restricts understanding of how overweight, obese, and post-surgical individuals compare across the full spectrum of health-related quality of life and psychological well-being. Future research should adopt longitudinal designs to track changes in HRQoL and stress appraisal over time, especially in the years following bariatric surgery. Including a normal-weight control group would offer a more complete framework.

Additionally, studies should examine variables such as psychological support availability, types of bariatric procedures, cultural attitudes toward body image, and time since surgery to understand recovery trajectories better. Investigating interventions that promote mindfulness and improve emotion regulation could further enhance psychological well-being and stress management in obese and post-bariatric surgery populations (Asadollahi & Salehi, 2023). Expanding participant diversity across gender and socioeconomic status will also enhance the validity and applicability of findings.

This study has important clinical and public health implications. While bariatric surgery effectively improves physical health, ongoing psychological challenges emphasize the need for integrated care models. Post-surgical support should include psychological counseling, stress management, and social reintegration strategies to maintain mental well-being. The finding that overweight individuals may report better HRQoL than their obese or post-surgical peers suggests early intervention could be a more cost-effective and psychologically protective strategy. These insights can inform pre-surgical counseling, postoperative care, and public health efforts aimed at reducing the burden of obesity-related conditions. Finally, this study underscores the graded relationship between body weight and HRQoL. While bariatric surgery offers meaningful physical and mental health improvements compared to obesity, overweight individuals continue to report better outcomes across HRQoL and stress appraisal. These findings challenge the assumption that surgical weight loss always restores well-being to levels comparable to those of individuals with lower BMIs and suggest that psychological burdens can persist even after substantial physical transformation. Future research should focus on long-term, holistic care that addresses both physiological and psychosocial dimensions of recovery to maximize the benefits of bariatric procedures.

Conflict of Interest

The authors reported no conflict of interest.

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