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Relationship between Excess Body Weight Loss and Preoperative Body Mass Index in Patients with Sleeve Gastrectomy

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ABSTRACT— The laparoscopic sleeve gastrectomy treatment has become the most prevalent method for treating obesity in the United States and around the globe. Those with morbid obesity might expect a better quality of life as well as a lower risk of illness and death as a result of this treatment method. In patients undergoing sleeve gastrectomy, we hope to find a link between excess weight loss and the patient's preoperative BMI. As well as their relationship: From January 1, 2016, to December 31, 2018, we enrolled 80 patients who had laparoscopic sleeve gastrectomy in the surgical department of AL Imamian AL Kadimian Medical City. Pre- and post-operative BMI measurements with excess weight loss calculations, as well as information on the patient's family history of obesity, are all collected through the use of questionnaires. Patients are divided into two categories based on their BMIs (more than 45 and less than 45). 80-person sample, 69 (86.3%) of them were female. Males made up the majority, with 11 (13.8 percent) ranging in age from 18 to 65, with the most common range being 20-40 years (79.2 percent). At 3, 6, and 12 months after surgery, the mean weight of patients was (86.9817.208SD) compared to the mean weight of patients before surgery (128.13 25.65SD). It was also discovered that the mean body mass index before and after surgery were (48.488.515SD) and (336.318SD). (28.80+3.653SD) in patients with a BMI 45 and (34.33+4.667SD) in patients with a BMI > 45, there was a significant correlation (p=0.001). In patients with a BMI of less than 45, the mean excess body weight loss percentage (EBWL percent) than doubled (69.51+SD 8.809), with a significant correlation (p=0.001). Patients who undergo sleeve gastrectomy are more likely to lose weight if their preoperative BMI is higher than their postoperative BMI. Sleeve-gastrectomy patients' excess weight loss and preoperative body mass index are examined in this study.

KEYWORDS: Weight Loss, Body Mass Index, Sleeve Gastrectomy

1. INTRODUCTION

Obesity is a disorder that affects both children and adults around the world. Obesity has surged about three-fold in the previous two decades, with about 10% of the world's population currently categorized as obese. World Health Organization (WHO) estimates that, as of 2014, there were 600 million obese persons on the planet. 2 Abnormal or excessive fat accumulation that has the potential to harm one's health is what is known as obesity. Obesity and excess weight are mostly the result of an energy imbalance between caloric intake and expenditure. 1 An easy way to identify obese people is to test their Body Mass Index (BMI). kg/m2 is the weight divided by the square of the height in meters (kg/m2). An adult's risk of developing one or more co-morbid conditions is shown in the table below. 3

Table 1. According to BMI2(3) classification of obesity

Classification	BMI kg/m²
	Cut off points
Healthy Weight	18.5-24.99
Overweight(including obesity)	≥25.00
Obese (*class I obesity)*	≥30.00-34.99
Severely Obese *class II obesity class III obesity*	 35 - 40 >40.00

increases in importance as a determinant in the development of disease. 6 Obesity is a risk factor for many diseases and health problems that can be avoided. There is a two-fold increase in mortality compared to the overall population, as well as higher rates of cardiovascular disease, type II diabetes, and mental illness. Obesity is also putting a significant strain on healthcare resources and society at large, and these expenses are only going to escalate in the years ahead. 3 Obesity's genesis is difficult to cure because it involves the interplay of psychological and genetic as well as endocrine and metabolic components. Obesity appears to enhance the risk and severity of various co-morbidities. For example, the risk of heart failure increases by 5% for males and 7% for women with each unit increase in BMI. Figure 1 depicts this:

