

Comparative Study on Effective Weight Loss Management in Bariatric Surgical and Non Surgical Patients

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Abstract: The risk of chronic disease in a population increases progressively from a BMI 21. The present study was carried out to predict quick effective weight loss in Bariatric surgical and non surgical persons by comparison method over a period of three months. A prospective study was done between February 2016 and April 2016. Twenty non surgical and twenty Bariatric surgical overweight, obese, morbidly obese persons of 20-65 year age groups were randomly selected from BGS Gleneagles Global Hospitals, Bangalore for the study. All selected persons were examined clinically with anthropometric measurements and biochemical findings in the study. Medical history, family history, physical activity, personal details, energy intake was carried out by questionnaire and food frequency method. Statistical analysis performed using student independent sample t test and chi square test. The mean height of surgical and non surgical group were 160.88 ± 11.13 , 165.85 ± 10.44 , mean weight of surgical and non surgical group were 108.39 ± 17.6 , 81.9 ± 8.96 respectively. 25% of surgical group and 10% of the non surgical group were diabetic, 35% of surgical, 20% of the non surgical group were hypertensive, 21% of surgical group, 2% of the non surgical group were hypothyroid. It was found that the surgical group lost 20% weight loss effectively within three months period due to reduction in stomach size during surgery and maximum food intake was between 1000 to 1200kcal per day with vitamin, mineral supplementation and physical activity. The non surgical group lost only 6% weight loss and it varies as per the food calorie intake and physical activity.

Keywords: Anthropometric, Bariatric, Body Fat, Energy Balance, Insulin Resistance, Metabolic syndrome, Obese, Surgical, Transition, Triglyceride, Visceral Fat, Weight loss.

1. INTRODUCTION

Transition in health, rapid socioeconomic, demographic changes is rapidly in India. Industrialization, urbanization and economic betterment were the leading cause of transition. Over the last two decades, over nutrition and obesity have emerged as public health problems often associated with abdominal obesity. Overweight is termed as a BMI equal to or more than 25 and "obesity" as a BMI equal to or more than 30 for individual assessment. Risk of chronic disease in population increases progressively from a BMI of 21. High prevalence of malnutrition in people belonging to low socio economic strata led to the assumption that obesity and diabetes will not be a crucial problem in them whereas a rural population usually has low risk of development of diabetes and obesity in India, their migration to metropolitan city exposes them to several adverse lifestyle and environmental influences. Several lifestyle alterations results of this transition. Eating habit changes, exposure to severe stress, decreased physical activity and increase in smoking, tobacco chewing and alcohol intake were the major cause of obesity. Increased intake of energy dense foods high in fat, sugars, low in vitamins, minerals, micronutrients, decreased physical activity, sedentary forms of work, transportation changes,

urbanization leads to the global increase in overweight and obesity. The common consequences of overweight and obesity were CVD (mainly heart disease and stroke) the world's no one cause of death of people. The Insulin resistance in immigrant and intra country immigrant Asian Indians includes dyes lipidemia, (hyper triglyceridemia, low levels of HDL and high levels of small dense LDL), pro coagulant tendency, increased pro inflammatory cytokines and endothelial dysfunction. Some of the abnormalities are also evident at a young age, particularly in children with low birth weight. Clinically insulin resistance should be suspected in the presence of abdominal obesity, HTN, dyslipidemia, family history of type 2 diabetes and in individuals of certain ethnic groups (Hispanics, Asian Indians) particularly if they are obese. Bariatric surgical procedures apart from lifestyle changes, pharmacotherapy are major gastrointestinal operations that Seal of most of the stomach to reduce the amount of food one can eat. Bariatric surgery is an option for patients with a BMI>35Kg/ M2 and the metabolic syndrome. Improvement of obesity related Co morbid conditions following surgery is evidenced, notably, T2DM, obstructive sleep apnea, obesity hypo ventilation, gastro esophageal reflux disease (GERD), peripheral edema .

2. MATERIALS AND METHODS

Twenty non surgical and twenty Bariatric surgical overweight, obese, morbidly obese persons of 20-65 year age groups were randomly selected from BGS Gleneagles Global Hospitals, Bangalore for the study.

According to Gupta (2009) in a random sample, every individual in a population has an equal chance of being selected. Each subject was personally interviewed and filled the collected details in the questionnaire. Anthropometric measurements of the subjects recorded for all the selected samples were height, weight, Body Mass Index (BMI), waist circumference, waist hip ratio, Body fat %, REE, Visceral fat.

Height: The Height of an individual is principally a measure of skeletal bony tissue-leg, pelvis, spine and skull (Jelliffe-1991)

Weight: Weight of the subjects was measured using the portable bathroom weighing scale. The scale was checked for accuracy before taking the measurements.

