

# Determination of bariatric surgery outcomes: prospective study

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## ABSTRACT

**Aims:** Obesity and related problems are an important health problem whose prevalence has increased in recent years. Bariatric surgery is one of the accepted clinical treatment methods for obesity. However, the obesity-related problems that bariatric surgery corrects and the problems it causes are not clear. The aim of the study is to determine the recovery status and problems experienced in obesity and related problems in patients who have undergone bariatric surgery.

**Methods:** 185 individuals who underwent bariatric surgery participated in the study. A 24-question data collection form, prepared by the researchers in line with the literature and including sociodemographic data, pre- and post-operative weight changes, problems experienced due to obesity, problems resolved after surgery, and problems experienced due to surgery, was used.

**Results:** It was determined that 18.4% (n=34) experienced postoperative complications. most common problems are hair loss (66.4%) and vitamin deficiency (55.1%) after surgery. 74% of individuals reported taking vitamin supplements. After the surgery, it was found that most o related to psychological (60.5%), j f the individuals (41.37%; n=12) had gallbladder surgery. After the surgery, individuals reported improvement in symptoms oint (48.6%), eating and respiratory problems (46.4%; 43.2%). When the type of surgery was compared with revision surgery, presence of complications, postoperative psychological support, and vitamin supplement use, no statistically significant relationship was found (p>0.05).

**Conclusion:** Our research shows that it is important to monitor the long-term health status of individuals who have undergone bariatric surgery.

**Keywords:** Bariatric surgery, obesity, complication

## INTRODUCTION

Obesity is one of the important health problems whose rate is increasing today.<sup>1</sup> The World Health Organization (WHO) defines obesity as abnormal or excessive fat accumulation that poses a risk to health. According to WHO, individuals with a body mass index over 25 kg/m<sup>2</sup> are considered overweight, while individuals with a body mass index over 30 kg/m<sup>2</sup> are called obese.<sup>2</sup> Age, gender, education level, smoking-alcohol use, genetic factors, environmental factors, eating habits and psychological problems are effective in the formation of obesity.<sup>3</sup> Obesity brings with it serious health problems.1 These; insulin resistance, type 2 diabetes, metabolic syndrome, coronary heart disease, hyperlipidemia, gallbladder diseases, stroke, sleep apnea, fatty liver, asthma, musculoskeletal problems, menstrual irregularities, pregnancy complications, and some types of cancer. Obesity is also one of the health problems that increases the risk of complications after surgery.<sup>4</sup> In addition to the physiological effects of obesity, it has been reported that it has psychological

effects on individuals such as low self-esteem, depression, anxiety disorders, sexual function and sleep disorders.<sup>5</sup> Recent studies have shown that more than 1,2 million of the deaths in the European region of the World Health Organization are caused by obesity, accounting for 13% of the total causes of death and ranking fourth among the causes of death.<sup>6</sup>

Treatment methods used for obesity are grouped under five groups. These include non-surgical and surgical methods; diet, exercise, behavioral change, pharmacological treatment and surgical treatment.<sup>7</sup> Surgical treatment is applied to those whose body mass index (BMI) is over 40 kg/m<sup>2</sup> or whose BMI is 35 kg/m<sup>2</sup> and who has an accompanying disease accompanied by comorbidity. Surgical treatment is a treatment method applied to lose weight and prevent comorbid diseases.<sup>8</sup> The general name given to surgical treatment is bariatric surgery, and there are different types. These are: Gastric bands, Sleeve

gastrectomy (SG), Biliopancreatic diversion (BPD) Jejunioileal bypass, Combined restrictive and malabsorptive Mini gastric bypass, Roux-Y gastric bypass, BPD with duodenal switch.<sup>8</sup> There are risks of postoperative complications in bariatric surgery, especially those related to obesity. Leak, peritonitis, bleeding, stomal obstruction, internal hernia, marginal ulcer, fistula, gastroesophageal reflux, aletelctasis, pneumonia, long-term vomiting and diarrhea, weight regain, nutritional imbalances, psychosocial problems are among the risks seen after surgery.<sup>9</sup>

