



Predictors of Weight Regain after Bariatric Surgery.

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Abstract

For the group of people which is morbidly obese, bariatric surgery remains the most successful form of weight reduction method that is available nowadays. But the idea of weight regain is a risk for all patients after the bariatric surgery. The body weight regain is an important hindrance to many people after the bariatric operation. Hence, it gives a vast full of complications to occur in the future. The root causes for weight recurrence are highly variable, which includes socioeconomic status, physical, physiological, dietary, and pathological factors, which may also be procedure-specific. Little information is currently available about how to anticipate and treat all the patients who regain their former weight. The standard method would be to warn patients on the possibility of weight recovery and to be aware of the potential solutions if it happens. The management includes multidisciplinary counselling and requisite one or more revision or conversion surgeries.

INTRODUCTION

Obesity is a life-limiting condition which restricts life that is related to a variety of disorders. About two thirds of Americans are already overweight (BMI of around 25 kg/m²) and about one third are obese (BMI > 30 kg/m²), while obesity is expected to affect 650 million grown-ups nationwide [1].

A successful intervention for obesity is weight loss surgery. There are several conditions that are associated with obesity, for example, diabetes, high blood pressure, obstructive sleep-apnoea, and cardiovascular diseases. The body weight regain is a crucial obstacle to many people after the bariatric operation and it makes a lot of complication [1].

The predisposing factors are highly variable and may include anatomy (cardiac pouch construction, stomach dilation, gastro-gastric fistula), physiology (age, gender, race, preoperative BMI and postoperative weight base level, the amount of energy consumption, hormonal imbalance), economic factor (marriage status, the standard of education, income, the form of insurance), psychology (depression,

addiction) and behaviour (depression, addiction) [2].

AIM OF THE STUDY

In this brief review, we aimed at reviewing the problem of weight regain and its predictors after bariatric surgery.

i. The problem of morbid obesity

The World Health Organization (WHO) has made a point that excessive weight and obesity are the leading risks for mortality worldwide. It is due to mainly the increasing risk of developing chronic diseases [3]. WHO recognizes that the consumption of energy dense, high-fat foods, and decreased physical activity as the two of the main causes of obesity [4].

Obesity is when the BMI is above 30. Consider a kilogram of patient weight by its height in square meters (kg/m²). The approved BMI index for levels of excess weight and obesity by WHO is shown in (Table 1) [5].

Table 1: Obesity classification and likelihood of comorbidity [5].

Classification	BMI(kg/m ³)	Comorbidity Risks
Underweight	<18.5	Low. however the threat of other health concerns escalated
Normal range	18.5-24.9	Average
Overweight(pre-obese)	25.0-29.9	Raised
Obesity	>30.0	
Obesity Class 1	30.0-34.5	Moderate
Obesity Class 2	35.0-39.9	Severe
Obesity Class 3	>40.0	very severe

ii. Different Severe Obesity Operations

Laparoscopic sleeve gastrectomy operation (LSG), laparoscopic Roux-en-Y gastric bypass surgery (LRYGB), and laparoscopic adjustable gastric banding operation (LAGB) are three distinct forms of bariatric surgery commonly performed (**Figure**

1) [6]. Bariatric surgery is a choice for treating patients with obesity-related comorbidities with class III (BMI > 40 kg/m²) or class II (BMI 35.0-39.9 kg/m²) obesity which cannot be managed with nonsurgical procedures [6].

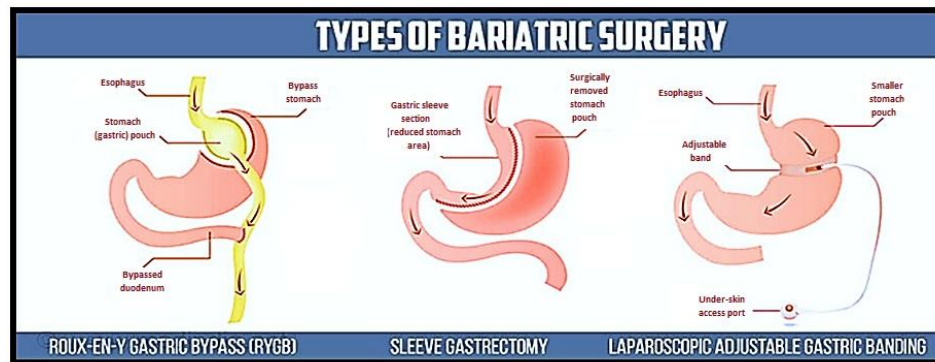


Figure 1: Types of bariatric surgery [8]

