

Effect of Liposuction on Overweight/Obese Patients' Eating Concerns, Body Shape Concerns, and Self-esteem

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Abstract Obesity is a growing public health problem in Egypt, with many physical and psychological deleterious effects. Liposuction could have a positive effect on patients' psychology. The aim of this study was to examine the effect of liposuction on overweight/obese patients' eating concerns, body shape concerns, and self-esteem. This quasi-experimental one-group study was conducted in *Bedayat* private Hospital in Cairo on 70 adult patients undergoing liposuction. A self-administered questionnaire with three validated scales for eating concerns, body shape concerns, and self-esteem was utilized in data collection before and after liposuction. The fieldwork lasted from April to July 2018. The results showed that 84.3% of the patients were, with age range 23 to 58 years. There were significant decreases in the percentages of patients having dyslipidemia, from 25.7% before the liposuction to 5.7% after the liposuction ($p=0.001$). The scores of eating showed improvements ($p<0.001$), and the frequency of unhealthy eating practices decreased ($p<0.001$). The mean score of body shape concerns decreased from 5.1 before liposuction to 2.1 after liposuction ($p<0.001$), whereas the mean scores of self-esteem domains increased ($p<0.001$). In multivariate analysis, liposuction was the only significant independent negative predictor of the eating concern and body shape concern scores, and a significant positive predictor of the self-esteem score. In conclusion, liposuction is a safe procedure that leads to significant improvements in the patients' eating concerns, body shape concerns, and self-esteem. The procedure is recommended for those suffering from such concerns and/or having low self-esteem. Further research is proposed to examine the long-term effects of liposuction on these parameters.

Keywords: liposuction, eating concerns, body shape concerns, self-esteem

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1. Introduction

Obesity and overweight are universal worldwide health problems of growing prevalence rates. [1] They are associated with risks for the physical and psychological wellbeing of individuals. They have been linked to many ailments and illnesses affecting adults [2], children [3], as well as women in reproductive age [4]. Moreover, localized areas of fat lead to body shape distortion with associated negative psychological effects. [5]

Thus, there is a need for efficacious multi-disciplinary interventions including cosmetic approaches to manage the problem of obesity. [6] However, dietary regimes and physical activity are often insufficient especially in cases of pockets of excess fat in the abdomen, thighs, and other locations. [7] In such cases, cosmetic interventions such as liposuction are must, although many factors influence the willingness to undergo such interventions such as gender, marital status, level of education, and body shape concerns. [8] They also affect the outcome of the intervention and

patient satisfaction with it. [9]

Liposuction is a safe and effective surgical outpatient procedure aimed at removal of localized fat deposits. [10,11] It is the most common cosmetic surgery carried out in the United State. [12] It is associated with minimal risks to the patient when used alone or as an adjunct to other cosmetic interventions. [13] The main purpose of liposuction is improve appearance, especially when the patient is unable to follow a healthful lifestyle, and to manage localized fatty areas. [14] However, the positive effects of liposuction do not seem to be long-lasting, and thus may not affect obesity-related problems. [15] Nonetheless, it has been argued that liposuction could have a positive effect on patients' eating habits through their better feelings of their shape. [11] Moreover, recent innovations in the procedure led to marked improvements in its effectiveness and safety. [16]

Obesity is a growing public health problem in Egypt, with many physical and psychological deleterious effects. Most studies of weight reduction focused on the physical effects, with a paucity of research addressing its psychological effects.

1.1. Aim of the Study

The aim of this study was to examine the effect of liposuction on overweight/obese patients' eating concerns, body shape concerns, and self-esteem. The research hypotheses were that overweight/obese patients undergoing liposuction will experience significant improvements in their eating concerns, body shape concerns, and self-esteem.

2. Subjects and Methods

2.1. Research Design and Setting

The study was carried out using a quasi-experimental one-group design with pre-post assessment. It was conducted in *Bedayat* Hospital, a private general hospital in Cairo.

2.2. Participants

The study included a convenience sample of 70 male and female patients attending the hospital for liposuction surgery during the time of the study. The eligibility criteria were being adult, not suffering from a major physical or mental illness, and able to respond to the questionnaires. The sample size was calculated to detect an improvement in the scores of eating concerns, body shape concerns, and self-esteem with a moderate effect size (0.50) [17] at 95% level of confidence and 80% power based on.

2.3. Data Collection Tool

A self-administered questionnaire was utilized in data collection. It comprised three scales measuring eating concerns, body shape concerns, and self-esteem, in addition to a section for some socio-demographic data as age, gender, education, job, marital status, as well the history of diabetes and hypertension. It also included a section for the sites of liposuction, height, and body weight before and after the liposuction.

