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Self-esteem, depression and anxiety after surgery for obesity: A longitudinal pre/post study

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ABSTRACT

Background: People with obesity can experience psychosocial disorders, such as anxiety, depression and low self-esteem. Surgery for obesity may alleviate these factors, but the strength of this association is not clear.
Methods: In this retrospective longitudinal single center study, we assess changes in anxiety, depression (Hospital Anxiety and Depression Scale, HADS) and self-esteem (Rosenberg scale) six months before, and one year after, bariatric surgery. We use correlation analysis to investigate whether reduction in psychosocial suffering is associated with the amount of weight lost (percentage total body mass index, BMI kg/m^2).
Results: 105 patients were included, 85.7% female, with a mean age at surgery of 41.3 years (SD 10.4), mean weight of 112.5 kg (SD 16.2) and mean BMI of 41.2 (4.7) kg/m^2. Overall, 57 (54.3%) patients had sleeve surgery and 48 (45.7%) had a gastric bypass. Pre-operative weight reduced by a mean 36.0 (10.3) kilograms ($P < 0.0001$). Baseline proportions of anxiety, depression and low self-esteem were high and improved one year after surgery (Low self-esteem: 46.7% [95%CI 37.4–56.2] to 18.1% [95%CI 11.9–26.5]; anxiety: 45.7% [95%CI 36.5–55.2] to 33.3% [95%CI 25.0–42.8]; and depression: 36.2% [95%CI 27.6–45.7] to 5.7% [95%CI 2.6–11.9]). Improvements in depression ($P < 0.05$) and self-esteem ($P < 0.01$) were greater for women. Average percentage total weight loss following surgery was 32.2% (SD 8.5) but there was no correlation with post-surgery anxiety, self-esteem or depression scores.
Conclusions: Self-esteem and depression improve markedly after bariatric surgery. Anxiety rates decline, but a high rate of people still experience clinical anxiety after surgery. Psychosocial gains after bariatric surgery may be greater for women who are in general younger and have higher baseline psychosocial burdens.

1. Introduction

In 2020, almost one in five people in France had obesity, a prevalence rate that has doubled since 1997 [1]. Individuals with obesity have an increased likelihood of developing depression [2] and anxiety disorders [3]. Surgery for obesity and weight-related diseases, also known as metabolic bariatric surgery, is recognized as a transformative intervention for weight loss, improving or mitigating diabetes, reducing the risk of cardiovascular issues and improving quality of life [4]. The surgical approach is typically considered when traditional strategies, such as diet and exercise, fail to produce results, or when a person's health is severely at risk due to their obesity [5].

Various studies have outlined the psychological benefits of surgical management of obesity. A systematic literature review demonstrated reductions in depression, anxiety and eating disorders [6]. Depression and self-acceptance are reported to improve significantly after gastric banding [7], and post-surgery weight loss is reported to enhance body image and self-confidence for adolescents, fostering greater social engagement and an improved sense of self-worth [8]. In a recent prospective study in the UK, almost half of the surgery candidates had underlying anxiety or depressive symptoms before surgery and there was a significant reduction in symptoms one year after surgery [9]. High-quality evidence proves that the score of depressive symptoms can be significantly improved after bariatric surgery within a two-year follow-up period and is not affected by the follow-up time. [10]. However, much less is known about the impacts on self-esteem, especially outside of pediatric populations [11].

In France, following national guidelines [12], all adults considering bariatric surgery are accompanied for at least six months by a multidisciplinary team including a surgeon, nutritionist, dietician, adapted physical activity instructor (APA), coordinating nurse and psychologist. This provides ideal conditions to evaluate the burden of psychosocial

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disorders in this population and the impact of bariatric surgery. The aim of this research is to evaluate the impact one year after metabolic bariatric surgery on self-esteem, anxiety and depression for people with obesity in France. Secondary objectives were to study the impact of bariatric surgery on subgroups based on age and sex and to evaluate the relationship between the percentage of body mass index (BMI) lost and psychological outcomes.

