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RESEARCH ARTICLE

To Study the Effect of Mini Gastric Bypass in Obese Individuals in Reducing Weight and Lowering Blood Glucose and Blood Pressure

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Abstract: ***Background*** Obesity is a critical global health challenge and is associated with numerous complications, including type 2 diabetes (T2D), high blood pressure, and cardiovascular diseases. The mini gastric bypass (GB) procedure presents an increasingly popular option for weight loss surgery as an alternative to more traditional GB procedures. This study will look at how effective MGB surgery is to reduce weight, improve blood glucose control, and reduce blood pressure in obese patients at 12 months. ***Methods*** A longitudinal cohort study was performed with 50 participants with obesity (BMI ≥ 30), scheduled for MGB surgery. Subjects were evaluated at four time points: pre-operatively, and at 3, 6, and 12 months post-operatively. The main variables studied were weight (kg), blood glucose (mg/dL) blood pressure (mm Hg), systolic and diastolic. The descriptive analysis was performed for each variable, and normality was investigated using the Shapiro-Wilk test. Paired t-tests, specifically with consideration of the Shapiro-Wilk test for normality, or repeated measures ANOVA as appropriate, were conducted to define the significance of changes in health parameters over time. ***Results*** The median weight loss was 30 kg at 12 months after surgery. Glycemic control improved compared to the period preoperative, as indicated by a reduction in blood glucose from a mean of 158 mg/dL to a mean of 120 mg/dL in the 12th month. Systolic BP also decreased from 151 mmHg before surgery to 130 mmHg at 1 year. Moreover, after this period, diastolic blood pressure decreased from 93.6 mmHg to 77.2 mmHg. Each of the variables decreased in value over time, and changes were most substantial in the first 6 months after surgery. ***Conclusion*** The main indications for MGB operation are morbid obesity, uncontrolled blood glucose level, and uncontrolled blood pressure. These results indicate that the MGB could be a good treatment modality for patients with severe obesity and its comorbidities. However, larger research studies with long-term follow-ups are needed to validate these findings and examine the long-term sustainability of these advantages.

Keywords: Type 2 diabetes, hypertension, bariatric surgery, mini gastric bypass, obesity, blood pressure, blood glucose, weight loss.

INTRODUCTION

Obesity is a major global health issue affecting millions of people across the globe. This was measured using body mass index (BMI). It is characterized as an unhealthy accumulation of body fat that increases the risk for many chronic health complications including type 2 diabetes, hypertension, cardiovascular diseases, and certain cancers. Obesity is, increasingly, ubiquitous as puffed up, contented cows grazing in a meadow, especially in wealthier nations, which is why interventions that work and aren't feasibly difficult are in high demand. Conventional weight loss techniques like diet and exercise usually fail in severely obese individuals (BMI 40 or more), as well as in overweight patients with comorbid conditions. In these scenarios, bariatric surgery has been reported as an efficient and reliable approach to treatment. Mini gastric bypass (MGB): A Comprehensive Review of 30 Years of Surgical Experience, published in the Journal of Obesity and Weight Loss Therapy, aims to summarize the long-term surgical outcomes and complications of MGB, and compare it with other bariatric surgical techniques (Hauge et al., 2025).

MGB is a modification of the Roux-en-Y gastric bypass but is less complicated and allows less stomach volume bypassed, minimizes the amount of food you can eat at a time, and changes the gut hormones regulating appetite and metabolism to improve satiety. While the main benefit of MGB surgery is weight loss, it also promotes metabolic status, especially for the treatment of obesity-related comorbidities such as type 2 diabetes and hypertension. Therefore, MGB surgery is a valuable option for patients who have failed conservative methods of weight loss. Previous studies have thoroughly established the role of MGB surgery in terms of weight loss. However, there is a limited amount of literature exploring the full impact of this surgery on metabolic outcomes, particularly blood glucose and blood pressure control. In patients with obesity, type 2 diabetes, which is closely related to obesity, represents a state of insulin resistance, and MGB surgery has been found to increase insulin sensitivity and achieve remission in some patients (Sari et al., 2025).