The *Eating Disorder Examination (EDE)* scale measures the range and severity of eating disorder features. This self-reported questionnaire was developed by *Fairburn and Beglin*. [18] The questionnaire is composed of 28 items or questions in four sections. The first section includes 12 questions such as "*Have you had a definite fear of losing control over eating during the last 28 days?*" The response is on a 7-point Likert type scale: "No days / 1-5 days / 6-12 days / 13-15 days / 16-22 days / 23-27 days / and Every day." These are scored respectively from zero to six. The second section includes six questions about the frequency (times or days) of unhealthy eating practices such as "*Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)?*" The third section comprises three questions such as "*Over the past 28 days, on how many days have you eaten in secret (i.e., furtively)?*" They have the same scoring as the first section. The last section has seven questions such as "*Has your weight influenced how you think about (judge)*

yourself as a person?" These are checked on a 7-point Likert scale from "not at all" to "markedly", scored from zero to six respectively. The questionnaire covers four subscales, namely weight concern, shape concern, restraint, and eating concern. The scores of each subscale and the total score are calculated by simple summation and division by the number of corresponding items, giving a mean score ranging from zero to six so that a higher score indicates more eating concerns and disorders. The tool is appended with three questions for female asking about missing any menstrual periods over the past three-to-four months, their numbers, and about taking contraceptive pills.

The **Body Shape Concerns Questionnaire (BSQ)**: This scale was developed by *Cooper et al* [19] as a self-report indicating concerns about body shape. A short 16-item form was later developed and validated by *Evans and Dolan*. [20] It asks respondent about concerns such as having you been afraid that you might become fat (or fatter); having imagined cutting off fleshy areas of your body; having felt excessively large and rounded, etc. during the preceding four weeks. The responses are on a 6-point Likert scale: "never, rarely, sometimes, often, very often, always." These are scored from one to six respectively so that a higher score indicates more concerns about body shape.

The **Self-Esteem Scale** was used to assess participants' feelings of self-esteem. It was developed and validated by *Heatherton and Polivy*. [21] It has 20 items categorized into three subscales, namely performance, social, and appearance self-esteem. Items are checked on a 5-point Likert type scale: "not at all, a little bit, somewhat, very much, extremely). These are scored from one to five respectively. The scoring is reversed for negative items so that a higher score indicates more self-esteem.

The data collection form was vigorously reviewed by a panel of experts in psychiatric and mental health nursing. The three scales used have been validated and widely used in the literature. Moreover, their reliability was tested in the present study and demonstrated high levels of reliability, with Cronbach's Alpha coefficients 0.84, 0.94, and 0.93 respectively for the eating concern scale, body shape concerns scale, and self-esteem scale.

2.4. Pilot Study

A pilot study was carried out on six patients from the same setting. It was carried out to assess the clarity and applicability of the questionnaire and study procedures. Since n modifications were done in the tools based on the pilot findings, the pilot sample was included in the main study sample.

2.5. Fieldwork

Upon obtaining official approvals for carrying out the study, the researchers started the recruitment of patients according to the eligibility criteria. Those eligible were invited to participate, and were provided a full explanation of the study aim and maneuvers, along with re-assurance of their rights. Each subject who consented to participate was handed a form of the self-administered questionnaire, and was asked to fill its parts. This provided a baseline for

study parameters (pre-liposuction). The same process was repeated one and a half months after the liposuction (post-liposuction).

The work before liposuction was done in the inpatient while the patient was prepared for the procedure. The filling of the forms took around 30 minutes from each patient. Two to three patients were recruited per day. Each patient was given an appointment at the outpatient clinic for posttest one and a half months after discharge from the hospital. The fieldwork lasted from April to July 2018. All research ethics issues were complied with according to Helsinki Declaration.

2.6. Statistical Analysis

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and medians for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the sales used through their internal consistency. Quantitative continuous data were compared using paired t-test for pre-post changes. Qualitative categorical variables were compared using chi-square test. Whenever the expected values in one or more of the cells in a 2x2 tables was less than 5, Fisher exact test was used instead. Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones. In order to identify the independent predictors of the scores of eating concerns, body shape concerns, and self-esteem, multiple linear regression analysis was used and analysis of variance for the full regression models done. Statistical significance was considered at p-value <0.05.

