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Effects of Lifestyle and Educational Bridging Programs before Bariatric Surgery on Postoperative Weight Loss: A Systematic Review and Meta-Analysis

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Keywords

Bariatric surgery · Preoperative lifestyle intervention · Bridging · Body weight loss · Behavioral interventions

Abstract

Objective: To fulfill the requirements for bariatric surgery, patients often need to participate in mandatory preoperative lifestyle interventions. Currently, the efficacy of multimonth preoperative lifestyle intervention programs on body mass index (BMI) reduction from the start of the program (T0) through the immediate preoperative time point (T1) to 1 year post-surgery (T2) and how the amount of preoperative BMI reduction affects postoperative outcome (T1 to T2) is unclear. The aim of this meta-analysis was to analyze the effects of preoperative lifestyle interventions on BMI 1 year post-surgery. ***Method:*** A systematic literature search was conducted according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses criteria. Randomized controlled trials that implemented preoperative lifestyle interventions lasting 1–8 months before bariatric surgery were included. The BMI of the intervention group was compared with that of a control group before participation in the preoperative lifestyle interventions (T0), after completion of the program before surgery (T1), and 1 year post-surgery (T2). Finally, the impact of successful BMI reduction at T1 on BMI at T2 was analyzed. ***Results:*** $N = 345$ patients derived from 4 studies undergoing preoperative lifestyle interventions reduced their BMI at T1 by 1.5 units compared to the control group (95% CI: −2.73, −0.28). One year post-surgery, both groups had lost comparable BMI points. The influence of reduced BMI at T1 on weight status at T2 is unclear due to the lack of available studies. Other endpoints and subgroup analyses were rarely examined. ***Conclusions:*** Preoperative lifestyle interventions reduce BMI before bariatric surgery more effectively than usual care. These differences are not detectable 1 year post-surgery. Although a short-term energy reduction period before surgery is clearly important to minimize surgery risks, it is currently unclear whether, and if so, under what circumstances, participation in a preoperative lifestyle intervention is beneficial.

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Introduction

Current treatment options for obesity are, on the one hand, conservative weight management methods focusing on reduced energy intake, improved eating behavior, and increased physical activity. Realistic weight loss goals range between 4 and 6% of the initial body weight [1, 2]. On the other hand, there is the possibility of bariatric surgery, which is more effective in reducing body weight, reducing comorbidities, and enhancing quality of life than nonsurgical approaches [3–5]. Through bariatric surgery procedures, total body weight loss (BWL) of 21–22% can be achieved over the long term which corresponds to a 47–48% loss in excess body weight [6]. Other references indicate a total BWL of about 30% [7, 8]. Because the operation risk is low, bariatric surgery is a safe option for reducing body weight, especially when conservative methods have been exhausted [4, 9, 10].

However, there is still an ongoing debate about the ideal treatment of patients before surgery. It is recommended especially by bariatric surgeons to follow a 2-week very low-calorie diet (VLCD) before surgery to minimize risk of surgical complications by losing weight immediately before surgery and therefore reducing liver mass and abdominal fat [11]. In addition, there are also preoperative programs, so-called lifestyle interventions that last for several months, incorporating multiple aspects to different extents: eating behavior, physical activity, behavior change, education about obesity, and information about bariatric surgery. These programs aim to promote healthy long-term lifestyle changes to support bariatric surgery outcomes. Thus, their focus is not only weight loss. However, the question remains whether such programs impact body weight-related outcomes and/or psychological well-being post-surgery, especially since preoperative lifestyle programs are often mandatory before bariatric surgery [12–15].

