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ORIGINAL RESEARCH ARTICLE

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Does preoperative weight loss in a specialist medical weight management centre influence postoperative weight loss after bariatric surgery?

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Summary

Weight loss of 5%–10% is advised in medical weight management (MWM) programmes prior to bariatric surgery but it remains to be established whether it influences postoperative weight loss outcomes. We studied postoperative percent total weight loss (%TWL) in 168 patients categorized by preoperative referral weight loss <5% or ≥5% in a UK NHS bariatric centre. Eighty-six (51.2%) patients achieved sustained referral weight loss <5% (Group A) and 82 (48.8%) ≥5% (Group B). Overall postoperative %TWL in Group A compared with Group B was 30.0% versus 28.3% ($p = .30$) at 12 months and 32.5% versus 29.6% ($p = .20$) at 24 months. There were no significant differences in postoperative %TWL at 12 and 24 months when categorized by procedure (gastric bypass, $n = 106$; or sleeve gastrectomy, $n = 62$), age or sex. Preoperative weight loss during intensive specialist MWM did not influence postoperative weight loss up to 24 months with gastric bypass or sleeve gastrectomy.

KEYWORDS
5% weight loss, bariatric surgery, obesity, specialist medical weight management, weight loss outcomes

Key points

- Weight loss is advised in preoperative medical weight management programmes before recommending bariatric surgery.
- We studied postoperative weight loss outcomes in bariatric surgical candidates categorized by preoperative referral weight loss <5% or ≥5%.
- There was no difference in postoperative weight loss between groups overall or categorized by procedure, age or sex.

Preliminary results of this study were presented as an abstract/poster at the 11th BOMSS (British Obesity & Metabolic Surgery Society) Annual Scientific Meeting, Aberdeen, 2020 (doi: 10.1007/s11695-020-04433-3).

1 | INTRODUCTION

Bariatric surgery, well recognized as a clinically- and cost-effective intervention for severe obesity, is subject to special commissioning in the UK with tiers of weight management interventions.[1] Tier-1 covers universal health promotion, Tier-2 includes primary care-based lifestyle and dietetic interventions and Tier-3 specialist weight management services include multi-disciplinary team (MDT)-based medical weight management (MWM). Patients likely to benefit from bariatric surgery are referred from Tier-3 to Tier-4, which covers specialized complex obesity services including bariatric surgery.

Patients undertaking preoperative MWM are encouraged to aim for weight loss of 5%–10%,[1] both for health-related benefits and to demonstrate commitment to lifestyle, dietary and behavioural changes. Whilst such weight loss targets are used as part of the MDT referral criteria for bariatric surgery, it remains to be established whether achieving weight loss before surgery influences postoperative weight loss outcomes.

2 | METHODS

We performed a retrospective, observational cohort analysis of prospectively recorded longitudinal data on weight loss in patients who underwent primary bariatric surgery upon referral from our hospital-based MWM programme between 1 November 2013 and 15 October 2018. All patients fulfilled the national clinical and commissioning criteria for bariatric surgery.[1,2] Patients were assessed by the Bariatric MDT and followed standardized preoperative and postoperative pathways.

2.1 | Statistical analysis

Weight loss was reported as percent total weight loss (%TWL) calculated as (weight loss ÷ initial weight) × 100. We compared postoperative weight loss in patients who had achieved preoperative sustained referral weight loss (RWL) <5% (Group A) or ≥5% (Group B). Assuming a (conservative) difference in postoperative weight loss outcomes of 5% TWL between the two preoperative groups, we estimated a sample size of 80 (40 in each group) for a power of 80% at an α of .05. After excluding those who underwent revision procedures ($n = 2$) or had insufficient follow-up data ($n = 1$), 168 patients were identified and included in the study period. Comparisons between groups were performed with the Student's *t*-test for continuous variables and Fisher's exact test for 2 × 2 contingency tables. A *p* value of <.05 was deemed to be statistically significant. Data were analysed using IBM SPSS 25.0.0.1.