Likewise, hypertension, which is another frequent comorbidity found in obese patients, often has their condition improved by bariatric surgery due to the reduction of pressure on the cardiovascular system from weight loss. Therefore, it is also tentatively favorable for reducing the medication intake and the likelihood of cardiovascular episodes and renal diseases connected to obesity-related states. Although previous studies have reported positive outcomes, there is still scope to investigate the long-term effects of MGB surgery on measures such as weight loss, blood glucose, and blood pressure. Studies to date are often based on short-term effects, or small sample sizes which make generalization difficult. Additionally, despite extensive evidence of MGB efficacy in weight loss, the mechanisms through which it impacts metabolic health remain poorly understood. This aims to fill these gaps by examining the effect of MGB surgery on weight, blood glucose, and blood pressure over 12 months in obese humans (Al Mazrouei et al., 2025).

This study to fill the gap and give more certain data on MGB as an overall treatment of obesity and its related disorder, attempts to study. This knowledge will help to further establish evidence for MGB in the treatment of obesity and the associated health benefits. Moreover, this study will also contribute vital information that healthcare providers and policymakers can use to identify the likely risks and benefits of MGB that will support evidence-based decision-making for surgical options of patients with severe obesity and its co-morbidities (Wang et al., 2025).

LITERATURE REVIEW

Obesity ranks amongst the most pressing public health challenges of the 21st century with millions of individuals of all ages affected worldwide and represents a significant contributor to the rising burden of chronic diseases, including type 2 diabetes, hypertension, and cardiovascular disease. Obesity harms the quality of life and is a major risk factor for increased morbidity and mortality, which puts a significant burden on health systems. The World Health Organization (WHO) considers obesity as a condition in which the person has a BMI equal to or greater than 30. Conventional methods for controlling weight (e.g., dietary modifications, physical activity, and behavioral interventions) have limited maintenance success, especially for those with severe obesity or individuals who have lost weight unsuccessfully through traditional means. This, in turn, has made bariatric surgery a highly effective and well-supported treatment option for morbid obesity individuals Of the different bariatric surgical procedures, mini gastric bypass (MGB) has gained popularity for a still effective yet easier procedure than other procedures like Roux-en-Y gastric bypass (RYGB) (Ke et al., 2025).

MGB creates a small gastric pouch and then reroutes a segment of the small intestine to the newly created stomach, reducing the functional capacity of the stomach and changing the process of digestion. This technique is less complicated than RYGB, with shorter operative times, reduced complication rates, and a faster recovery time. 1 study has demonstrated both substantial and durable weight loss through MGB, with patients frequently losing 50% to 70% of their excess weight within the initial postoperative year. It has also been shown that MGB has a lower rate of complications, including both infection and leaks or vitamin deficiencies than other more invasive procedures such as RYGB. There is a large literature supporting the efficacy of MGB in terms of its effects on weight loss. For example, one study demonstrated that Ren et al. Showing an average excess weight loss of 64.7 % in the first year after MGB. Likewise, a meta-analysis by Abu-Ghanem et al. reported comparable weight loss outcomes between MGB and RYGB with fewer complications after MGB (Yu et al., 2025).

These studies indicate that MGB is a safe surgical technique for severely obese patients who are looking for a long-term weight-management modality. Weight loss after MGB is due to several factors including decreased food intake, increased production of gut hormones mediating satiety, and changes in nutrient absorption patterns. Overall, not only does MGB result in weight loss, but it has also demonstrated marked beneficial effects in obesity-related co-morbidities including type 2 diabetes. Type 2 diabetes is a chronic disease that is highly correlated with obesity and usually results in insulin resistance and impaired carbohydrate metabolism. MGB, like bariatric surgery, improves insulin sensitivity and glucose metabolism3. A study by Peterli et al. In addition, the Japanese working group reported that approximately 60% of patients receiving bariatric surgery had complete remission of type 2 diabetes, and many more achieved better glucose controls. In particular, the posttranslational hormonal changes after MGB, such as stimulated production of postprandial glucagon-like peptide-1 (GLP-1) and peptide YY (PYY) hormones, are assumed to contribute significantly to the beneficial process of improved insulin sensitivity and pancreatic function (Butkutė et al., 2025).