Four systematic reviews have investigated postoperative differences in weight-related outcomes between an intervention group (IG) that participated in a preoperative lifestyle intervention versus a control group (CG) that underwent usual care [16–19]. Cassie et al. [16] found no differences between the IG and the CG on postoperative weight-related outcomes. Liu [17] reported that in 5 of 8 studies, the IG tended to have a greater weight loss than CG at postoperative endpoints. Stewart et al. included both preoperative and postoperative interventions and concluded that both interventions were able to optimize the post-surgery weight loss. However, the postoperative period appeared to be more favorable for implementation of lifestyle interventions [19]. Marshall et al. [18] found that the IG lost more weight post-surgery through interventions both before and after surgery but also favored the postoperative timing for delivering the program. It is important to note that this analysis included short-term intervention programs with 2-week duration.

None of the reviews examined how the amount of preoperative weight loss achieved through the programs affected postoperative weight loss. Consequently, the impact of multi-month preoperative lifestyle intervention programs on body mass index (BMI) change from the start of the program (T0) to the immediate preoperative time point (T1) and to 1 year post-surgery (T2) and how the success of pre-surgery BWL affects the postoperative outcomes (T1 on T2) are currently unclear. The overall aim of this meta-analysis was to provide a comprehensive overview of the effect of >1-month preoperative lifestyle interventions on BWL 1 year post-bariatric surgery. The following three review questions were examined to evaluate whether or not preoperative interventions in comparison to usual care before bariatric surgery are beneficial.

- Do lifestyle interventions delivered preoperatively reduce BMI before a bariatric surgery procedure?
- Do individuals completing a lifestyle intervention program preoperatively decrease their BMI greater post-surgery in comparison to individuals undergoing usual care?
- Are individuals who have successfully reduced their BMI preoperatively through a lifestyle intervention more successful at decreasing the BMI postoperatively than individuals with no success?

Methods

This review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines [20]. The review protocol was registered at the International Prospective Register of Systematic Reviews (PROSPERO; CRD42021200524).

Literature Information Sources and Search Strategy

A systematic literature search was conducted on 21 May 2020 and updated on 28 April 2021, in the databases PubMed, Web of Science, and the Cochrane Library. The full search strategy is documented in the online supplementary Material 1 (for all online suppl. material, see www.karger.com/doi/10.1159/000526945) and was based on the five PICOS dimensions, i.e., participants (P), interventions (I), comparators (C), outcome (O), and study design (S) to identify all relevant articles [21]. Studies were included if they had the following characteristics.

Participants

Patients with obesity of both sexes and all ethnicities aged ≥18 years and an indication for bariatric surgery. To avoid selection bias of specific groups, studies conducted exclusively in specific patient groups (e.g., type 2 diabetes, metabolic syndrome) were excluded.

Interventions

Preoperative lifestyle interventions for a mean period of 1–8 months before bariatric surgery consisting of (a) dietary interventions including meal replacement and VLCD (very low-calorie diet), (b) behavioral/psychological interventions, and (c) educational programs preparing for changes post-bariatric surgery combined with or without physical activity were included. Studies only recommending weight loss without further interventions were excluded. The period of 8 months was chosen because many intervention programs are designed for 6 months but are extended due to vacations, catch-up appointments, illness, and program organization. Studies lasting less than 4 weeks were excluded because they were indistinguishable from the 2-week protein diets immediately before surgery.

Comparators

Studies with CGs that underwent usual care before bariatric surgery.

Outcome

The primary outcome was body weight-related parameters including BWL (in % or kg), BMI, change in BMI, and other weight-related parameters. Data were extracted from text, tables, and graphs. Body weight-related parameters were assessed before (T0) and for review question 1 after completing the preoperative lifestyle intervention before surgery (T1) and for review question 2 after a mean duration of 12–36 months post-surgery (T2). Question 3 examines the effects of preoperative (T1) on postoperative body weight change (T2). Studies with self-reported weight post-bariatric surgery were included since self-reported weight after bariatric surgery is similar to the objectively measured body weight [22].

Study Design

Randomized controlled trials (RCTs) published in peer-reviewed journals in English were included.