It is important to take the necessary precautions against complications that may occur after the surgery, to monitor the patient and to follow up after discharge. In this regard, physicians and nurses play an important role in patient follow-up through multidisciplinary team work. When we look at the literature, there are a limited number of studies revealing the effects of obesity surgery on patients and the care needs of patients. The aim of this study is to determine the recovery levels of obesity-related problems of individuals who have undergone bariatric surgery and the problems they experience after surgery, and to determination of the postoperative care and education needs of patients in this context.

## METHODS

### Ethics

Before starting the study, ethical approval was obtained from Ankara Yıldırım Beyazıt University Health Sciences Ethics Committee (Date: 16.03.2023, Decision No: 03-95). Additionally, written and verbal consent was obtained from the patients. This study was performed in line with the principles of the Declaration of Helsinki.

### Type of Research

It was conducted descriptively in order to determine the recovery levels of obesity-related problems of individuals who underwent bariatric surgery and the problems they experienced after surgery, and to determination of the postoperative care and education needs of the patients in this context.

### Population and Sample of the Research

The population of the research online consists of individuals who applied to a physician to receive consultancy services regarding healthy living and weight control between 16.03.2022 and 16.06.2023, and who underwent bariatric surgery. 185 individuals who met the inclusion criteria and volunteered to participate in the study were included in the study without sample selection. It was calculated as 0.99 the power of the study.

### Inclusion Criteria

Individuals who agreed to participate in the study, were over 18 years of age, know how to read, write and speak Turkish, had no mental problems, and had at least 3 months and a maximum of one year after surgery were included.

### Data Collection Tools

The data were collected through a survey containing 24 questions prepared by the researchers in line with the literature, aimed at determining the sociodemographic characteristics of

the individuals, the physiological problems they experienced due to obesity and obesity surgery, the problems related to the obesity surgery they had undergone, and the status of receiving psychological support before and after surgery.<sup>2-5</sup>

### Collection of Data

To collect data, individuals who received counseling services and underwent bariatric surgery were identified according to the inclusion criteria. The researchers contacted the individuals and explained the purpose of the study. The data collection form prepared for individuals who volunteered to participate in the study was delivered online, and the researchers asked for questions that were not understood.

One's contact information was shared with individuals. Informed consent was obtained from individuals before data collection.

### Statistical Analysis

The data were analyzed in computer environment. Percentage distribution, mean, standard deviation, independent groups t test, one-way analysis of variance (ANOVA) test were used to evaluate the data. In all results,  $p < 0.05$  was considered statistically significant.

## RESULTS

42.2% of the individuals participating in the research were in the 26-36 age group, 91.4% were women.

It was determined that 75.1% of them were married and 61.1% had a university education or higher. When the preoperative BMI of the individuals was examined, it was determined that 75.1% were in the group of 40 and more, and when the current BMI was considered, 34.1% were in the group between 25-29.9. 71.4% of the individuals participating in the study had a family history of obesity and 67% It was determined that 6 of them had weight problems in childhood. It was determined that 74.1% of the individuals did regular sports before the surgery, 87% did a regular diet, and 18.9% received psychological support before the surgery (Table 1).

It was determined that 80% of individuals who underwent bariatric surgery had sleeve gastrectomy and 20% had gastric bypass surgery. 3.8% of these individuals underwent revision surgery.

It was determined that 18.4% (n=34) experienced postoperative complications. Individuals; While they reported that the most common problems they experienced after surgery were hair loss (66.4%) and vitamin deficiency (55.1%); 74% of individuals reported taking vitamin supplements. After the surgery, it was found that most of the individuals (41.37%; n=12) had gallbladder surgery.