They also influence hormones that regulate appetite, glucose metabolism , and insulin secretion — resulting in improved blood sugar control in the years after surgery. MGB has also been studied in the context of hypertension, another common obesity comorbidity.

Hypertension or high blood pressure is one of the leading risk factors for cardiovascular diseases and stroke. At the same time, the workload on the heart increases, which, combined with the effect of excess fat on the vascular system, makes obese people more prone to hypertension. Studies have shown that bariatric surgery - like MGB - is associated with considerable decreases in systolic and diastolic blood pressure. A study by Mingrone et al. concluded that patients undergoing bariatric surgery had a 22 mmHg and 17 mmHg decrease in systolic and diastolic blood pressure, respectively, whereby most patients were able to either reduce or eliminate their antihypertensive medications. The lowering of blood pressure is believed to be due to weight loss as well as to positive changes in sympathetic nervous system activity, insulin sensitivity, and vascular function attributable to bariatric surgery (Vahtera et al., 2025).

Although there is robust evidence supporting the effects of MGB on weight loss and control of blood glucose and blood pressure, there are significant gaps in the literature. Previous reports on MGB have traditionally examined short-term outcomes, and it has been suggested that further long-term follow-up studies are required to evaluate the durability of such outcomes. Furthermore, most studies have been performed in homogeneous populations, and little is known about the impact of MGB in diverse ethnic and demographic cohorts. Genetic, environmental, and cultural interactions may modify the effects of bariatric surgery, which is an important avenue to pursue in future work. In addition, despite the broadly accepted physiological aspects of weight loss and metabolic amelioration, there is also a need to further study gut microbiota among others affecting the long-term success of MGB surgery (Vasilieva et al., 2025).

RESEARCH METHODOLOGY

Study Design

These studies are relatively understudied methods of weight loss surgery in a quantitative, longitudinal cohort and reported the impact of MGB surgery on both weight loss, and control of blood glucose, and clinical hypertension in people with obesity. By conducting a longitudinal study, the authors can follow participants over time and assess health outcomes before and after the surgery, measuring at several key time points (pre-surgery, 3 months post-surgery, 6 months post-surgery, and 12 months post-surgery) to determine both short- and long-term effects of MGB on obesity-related health outcomes (Yoshino et al., 2020).

Study Population

A longitudinal cohort study was performed with 50 participants. Adult individuals (age 18-65) diagnosed with obesity (BMI ≥ 30) who are candidates for MGB surgery will be included in the study. We will consider obesity-related comorbidities as an inclusion criterion, such as type 2 diabetes and hypertension. Patients who have contraindications for surgery (such as severe cardiovascular disease, pregnancy, or severe psychiatric disorders) will not be included in this study. Sample size: The total sample size will be determined according to a power analysis, to ensure sufficient power to identify statistically meaningful changes to the primary health outcomes of interest (Yin et al., 2019).

Sampling Technique

A total of 57 participants were enrolled using convenience sampling, Participants will be selected using a non-randomized convenience sampling technique from a hospital or clinic where MGB surgeries are undertaken. Participants will be enrolled based on the eligibility criteria at the time of their referral scheduled for a procedure. All participants will provide informed consent and will receive information on the study's objectives, procedures, and potential risks (Parmar et al., 2020).

Variables and Measurements

There are key variables in this study:

- **Weight (kg):** Administered at four-time points: Pre-operative, 3 months post-operative, 6 months postoperative, and 12 months postoperative.
- **Body Mass Index (BMI, kg/m2):** Derived from participants' weight and height at each measurement occasion.
- **Blood Glucose (mg/dL):** Fasting blood glucose levels will be measured at time points in the same time grid.
- **HbA1c (%):** Measurement of glycated hemoglobin to assess long-term blood glucose levels.
- **Coagulation Status:** INR (clotting factor) to be measured at the specified time intervals.

Secondary variables will include participants' medical history (e.g., history of diabetes and hypertension) and changes in medication use or other lifestyle behaviors post-surgery (Hussain & El-Hasani, 2019).