Study Selection, Data Collection, and Organization

The search results of the three databases were combined and duplicates were removed. Next, titles and abstracts were screened independently by two authors (TL and JC) to identify appropriate studies, and their eligibility was discussed in cases of disagreement. To provide a structured overview, the studies were categorized into three groups according to our research questions. *Group 1*: Effect of preoperative lifestyle interventions on pre-surgery BMI reduction (T0 to T1); *Group 2*: Effect of preoperative lifestyle interventions on postoperative BMI reduction (T0 to T2); *Group 3:* Impact of successful BMI reduction before surgery on postoperative outcome (T1 to T2).

Data Items and Statistics

The following information was extracted from each included article: year of publication, country of origin, study type, sample characterization (including sample size, sex, age), BMI (T0: baseline BMI, T1: preoperative BMI, and T2: postoperative BMI), information on the bridging interventions (type of intervention, duration, frequency, interval to surgery), operation method, and follow-up length. Characteristics across studies are presented as median (interquartile range), minimum and maximum for sample size, intervention length, age, and sex. The analyses were performed using the software package Review Manager (Review Manager [RevMan] [Computer program], Version 5.4. The Cochrane Collaboration, 2020). BMI data at T1 and T2, corresponding standard deviations, and sample sizes are presented separately for the IG and CG, and the difference is expressed as mean difference and 95% confidence interval and displayed in forest plots. Statistical heterogeneity was examined by visual inspection of forest plots and using the I^2 statistics to quantify inconsistency between the studies. I^2 heterogenity below 40% is considered low. Robustness of the results was tested by repeating the analysis using different statistical models (fixed-effects and random-effects models). In case of missing data, authors were contacted by email. All authors have responded and have provided the most relevant data.

Risk of Bias

A risk of bias assessment was performed for all included studies using the Cochrane risk-of-bias tool RoB 2 for randomized trials [23]. The tool is divided into 5 domains addressing different types of bias: randomization, deviations from the intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result. In each domain, different signaling questions are used to evaluate the risk of bias. With the help of an algorithm, the risks of the individual sections are evaluated, and an overall risk is calculated and expressed as "low" or "high" risk of bias or can be expressed as "some concerns."

Results

Study Selection and Categorization

A total of 1,092 articles were identified through databases and hand search. Five of the articles met the inclusion criteria [24–28]. Figure 1 shows the detailed process of the systematic literature search. One trial (Hjelmesæth et al. [26]) was a follow-up publication of another included paper (Gade et al. [25]). Thus, the data of both papers were summarized and analyzed as one study.

Summary of Study Characteristics

A detailed description of the characteristics of the single trials is given in Table 1. The trials were published between 2012 and 2019. Two studies were conducted in Norway, one took place in Canada and one in the USA. All studies included behavior change interventions. In total, the four trials included 345 participants. The median sample size was 89 (66–109) and ranged between 25 and 143 participants. The duration of the interventions lasted from 6 to 33 weeks with a median length of 18 (9–28)