2. Methods

2.1. Study design and setting / participants

In this retrospective single-centre longitudinal pre/post study, we included all adult patients, aged 19–65 years, eligible for bariatric surgery according to national guidelines [12] (Class III, IV or V obesity, or Class II obesity with associated medical problems; and age 18–65 years). People receiving conversion bariatric surgery, with other conditions (e.g. pregnancy or illness), or unable to complete questionnaires in French were excluded. All patients received bariatric surgery in our clinic during 2022 or 2023 either by a sleeve or a gastric bypass and they were followed up in clinic one-year post-surgery. Pre-surgery evaluation of baseline psychosocial condition was carried out six months before surgery. Psychometric evaluations were carried out in our centre during a consultation with the psychologist as part of a pre-surgery multidisciplinary clinical evaluation and then as part of the one-year follow-up visit.

2.2. Data collection

We used the Hospital Anxiety and Depression Scale to measure anxiety (HADS-A) and depression (HADS-D) [13] with scores on each scale classified: 0–7: normal, 8–10: borderline abnormal, 11–21: abnormal. To measure self-esteem, we used the Rosenberg Self-Esteem Scale (RSES), a widely-used 10-item scale for measuring self-esteem, with questions about general feelings of self-worth and self-acceptance rated on a 4-point Likert scale. The items were coded, summed, and scored giving scores between 10 and 40, with scores under 30 indicating low self-esteem. Other patient characteristics recorded were weight and height 6 months before and 12 months after surgery, sex, age, and type of surgery received. We calculated percentage total weight loss (% TWL) by (pre-surgery weight - post-surgery weight) / pre-surgery weight *100, and percentage of BMI change after surgery by (pre-surgery BMI - post-surgery BMI) / pre-surgery BMI *100.

2.3. Statistical methods

Psychosocial data collected was individual-level repeated measures and group means were calculated for each indicator for comparison between pre-surgery and post-surgery. We describe categorical variables by the number of values observed, the absolute and relative frequencies and the number of missing data. Patients with missing data were not included in percentage calculations. We uses the Chi^2 test or Fisher's exact test to compare two or more categorical variables, depending on the values expected under the assumption of independence. Quantitative variables were described by the number of values observed, the mean, standard deviation, median, extreme values (minimum and maximum) and the number of missing data. We used Student's t test or Mann-Whitney-Wilcoxon test (non-parametric test comparing ranks) to compare quantitative variables depending on the distribution of the variable of interest and to compare paired data (non-parametric test) depending on the number of patients in each group ($n < \text{or} > 30$) and/or the distribution of the variable of interest. Pearson's correlation coefficients were calculated between the individual percentage reduction in BMI and the individual improvements in anxiety, depression and low self-esteem. Exploratory analysis was carried out to identify any sex-based differences in psychosocial gains after surgery.

Statistical significance was set at $P < 0.05$. All calculations were performed with SAS for Windows (v 9.4; SAS Institute Inc).

3. Results

Of 106 patients included, one was lost to follow-up due to severe unrelated illness and we included 105 patients in the analyses. They were 85.7% female, with an average age at surgery of 41.3 years (SD 10.4), an average weight of 112.5 kg (SD 16.2) and average BMI of 41.2 (4.7) kg/m^2. Overall, 57 (54.3%) patients had sleeve surgery and 48 (45.7%) had a gastric bypass (Table 1).

Pre-surgery, high proportions of individuals had low self-esteem (46.7%, 95%CI 37.4; 56.2), anxiety (45.7%, 95%CI 36.5; 55.2) and depression (36.2%, 95%CI 27.6; 45.7) (Table 2). People < 40 years had higher rates of low self-esteem ($P < 0.05$) and anxiety (borderline statistical significance, $P = 0.05$) than people 40 years and over (Table 2).

One year after surgery, there was a reduction in proportions of people experiencing low self-esteem (18.1%, 95%CI 11.9; 26.5, $P < 0.01$), anxiety (33.3%, 95%CI 25.0; 42.8, $P < 0.01$) and depression (5.7%, 95%CI 2.6;11.9, $P < 0.01$) (Fig. 1 citation to appear here). In terms of raw scores (Table 2), self-esteem improved on average 4.5 (SD 5.1) points, from 30.9 (5.5) pre-surgery to 35.4 (4.4) post-surgery ($P < 0.0001$). HADS-D depression scores improved by 4.2 (4.1) points on average, from 6.6 (3.5) to 2.4 (2.5) ($P < 0.0001$). HADS-A scores improved only 2.1 (3.5) points on average, from 8.2 (3.4) to 6.1 (3.0) post-surgery ($P < 0.0001$), notably crossing the threshold from borderline abnormal to normal (cut-off of 7).