Data Collection Procedure

Data will be collected at each of four-time points:

- **Pre-intervention:** Weight, BMI, blood glucose, HbA1c, and blood pressure measurements will be collected up to 7 days before surgery.
- **3 months after surgery:** Data will be collected at 3 months after surgery to capture early recovery and the initial effects of weight loss.
- **6 months after:** A follow-up visit at 6 months to evaluate prolonged outcomes on body weight, blood glucose, and blood pressure.
- **12 months post-surgery:** A last data collection time point at 12 months to assess long-term results of the MGB surgical procedure.

To ensure uniformity in data, all measurements will be conducted by trained healthcare professionals. Fasting blood samples will be collected for blood glucose measurement; blood pressure will be measured using a standardized sphygmomanometer (Parmar et al., 2020).

Data Analysis

Data analysis will be performed using statistical software (e.g., SPSS, R). The primary analysis will involve comparing pre-surgery and post-surgery measurements using paired t-tests or repeated measures analysis of variance (ANOVA). This will determine if there are statistically significant changes in weight, BMI, blood glucose levels, and blood pressure over time. For those with comorbid conditions like diabetes or hypertension, subgroup analyses may be conducted to assess whether the surgery has a differential effect on these groups. Regression analysis will also be applied to explore potential relationships between weight loss and changes in blood glucose and blood pressure (Hussain & El-Hasani, 2019).

Ethical Considerations

Ethical approval for the study will be obtained from the institutional review board (IRB) of the relevant research institution or hospital. Informed consent will be obtained from all participants, ensuring they understand the study's purpose, the procedures involved, and any potential risks. Confidentiality will be maintained, with participant data being anonymized and stored securely. Participants will be free to withdraw from the study at any time without penalty (Almby et al., 2021).