Body Mass Index: The Body Mass Index was calculated from the heights and weights of all subjects using the formula. Categorization of the subjects based on their BMI into various groups was done as per WHO 1995

$$\text{Body mass Index} = \frac{\text{Weight in Kg}}{\text{Height in m}^2}$$

Waist circumference/Hip circumference: Waist circumference was taken on the narrowest circumference between ribs. Hip circumference was also measured using a non stretch inch tape with 0.1 cm accuracy.

Waist Hip Ratio: Waist Hip ratio was calculated using the formula

$$\text{Waist Hip Ratio} = \frac{\text{Waist circumference (cm)}}{\text{Hip circumference (cm)}} \quad (\text{Boyle 1993})$$

Fat Composition Analyzer

Body fat percentage (stored fat) and visceral fat percentage (Fats which surround organs) is measured through bioelectrical impedance. Subject details like height, age, sex to be fed into the machine. The subjects were made to stand erect with shoulder straight by holding tight two sides of nodes like handling two wheeler till it records body fat percentage and visceral fat.

Body fat percentage=10 to 20% (Male), 20 to 30 % (Female)

Visceral fat percentage= 1 to 9 % (Male and Female)

Biochemical Examination

The serum lipid profile is useful in determining the amount of different lipids in the blood in order to assess the risk levels of CVD.

Estimation of cholesterol, triglyceride and various forms of lipoprotein are done to screen people who may be at high risk of cardiovascular Diseases (Guthrie 1989). The lipid fractions namely total cholesterol, triglycerides, low density lipoprotein, high density lipoprotein were estimated for all the samples selected. Blood was drawn early morning at fasting state with the help of technicians and stored in a vial. The subjects were informed previously to be in fasting state. The estimation was done on the same day.

Total cholesterol was estimated using the expand enzymatic procedure given by Allen et al (1994)

Serum triglycerides were estimated using GPOPAP procedure given by Werner et al (1981)

HDL Cholesterol was estimated using CHOD-PAD method furnished by Grove(1989)

LDL Cholesterol levels were computed using the formulae

LDL = Total cholesterol-Triglyceride-HDL

Table I. Mean Anthropometric Measurements and Indices of Surgical and Non surgical groups

Parameter	Surgical group	Non surgical group	P value
	Mean ± SD	Mean ± SD	
Height	160.88 ± 11.13	165.85 ± 10.44	0.154
Weight	108.39± 17.6	81.9±8.96	<0.001
Body Mass Index (BMI)	42.00 ± 5.89	29.81 ± 2.18	<0.001
Waist circumference	60.15 ± 13.03	46.5 ± 5.37	<0.001
Waist Hip Ratio	± 0.09	1.05 ± 0.05	0.119

Table II. Weight details of surgical and non surgical group

Weight Details	Surgical group	Non Surgical group	Total	P-Value
Overweight	0	11 (55%)	11 (29%)	<0.001
Obese	6 (33%)	9 (45%)	15 (39%)	
Morbid obese	12 (67%)	0	12 (32%)	

3. RESULTS

The mean Height, weight, BMI, waist circumference, waist, hip ratio was given in Table 1. There were 33% obese, 67% morbid obese in the surgical group and 55% overweight,45% obese in non surgical group respectively. The basal energy expenditure of surgical and non surgical group were given in Figure 1.

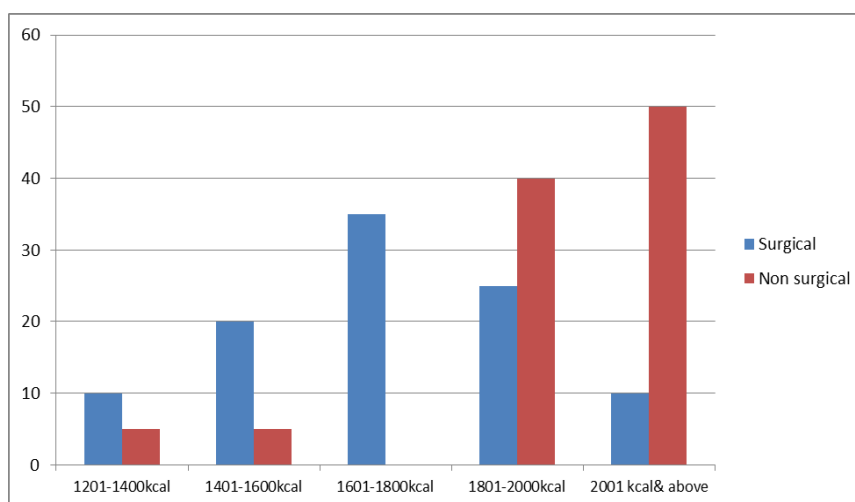


Fig 1 Basal Energy Expenditure of Surgical and Non Surgical groups

Medical history, past medical history, family history was collected from surgical and non surgical groups.