Planned exploratory analysis looked at whether improvements were greater depending on gender and age, finding that, compared to men, there appeared to be more marked improvements post-surgery for women for both self-esteem ($P < 0.01$) and depression scores ($P < 0.05$). However, there was no gender effect for improvement in anxiety scores (Fig. 2 citation to appear here, raw scores Table 2). There was no effect for age on the size of improvement in scores (P = ns for all

Table 1
Characteristics of adults receiving bariatric surgery 2022–2023.

	Women N = 90 (%)	Men N = 15 (%)	Total N = 105 (%)
Mean age at surgery, years (SD)	40.4 (10.1)	46.4 (10.9)	41.3 (10.4)
Age group at surgery			
< 30 years	14 (15.6)	1 (6.7)	15 (14.3)
30–34 years	16 (17.8)	0 (0.0)	16 (15.2)
35–39 years	9 (10.0)	4 (26.7)	13 (12.4)
40–44 years	20 (22.2)	0 (0.0)	20 (19.0)
≥ 45 years	31 (34.4)	10 (66.7)	41 (39.0)
Age group at surgery			
< 40 years	39 (43.3)	5 (33.3)	44 (41.9)
≥ 40 years	51 (56.7)	10 (66.7)	61 (58.1)
Type of surgery			
Sleeve	48 (53.3)	9 (60.0)	57 (54.3)
Bypass	42 (46.7)	6 (40.0)	48 (45.7)
Mean pre-surgery weight (SD), kg	110.5 (15.7)	125.0 (14.2)	112.5 (16.2)
Mean post-surgery weight (SD), kg	73.8 (14.7)	93.2 (13.6)	76.5 (16.0)
Mean % total weight loss (%TWL)	31.7 (9.2)	32.7 (7.7)	32.2 (8.5)
BMI pre-surgery, kg/m^2			
18.5 < 25	0 (0.0)	0 (0.0)	0 (0.0)
25 < 30	0 (0.0)	0 (0.0)	0 (0.0)
30 < 35	2 (2.2)	1 (6.7)	3 (2.9)
35 < 40	41 (45.6)	6 (40.0)	47 (44.8)
≥ 40	47 (52.2)	8 (53.3)	55 (52.4)
BMI post- surgery, kg/m^2			
18.5 < 25	30 (33.3)	1 (6.7)	31 (29.5)
25 < 30	37 (41.1)	5 (33.3)	42 (40.0)
30 < 35	17 (18.9)	8 (53.3)	25 (23.8)
35 < 40	4 (4.4)	1 (6.7)	5 (4.8)
≥ 40	2 (2.2)	0 (0.0)	2 (1.9)
Mean % BMI lost (SD)	33.3 (7.9)	25.3 (8.7)	32.2 (8.5)

*Pre-surgery = 6 months before bariatric surgery and post-surgery = 12 months after

Table 2
Psychosocial scores pre- and post- bariatric surgery.