3 | RESULTS

The 168 patients had a median age of 47 years and included 127 women (75.6%) and 41 men (24.4%); 106 patients (63.1%) underwent gastric bypass and 62 (36.9%) sleeve gastrectomy; 54 (32.1%) had Type 2 diabetes (T2D), one had Type 1 diabetes, 71 (42.3%) had hypertension and 40 (23.8%) had obstructive sleep apnoea (OSA) treated with nocturnal continuous positive airway pressure (CPAP).

From greatest weight to preoperative referral weight, sustained RWL ranged from −1.53% to 16.47% with mean ± SD of 4.96% ± 3.55%; 86 (51.2%) patients achieved "RWL < 5%" including nine patients who lost no weight and four patients who gained a modest amount of weight (Group A) and 82 (48.8%) achieved "RWL ≥ 5%" (Group B). Overall, mean RWL in Group A compared with Group B was 2.25% versus 7.79% ($p < .001$).

3.1 | Subgroup analysis

Mean RWL in women versus men was 5.38% versus 3.64% ($p = .009$), in patients with T2D versus without was 5.87% versus 4.53% ($p = .040$), in patients with hypertension versus without was 4.58% versus 5.25% (ns, non-significant) and in patients with OSA treated with CPAP versus without was 3.18% versus 5.29% ($p = .020$). Fewer men (22.0%) achieved "RWL ≥ 5%" compared with women (57.5%, $p < .001$) (Table 1). Fewer patients with hypertension (38.9%) achieved "RWL ≥ 5%" compared with patients without hypertension (56.3%, $p = .030$). There were no significant differences in rates of "RWL < 5%" versus "RWL ≥ 5%" categorized by age, T2D, OSA and type of bariatric surgery.

Overall postoperative %TWL in Group A compared with Group B was 29.96% versus 28.26% (ns) at 12 months and 32.47% versus 29.63% (ns) at 24 months (Figure 1A). In 106 patients who underwent gastric bypass, postoperative %TWL in Group A compared with Group B was 31.45% versus 29.03% (ns) at 12 months and 32.55% versus 32.43% (ns) at 24 months (Figure 1B). In 62 patients who underwent sleeve gastrectomy, %TWL in Group A compared with Group B was 27.14% versus 27.11% (ns) at 12 months and 32.31% versus 25.16% (ns) at 24 months (Figure 1C). There were no significant differences in %TWL in Group A compared with Group B sub-categorized by median age or sex.

4 | DISCUSSION

We report that preoperative weight loss during intensive specialist MWM did not influence postoperative weight loss up to 24 months with gastric bypass or sleeve gastrectomy. This is consistent with another UK-based study that reported that preoperative weight loss did not predict greater weight loss outcomes up to 24 months after gastric banding or bypass.[3] Similarly, there was no difference in weight loss outcomes up to 2 years after bariatric surgery in patients who required insurance-mandated MWM programmes in the United States.[4] Another US study has reported that insurance-mandated precertification requirement for preoperative MWM was not associated with a reduction in inpatient healthcare utilization in

TABLE 1 Preoperative total weight loss <5% or ≥5% categorized by subgroups

	Group A (RWL <5%)	Group B (RWL ≥5%)	p[a]
Age			
<47 years	35	46	ns
≥47 years	51	36	
Sex			
Women	54	73	<0.001 <0.0
Men	32	9	
Type 2 diabetes			
Present	25	29	ns
Absent[b]	61	53	
Hypertension			
Present	44	28	<0.30 <0
Absent	42	54	
OSAS with CPAP[c]			
Present	25	15	ns
Absent	61	67	
Bariatric surgery			
Gastric bypass	56	50	ns
Sleeve gastrectomy	30	32	

Note: Values are counts.
Abbreviations: RWL, referral weight loss. ns, non-significant.
[a]Fisher exact test.
[b]One patient had Type 1 diabetes mellitus.
[c]Patients with obstructive sleep apnoea syndrome treated with continuous positive airway pressure.