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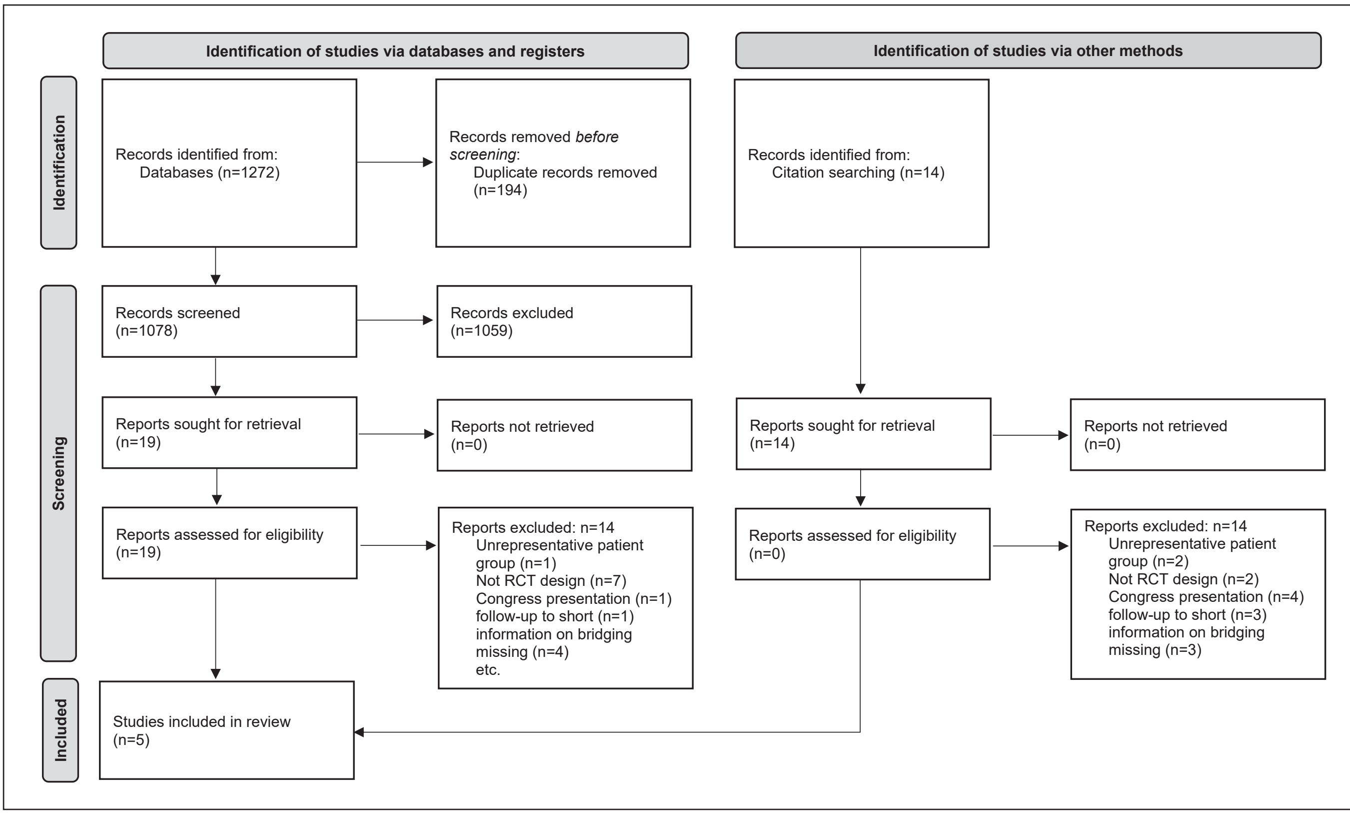

Fig. 1. PRISMA flow diagram. N: number; RCT: randomized controlled trial.

Table 1. Characteristics of studies

First author [ref.] (year)	Country		Sample size and characterization at T0				Intervention type
			N	age, years	women	BMI, kg/m^2	
Baillot et al. [24] (2018)	Canada	IG	13	44.5 (8.8)	84.6%	47.3 (7.3)	Counseling sessions Exercise training sessions (33 weeks)
		CG	12	41.1 (10.3)	75.0%	48.4 (9.2)	
Gade et al. [25] (2015)/ Hjelmesæth et al. [26] (2019)	Norway	IG	42	44.1 (9.8)	64.3%	43.6 (5.1)	Cognitive behavioral therapy (10 weeks)
		CG	38	41.2 (9.6)	73.3%	43.5 (4.7)	
Kalarchian et al. [27] (2016)	USA	IG	71	43.9 (10.3)	90.1%	47.4 (6.2)	Behavioral weight management program (26 weeks)
		CG	72	45.9 (11.6)	90.3%	47.6 (6.5)	
Lier et al. [28] (2012)	Norway	IG	49	43.5 (11.1)	74.0%	45.5 (4.3)	Cognitive behavioral treatment program (6 weeks)
		CG	48	42.4 (9.1)	67.0%	45.1 (5.9)	

Age and BMI are presented as mean and standard deviation. T0: time at baseline; N: number; BMI: body mass index; IG: intervention group; CG: control group; kg: kilogram; m: meter.