	Women N = 90 (%)	Men N = 15 (%)	< 40 years N = 44 (%)	≥ 40 years N = 61 (%)	Total N = 105 (%)
Anxiety					
Pre-surgery HADS-A > 7	44 (48.9)	4 (26.7)	25 (56.8)*	23 (37.7)*	48 (45.7)
Post-surgery HADS-A > 7	31 (34.4)	4 (26.7)	18 (40.9)	17 (27.9)	35 (33.3)
Mean pre-surgery HADS-A (SD)	8.4 (3.5)	6.5 (1.8)	9.3 (3.5)	7.3 (3.1)	8.2 (3.4)
Mean post-surgery HADS-A (SD)	6.1 (3.0)	5.9 (3.2)	6.9 (2.7)	5.5 (3.0)	6.1 (3.0)
Mean improvement in HADS-A (SD)	2.3 (3.5)	0.5 (3.4)	2.4 (3.7)	1.8 (3.4)	2.1 (3.5)
Depression					
Pre-surgery HADS-D > 7	35 (38.9)	3 (20.0)	17 (38.6)	21 (34.4)	38 (36.2)
Post-surgery HADS-D > 7	5 (5.6)	1 (6.7)	4 (7.0)	2 (4.2)	6 (5.7)
Mean pre-surgery HADS-D (SD)	6.8 (3.6)	4.9 (2.7)	6.3 (3.6)	6.9 (3.4)	6.6 (3.5)
Mean post-surgery HADS-D (SD)	2.3 (2.4)	2.9 (3.0)	2.4 (2.6)	2.4 (2.4)	2.4 (2.5)
Mean improvement in HADS-D (SD)	4.5 (4.2) *	2.0 (3.2) *	3.9 (4.1)	4.5 (4.2)	4.2 (4.1)
Low self-esteem					
Pre-surgery Rosenberg ≤ 30	45 (50.0)	4 (26.7)	26 (59.1)*	23 (37.7)*	49 (46.7)
Post-surgery Rosenberg ≤ 30	16 (17.8)	3 (20.0)	11 (25.0)	8 (13.1)	19 (18.1)
Mean pre-surgery Rosenberg (SD)	30.4 (5.5)	34.1 (4.8)	29.4 (5.5)	32.0 (5.3)	30.9 (5.5)
Mean post-surgery Rosenberg (SD)	35.4 (4.3)	35.5 (4.8)	34.3 (4.8)	36.2 (3.9)	35.4 (4.4)
Mean improvement in Rosenberg (SD)	5.0 (5.1) *	1.5 (3.4) *	4.9 (5.8)	4.2 (4.5)	4.5 (5.1)

* Chi2 test for differences based on gender or age were significant at P < 0.05. Post-surgery = 12 months after bariatric surgery. Anxiety and Depression were measured by the Hospital Anxiety and Depression Scales (HADS-A and HADS-D) with scores over 7 representing anxiety and depression; Self-esteem was measured by the Rosenberg Self-Esteem Scale with scores of 30 and under representing low self-esteem.

three measures) (Fig. 3 citation to appear here, Table 2).

Average BMI before surgery was 41.2 (4.7) kg/m^2, reducing to 28.0 (4.7) kg/m^{2}following surgery; thus no longer classified as having obesity, and representing a reduction of 32.2% (8.5) (P < 0.0001). Reductions in average BMI were greater for women (41.3 (4.8) pre-surgery to 27.5 (4.7) post-surgery), representing a 33.3% (7.9) reduction. For men, average BMI reduced from 40.8 (3.7) kg/m^2 to 30.4 (3.9) kg/m^2, representing a 25.3% (8.7) reduction.

On average, pre-operative weight reduced by 36.0 (10.3) kilograms from 112.5 (16.2) to 76.5 (16.0) (P < 0.0001). Average total weight loss per surgery recipient was 32.2% (8.5). Subgroup analyses reveal that women lost an average of 36.7 (10.0) kilograms, representing 33.3% (8.0) TWL, and men lost an average of 31.8 (11.2) kilograms, representing 25.3% (8.7) TWL. People under 40 years of age lost on average 38.5 (11.1) kilograms, representing 33.8% (9.2) total weight loss compared to people 40 years and over losing 34.2 (9.3) kilograms, representing 30.9% (7.9) total weight loss.

Percentage of BMI reduction was not correlated with the improvement in self-esteem scores (Correlation coefficient 0.033, 95%CI −0.16; 0.22), nor with improvement in anxiety scores (0.191 (95%CI −0.00; 0.37), or reduction in depression scores (0.176 (95%CI −0.02; 0.36). Type of surgery (sleeve or bypass) was not associated with greater reductions in depression, anxiety or low self-esteem.

4. Discussion

In this longitudinal study of people undergoing metabolic bariatric surgery, we observed high baseline rates of depression (36.2%), low self-esteem (46.7%) and anxiety (45.7%). One year after bariatric surgery, these rates had reduced to 5.7% depression, 18.1% low self-esteem and 33.3% anxiety. This is in alignment with various literature reviews reporting improvements in psychological health after bariatric surgery [14–17].