It was found that 15% of the patients' marital status changed after the surgery and 13.5% received psychological support. When the postoperative nutritional behavior of the individuals was examined, diet compliance behavior was detected in 41.6%, while emotional eating behavior was detected in 30.2%. After the surgery, individuals, in order; reported improvement in symptoms related to psychological (60.5%), joint (48.6%), eating and respiratory problems (46.4%; 43.2%) of individuals.

Table 1. Distribution of individuals' descriptive characteristics		
	Number	%
<b>Age groups</b>		
25 and less	10	5.4
26-36	78	42.2
37-47	68	36.8
48 and above	29	15.6
The average age	38.47±9.05	
<b>Gender</b>		
Woman	169	91.4
Male	16	8.6
<b>Marital status</b>		
Single	46	24.9
Married	139	75.1
<b>Education status</b>		
Primary education	23	12.4
High school	49	26.5
University and postgraduate	113	61.1
<b>Live</b>		
Marmara	73	39.5
Black Sea	12	6.5
Southeast	10	5.4
East Anatolia	5	2.7
Central Anatolia	44	23.8
Aegean	20	10.8
Mediterranean	7	3.7
Abroad	14	7.6
<b>Preoperative body mass index</b>		
30 – 34.9 (First degree obese)	9	4.9
35-39.9 (Second degree obese)	37	20.0
40 and more (Third degree obese)	139	75.1
<b>Current body mass index</b>		
18-24.9 (Normal)	25	13.5
25-29.9 (Light fat)	63	34.1
30 – 34.9 (First degree obese)	53	28.6
35 –39.9 (Second degree obese)	30	16.2
40 and more (Third degree obese)	14	7.6
<b>Family history of obesity</b>		
There is	132	71.4
None	53	28.6
<b>History of childhood obesity</b>		
There is	125	67.6
None	60	32.4
<b>Preoperative psychological support status</b>		
Yes	35	18.9
No	150	81.1
<b>Regular exercise before surgery</b>		
Yes	137	74.1
No	48	25.9
<b>Regular diet before surgery</b>		
Yes	161	87.0
No	24	13.0
<b>The impact of psychological factors on the decision to undergo surgery</b>		
Yes	181	97.4
No	5	2.6

It was determined that psychological factors were effective in 97.4% of the patients' decision to undergo surgery (Table 2). When the individuals' age, gender, marital status, family obesity status, weight problem as a child, diet and exercise status, region of residence, pre-operative psychological

Table 2. Distribution of individuals' characteristics regarding bariatric surgery and the postoperative period		
	Number	%
<b>Surgery type</b>		
Stomach bypass ( Roux-en Y gastric bypass, RNY Gastric bypass)	37	20.0
Gastric Sleeve Surgery (Sleeve gastrectomy)	148	80.0
<b>Revision surgery status</b>		
Yes	7	3.8
No	178	96.2
<b>Post-operative re-operation (except revision surgery)</b>		
Cholecystectomy	12	42.9
Skin prolapse	5	17.9
Polyp-cyst	3	10.7
Other*	8	28.5
<b>Postoperative marital status change</b>		
Yes	28	15.1
No	157	84.9
<b>Development of postoperative complication</b>		
Yes	34	18.4
No	151	81.6
<b>Postoperative problems a</b>		
Nausea	37	20.0
Vomiting	48	25.9
Vitamin insufficiency	102	55.1
Dumping syndrome	31	16.7
Hair spill	123	66.4
Constipation	61	32.9
Skin prolapse	64	35.5
Eat less	30	16.2
Other**	95	51.3
<b>Symptom improvement after surgery</b>		
Hypertension	40	21.6

support, and pre-operative BMI were compared, no statistically significant relationship was found between them ( $p>0.05$ ).

When the type of surgery was compared with revision surgery, presence of complications, postoperative psychological support, and vitamin supplement use, no statistically significant relationship was found ( $p>0.05$ ).