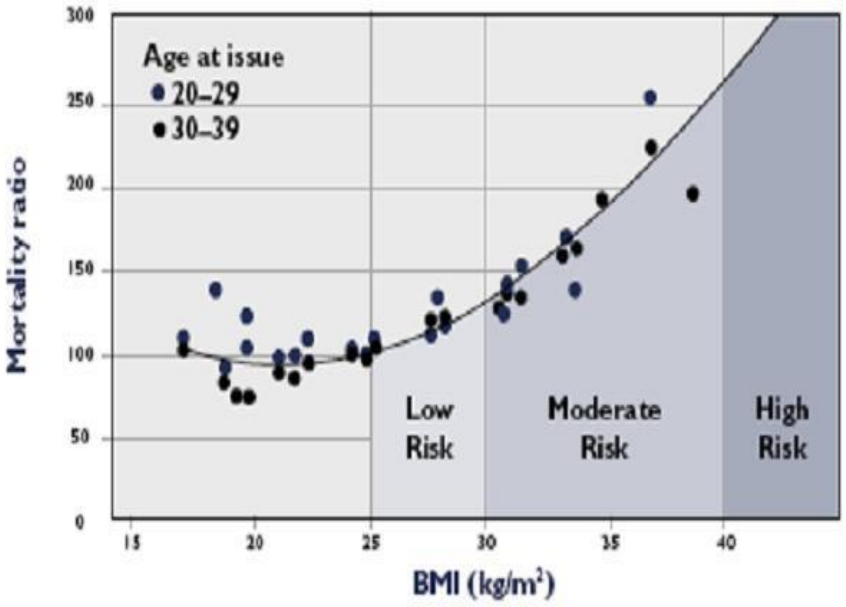


Figure 1. Obesity and mortality rate

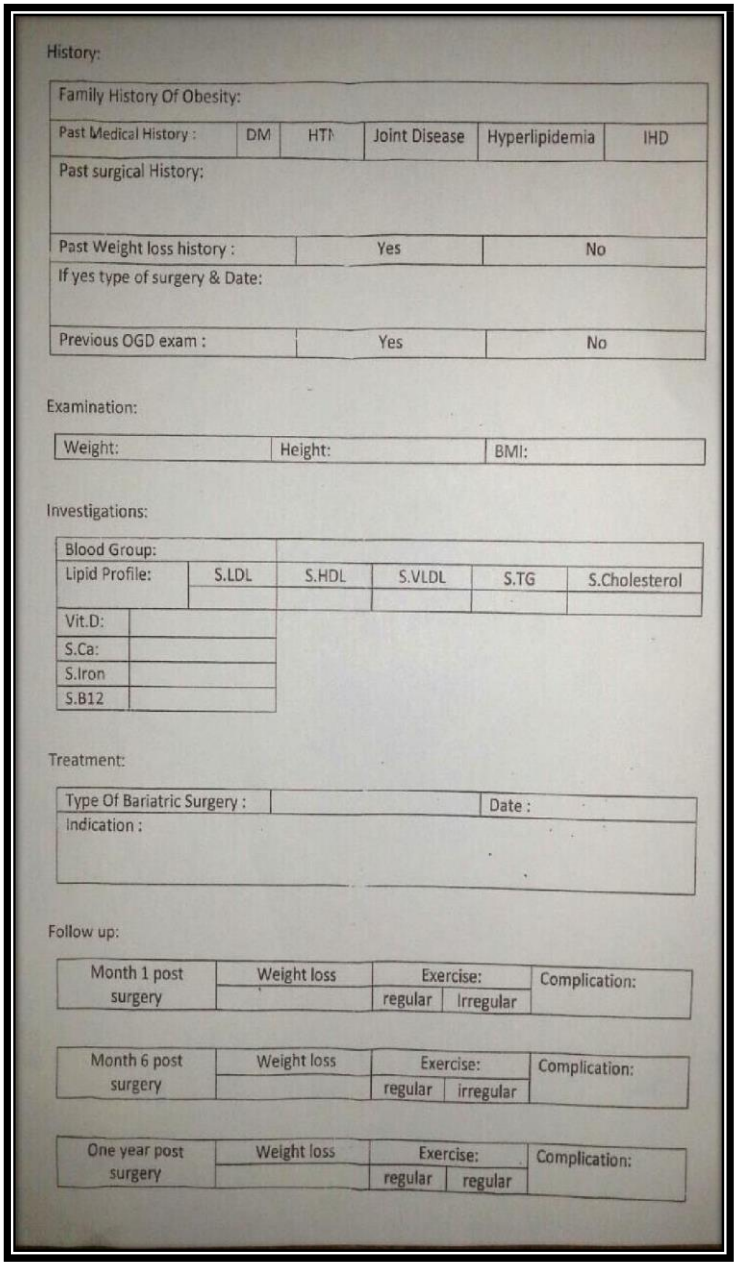
2. Methods and Patients

The study's design and setting: From January 1st, 2016, to December 31st, 2018, the surgical department at AL Kademia medical city conducted a prospective database study. The study's sample was drawn from the following places: 80 patients from this hospital who had undergone LSG were included in the sample, ranging in age from 18 to 65, with a median age of 20. 40 years. The entire set of prerequisites for inclusion BMI >40 or >35 with comorbidities were the criteria for admission. I've already had a hard time with the diet, exercise, and medicine regimens. The general surgery clinic was recommended by my endocrinologist. Several medical specialists, including a general surgeon, endocrinologist, anesthesiologist, pulmonary specialist, schizophrenic, and cardiothoracic surgeon, assessed each patient meticulously before surgery. Informed permission, acceptance of surgical risk, and a knowledge of the surgery and its implications for

the patient's life are required for inclusion in the study. The following are the exclusions. Patients who suffer from an endocrine disorder According to national norms, no patients are eligible for bariatric surgery. Surgery is not recommended for patients with medical or psychiatric conditions. warning signs that the perioperative regimen is not being followed. Alcohol or drug misuse that goes unchecked. Absence of or major disagreement among members of one's family concerning the proposed procedure. preparing for surgery in advance: Prior to surgery, they were screened (Blood Pressure, blood count, routine biochemical tests including lipid profile, fasting blood sugar and chest x-ray). The co-morbidities of each patient were assessed by conducting a thorough history and physical examination. The diagnostic workup includes measurements of height, weight, BMI, gastroscopy, abdominal ultrasonography, X-ray chest film, and EKG. Enoxaparin and elastic stockings were used to prevent deep vein thrombosis (DVT) in patients who had one injection of first-generation cephalosporin during induction. Patients were also given Zofran vials as an antiemetic follow-up treatment after their initial surgery. One day before surgery, patient was hospitalised and placed on a low-carbohydrate diet for two weeks to reduce the size of the liver.