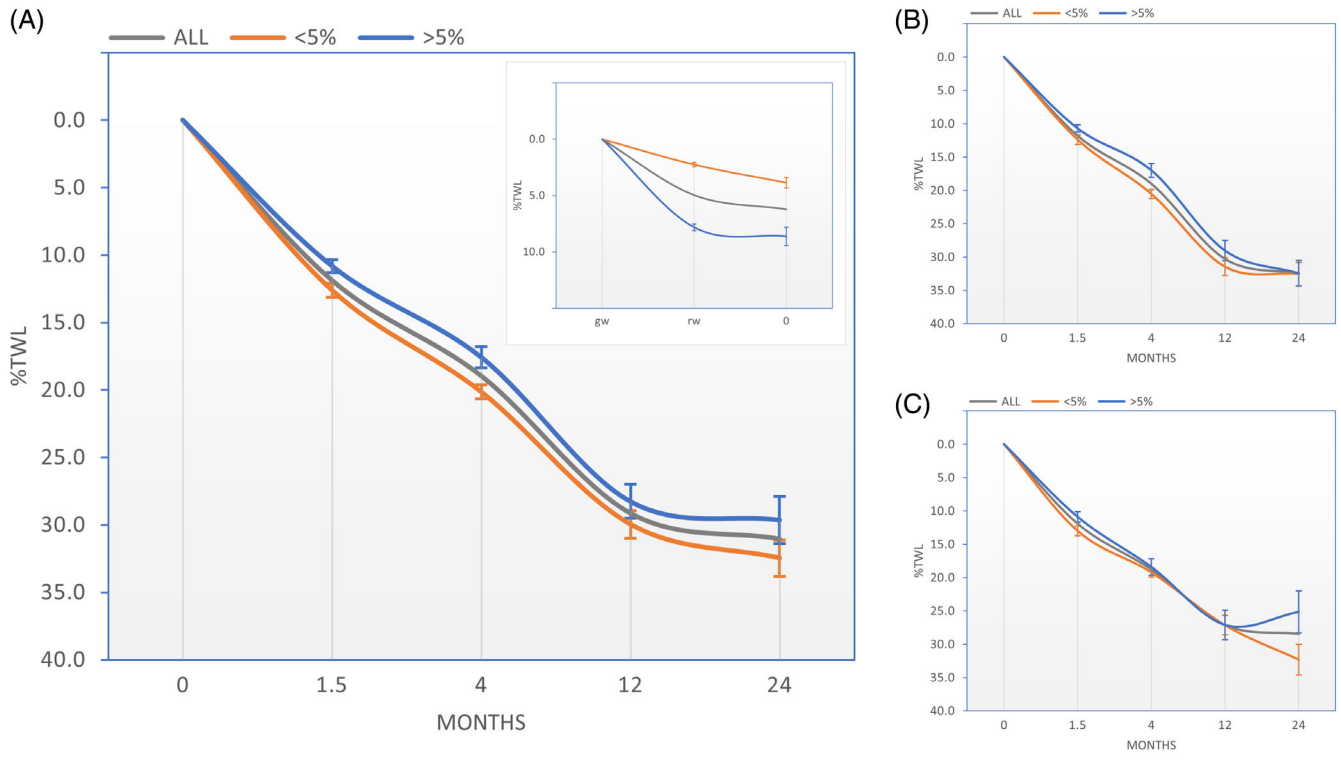

FIGURE 1 Weight loss outcomes after bariatric surgery categorized by preoperative percent total weight loss (%TWL) as Group A (<5%, orange trace) or Group B (≥5%, blue trace) and all patients (all, grey trace). (A) All patients; inset depicts preoperative weight loss. (B) Gastric bypass patients. (C) Sleeve gastrectomy patients. Error bars depict standard error of the mean. gw, greatest weight in preoperative medical weight management; rw, referral weight from preoperative medical weight management to bariatric surgery.

the first postoperative year.[5] A national study from the Netherlands that compared weight loss between patients who qualified for bariatric surgery outright versus patients who underwent MWM before bariatric surgery found no clinically relevant impact on postoperative weight loss up to 3 years.[6] However, another large Dutch nationwide registry audit found that patients with higher preoperative weight loss of 5%–10% had an increased likelihood of achieving 25% TWL.[7] A study from Poland found that lesser degree of preoperative weight loss was not associated with an increased risk of surgical complications[8]; however, greater preoperative weight loss was predictive of better short-term postoperative weight loss and follow-up participation. Another recent study, from Turkey, has reported that weight loss before laparoscopic sleeve gastrectomy does not improve postoperative weight loss.[9]