Our study is one of the few to reports changes in self-esteem after bariatric surgery; despite this important concept for self-worth and its link to anxiety and depression. Recent research has also shown improvements in self-esteem post surgery [18], reporting that the major improvements in self-esteem were primarily due to the initial weight loss rather than to any subsequent changes to physical image with body contouring. Indeed, we believe it is important to distinguish between low self-esteem on the one hand and depressive mood on the other, as these two emotions are not always necessarily linked. They can sometimes appear simultaneously, as in depressive states where a sad mood is associated with low self-esteem, and at other times be completely independent and uncorrelated with each other, as in the emotions of grief or the painful experience of an illness/disability that does not alter our perception of identity. Self-esteem can be independent of the afflictions that affect people. According to French author and psychiatrist Christophe André, self-esteem is the relationship we have with ourselves. It is the answer to three questions: “how I see myself, how I judge myself, and above all, how I treat myself”. [19]

There is high-quality evidence that depressive symptoms in particular can be significantly improved after bariatric surgery over a two-year follow-up period [15]. A recent meta-analysis including 46 studies on the impact of bariatric surgery on depressive symptoms concluded on a significant postsurgical reduction in depressive symptom scores, with subgroup analyses finding that symptom reductions did not

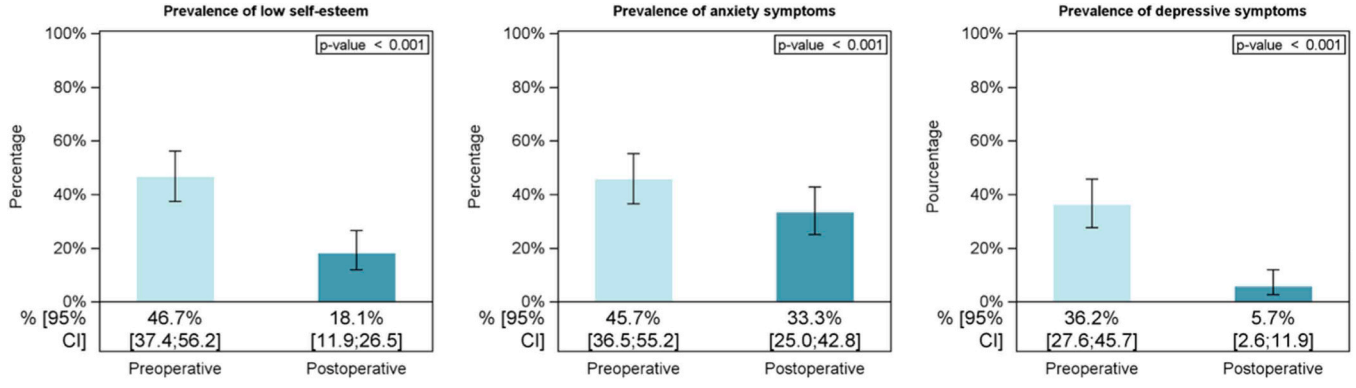

Fig. 1. Pre- and post-operative levels of low self-esteem, anxiety, depression and for people undergoing bariatric surgery.