2.1 Collection of data

utilizing a customized survey Data on sociodemographic characteristics, test results, smoking, alcohol usage, illnesses, medications, and supplement use.



History:

Family History Of Obesity:					
Past Medical History :	DM	HTN	Joint Disease	Hyperlipidemia	IHD
Past surgical History:					
Past Weight loss history :		Yes		No	
If yes type of surgery & Date:					
Previous OGD exam :		Yes		No	

Examination:

Weight:	Height:	BMI:

Investigations:

Blood Group:					
Lipid Profile:	S.LDL	S.HDL	S.VLDL	S.TG	S.Cholesterol

Vit.D:	
S.Ca:	
S.Iron	
S.B12	

Treatment:

Type Of Bariatric Surgery :		Date :
Indication :		

Follow up:

Month 1 post surgery	Weight loss	Exercise:		Complication:
		regular	Irregular	

Month 6 post surgery	Weight loss	Exercise:		Complication:
		regular	irregular	

One year post surgery	Weight loss	Exercise:		Complication:
		regular	regular	

2.2 Technique in the field of surgery

Five trocars were implanted under general anesthesia: a supraumblical 12 mm optical, two 5/12 mm right and left superolateral to the umbilicus, and two 5 mm epigastric trocars. From a position 4 cm above the pylorus to the left crura, the greater curvature was liberalized upwards. The stapler line was marked by inserting a 36 F tube from the mouth. With an Endo-GIA (Gastrointestinal Anastomosis Stapler), the larger curvature toward the Angle His was stapled longitudinally. A 12 mm trocar was used to remove the specimen from the abdomen.

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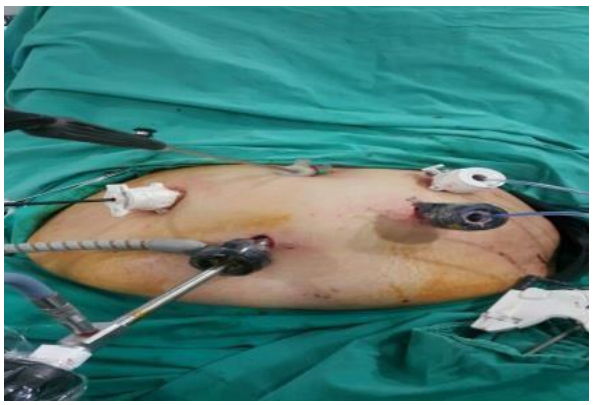

Figure 2. Port Placement) Operation room)

2.3 Follow-up after surgery

When it came time to do the surgery, patients were monitored on the operating room floor. On postoperative day two, liquids were introduced into the diet. The patients were released from the hospital as soon as they could tolerate soft foods. After surgery, they were required to return to the outpatient clinic for follow-up visits at intervals of 10 days, one month, three months, and six months. During these visits, a variety of routine biochemical tests were performed, as well as the actual weights of the patients. The findings of the six-month follow-up tests and BMI measurements were compared to those obtained before the surgery in this study. Prior to the operation, the patients were also surveyed about the severity of their pre-surgical obesity-related symptoms (joint aches, sleep apnea, etc.).

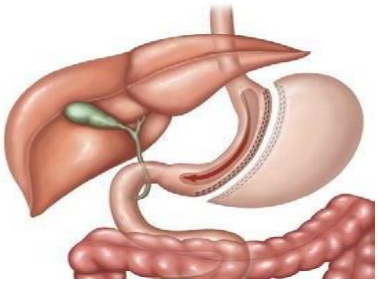

Figure 3. sleeve gastrectomy

Figure 4. Extracted Surgical Specimen (operation room)

Analysis of data: SPSS-20 is a statistical computer application (statistical packages for social sciences). In order to conduct the following tests and measurements: With the ranges, the mean and standard deviation (SD). A chi-square test is used to determine whether or not the qualitative variables under consideration are related. Unpaired (Student) t-test for independent data was used to examine the significance of the differences between two means. If the probability value (P value) was less than or equal to 0.05, a connection or difference was declared statistically significant.