The potential advantages of MWM include opportunities to lose weight by less-invasive means or practice postoperative lifestyle, dietary and behavioural changes and possibly perioperative benefits including improved technical aspects of surgery, shorter operating time and shorter length of stay. A short period of low- or very-low-calorie diet prior to bariatric surgery can reduce liver volume, a surgeon's perceived complexity of the procedure and postoperative complications.[10] Specialist MWM is also important for optimizing medical therapies for comorbid metabolic conditions such as Type 2 diabetes as good preoperative glycaemic control is essential in patients undergoing bariatric surgery.[11] A randomized trial that compared patients in weight loss and non-weight loss groups preoperatively found no differences in weight, BMI, excess weight loss and number of remaining comorbidities at 1 year after gastric bypass surgery[12]; however, patients who had lost at least 5% of their excess body weight preoperatively achieved greater postoperative excess weight loss at 1 year.

Disadvantages of weight loss targets in preoperative MWM programmes include discouraging patients and possibly delaying clinically effective and necessary treatment.[13] It has been argued that MWM before bariatric surgery, rather than being an evidence-based intervention, may be a device for limiting access to surgery.[14] However, a UK study of referrals for bariatric surgery categorized according to source—Tier-3 MWM, direct from the general practitioner or from another speciality—reported that patients from Tier-3 MWM were more likely to undergo surgery and were better informed about the benefits of surgery and risks of severe obesity.[15] This underpins the real utility and value of preoperative MWM in identifying and enabling appropriate candidates for bariatric surgery. Whilst the advent of effective drug therapies for obesity heralds a new era in MWM, weight loss prior to surgery may not be the best predictor of postoperative outcomes.[13] Rather, shifting the focus of preoperative MWM on education and lifestyle, dietary and behaviour modification in preparation for life after bariatric surgery is a realistic and pragmatic approach.

A notable finding of our study is that men achieved less preoperative weight loss in MWM compared with women. It is recognized that there is gender disparity in the uptake of bariatric surgery between men and women globally despite similar rates of obesity,[16] and similar postoperative weight loss and metabolic benefits after bariatric surgery.[17] Several social barriers and behavioural health risks are recognized to prevent men from seeking and benefiting from medical services generally,[18] which may partly explain the poorer weight loss outcome in a lifestyle and behavioural weight management programme. More action is needed to widen and encourage access to potentially life-enhancing treatments in both genders.

It has long been recognized that major metabolic comorbidities, such as Type 2 diabetes,[19] adversely affect the ability to lose weight in structured MWM programmes. In our study, mean preoperative referral weight loss was greater in people with diabetes, perhaps due to use of potent weight-friendly antidiabetic drugs such as glucagon-like peptide-1 receptor agonists, which was beyond the scope of study; however, there was no significant difference in the proportions of people with or without diabetes achieving preoperative weight loss >5%. On the other hand, people with OSA treated with CPAP achieved lesser mean preoperative weight loss, and a smaller proportion of people with hypertension achieved preoperative weight loss >5%. These findings reflect the burden of metabolic comorbidities that generally impedes significant weight loss in MWM programmes. Whilst the choice of bariatric surgical procedure may be dictated by the presence of significant comorbidities,[20] postoperative weight loss categorized by procedure was not influenced by preoperative weight loss per se in our study.

Limitations of our study include retrospective analysis (although data were accumulated prospectively) and a relatively small sample size which limited some subgroup analyses. Preoperative specialist MWM may potentially influence other outcome measures such as complication rates, glycaemic control, reduction of liver volume, technical ease or time, length of hospital stays and intensive care utilization which were beyond the scope of this study.

5 | CONCLUSION

The degree of preoperative weight loss does not influence postoperative weight loss outcomes. However, qualitative benefits such as better understanding by patients of lifestyle, dietary and behavioural changes, improvements in quality of life and potential reduction of perioperative risks require further research.

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CONFLICT OF INTEREST

Dr Lucinda Summers declares receiving support to attend meetings from NovoNordisk (producers of weight loss medications). None of the other authors have declared any conflict of interest.