3. Results

The patients were mostly females (84.3%), whose age ranged between 23 and 58 years as shown in [Table 1](#). More than a half of them had university education (58.6%), and were working (60%), and the majority were married (81.4%). Only five (7.1%) of them were suffering from diabetes and/or hypertension. The most common liposuction sites were the abdomen (77.1%) and buttocks (47.1%), and 57.1% of the patients had it in two different sites.

[Table 2](#) illustrates statistically significant decreases in the percentages of patients having dyslipidemia, from 25.7% before the liposuction to 5.7% after the liposuction ($p=0.001$). Moreover, the percentages of obese patients significantly decreased from 58.6% before the liposuction to 20.0% after liposuction ($p<0.001$).

As displayed in [Table 3](#), patients' mean BMI decreased from 30.9 before liposuction to 27.8 after liposuction ($p<0.001$). The scores of their eating concerns were high before liposuction, ranging from 4.9 for restraint to 5.2 for shape concern and eating, approaching the maximum score of 6. These decreased after liposuction by mean differences ranging from 3.4 for restraint and 4.2 for eating concern. All these improvements were statistically significant ($p<0.001$). Additionally, the frequency of

unhealthy eating practices during the preceding 28 days decreased after liposuction by mean differences ranging from 7.00 times for losing control over eating to 12.00 days of taking laxatives. These decreases were statistically significant ($p<0.001$). The mean score of body shape concerns decreased from 5.1 before liposuction to 2.1 after liposuction ($p<0.001$). Meanwhile, the mean scores of the three self-esteem domains significantly increased after liposuction with mean post-pre differences ranging from 2.43 for social evaluation to 3.33 for appearance ($p<0.001$). In total, the mean self-esteem score increased from 1.8 before liposuction to 2.4 after liposuction, and the difference was statistically significant ($p<0.001$).

[Table 4](#) points to a statistically significant strong positive correlation between the post-pre-liposuction difference in the score of body shape concern and the score of eating concern ($r=0.808$). It also indicates statistically significant small negative correlations between the post-pre-liposuction difference in the score self-esteem on one hand and BMI and each of the scores of eating and body shape concerns. It also shows a statistically significant small positive correlation between the post-pre-liposuction difference in the score of eating concern and the level of patient education.

Table 1. Socio-demographic and medical characteristics of patients in the study sample (n=70)

	Frequency	Percent
Age:		
<40	46	65.7
40+	24	34.3
Range	23.0-58.0	
Mean±SD	37.3±7.7	
Median	37.0	
Gender:		
Male	11	15.7
Female	59	84.3
University education:		
No	29	41.4
Yes	41	58.6
Job:		
Unemployed	28	40.0
Working	42	60.0
Marital status:		
Unmarried (single/divorced)	13	18.6
Married	57	81.4
Have:		
Diabetes	5	7.1
Hypertension	5	7.1
Sites of liposuction:		
Abdomen	54	77.1
Buttocks	33	47.1
Thighs	27	38.6
Legs	11	15.7
Chest	10	14.3
Arm	7	10.0
No. of sites:		
1	14	20.0
2	40	57.1
3	16	22.9

Table 2. Pre-post intervention changes in patients' BMI and dyslipidemia

	Time				X ² test	p-value
	Pre (n=70)		Post (n=70)			
	No.	%	No.	%		
Hypercholesterolemia:						
No	45	64.3	47	67.1	0.13	0.72
Yes	25	35.7	23	32.9		
Dyslipidemia:						
No	52	74.3	66	94.3	10.57	0.001*
Yes	18	25.7	4	5.7		
BMI:						
Normal (<25)	1	1.4	10	14.3	25.00	<0.001*
Overweight (25-<30)	28	40.0	46	65.7		
Obese (30+)	41	58.6	14	20.0		
Missed menses (n=59):						
No	56	94.9	59	100.0	Fisher	0.09
Yes	3	5.1	0	0.0		

(*) Statistically significant at p<0.05.

Table 3. Patients' post-pre-intervention changes in BMI and eating concerns, body shape concerns, and self-esteem scores