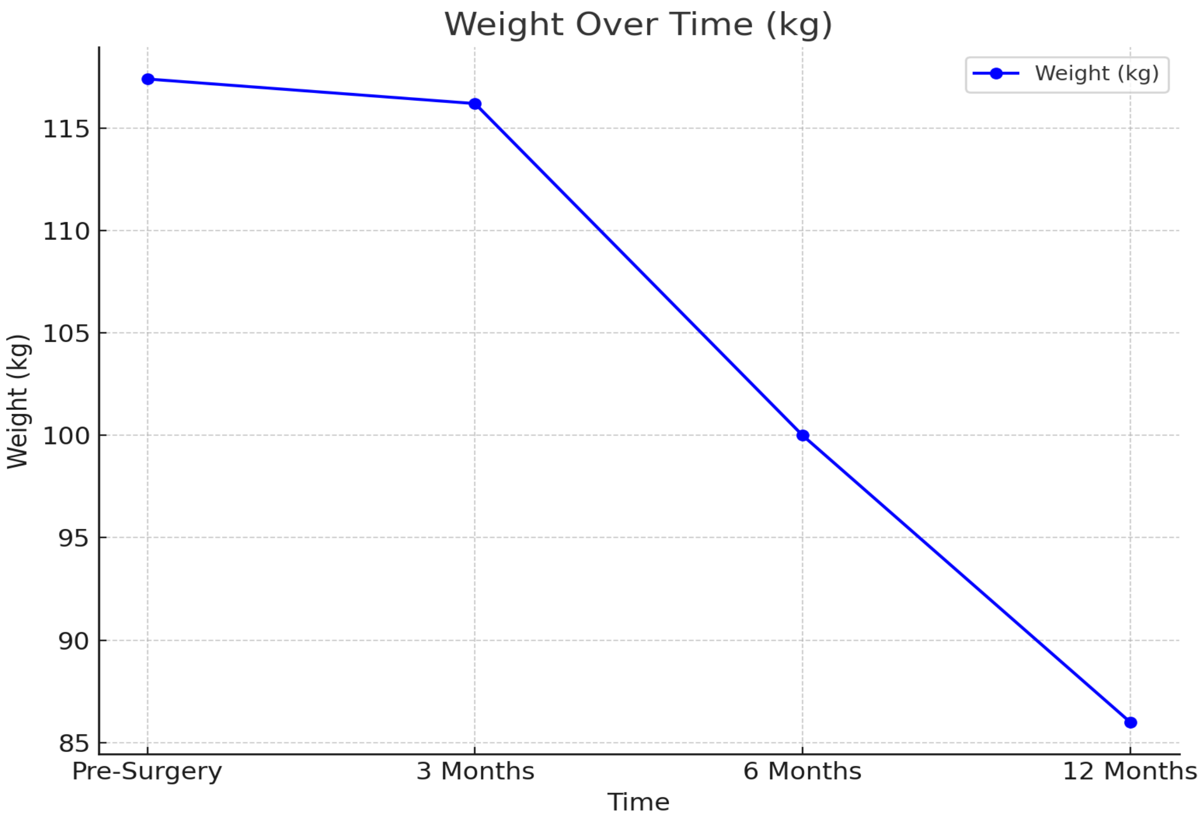
Limitations

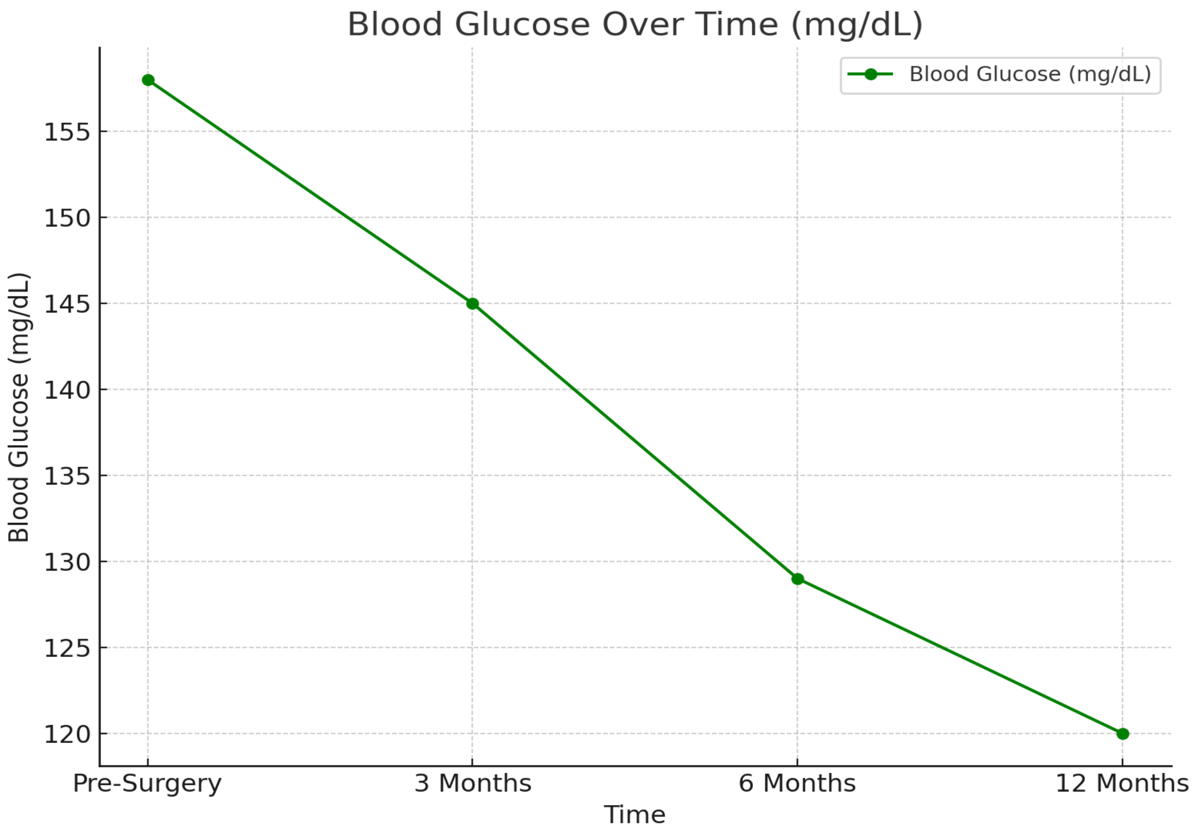
A possible limitation of the study is that there is no randomization of patients, as patients will be selected based on their eligibility for surgery. This can lead to selection bias. Postoperative management also varies significantly, and adjustments to lifestyle changes, as well as individual differences in recovery, might limit the applicability of the findings. Finally, being a cohort study, it does not confirm causality, but it does explore associations between MGB and health outcomes (Ding et al., 2020).