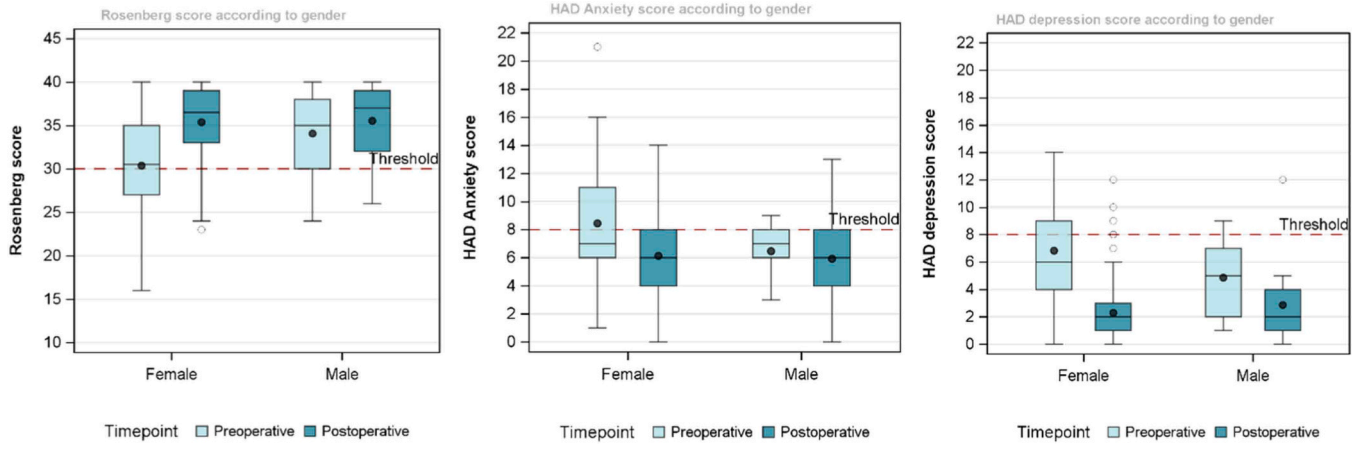

Fig. 2. Pre- and post-bariatric surgery self-esteem, anxiety and depression and scores by sex (Men N = 15; Women N = 90; note that due to small numbers of men any comparisons here are exploratory).

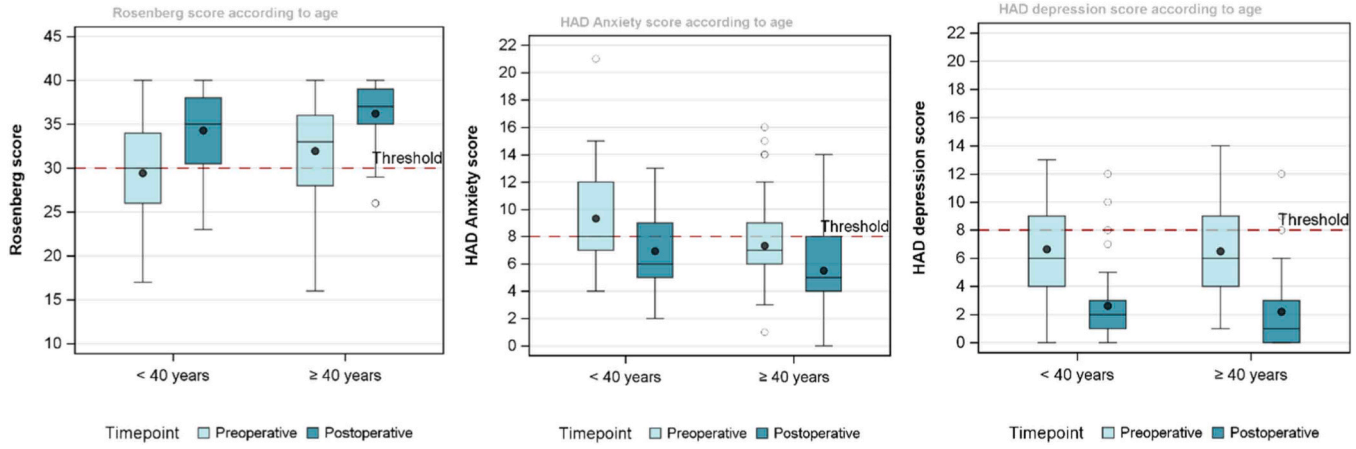

Fig. 3. Pre- and post-bariatric surgery self-esteem, anxiety and depression scores by age (<40 years N = 44; > 40 years N = 61).

differ between the timing of follow-up periods, measurement tool, and surgical procedure, as in our study [17]. This is an important finding as there is a reciprocal influence between depression and obesity [2].