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REFERENCES

1. NHS Commissioning Board. Clinical commissioning policy: complex and specialised obesity surgery [Reference: NHSCB/A05/P/a]. 2013. Accessed June 01, 2022. https://www.england.nhs.uk/wp-content/uploads/2016/05/appndx-6-policy-sev-comp-obesity-pdf.pdf.
2. National Institute for Health and Care Excellence. Obesity: identification, assessment and management. Clinical Guideline [CG189]. 2014. Accessed June 01, 2022. https://www.nice.org.uk/guidance/cg189.
3. Abbott S, Lawson J, Singhal R, Parretti HM, Tahrani AA. Weight loss during medical weight management does not predict weight loss after bariatric surgery: a retrospective cohort study. *Surg Obes Relat Dis*. 2020;16(11):1723-1730.
4. Horwitz D, Saunders JK, Ude-Welcome A, Parikh M. Insurance-mandated medical weight management before bariatric surgery. *Surg Obes Relat Dis*. 2016;12(3):496-499.
5. Gasoyan H, Soans RS, Ibrahim JK, Aaronson WE, Sarwer DB. Association between insurance-mandated precertification criteria and inpatient healthcare utilization during one year after bariatric surgery. *Surg Obes Relat Dis*. 2021;18:271-280.
6. Jacobs A, Liem RSL, Janssen IMC, Tollenaar R, Monpellier VM, NOK Research Group. Weight loss after bariatric surgery: a comparison between delayed and immediate qualification according to the last resort criterion. *Surg Obes Relat Dis*. 2021;17(4):718-725.
7. Lodewijks Y, Akpinar E, van Montfort G, Nienhuijs S. Dutch audit for treatment of obesity research group. Impact of preoperative weight loss on postoperative weight loss revealed from a large nationwide quality registry. *Obes Surg*. 2022;32(1):26-32.
8. Stefura T, Dros J, Kacprzyk A, et al. Influence of preoperative weight loss on outcomes of bariatric surgery for patients under the enhanced recovery after surgery protocol. *Obes Surg*. 2019;29(4):1134-1141.
9. Sen O, Turkcapar AG. Effect of pre-operative weight loss on patients' outcomes undergoing laparoscopic sleeve gastrectomy. *J Minim Access Surg*. 2022;18(2):260-263.
10. Stenberg E, Dos Reis Falcao LF, O'Kane M, et al. Guidelines for perioperative care in bariatric surgery: Enhanced Recovery After Surgery (ERAS) Society recommendations: a 2021 update. *World J Surg*. 2022;46(4):729-751.
11. Ahmed B, Ammori BJ, Akhtar K, et al. Why good preoperative control of diabetes is important in patients undergoing metabolic bariatric surgery. *Obes Surg*. 2022;32(3):934-936.
12. Solomon H, Liu GY, Alami R, Morton J, Curet MJ. Benefits to patients choosing preoperative weight loss in gastric bypass surgery: new results of a randomized trial. *J Am Coll Surg*. 2009;208(2):241-245.
13. Tewksbury C, Williams NN, Dumon KR, Sarwer DB. Preoperative medical weight management in bariatric surgery: a review and reconsideration. *Obes Surg*. 2017;27(1):208-214.
14. Mahawar KK, Small PK. Medical weight management before bariatric surgery: is it an evidence-based intervention or a rationing tool? *Clin Obes*. 2016;6(6):359-360.
15. Arhi C, Karagianni C, Howse L, Siddiqui M, Borg CM. The effect of participation in tier 3 services on the uptake of bariatric surgery. *Obes Surg*. 2021;31(6):2529-2536.
16. Adam S, Syed AA. Bariatric surgery. *Lancet Diabetes Endocrinol*. 2014;2(6):449.
17. Kennedy-Dalby A, Adam S, Ammori BJ, Syed AA. Weight loss and metabolic outcomes of bariatric surgery in men versus women - a matched comparative observational cohort study. *Eur J Intern Med*. 2014;25(10):922-925.
18. Lancet T. Raising the profile of men's health. *Lancet*. 2019;394(10211):1779.
19. Wing RR, Marcus MD, Epstein LH, Salata R. Type II diabetic subjects lose less weight than their overweight nondiabetic spouses. *Diabetes Care*. 1987;10(5):563-566.
20. Arterburn DE, Telem DA, Kushner RF, Courcoulas AP. Benefits and risks of bariatric surgery in adults: a review. *JAMA*. 2020;324(9):879-887.

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