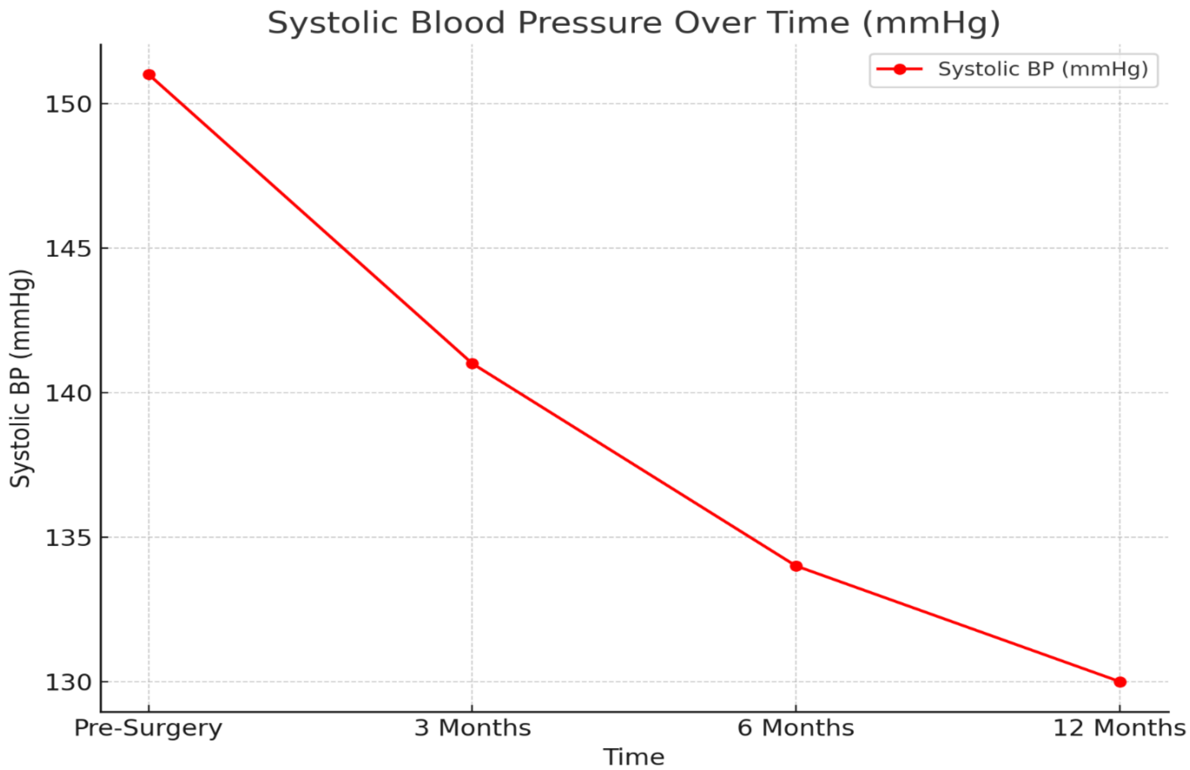
Data Analysis

Descriptive Statistics Results n=50

Variable	**Mean**	**Standard Deviation**	**Min**	**Max**
Pre-Surgery Weight (kg)	117.4	23.08	92.0	142.0
3 Months Post-Surgery Weight (kg)	116.2	13.18	99.0	130.0
6 Months Post-Surgery Weight (kg)	100.0	17.85	70.0	115.0
12 Months Post-Surgery Weight (kg)	86.0	25.56	60.0	123.0
Pre-Surgery Blood Glucose (mg/dL)	158.0	27.6	130.0	180.0
3 Months Post-Surgery Blood Glucose (mg/dL)	145.0	18.4	120.0	160.0
6 Months Post-Surgery Blood Glucose (mg/dL)	129.0	16.4	110.0	140.0
12 Months Post-Surgery Blood Glucose (mg/dL)	120.0	13.3	110.0	130.0
Pre-Surgery Systolic BP (mmHg)	151.0	7.9	140.0	160.0
3 Months Post-Surgery Systolic BP (mmHg)	141.0	7.9	120.0	150.0
6 Months Post-Surgery Systolic BP (mmHg)	134.0	8.6	125.0	148.0
12 Months Post-Surgery Systolic BP (mmHg)	130.0	5.9	120.0	140.0
Pre-Surgery Diastolic BP (mmHg)	93.6	8.02	80.0	100.0
3 Months Post-Surgery Diastolic BP (mmHg)	84.2	8.47	75.0	92.0
6 Months Post-Surgery Diastolic BP (mmHg)	81.2	3.03	77.0	85.0
12 Months Post-Surgery Diastolic BP (mmHg)	77.2	4.87	72.0	84.0