Table 2. Risk of bias

Study ID	D1	D2	D3	D4	D5	Overall
Baillot et al. [24], 2018	⊕	⊕	⊕	⊕	⊕	⊕
Gade et al. [25], 2015/ Hjelmesæth et al. [26], 2019	⊕	⊕	⊘	⊕	⊕	⊕
Kalarchian et al. [27], 2016	⊕	⊕	⊘	⊕	⊕	⊕
Lier et al. [28], 2012	⊕	⊕	⊘	⊕	⊕	⊕

D1: randomization process; D2: deviations from the intended interventions; D3: Missing outcome data; D4: measurement of the outcome; D5: selection of the reported result. ⊕: Low risk; ⊘: Some concerns; ⊖: High risk.

weeks (4.5 months). The participants had a median age of 43.6 (42.9–44.5) years (min: 42.9, max: 44.9) and 75% of the participants were women.

Risk of Bias

Table 2 summarizes the risk of bias assessment. The overall risk of bias for the included trials was low.

Bias Arising from the Randomization Process

The randomization and allocation of participants was of low risk of bias in all trials.

Bias due to Deviations from Intended Interventions

For some exposures, such as behavioral interventions including counseling, diet restrictions, and physical activity, it is not possible to entirely blind research staff and participants during the study. However, since no deviations from the study protocols were identified, the performance bias was considered low.

Bias due to Missing Outcome Data

Three of the trials were analyzed per protocol and not per intention-to-treat. The dropout rate of these 3 RCTs was above 20%, with two even exceeding 30%. Consequently, attrition bias was assessed with "some concerns."

Bias in Measurement of the Outcome

The outcome measurement was of low risk of bias because weight-related parameters like BMI as an outcome are very reliable and objectively measurable.

Bias in Selection of the Reported Result

The adherence to study protocols was of low risk of bias.

Summary of Study Outcome

Group 1: Effect of Pre-Operative Lifestyle Interventions on Pre-Surgery BMI Reduction (T0 to T1)

For the analysis of group 1, three trials were eligible [24–27]. The baseline BMIs were similar between IG and CG in all RCTs. Two studies demonstrated no effect of bridging on preoperative BMI [24, 27]. In contrast, Gade et al. [25]/Hjelmesæth et al. [26] favored the IG for BWL (mean BMI difference –1.36 kg/m^2, 95% CI: – 1.95, –0.77; $p < 0.001$). Figure 2 shows the quantitative analysis of these three RCT studies and is in favor of preoperative lifestyle interventions. Participants who underwent preoperative intervention had 1.44 BMI units less in comparison to the controls (95% CI: −2.01, −0.86). There is no statistical heterogeneity among the studies ($I^2 = 0\%$), and the random-effects and fixed-effect models yielded identical results.

Group 2: Effect of Pre-Operative Lifestyle Interventions on Post-Operative BMI Reduction (T0 to T2)

All four trials were included for analysis [24–28]. None of the studies reported a significant difference in BMI decrease between the IG and CG 1 year post-surgery. In line, the quantitative analysis (shown in Fig. 3) found no superiority of preoperative bridging intervention in comparison to standard care. One year post-surgery, the IG lost mean −0.05 BMI units [95% CI: −1.39, 1.29] compared to the CG. Statistical heterogeneity among the studies was $I^2 = 0\%$, and the random-effects and fixed-effect models displayed identical results.