3. Results

According to this study, the most common age group was between 20 and 40 years old in both groups (BMI >45 and BMI 45), and the mean age of obese patients ranged from 36.55 + 9.213 years old to 37.00 + 9.213 years old for the two groups. The majority of obese females were between the ages of 30 and 45, but only 5% of the obese males were between the ages of 30 and 45, (table 1), with no significant association between gender and age (figure 6)

Table 2: According to the age and gender distribution of obese patients.

Count	Sex Male	Female	Total
<45y %of Total	7	31	38
age Count	8.8%	38.8%	47.5%
45y %of Total	4	38	42
Total Count	5.0%	47.5%	52.5%
% of Total	11	69	80
	13.8%	86.3%	100.0%

Pearson Chi-Square 1.332a dr=l p=.249

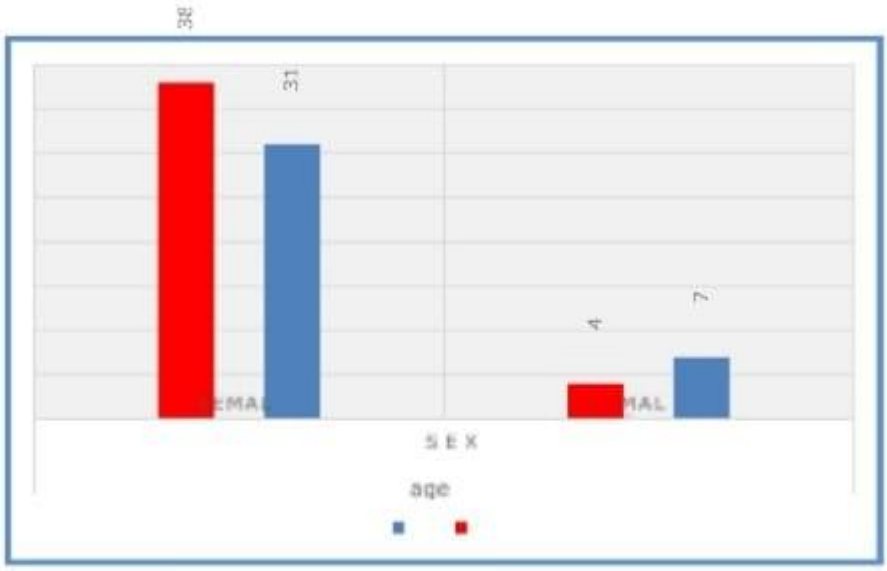

Figure (5): Distribution of obese sample according to age and gender. N=80

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The average weight of the patients was found to be 128.13 lbs. 25.65SD), whereas the six-month weight gain was (86.9817.208SD) and the six-month height gain was (162.37 7.82SD). 25.65SD). Mean BMI before surgery was (48.486.56SD), while mean BMI after surgery was (336.318SD) after six months.

Table 4. distribution of obese sample according according to age, sex

Variable	N	Mean	Std. Deviation
Age	80	36.55	9.213
Weight	80	128.13	25.654
Height	80	162.38	7.283
BMI	80	48.48	8.515
Post WT	80	86.98	17.208
Post BMI	80	33.00	6.318
Ideal weight	80	62.37	7.28
EBWL	80	65.75	23.08
Total	80		

Characteristics and comorbidities of the sociodemographic type: This study's findings showed that while 55% of the participants were married, the remaining 45% were not. According to previous obesity history, 64.4 percent of the study sample had a favorable familial history of obesity, whereas 85 percent were urban residents and 15 percent rural residents (table 3) The prevalence of diabetes mellitus (34%) and non-diabetes (66%) was found in the current study, as well as 27.5 percent hyperlipidemia, 21 percent joint discomfort, and 15 percent hypertension. Table 4 reveals the results.

Table 4 The sociodemographic characteristics to distribution of study sample according

		Frequency
marital status		
	Yes	43 (55%)
	no	37(45%)
	Total	80
Occupation		Frequency
	Yes	40(50%)
	no	40(50%)

	Total	80
Past history of obesity		Frequency
	Yes	52(64.4%)
	no	28(34.6%)
	Total	80
Residency		Frequency
	Urban	68(85.2%)
	Rural	12(14.8%)
	Total	80

Table 5. distribution of study sample according according comorbidity factors

		Frequency
DM		
	Y es	27(34%)
	no	53(66%)
	Total	80
joint pain		Frequency
	Y es	17(21%)
	no	63(79%)
	Total	80
HT		Frequency
	Y es	12(15%)
	no	68(85%)
	Total	80
Hyperlipidemia		Frequency
	Y es	22(27%)
	No	58(72%)
	Total	80

Sleeve gastrectomies have been shown to be associated with significant weight loss when compared to pre-surgery weight =0.001). Before and after surgery, BMI has a statistically significant correlation (p=0.001).