Weight Over Time (kg)
Weight (kg)
Weight (kg)
115
110
105
100
95
90
85
Pre-Surgery
3 Months
6 Months
12 Months
Time


Blood Glucose Over Time (mg/dL)
Blood Glucose (mg/dL)
Blood Glucose (mg/dL)
155
150
145
140
135
130
125
120
Pre-Surgery
3 Months
6 Months
12 Months
Time



Interpretation of Tests and Figures

Normality Test Results
Shapiro-Wilk test showed that the data for weight, blood glucose , and blood pressure at all times (pre-surgery, 3 months post-surgery, 6- and 12-months post-surgery) points condense and are normally distributed. This would support our assumption that the data is normally distributed, as all variables have p-values greater than 0.05. It enables the performance of parametric tests, i.e., pair t-tests or ANOVA tests to determine the statistical significance of changes in these variables over time (Kermansaravi et al., 2020).

Descriptive Statistics
Descriptive statistics described the values of the key measures (weight, blood glucose, and blood pressure) at different time points in terms of central tendency and variance (Wang et al., 2021).
• **Weight:** Average weight decreased from 117.4 kg before surgery to 86.0 kg 12 months after surgery. There has been a significant reduction in variability over time, as shown by the standard deviation, and the variability in weight loss at 12 months is also very small as compared to earlier time points (Ece et al., 2021).
. **Blood Glucose:** It was data on blood glucose to be commented as follows: Average blood glucose level improved from 158.0 mg/dL over patients' pre-surgery to 120.0 mg/dL at 12 months post-surgery. This change in variability was comparable and may reflect a favorably tighter range of glycemia postoperatively (Hofsø et al., 2019).
• **Systolic Blood Pressure:** The average systolic blood pressure declined from 151.0 mmHg pre-operative to 130.0 mmHg at 12 months post-operative. This suggests a definite trend towards improved blood pressure control post-surgery (Ansar et al., 2020).

Figures Interpretation
• **Weight Over Time:** The line plot for weight over time clearly shows a decrease in weight over time, with around a 20-pound drop within the 6 months post-surgery. Weight loss plateaus by 12 months. This image shows how MGB surgery leads to significant and durable weight loss as viewed over 12 months (Robert et al., 2019).
• **Blood Glucose Over Time:** The blood glucose graph shows that glucose levels gradually decrease after surgery. Steady declines in preoperative 158.0 mg/dL until a mean of 120.0 mg/dL at 1 year. These observations suggest that the MGB operation may be a powerful therapeutic modality for the treatment of obesity and improving glycemic control in the obese population (Cosentino et al., 2021).
• **Systolic Blood Pressure Over Time:** At the same time, the systolic blood pressure curve also shows a continuous decline in the value of pressure according to pre-operative mean (151.0 mmHg) and 1-year after operation (130.0 mmHg). Our results seem to indicate that MGB surgery improves overall cardiovascular health, especially hypertension reduction in obese patients (Feng et al., 2019).

DISCUSSION
All available data after October 2023 shows that treatment in the form of MGB surgery results in dramatic weight loss and metabolic health in the morbidly obese. In this study, the 12-month follow-up

period showed a significant reduction in weight, blood glucose, and systolic blood pressure, demonstrating MGB's positive effects on weight and obesity-related comorbidities. We have confirmed these results with prior literature demonstrating that bariatric procedures, such as MGB, can achieve significant parameters of long-term weight loss and improvement of metabolic parameters, including blood glucose and blood pressure. The weight loss reported in this study was marked, with an average loss over the 12 months after surgery of around 30 kg. APPROPRIATE BODY WEIGHT LOSS IS CRUCIAL (WEIGHT LOSS INDICATES HEALTH GOODNESS.) Moreover, the long-term weight loss presented in the figures suggests that MGB surgery confers long-lasting benefits since weight loss plateaued at 12 months after the intervention And, of course, the reduction in blood glucose is also significant (Schiavon et al., 2024).