Group 3: Impact of Successful BMI Reduction before Surgery on the Post-Operative Outcome (T1 to T2)

Kalarchian et al. [27] were the only out of the four RCTs which examined the role of pre-surgery BWL on

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Study or Subgroup	Intervention group Mean	SD	Total	Control group Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Baillot 2018	46.4	7.73	13	48.5	11.66	12	0.5%	-2.10 [-9.92, 5.72]
Gade 2015/Hjelmesæth 2019	42.2	1.21	48	43.6	1.76	50	91.6%	-1.40 [-2.00, -0.80]
Kalarchian 2016	44.6	5.7	71	46.4	6.7	72	7.8%	-1.80 [-3.84, 0.24]
Total (95% CI)			**132**			**134**	**100.0%**	**-1.44 [-2.01, -0.86]**

Heterogeneity: Tau² = 0.00; Chi² = 0.16, df = 2 (P = 0.92); I² = 0%
Test for overall effect: Z = 4.93 (P < 0.00001)

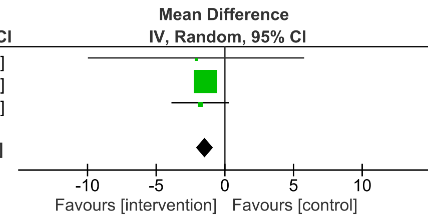

Fig. 2. Quantitative analysis of BMI at T1. BMI: body mass index; T1: time point at T1 (before bariatric surgery); SD: standard deviation; CI: confidence interval; IV: inverse variance.

Study or Subgroup	Intervention group Mean	SD	Total	Control group Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Baillot 2018	30.4	6.07	13	34.9	9.82	12	3.0%	-4.50 [-10.96, 1.96]
Gade 2015/Hjelmesæth 2019	30	3.53	42	29.5	3.19	38	57.8%	0.50 [-0.97, 1.97]
Kalarchian 2016	34.1	6.92	71	33.4	6.55	72	25.7%	0.70 [-1.51, 2.91]
Lier 2012	30.8	7.35	34	31.7	5	30	13.5%	-0.90 [-3.95, 2.15]
Total (95% CI)			**160**			**152**	**100.0%**	**0.21 [-0.91, 1.33]**

Heterogeneity: Tau² = 0.00; Chi² = 2.89, df = 3 (P = 0.41); I² = 0%
Test for overall effect: Z = 0.37 (P = 0.71)

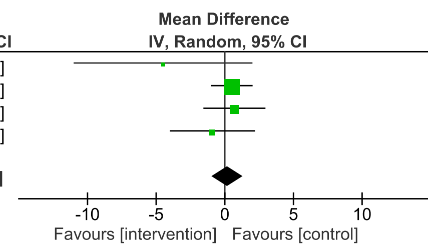

Fig. 3. Quantitative analysis of BMI at T2. BMI: body mass index; T2: 12 months after bariatric surgery; SD: standard deviation; CI: confidence interval; IV: inverse variance.

postoperative BWL outcomes; thus, no quantitative analysis is possible for this group. Participants who lost more than 5% of their initial body weight preoperatively (group ≥5%) and those who lost less than 5% of their initial body weight (group <5%) were distinguished. These two different weight loss groups were compared from 6 months to 24 months post-surgery for their % BWL. Six months after bariatric surgery, the "group ≥5%" lost more than the "group <5%" (25.7% BWL vs. 22.3% BWL, $p < 0.0006$). This significant difference between these groups disappeared after 12 months (28.5% vs. 28.3% weight loss, $p = 0.33$) and 24 months (28.1% vs. 27.8% weight loss, $p = 0.37$) post-surgery, respectively. Besides this RCT by Kalarchian et al. [27], we identified 14 non-RCT studies during our research process covering the topic of the impact of successful BMI reduction before surgery on the postoperative outcome. The findings of these studies are incorporated into the discussion.