	Mean±SD	Post-pre difference	Paired t-test	p-value		
	Pre (n=70)	Post (n=70)	Mean±SD	Median		
BMI	30.9±3.5	27.8±3.2	-3.2±1.0	-3.10	26.43	<0.001*
EATING CONCERNS						
• Weight concern	5.0±0.9	1.3±1.7	-3.7±2.1	-4.30	14.84	<0.001*
• Shape concern	5.2±0.6	1.2±1.6	-4.0±1.9	-4.63	17.95	<0.001*
• Restraint	4.9±1.2	1.4±1.6	-3.4±2.0	-4.40	14.66	<0.001*
• Eating concern	5.2±0.7	1.1±1.5	-4.2±1.8	-4.80	19.07	<0.001*
Total eating	5.1±0.7	1.3±1.6	-3.8±1.8	-4.57	17.52	<0.001*
Times/days of:						
• Eating unusual amount	9.9±5.2	1.5±3.1	-8.4±5.9	-8.00	11.99	<0.001*
• Lost control over eating	10.4±5.7	1.9±2.8	-8.5±6.6	-7.00	10.76	<0.001*
• Days overeating	11.3±5.9	1.8±2.1	-9.4±6.3	-8.00	12.52	<0.001*
• Induced vomiting	12.8±5.7	1.4±2.1	-11.4±6.0	-10.00	15.77	<0.001*
• Taking laxatives	13.6±5.0	1.4±2.2	-12.2±5.6	-12.00	18.25	<0.001*
• Driven exercise	11.8±5.9	2.0±2.8	-9.8±6.4	-9.00	12.88	<0.001*
Body shape concerns	5.1±0.8	2.1±1.5	-2.9±1.8	-3.72	13.68	<0.001*
SELF-ESTEEM:						
• Appearance	1.5±0.4	4.3±1.2	2.7±1.3	3.33	17.39	<0.001*
• Academic performance	1.9±0.6	4.3±1.2	2.4±1.2	2.57	17.21	<0.001*
• Social evaluation	1.9±0.3	4.0±0.8	2.0±0.9	2.43	18.90	<0.001*
Total self-esteem	1.8±0.3	4.2±1.0	2.4±1.1	2.80	18.80	<0.001*

(*) Statistically significant at p<0.05.

Table 4. Correlation between pre-post changes in BMI and scores of eating concern scale, body shape concern, and self-esteem, and patients' characteristics

	Spearman's rank correlation coefficient			
	Post-pre differences			
	BMI	Eating concern scale	Body shape concern	Self-esteem
BMI				
Eating concern scale	.154			
Body shape concern	.020	.808**		
Self-esteem	-.248*	-.267*	-.254*	
Age	-.021	-.056	.109	-.169
Education	.121	.236*	.154	.058
No. of liposuction sites	-.203	.042	.034	-.077

(*) Statistically significant at p<0.05, (**) Statistically significant at p<0.01.

Table 5. Best fitting multiple linear regression model for the scores of eating concern, body shape concern, and self-esteem

	Unstandardized Coefficients	Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	Lower	Upper
	B	Std. Error					
Eating concern scale							
Constant	8.96	0.33		27.356	<0.001	8.31	9.60
Intervention	-3.85	0.21	-0.85	18.575	<0.001	-4.26	-3.44
r-square=0.71 Model ANOVA: F=345.03, p<0.001 Variables entered and excluded: gender, education, marital status, job, hypertension, diabetes, No. of sites							
Body shape concern scale							
Constant	7.95	0.32		24.534	<0.001	7.31	8.59
Intervention	-2.94	0.20	-0.77	14.399	<0.001	-3.34	-2.53
Diabetes	0.77	0.40	0.10	1.951	0.053	-0.01	1.56
r-square=0.60 Model ANOVA: F=105.57, p<0.001 Variables entered and excluded: gender, education, marital status, job, hypertension, No. of sites							
Self-esteem scale							
Constant	3.69	0.33		11.060	<0.001	3.03	4.35
Intervention	0.63	0.16	0.22	3.806	<0.001	0.30	0.95
Body shape concern score	-0.17	0.09	-0.23	-1.908	0.059	-0.35	0.01
Eating concern score	-0.32	0.09	-0.52	-3.575	<0.001	-0.50	-0.14
r-square=0.88 Model ANOVA: F=340.40, p<0.001 Variables entered and excluded: gender, education, marital status, job, hypertension, diabetes, No. of sites							

In the multivariate analysis (Table 5), liposuction was identified as the only statistically independent negative predictor of the eating concern score, explaining 71% of its improvement. It was also the main statistically significant independent negative predictor of the body shape concern score, while having diabetes was a positive predictor. They both explained 60% of the improvement in this score. As for the self-esteem score, liposuction was its only statistically significant independent positive predictor, whereas the scores of body shape and eating concerns were negative predictors. The model explains 88% of the change in the self-esteem score.

4. Discussion

Obesity is associated with many psychological disorders affecting mental health such as distortion of body image and psychological wellbeing. [22] Hence, [23] emphasized the importance of psychological evaluation of the patients undergoing bariatric interventions. The present study findings indicate generally improved women's self-esteem and eating and body image concerns after liposuction. These results lead to acceptance of the set research hypotheses.