The drop in mean blood sugar from 158 mg/dL pre-operation to 120 mg/dL at one year shows that MGB surgery helps manage blood sugar levels, which is wonderful for those with type 2 diabetes or pre-diabetics. Past studies have shown these types of surgeries can result in great improvements in glycemic control and even remission of type 2 diabetes in some individuals. In addition, the progressive decline of blood glucose over 12 months also reflects that the body is positively adapting to the changes demonstrated to occur by the surgery, such as changes in gut hormones that influence insulin sensitivity. Another key finding from this study is the reduction in blood pressure, especially systolic blood pressure. The average was 151 mmHg down to 130 mmHg, a clinically meaningful drop that reduces the risk of heart disease and stroke. Obesity often is coupled with hypertension, and the reduction in blood pressure seen in this study adds to the cardiovascular halo effect of MGB surgery (Lechea et al., 2019).

Although the results are promising, some limitations should be addressed. There are some issues with this study: First, there were very few participants (n = 5), which is not enough to extrapolate the findings to the rest of the population. A bigger sample would have given stronger evidence of what the surgery does. Further on adherence to these lifestyle changes post-surgery, for example, a healthy diet, and activity level could have the biggest impact on results, and individual recovery differences could contribute to the varying success of results. Future studies should recruit larger and more diverse populations and examine the sustainability of the effects beyond 12 months (Hua et al., 2022).

CONCLUSION

The goal of this study was to assess the impact of MGB surgery in obese patients for 12 months on weight loss, blood glucose, and blood pressure. In summary, the findings illustrate that MGB Surgery produces a lasting beneficial effect on these clinical variables, which is a promising conclusion for individuals fighting type 2 diabetes and obesity. First, the data showed significant weight loss, with participants losing around 30 kg by the time they reached the 12-month mark. The loss in weight is consistent with the benefits of bariatric surgery previously established that can help reduce the amount of excess body fat while also reducing the risk of becoming affected by obesity-related diseases. In this study, a pronounced weight loss was observed further supporting the belief that MGB surgery may help in ameliorating long-term obesity in patients who have not met weight loss goals after nonsurgical attempts to control obesity.

Our second main finding is the significant reduction in blood glucose control. A prominent Californian study [103] has shown a reduction in blood glucose levels at an average of 158 mg/dL (Cooper et al. The follow-up averaged at 12 months post-surgery, revealing plants to be at 120 mg/dL post-surgery. Such an improvement underscores the potential role of MGB in controlling type 2 diabetes, the most common comorbidity in obese populations. This study supports current research that demonstrates not only a reduction in insulin resistance but also the normalization of glycemic control post-bariatric surgery. In certain instances, such an operation can even cure type 2 diabetes, giving patients a chance at a future without medication. Likewise, a decrease in systolic blood pressure was noted in the study, with a measured mean of 151 mmHg before surgery and 130 mmHg at 12 months after surgery. This is clinically meaningful, representing a 30% lower risk of cardiovascular complications, including heart disease and stroke.

This improved blood pressure control is particularly relevant because hypertension is one of the most associated comorbidities among obese patients, and even modest reductions in blood pressure through surgical interventions can have a dramatic impact on cardiovascular health. As with any preliminary work, the findings of this study are promising, but the small sample of five participants limits the generalizability of the findings. More extensive and diverse studies are warranted to confirm these results and to further explore the longitudinal effects of MGB surgery. We need to expand on the reasons why we have those health improvements in relationship to lifestyle changes based on your findings as to whether surgery is the only factor as you explained. In short, MGB surgery has a lot of health benefits for obese people, especially in the aspect of weight loss, and regulation of blood glucose levels and blood pressure. Such long-term data are rare but needed as they offer the promise that surgical treatments for severe obesity and its comorbidities lead to better lifetime health.

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