Rates of depression in the population of individuals with obesity are higher than in the general French adult population where around 12.5% of people are reported to experience a depressive episode over a 12-month period [20]. Individuals with extremely high BMI are five times more likely to have suffered from a major depressive episode in the past year [21]. In addition, people with obesity who seek bariatric surgery are more likely to be experiencing higher levels of psychosocial distress than individuals with obesity who do not seek surgery [22,23]. Booth *et al.* found that 41% of candidates for surgery met the criteria for clinical depression in the year preceding surgery, compared to 21% of BMI-matched controls [24]. Our rates of 36.2% of candidates for surgery presenting with depression prior to surgery align with Schowalter *et al.*'s [7], study where they observed 35% of surgery candidates presenting clinically-relevant depression symptoms and Kalarchian *et al.* who found that 38% of patients met diagnostic criteria of at least one Diagnostic and Statistical Manual of Mental Disorders (DSM) IV axis I disorder at the time of preoperative evaluation [25]. It should thus be kept in mind that this is a highly selected and highly burdened population. This may in part be related to weight-shape overevaluation (WSO, undue influence of weight and shape on self-evaluation). People who had undergone bariatric surgery have been reported to have moderate WSO that is linked to anxiety, depression, emotional eating and addictive eating behaviors and these links persist up to 4 years after bariatric surgery. [26].

We observed that remaining rates of anxiety were high after surgery, with one third of our cohort still experiencing clinically-significant anxiety. A pooled meta-analysis including 24 studies looking at anxiety symptoms reported that anxiety symptoms are experienced by 24.5% (95% CI 0.19, 0.31) of patients prior to surgery, reducing moderately to 16.9% (95% CI 0.12, 0.22) during the post-operative period, with an OR of 0.58 (95% CI 0.51, 0.67, $P < 0.001$) [16]. Moreover, a recent cross sectional study reports mixed results with anxiety and stress worsening 12 months post surgery, and depression symptoms improving [27]. This requires further investigation to identify the causality of anxiety effects and the timeline for potential improvements.

In terms of the proportion of reduction, a recent randomised controlled trial using the same measure of anxiety and depression (HADS) to measure prevalence and short-term changes in anxiety and depression after bariatric surgery reported an 9.5% reduction in rates of individuals experiencing anxiety and 22.3% for depression [9]. We observed a reduction in depressive symptoms for more than 30% of the population, which may be influenced by the high number of women in our study (86% versus 75%).

Unexpectedly, our correlation analysis did not identify any relationship between the percentage of reduction of BMI with the reduction in low self-esteem, anxiety and depression. However, this may be a result of insufficient statistical power to detect associations.

The interpretation of the exploratory subgroup analyses is limited by

the small number of men in our study; however there is an indication that the positive psychosocial impacts of bariatric surgery may be stronger for women than for men for improvements in self-esteem and depression reduction, but not for anxiety. Initial proportions of anxiety, depression and low self-esteem were worse for women than for men in our study, though these differences were not statistically different, likely due to the small sample size with only 15 men in our study; who had low levels of anxiety overall. Of note, not only are women more likely to seek bariatric surgery, they do so at a younger age (average age 40.4 years for women and 46.4 years for men in our population), despite relatively similar rates of female and male obesity in France (15.6% and 15.8%, respectively) [28]. Our data also indicate that women experienced a greater reduction in BMI. While initial psychosocial profiles for younger people under 40 years were more heavily affected by low self-esteem and anxiety than people 40 years and over, there were no age-based differences for the size of the reduction in scores. However, of clinical significance, younger patients showed the presence of clinical anxiety before surgery, and post-surgery scores had reduced below the threshold for clinical anxiety. People over 40 were below the threshold before and after surgery. In summary, although the small number of men in this study do not allow for definitive conclusions, our data indicate that men and women show tendencies towards different characteristics, with women more likely to seek bariatric surgery at a younger age, to have higher initial rates of anxiety, and obtain greater reductions in BMI. Post-surgery the gains in self-esteem and depression appear higher for women. This may be linked to gender-based motivations for seeking bariatric surgery; with males more like to seek to improve co-morbidities and quality of life [29]. Of note, the small number of men in this study showed low levels of pre-surgery anxiety, potentially supporting different gender-based motivations for seeking surgery and requiring further qualitative investigation. Based on our clinical experience, we hypothesize that women and young people are more exposed to psychosocial suffering and sensitive to societal pressure regarding their image (body image and social expectations, the need for physical activity, seduction: the pressure to be desirable, etc.). Men and older people, on the other hand, may benefit from greater social leniency in this regard and may not have the same expectations of their own bodies. However, their mood may be affected by changes in their living conditions, particularly in terms of autonomy and comorbidities that develop over time.