Table III. Medical history, Past Medical History, Family History, Surgical and non surgical groups

Patient History	Surgical (%)	Non surgical (%)
Medical History		
Diabetes Mellitus	25	10
Hypertension	35	20
Dyslipidemia	15	20
IHD	-	10
Sleep apnea	10	15
Endocrine/Thyroid disorder	20	10
Arthritis	10	-
Past Medical History		
Tuberculosis	-	-
Typhoid	-	10
Measles	-	05
Juvenile Diabetes	-	-
Family History		
Diabetes Mellitus	5	15
Hypertension	-	20
IHD	-	10
Sleep apnea	5	-
Liver Disease	-	-
Arthritis	-	-
Stroke	-	-
Lung Disease	-	05
Obesity	5	20
Cancer	5	05
Vegetarian/Non Vegetarian		
Vegetarian	30	25
Non vegetarian	70	75

Meals, snacks, cooking oil consumption were collected from surgical and non surgical groups.

Majority of surgical and non surgical group consumes four meals and two to four snacks respectively.

Table. IV Meal consumption per day in pre surgical and non surgical groups

No of meals	Pre Surgical group(%)	Non surgical group(%)
Three	05	15
Four	90	50
More than four meals	05	35
Snacks		
No snacks	00	00
One snack	05	10
Two snacks	40	10
Three snacks	40	75
For snacks	15	05
Cooking oil		
Safflower	-	-
Mustard	10	-
Sesame	10	10
Soybean	-	-
Corn	15	-
Sunflower	50	70
Groundnut	05	05
Cottonseed	-	-
Palm	05	05
Coconut oil	05	10

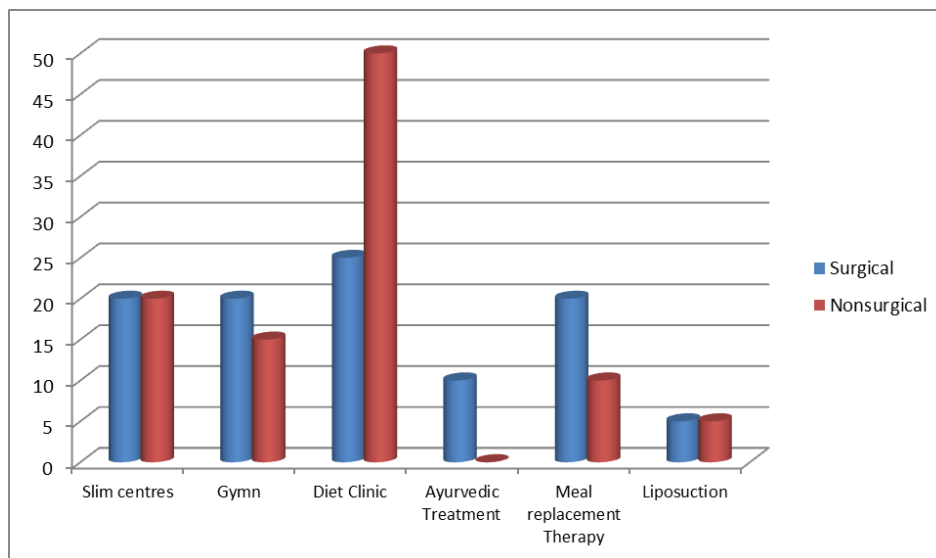


Fig 2 Modes of weight loss therapy in pre surgical and nonsurgical patients %

20 % Pre surgical and non surgical patients tried slim centres,20% pre surgical ,15% non surgical tried gymn,25% pre surgical,50% non surgical visited Diet clinic,10% pre surgical tried arurvedic treatment,20% presurgical,10% non surgical patients tried meal replacement supplement from non nutritionists,5% pre surgical ,5% underwent liposuction procedure from surgical and non surgical patients to remove fat from abdomen, thighs and back and regained weight again over a period of 8 to 12 months due to lack of calorie control and physical activity.

Table V. Physical activity and Exercise pattern in surgical and Non surgical Groups

Activity/Physical Activity	Pre Surgical %	Non surgical %
Mild	95	95
Moderate	05	05
Heavy	-	-
Exercise		
Daily	50	35
Alternate days	20	20
Weekly once	10	30
No	20	15
Meditation		
Yes	10	10
No	90	90

Most of the patients were not physically active and not continued regular exercise.