Table 6. body weight and BMI before and after operative relation

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Variables		Mean	N	Std. Deviation	P.value
Pair 1	weight	128.13	80	25.654	0.001
	Post WT	86.98	80	17.208	
Pair 2	BMI	48.4811	80	8.51517	0.001
	Post BM	33	80	6.318	
Paired sample T.test					

In the dining room, a table is (6) Patients are divided into two groups (45>) in this table based on their BMI, with a total of 40 individuals in each. BMI category and pre- and post-operative weight were found to have a strong correlation (p 0.001) in this study.

Table 7. BMI and weight pre and post operative relation

	BMI	N	Mean	Std. Deviation	P.value
Weight	BMI<45	40	107.67	11.744	0.001
	BMI>45	40	132.58	14.637	
Independent t. Test = 7.625 df= 64					
Post weight	BMI<45	40	75.64	11.269	0.001
	BMI>45	40	90.67	12.394	
Independent t. Test = 5.153 df= 64					

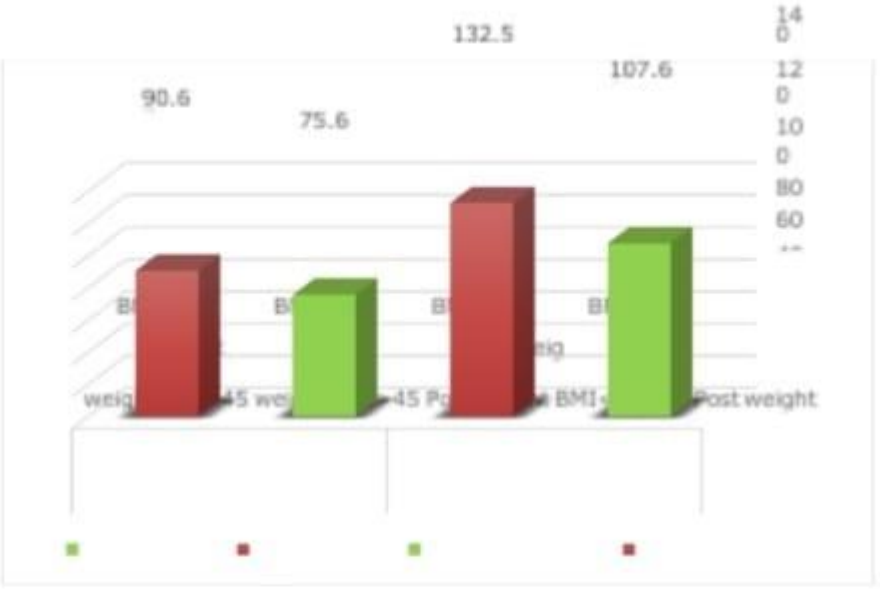

Figure (6): comparison between BMI category and weight pre operation and 6 months post operation. n=80

The results demonstrated a significant difference between two groups, with the mean EBW higher in patients with a BMI of 45 or more than those with a BMI of 45 or less. As shown in (table 7 and figure 4), there was a substantial difference in BMI categories in terms of post-operative excess body weight, with patients with BMI > 45 having significantly more excess body weight than those with BMI 45 (pO.OOl).

Table 8: Comparison of EBW and BMI group between the study groups

	BMI	N	Mean	Std. Deviation	p.value
EBW	BMI<45	33	45.73	7.539	0.001
	BMI>45	33	69.91	8.79	
Independent T.Test=11.995 df=64					
EBW post	BMI<45	33	13.7	9.459	0.001
	BMI>45	33	28	12.01	
Independent T.Test=5.375 df=64					