Mechanisms by which depression and anxiety improve after surgery are likely to be multi-pathway and still require deciphering. Lower physical weight and improved self-image may enable greater levels of activity and social interaction, alleviating depression and anxiety. Mental health gains may be attributable both to physiological changes such as reduced inflammation and pain, as well as to psychological factors like enhanced body image, self-esteem and self-image [8,14].

Some limitations should be kept in mind when interpreting these results, notably the lack of control group with similar levels of anxiety, depression and low self-esteem who receive the same pluridisciplinary care without surgery and, as mentioned, the small number of men and the interaction between age and gender. In addition, while we observe post-surgery improvements, we do not know how long these gains last for. Long-term follow-up studies describe a mixed picture regarding the sustainability of psychological benefits [30,31]. Weight regain, unmet expectations about life changes, and difficulties in maintaining the behavioral adjustments required for sustained weight loss may contribute to this [14]. Our study design, with a relatively small sample size, and a low proportion of men, does not allow us to definitively attribute causality to the effects of the surgery. It is possible that the care offered by the multidisciplinary team including a nutritionist and psychologist contributed to the improvements. Further research with a control group comparing outcomes for a similarly burdened population is necessary to see more clearly the specific effects of surgery compared to the effects of support and the psychological and relational investment inherent in the care relationship and its contextual effects. Lastly, the sustainability of these gains is not clearly demonstrated in this study, nor in the literature. In our clinical experience and in this study, we observe a 'honeymoon effect' for self-esteem and depression, whereby post-surgery psychosocial scale scores are concentrated around the most extreme scores with very low depression and high self-esteem which may not last over time. Anxiety appears to be mediated by other mechanisms and does not show the same gains following surgery as depression and self-esteem.

5. Conclusions

In this article, we have documented the high rates of low self-esteem, anxiety and depression among candidates for bariatric surgery and the positive psychosocial outcomes twelve months after surgery. Importantly, our results demonstrate that these gains are not dependent on the amount of weight or BMI lost, they are experienced across the population of bariatric surgery recipients. Poor self-esteem, anxiety and depression appear to be particularly prevalent pre-surgery for women, who were more likely to present for surgery than men, and at a younger age, and the beneficial impact of surgery may be more marked for women and younger patients who experience a greater psychosocial burden pre-surgery. Further research with a paired control group is now necessary to validate these claims. A follow-up to this longitudinal study would be useful, continuing to take these measurements regularly from the same sample over the years to see whether mental well-being can be maintained or continues to vary.

Previous presentation

SOFFCO.MM 22–23 May 2025, Saint Etienne, France (Société Française et Francophone de Chirurgie de l'Obésité et des Maladies Métaboliques)

Author agreement

All authors agree to the submission of our article: "Self-Esteem, Depression and Anxiety After Surgery for Obesity: A Longitudinal Pre/Post Study" to the journal Obesity Research and Clinical Practice and we remain available to sign the publishing agreement if accepted for publication.

CRediT authorship contribution statement

Vincent Kapps: Writing – review & editing, Resources, Investigation. **Magali Berthon:** Writing – review & editing, Validation, Resources, Investigation, Funding acquisition, Conceptualization. **Pournin Pierre Arnaud:** Writing – review & editing, Writing – original draft, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Statement of institutional review board or ethics committee approval of the study protocol

All procedures were performed in compliance with relevant laws and institutional guidelines and have been approved by the scientific committee of the Ramsay Health Cooperation Group for Education and Research (GCS Ramsay Santé, No. COS-RGDS-2025–01–001-POURNIN-P) and the Scientific Orientation Council IRB00010835. The privacy rights of human participants have been observed and informed consent was obtained.

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Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Pierre Pournin reports financial support, statistical analysis, and writing assistance were provided by Ramsay Santé SA. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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