Discussion

The aim of this systematic review and meta-analysis was to analyze the long-term benefit in BMI reduction of patients with obesity undergoing >1-month preoperative lifestyle interventions versus usual care before bariatric surgery. Our first review question showed that preoperatively delivered lifestyle interventions reduce BMI before a bariatric procedure better than usual care. The purpose of these preoperative interventions is to prepare for surgery and to provide knowledge for a lifelong healthy lifestyle. The results indicate that participation in such preoperative lifestyle interventions before bariatric surgery led to minor BWL, which contribute to decreased risk during the procedure. However, these intervention programs may have their limitations since Bauer et al. [29] recently showed that having a positive attitude toward bariatric surgery per se hinders an individual's weight loss in a 6-month, multimodal lifestyle intervention. Personal exhaustion toward conservative weight loss programs and a lack of motivation may be underlying factors. Thus, a personalized approach for choosing the appropriate program for weight loss (focus of program, length) before bariatric surgery may achieve the best results. In terms of psychological well-being, the situation is completely unclear. Despite minor weight loss in patients wishing to undergo bariatric surgery in the abovementioned study by Bauer et al. [29], depressive and anxiety symptoms and quality of life had similar improvement in comparison to the patients not wishing to undergo bariatric surgery. Especially for psychologically unstable patients, such lifestyle interventions could help improve compliance post-bariatric surgery, which is known to be critical, e.g., in patients with depression [30]. However, this is speculation at this point since no evidence is available in the literature.

Taking this topic further, the second question examined if individuals completing a lifestyle intervention program preoperatively would decrease their BMI greater post-surgery in comparison to individuals undergoing usual care. Both the IG and CG did not differ in their BMI losses 1 year post-surgery. Bariatric surgery itself is such a strong intervention factor for BWL that it is most likely that other small achievements before surgery are negligible in impacting long-term outcomes when an approximate energy balance is finally achieved post-surgery [31–34]. After surgery, when BWL occurs naturally, if not counteracted due to severe psychological conditions such as depression, the patients themselves experience the full benefit of weight loss, accompanied by an increase in quality of life and a considerable positive impact on their motivation to change their lifestyle [30, 35]. Although it has been suggested that the postoperative timing for lifestyle intervention may be more favorable than the preoperative timing [18, 19], a high-quality randomized, controlled multicenter study showed that a video-based postoperative treatment was not superior to treatment as usual [35]. However, postoperative support is inevitably important for patients with depression and other psychological problems [30, 35].

Finally, the third review question examined whether or not individuals having successfully reduced their BMI preoperatively through the lifestyle intervention were more successful at decreasing the BMI postoperatively in comparison to individuals with no success. Since only one RCT addressed this question, this did not allow for quantitative analysis. No differences in BWL after 12 and 24 months post-surgery between the preoperative weight loss and non-weight loss group were detected.

These results are supported by 14 other non-RCT addressing this issue [36–49]. Some of these studies examined preoperative lifestyle modification programs or short educational trainings [37–44, 47–49], whereas the other three studies only examined the impact of a certain percentage or amount of weight loss before surgery on postoperative weight loss [36, 45, 46]. All studies examined the impact of successful preoperative BWL on BWL 12 months post-surgery, except for one study which performed a follow-up until 6.3 years [45]. The results of 9 out of the 14 studies were in line with the only RCT existing on this topic, showing that the success of pre-surgery BWL did not influence postoperative weight loss [36, 38–40, 42–47, 49]. In contrast, three other studies concluded that patients who either participated in preoperative programs or successfully met the weight loss guidelines preoperatively were more successful in losing weight post-surgery [37, 41, 48].

Since there appears to be no or only minor benefit in undergoing lifestyle intervention programs prior to surgery in terms of body weight reduction, the question arises whether there are other benefits from these interventions for bariatric surgery candidates. As mentioned above, improvement of psychological stability can be expected from such programs independent of attitude toward bariatric surgery, which may be especially important for patients with psychological burden [29, 50].

In this review, three of the included trials examined secondary outcomes in addition to BWL [24–26, 28]. Lier et al. [28] concluded that preoperative interventions lead to better treatment compliance. Additionally, they examined patient's satisfaction with the program. However, their results did not show a relation between satisfaction and compliance with the intervention.