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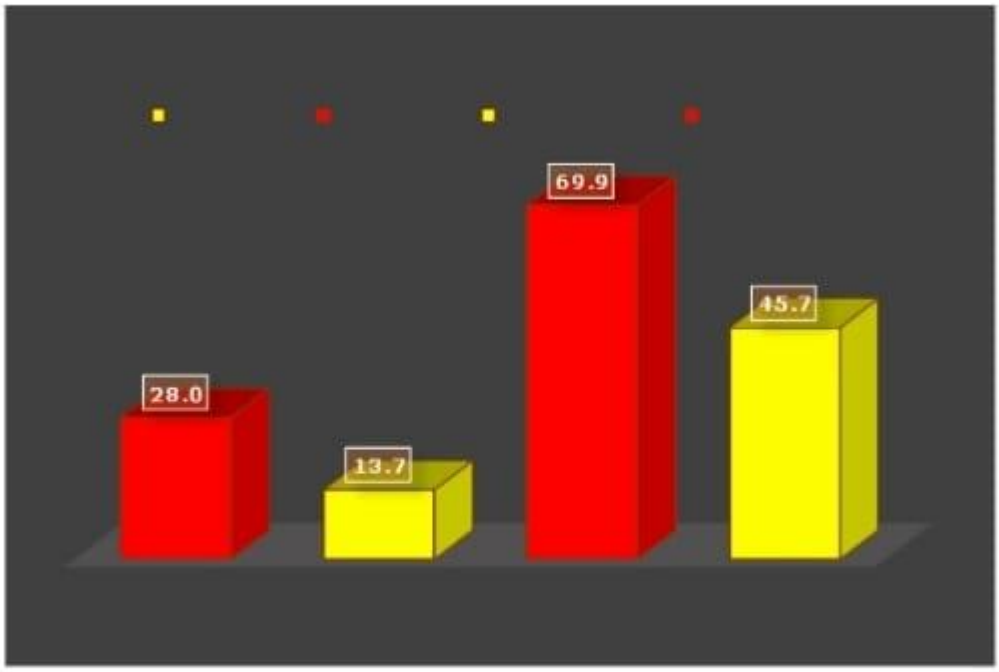
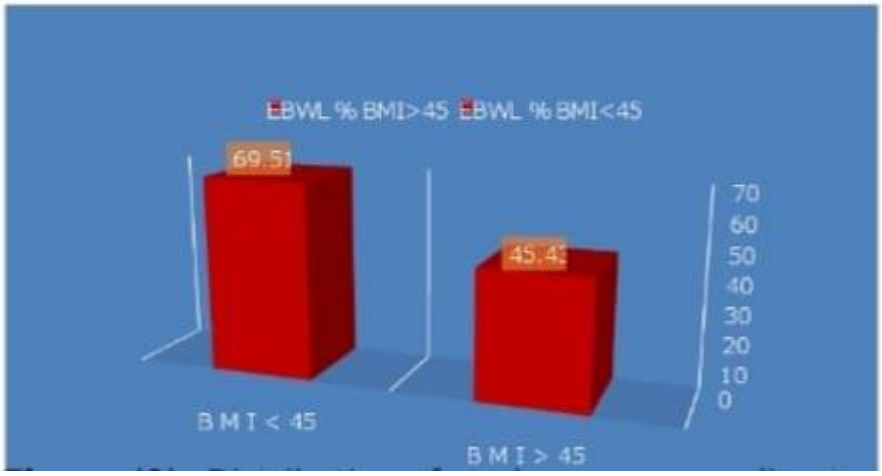


Figure (7): Distribution of study group according to EBW pre and post operation. n=80

A recent study indicated that the mean EB WL percent of patients with BMI > 45 was significantly lower than that of patients with BMI 45 in the other groups, with a significant correlation between EBWL percent and BMI groups (p0.001) (table 8 and figure 5)

Table 9. EBWL %and BMI in relation

	BMI	N	Mean	Std. Deviation	p.value
EBWL %	BMI>45	33	45.43	7.537	0.001
	BMI<45	33	69.51	8.809	
Independent T.Test=11.931 df= 64					



The study's distribution as determined by EBWL, with a n of 80. There was a considerable difference between the pre-operation BMI and the post-operation outcome

In patients with a BMI of 45 or higher, the mean BMI was higher than in patients with a BMI of 45 or lower. There was a significant difference in BMI post-operation between BMI categories, with those with BMI 45 having a lower post-operation BMI than those with BMI > 45 (p 0.001), and those with BMI > 45 having a lower post-operation BMI than those with BMI 45 (pO.OOl), as demonstrated in the study (table 9 and figure 6).

Table 10 comparison group study with BMI no.80 independent t.Test 13.396 df.64

	BMI	N	Mean	Std. Deviation	p.value
BMIpre	BMI<45	33	40.99	2.708	0.001
	BMI>45	33	50.01	2.752	
Independent t.Test =13.452 df=64					
BMI post	BMI<45	33	28.8	3.653	0.001
	BMI>45	33	34.33	4.667	
Independent t. Test=5.354 df= 64					
BMIL %	BMI>45	33	40.28	2.73	0.001

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	BMI<45	33	49.32	2.752	
Independent t.Test =13.396 df=64					