Weight loss post-surgery is typically dramatic. On average, 60 percent of the excess weight would be lost by patients. An individual who is 350 pounds, who is having 200 pounds heavier will decrease 120 pounds, for example. After gastric bypass surgery, many weight-related health conditions change. The most common ones are diabetes, high blood pressure, asthma, and obstructive sleep apnoea [7].

iii. The problem of weight regain following the surgical operation

Regaining weight is a feared matter for all patients following metabolic surgeries. About twenty to thirty % of cases after surgeries not achieving successful weight outcome. Regaining 20 to 25% of the weight lost after surgeries can occur over ten years post-surgery [9].

Weight regain have harmful effects on weight-related comorbidities, the health-related quality of life, patient satisfaction with surgery,

and health care costs. They are all the aspects need to be focused on after the operation. Innumerable studies have been done to understand the extent of weight regain following bariatric surgery. Anyhow, reported regaining of weight varies widely across studies [10].

Furthermore, threshold is used to stipulate clinically meaningful weight regain. For example (e.g.), $\geq 10\%$, $\geq 20\%$, and $\geq 25\%$ of maximum weight lost). [10]. RYGB is now a popular gastric bypass surgery. While RYGB is really efficient, about 15%–35% of patients will not be satisfied with their own losing weight (about 50 percent extreme weight reduction) or may gain weight (about 15 percent of the previously lost maximum weight) [11].

iv. Predictors of weight regain after bariatric surgery

An average weight loss is around 47-80% of extra weight directly upon gastric

bypass. Nevertheless, people will gain 15–25% of the lost weight loss. For patients, it is very discouraging and expecting of weight gain

following surgery is important. There is variety of factors for weight to regain after surgery (as shown in **Table 2**) [12].

Table 2: The contribution variables to weight recovery [12].

Factors contributing to weight regain	Common examples
Anatomical	Stomach expansion, enlargement of the stomach channel
Type of surgery	Restrictive versus malabsorptive procedures
Physiological	Altered processing of food leading to quick storing of fat and reduced fat burning; menopause
Psychological	Depression; absence of identity; troublesome to assert behaviour changes
Behavioural	Laziness; behavioural feeding (eg processed foods, grazing, consume more than the usual sense of satisfaction)
Others	Adherence to follow up Socio economic status

Weight recurrence is generally described as a weight increase higher than 10 kg from the nadir's level. The extra weight recovery, even in the same type of medical operation, is very subjective. Weight recurrence is multifactorial following bariatric surgery, which involves anatomical, biochemical, behavioural, and psychological variables. It depends on the different kind of operations; there could be

numerous anatomical variables that lead to chapter body weight recovery [13].

- **Type of Surgery**

Compared to malabsorptive procedures, restrictive procedures tend to have higher rates of weight loss failure and weight regain. LAGB had a higher failure rate compared to roux-en-Y gastric bypass (RYGB) (**Table 3**). Maximum weight lost and rate of weight loss were better with RYGB [14].

Table 3: surgical failure rate in LAGB versus RYGB [15].

	Excess weight loss(EWL) < 25% or need for reversal/conversion procedure		BMI > 35 kg/m ² or need for reversal/conversion procedure	
	LAGB	RYGB	LAGB	RYGB
Three years	18.2%	0%	31.7%	6.9%
Six years	38.9%	2.5%	48.3%	12.3%

- **Physiology:**

The physiological factor plays a major part in the development of weight recovery. There are hormones that are the contributors that have been identified. It is demonstrated that post-bariatric surgery reduces the orexigenic factors (including ghrelin), whereas anorexigenic hormones, which include GLP-1 and PYY have been shown to increase. Anatomical alteration of the digestive system is thought to lead to these changes, but this effect disappears with time leading to weight recovery. [13].