Table. VI. Food habits of surgical and non surgical groups

Food Habits	Pre Surgical	Non surgical
Outside Dining		
Daily	25	05
Weekly thrice	20	05
Weekly twice	25	05
Weekly once	15	75
Never	15	10
Eating Habit		
Normal	15	10
Binge Eating	45	15
Binge Eating & Sweet intake	40	75

Comparatively pre surgical patients dine outside frequently than the nonsurgical group. Binge eating was more in pre surgical patients and sweet intake with binge eating was more in non surgical patients

Table.VII Comparison of Biochemical parameters, Blood pressure and Visceral fat in surgical and nonsurgical groups

Biochemical Parameters	Pre Surgical %	Non surgical %
HbA1C		
4.0 -6.0	50	90
6.1-7.0	30	-
7.0 & above	20	10
Lipid Profile		
Total Cholesterol		
Normal	75	80
High	25	20
LDL		
Normal	30	70
High	70	30
VLDL		
Normal	35	85
High	65	15
HDL		
Low	90	40
Normal	10	60
Triglycerides		
Normal	65	85
High	35	15
Blood pressure		
Normal	80	80
Above 140/80mm/Hg	20	20

Biochemical parameters were found comparatively more in surgical and non surgical patients.

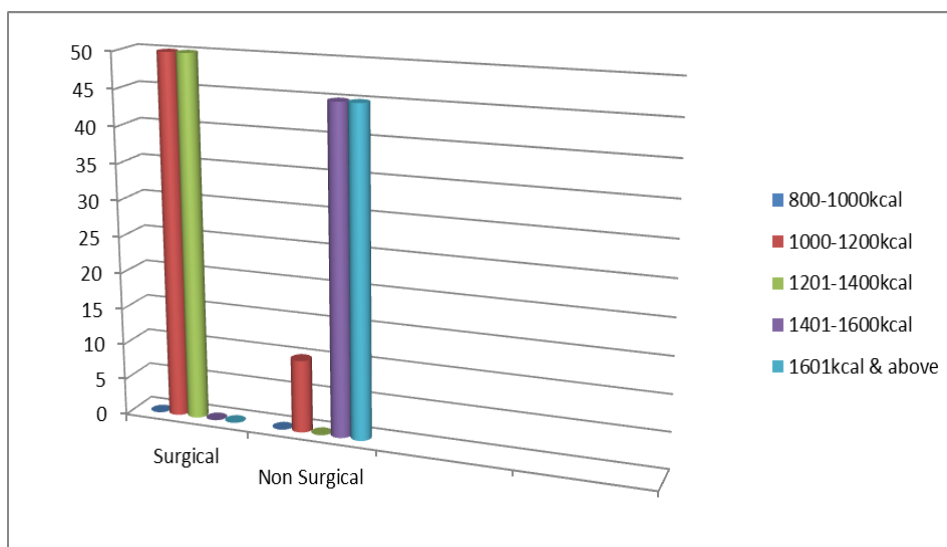


Fig.3 Energy intake of Post surgical and Non surgical group

Energy intake was very less between 1000 to 1400kcal in post Bariatric surgical patients and 45% non surgical patients were consuming between 1400 & above respectively.

Table VIII Visceral Fat values in surgical and non surgical patients

Visceral Fat%	Surgical %	Non Surgical %
9-14	5	50
15-19	45	40
20-25	50	10

Visceral fat were more in Bariatric surgical obese and morbid obese patients.

Visceral fat and waist circumference were correlated with surgical (0.46) and non surgical patients (0.13) respectively.

Table IX. Comparison of weight loss in surgical and nonsurgical groups

	Surgical group	Non Surgical group	P-Value**
	Mean ± SD	Mean ± SD	
Baseline	108.39 ± 17.65	81.95 ± 8.96	<0.001
Follow up	87.34 ± 19.62	77.19 ± 9.67	0.045
P-Value*	<0.001	<0.001	
Percentage of weight loss	20%	6%	

*Students paired t-test, **Students Independent sample t-test

It was found that the surgical group lost 20% weight loss effectively within three months period due to reduction in stomach size during surgery and maximum food intake was between 1000 to 1200kcal per day as small frequent, low calorie with vitamin, mineral supplementation and physical activity. The non surgical group lost only 6% weight loss and it varies as per the food calorie intake and physical activity

4. DISCUSSION

The findings of the current study are significant because it demonstrates that a markedly effective reduction in weight after Bariatric surgery and very minimal weight gain due to a reduction in stomach size compared to non surgical groups due to the prolonged requirement of exercise and calorie control without discontinuation. Thus, it can be concluded that Bariatric surgery can go a long way in improving the quality of life of obese, especially morbid obese by reducing weight effectively and delay the progression of metabolic syndrome and endocrine disorders. Weight loss of Morbid obese persons cannot be achieved due to the discontinuity of exercise, not consuming balanced healthy diet, saturation in weight loss. Bariatric surgery can help in reducing weight at a faster rate.

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