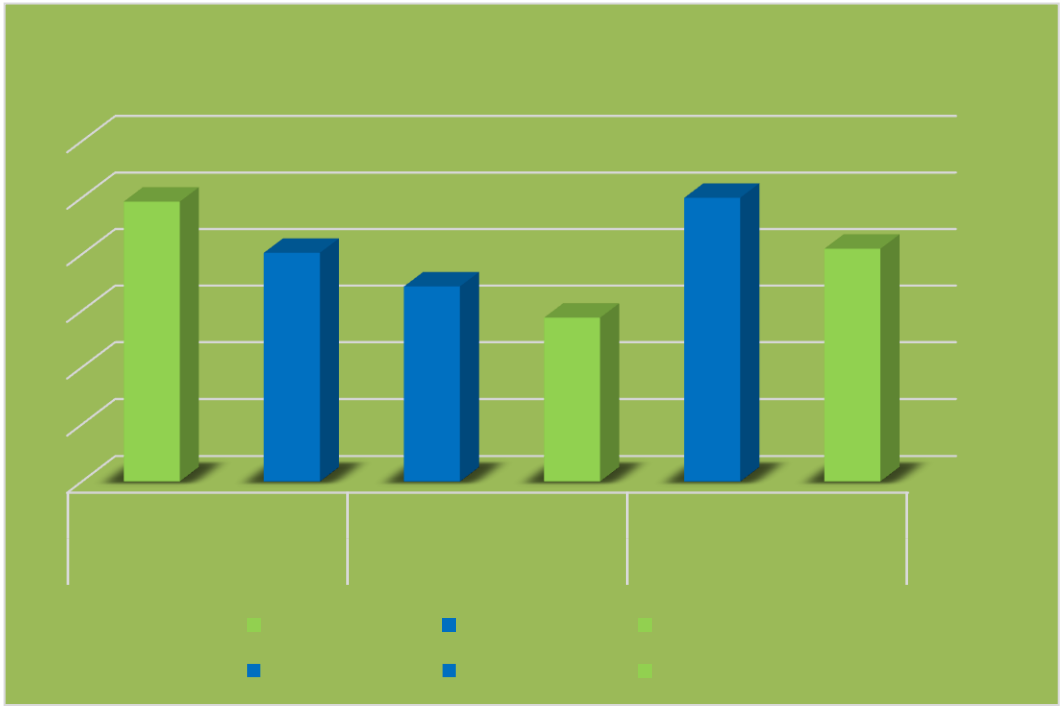

Figure (9): Study group distribution based on BMI, n=66 In the current investigation, sociodemographic characteristics of the study sample had no significant correlation with BMI category. According to the table (10). More than half of our sample (47 people) had a history of an illness, and only 33 of them were disease-free at the time of the study's completion.

Table. 11. Distribution of study sample according and sociodemographic characteristics category of BMI

		BMI		**Total**
		BMI<45	BMI>45	
occupation	yes	18	22	40
	no	15	25	40
Total		33	47	80
Pearson's chi-square =0.465 df=1 p=0.491				
		BMI		Total
		BMI<45	BMI>45	
marital	yes	19	24	43
	no	14	23	37

Total		33	47	80
Pearson's chi-square =0.301 df=1 p=0.562				
		BMI		Total
		BMI<45	BMI>45	
residency	urban	29	39	68
	rural	4	8	12
Total		33	47	80
Pearson's chi-square =0.347 df=1 p=0.546				

Table. 12. Distribution of study sample according according comorbidity and category of BMI

		BMI		Total
		BMI<45	BMI>45	
DM	yes	8	19	27
	no	25	28	53
chi-square=2.271 df=1 p=0.546		33	47	80
		BMI		Total
		BMI<45	BMI>45	
HT	yes	2	10	12
	no	31	37	68
chi-square=3.52 df=1 p=0.546		33	47	80
		BMI		Total
		BMI<45	BMI>45	
joint	yes	7	10	17
	no	26	37	63
chi-square = 0.322 df=1 p=0.546		33	47	80
		BMI		Total
		BMI<45	BMI>45	
hyperlipidemia	yes	7	15	22
	no	26	32	58
chi-square =1.112 df=1 p=0.546		33	47	80

4. Discussion

EBWL percent and changes in BMI will be used in this study to determine the degree of weight loss, but the most significant starting point for each patient should be considered as well. Researchers such as [16], [14]