Other than that, to a certain degree, maternity status may also lead. Patients are usually recommended to stay away from pregnancy after having bariatric surgery for at least 1 year. One of the strongest contributing factors for regaining of weight is the gestational weight gain. Weight gain is also associated with certain drugs, for instance anti-psychotics, anti-depressants, and steroids. Quitting smoking can also cause body to gain more weight. Highly unusual, patients can develop a new health problem which might lead to overweight recovery or inadequate losing weight [13].

- **Behavioural/Environmental:**

In the postoperative period, the main contributors to weight recurrence are grazing and general non-compliance with bariatric diets (food that contains a lot of calories and fat or increased portions). Grazing means the non-stop intake of small quantities of food over a period of time that follows with a feeling of losing

control. Stress, boredom, and emotional distress will trigger grazing to happen and it will be getting worsen with “mindless eating” while watching television, exploring the internet, attending social activity, or even working in food service settings [16].

Some other pillar of effective ways to lose weight is physical practise after bariatric surgery [13]. It was found in a study that people who completed moderate to extreme exercises for around > 150 minutes per week showed reduction in body weight and weight control [16]. These results together increase the significance of the regular exercises among bariatric surgery patients in postoperative weight loss [13].

- **Psychological:**

Obese patient is commonly related to depression. After bariatric surgery, depression scores are consistently lower. [18]. There are two psychiatric disorders that can be related with weight regain, which are binge eating disorder (BED) and night eating syndrome (NES). BED is an eating pattern in which there is a substantially large amount of food consumption within short periods of time, accompanied by losing control and the person will feel guilty and/or depression after binge episodes. The characters of NES are morning anorexia, evening over-eating (consuming ~25% of daily caloric intake), and having problems in sleeping at night, and it is considered as a stress reaction [16].

- **Anatomical:**

A surgical assessment must be done. It is an opportunity for the surgeon to make a review about the bariatric surgical history and the current medical status of the patient. Contraindications to surgery through the “RED FLAG” process are reviewed. All patients are

required to do an upper GI Endoscopy and a barium study of the oesophagus and stomach. The purpose of the investigation is to gain a more complete understanding of current anatomy. Gastro graphic fistula and pouch dilatation must be expected (as shown in **Figure2&3**) [19].

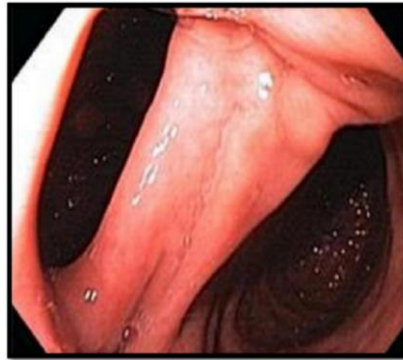


Fig. 2: Gastrographic fistula [19]



Fig. 3: Pouch dilatation [19]

- **Adherence to follow up:**

Adherence to recommendations is important for any intervention to be successful. The frequency of follow-up will depend on the type of procedure and comorbid conditions. Nutrition care by a registered dietitian is recommended for all bariatric surgery patients. Adherence with

follow-up visits after bariatric surgery improves weight outcomes. Missing < 25% of appointments was associated with greater loss of excess body weight. Dixon et al. found that a follow-up frequency less of than 13 times in 2 years especially males was associated with less weight loss. Frequency of post-surgery visits is

also inversely related to weight regain after gastric bypass [20].

- **Socioeconomic status:**

The upper income levels are correlated with a flourishing life and stronger in the aspect of the health problem. It could be hypothesised that the association between weight recovery and higher socio-economic levels could be attributable to increased health behaviours for weight recovery, especially among men with a higher socio-economic standard, such as a more unhealthy lifestyle and excessive calorie consumption [2].

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