Two studies investigated quality of life and reported no differences between IG and CG 1 year post-surgery [24–26]. Gade et al. [25]/Hjelmasaeth et al. [26] reported a faster improvement of pathological eating patterns and affective symptoms (anxiety and depression symptoms) through pre-surgery lifestyle intervention, but in their follow-up publication at 4 years post-surgery, these improvements were no longer related [26]. These results are not unexpected since initial BWL per se increases quality of life in patients with obesity [51, 52]. In summary, only few studies investigated factors other than BWL. For these, no superiority in the long-term was shown for preoperative lifestyle intervention programs. Nevertheless, it is important to note that no subgroup analyses for vulnerable groups, e.g., with depression, were reported by any of these studies.

This leads to the question to what degree lifestyle intervention and information should be provided preoperatively to (i) educate patients appropriately about the surgery and the consequences and (ii) prepare and initiate an improved lifestyle without unnecessarily lengthening the time to surgery? As pointed out already above, a personalized approach taking into account especially the psychological situation of the patients may be most suitable.

Overall, although not a topic of this review, the short-term VLCD immediately before the operation to lose weight and therefore minimize surgery complications is efficient and has been widely used with success [11, 53]. In addition, patients need a thorough education about the surgery and its consequences to allow them to feel secure and have realistic expectations regarding the amount of weight loss and resolution of comorbidities following surgery [54]. This period should not last too long in order to allow a fast transfer to surgery [55]. Under which circumstances a preoperative lifestyle intervention is advantageous is not clear at the current stage of evidence. However, after bariatric surgery, vulnerable groups, e.g., with depression, need support for compliance and favorable outcomes [35, 56].

This study has several strengths and limitations. Most importantly, this meta-analysis showed minimal heterogeneity among the studies, allowing to conclude that the results of the quantitative analyses are reliable. However, the findings are based on only four RCTs which differed in content and extent of their interventions, and the used I^2 statistics should be treated with caution when a meta-analysis includes only a few studies [57]. Secondary outcomes like psychological well-being were rarely investigated, and no subgroup analysis for vulnerable groups, e.g., with depression, was reported. In this review, only postop periods of 1 year could be considered due to a lack of long-term data exceeding this time period.

Conclusions

Preoperative lifestyle programs are often mandatory before bariatric surgery. However, although preoperative lifestyle interventions reduce body weight before bariatric surgery more effectively than usual care, this difference disappears 1 year post-surgery. Although a short-term energy reduction period before surgery is clearly important to minimize risk, it is currently unclear whether, and if so under what circumstances, participation in a preoperative lifestyle intervention is beneficial.

Key Points

- Preoperative lifestyle interventions reduce BMI before bariatric surgery.
- BMI reduction post-surgery is independent of preoperative lifestyle intervention.
- Influence of pre-surgery BMI reduction on postoperative weight success is unclear.
- Secondary outcomes and psychological well-being are rarely investigated.

Statement of Ethics

An ethics statement is not applicable because this study is based exclusively on published literature.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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Author Contributions

Conceptualization: Isabelle Mack, Teresa Lau, Jessica Cook, and Rami Archid; methodology and validation: Teresa Lau, Jessica Cook, and Isabelle Mack; software and data curation: Teresa Lau and Jessica Cook; formal analysis and visualization: Teresa Lau; supervision: Isabelle Mack; discussion of results and interpretation: Teresa Lau, Jessica Cook, Stephan Zipfel, Rami Archid, Andreas Stengel, and Isabelle Mack; writing – original draft preparation: Teresa Lau and Isabelle Mack; writing – review and editing and approval of the final version: Teresa Lau, Jessica Cook, Stephan Zipfel, Rami Archid, Andreas Stengel, and Isabelle Mack.

Data Availability Statement

All data generated or analyzed during this study are included in this article and its supplementary material files. Further inquiries can be directed to the corresponding author.

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