have recently proposed using other markers that are more relevant to the realities of today's society as a way to convey weight loss after surgery. The researchers in this study found no connection between the severity of the Weight and height were not found to have any correlation with age or sex in the study. The effect of one's weight at birth on one's body mass index Patients with an initial BMI of more than 45 kg/m2 had a harder time achieving a BMI of less than 30 kg/m2 in the postoperative term. Higher EB WL following surgery can be achieved with lower baseline body weight parameters, according to this study. Success is measured by a reduction in BMI that falls below the objective. In the current study, it was revealed that patients with a low BMI at baseline had much higher chances of their EB WL percent rising after surgery than patients with a BMI greater than 45. According to a study published in the United States in 2013, the LSG was most helpful in the 35 to 39 kg/m2 BMI group, however it wasn't statistically significant36-37. EWL was shown to be higher in patients with BMIs under 50 kg/m2 as compared to individuals with BMIs over 50 kg/m2, although this difference only became apparent after six and twelve months in the study by Chopra et al. Two groups of patients were categorized according to BMI prematurely, those who were BMI less than 45 and those who were BMI more than 45, while the age and sex did not make much difference, and the average length of hospital stay was not effect, but, six months after surgery, the first group had a lower body weight and a lower BMI than the second. group. This could imply that the better the outcomes from LSG and other forms of bariatric surgery are, the lower the preoperative BMI must be. According to Ochner et al., heavier patients showed lower percentages of initial and excess weight loss, and this effect was particularly apparent after the initial rapid weight loss phase during the first year, when patients with BMI 50 continued losing weight, while patients with BMI 50 regained significant weight. also Another cohort research found that laparoscopic sleeve gastrectomy resulted in considerable weight loss and improvement of type 2 diabetes, hypertension, and hyperlipidemia in 78 patients with a BMI under 50. There was no correlation between morbidity (DM, TH, and hyperlipidemia) and BMI less than or greater than 45 in our study. Patients who were less obese before surgery had a larger postoperative percentage of EBWL, according to prior studies of gastric bypass surgery. Patients who were obese before to surgery (i.e. BMI >45 kg / m2) tend to postpone the weight loss process in the first six months following surgery. Our pre-start design hides the time-frame for weight change, so explanations remain speculative despite the possibility that early weight loss and weight recovery play a role. An in-depth analysis of the weight path following LSG requires longitudinal data. Observational studies have shown a wide range of weight loss over a variety of follow-up intervals. A total of 65 percent of the whole sample had experienced EBWL six months following surgery, with patients with BMIs lower than 45 seeing the most weight loss, at an average of 80 percent. EBWL was found to be 57.9% in another study conducted by Parikh 12. at the end of the first year and 53.8 percent at the end of the third. Following 53 gastric banding patients, Sultan found a 69.7 percent EBWL at two years. In 96 individuals who had been monitored for five years after banding, the Italian Collaborative study found that 71.9% developed EBWL. BMI 30-35 patients with co-morbidities were also studied by Choi et al.

In the current study, it was revealed that patients with a low BMI at baseline had much higher chances of their EB WL percent rising after surgery than patients with a BMI greater than 45. According to a study published in the United States in 2013, the LSG was most helpful in the 35 to 39 kg/m2 BMI group, however it wasn't statistically significant36-37. Patients with BMI 50 kg/m2 had a larger percentage of EWL than those with BMI > 50 kg/m2 at the start of the study, but the difference was only statistically significant after 6 and 12 months35. While the age and gender of the patients were not significant, the average length of hospital stay was not, but the first group of patients was found to have a lower BMI and lower body mass index six months following surgery than the second group. This could imply that the better the outcomes from LSG and other forms of bariatric surgery are, the lower the preoperative BMI must be. Patients with a BMI under 50 continued to lose weight for the first year after surgery, while those

with a BMI over 50 gained significant amounts of weight back. This finding is in line with that of Ochner et al. 38, who found that preoperative BMI had a significant impact on weight loss outcomes, with heavier individuals losing less weight overall and gaining more weight back. also 78 patients under the age of 50 who underwent laparoscopic sleeve gastrectomy experienced considerable weight loss and improvement in type 2 diabetes, hypertension, and hyperlipidemia. There was no correlation between morbidity (DM, TH, and hyperlipidemia) and BMI less than or greater than 45 in our study. Gastric bypass surgery studies have previously shown that patients who were less obese prior to surgery had a higher postoperative percentage EBWL38-40-41. Because patients who were obese before to surgery (BMI >45 kg / m2) tend to postpone the weight loss process in the first six months after surgery, this may be a possible explanation. Our pre-start design hides the time-frame for weight change, so explanations remain speculative despite the possibility that early weight loss and weight recovery play a role. An in-depth analysis of the weight path following LSG requires longitudinal data. Observational studies have shown a wide range of weight loss over a variety of follow-up intervals. A total of 65 percent of the whole sample had experienced EBWL six months following surgery, with patients with BMIs lower than 45 seeing the most weight loss, at an average of 80 percent. While 42 reported 57.9 percent EBWL at one year and 53.8 percent at three years in another study conducted by Parikh. In a study of 53 patients who had undergone gastric banding, Sultan 43 found a 2 year EBWL of 69.7 percent. In 96 patients who had been monitored for five years after banding, the Italian Collaborative study 44 found EBWL in 71.9% of cases. Patients with BMI 30-35 and co-morbidities and without co-morbidities had an overall EBWL of 42 percent at 18 months, which was no different from their group of band patients who match the current NIH criteria43.... Another study conducted in the United States in 2009 found that 23 patients who had undergone sleeve gastrectomy had achieved 100% EBWL after six months of follow-up. A study by Leeet al. found that patients who underwent laparoscopic sleeve gastrectomy lost 69 percent of their body weight in a year 37, 48, and 49, respectively, after the procedure. Cohenetal.

5. Conclusion

A sleeve gastrostomy patient's preoperative BMI is a good predictor of excess weight loss.

6. Recommendation

Patients should have their BMI and excess weight accurately assessed prior to surgery, and they should participate in a group discussion with the treating team to learn about postoperative weight loss and how it relates to their preoperative BMI. This will help patients set realistic postoperative weight loss goals and avoid unrealistic expectations.

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