The current study involved a sample with a majority of females in early adulthood and middle age. These are the gender and age categories mostly interested in cosmetic surgery and weight reduction interventions. In line with this, a review of a ten-year experience with liposuction in Brazil reported that the majority of the patients were females. [24] However, the age span was a little bit older

compared with the present study, which could be attributed to differences in population age distribution and life expectancy in the two countries. Moreover, most patients in the present study had university education, were employed and married. These demographic characteristics are similar to those reported by in a study in Saudi Arabia. [25]

The liposuction sites mostly reported among the participants in the present study were the abdomen and buttocks. These are the sites that accumulate most of the body fat. Additionally, they are the sites that have evident negative effects on body shape. Moreover, more than a half of the participants had liposuction in two different sites, which indicates a more need for weight reduction and body shape improvement. Similar findings were reported in a study of cosmetic liposuction and body lift in Texas, United States. [26]

The liposuction was successful in decreasing the percentage of obese patients from about two-thirds to one-fifth. Moreover, the mean BMI changed from the obese to the overweight category. This improvement in body mass had certainly a positive impact on patients' eating and body shape concerns, thus leading to better self-esteem. In agreement with this, a study in Italy reported significant reductions in BMI among obese patients undergoing abdominoplasty with liposuction, and this was maintained through a one-year follow-up. [27]

The reduction in body weight among the patients in the present study was not only for cosmetic purposes, but also for improvement of health and reduction of risks. Thus, the study results demonstrated significant decreases in the percentage of patients suffering from dyslipidemia,

dropping from around one-fourth before liposuction to only less than six percent after liposuction. In congruence with this, a systematic review provided evidence of the beneficial effects of liposuction on cardiovascular risk factors including dyslipidemia. [28]

Before liposuction, the patients in the current study had high eating concerns. This was most evident regarding restraint with concerns about over eating, avoidance of eating, dietary rules, etc. as well as the shape concern such as the preoccupation with shape or weight, the fear of weight gain, discomfort seeing body, feelings of fatness, etc. All eating concerns were significantly decreased after liposuction. Moreover, the findings showed significant decreases in the frequency of unhealthy eating practices after liposuction such as taking laxatives and losing control over eating. Such improvements were positively correlated with the level of patient education. However, the multivariate analysis identified liposuction as the only significant independent negative predictor of the eating concern score, explaining of its improvement, providing a strong evidence of its positive effect on patient eating concerns. The finding is in agreement with those of a study in Finland, which demonstrated significant improvements in eating concerns following cosmetic liposuction. [29]

The present study results also demonstrated significant improvements in patients' scores of body shape concerns after liposuction. Such concerns encompass worried about flesh being not firm enough, being with thin women for fear of feeling self-conscious about own body shape, feeling thighs spreading out when sitting down, feeling ashamed of own body, etc. Such concerns were significantly improved after liposuction and the positive effect of the procedure was put into evidence through multivariate analysis where liposuction was identified as the main significant independent negative predictor of the body shape concern score, explaining about two-thirds of the improvement in its score. In agreement with these results, a study in New York, United States using the same BSQ tool reported significant improvements in body shape concerns following liposuction. [30]

A main objective of cosmetic interventions in general, and liposuction in particular, is to improve patients' self-esteem. In the present study, the scores of self-esteem were low in all its three domains of appearance, academic performance, and social evaluation. This is a reflection of the high pre-liposuction concerns about eating and body shape. In fact, there were significant negative correlations between the scores of self-esteem and each of the scores of eating and body shape concerns. In congruence with this, a study in Mexico found a high prevalence of self-esteem among obese nurses. [31]

After liposuction, the present study results showed significant improvement in self-esteem scores. The multivariate analysis identified liposuction as the only significant independent positive predictor of the self-esteem score. Moreover, the scores of body shape and eating concerns were negative predictors of the self-esteem score, and the three factors explained about ninety percent of the increase in the self-esteem score. Thus, liposuction had a direct positive effect on self-esteem, and an indirect effect through improving eating and body shape concerns. In line with this, a study in Iran highlighted that cosmetic

surgeries are associated with increased self-esteem. [32] On the same line, a study in the United States demonstrated significant improvements in patients' self-esteem following weight loss. [33]

5. Conclusion and Recommendations

Liposuction is a safe procedure that leads to significant improvements in the overweight/obese patients' eating concerns, body shape concerns, and self-esteem. Therefore, the procedure is recommended for those patients suffering from such concerns and/or having low self-esteem. Further research is proposed to examine the long-term effects of liposuction on these parameters.

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