## DISCUSSION

In this study, almost all of the patients reported that psychological reasons were effective in their decision for bariatric surgery. According to individuals' statements, the negative perspective of society seemed to be a big reason for making the decision to have surgery. It has been reported in the literature that the obese adults have 23-36% increased odds of developing depressed mood.<sup>10</sup> Similar to our research result, Callugi and Grave reported in their study that body image and weight concerns of individuals receiving obesity treatment were effective.<sup>11</sup>

Due to postoperative weight loss, an improvement was detected in the most common obesity-related joint, respiratory and eating problems in individuals. Obesity; It

affects osteoarthritis, osteoporosis and systemic inflammatory rheumatic diseases.<sup>12</sup> The fact that patients who lost weight after surgery reported improvement in joint problems may be associated with the positive effects of maintaining the ideal weight on the musculoskeletal system. Obesity also plays a major role in diseases such as obstructive sleep apnea syndrome, obesity hypoventilation syndrome, pulmonary hypertension, pneumonia, asthma is more common in obese individuals, and there is a strong relationship between COPD and obesity.<sup>13</sup> Fat accumulation in the abdominal and thoracic cavities and the mediastinal area causes the diaphragm to remain in an upward position, increasing pleural pressure and decreasing functional residual capacity (FRC). Factors that contribute to reduced lung compliance in obesity include increased thoracic blood volume, mediastinal fat compressing the lung, and closure of dependent airways resulting in atelectasis and increased alveolar surface tension.<sup>14</sup> While Chandrakumar et al.<sup>15</sup> reported an improvement in myocardial infarction, heart failure stroke and cardiovascular problems in individuals who underwent bariatric surgery, Pati et al.<sup>16</sup> reported that about 4-8% of all cancers are attributed to obesity. In our study, individuals; They stated that the problems related to obesity, which improved after surgery, mostly affected their daily life activities. In our research, in addition to the positive changes experienced by individuals after surgery, the problems they experienced were also reported. One of these was that postoperative individuals mostly reported that they had gallbladder surgery. After bariatric surgery, stones develop due to the increase in cholesterol levels in the gallbladder and saturation in bile mucin concentration, and rapid weight loss in a short time, weight loss more than 25% of the preoperative weight, triggers stone formation.<sup>17</sup> It has been reported that gallstones form in 3%-22% of bariatric patients within 12 months after surgery, and in 8%-30% within 24 months after surgery.<sup>18</sup> Approximately 4.7%-12% of obesity patients revealed that they had gallbladder surgery during active weight loss. Studies in the literature were similar to our study.<sup>17-19</sup> In addition, the individuals who participated in our research reported that they mostly experienced hair loss and vitamin deficiency after surgery. Bypassing a part of the gastric mucosa in bariatric surgery may lead to iron and B12 deficiency, and bypassing the duodenum and proximal jejunum may lead to impaired absorption of calcium and vitamin D from the intestines.<sup>20-22</sup> Bariatric surgery has also been reported to lead to decreased absorption of nutrients such as vitamins A, K, iron, selenium, zinc and copper.<sup>23,24</sup> The incidence of vitamin C deficiency in bariatric patients is 10-50%, calcium deficiency occurs in 10-25% at the end of the second year after surgery, 25-48% at the end of the fourth year, and vitamin D deficiency occurs in 17-52% and 50-63% of patients during the same period. deficiency has been reported.<sup>25-28</sup> Nutritional status after bariatric surgery may also affect vitamin deficiency and lead to low protein intake. This situation may cause an increase in hair loss.<sup>20,29</sup> According to the meta-analysis conducted by Zhang et al.<sup>30</sup>, the incidence of hair loss in bariatric patients was reported to be 57%. Research results in the literature were similar to our results.

### Limitations

This is a study that describes the positive and negative consequences of bariatric surgery. In the research, it would be more useful to check the patients at regular intervals in a clinical environment and support them with measurements of health-related parameters.

## CONCLUSION

After bariatric surgery, monitoring the weight loss and improvement in comorbidities in patients is very important for their quality of life. Physiological, psychological and sociological follow-up of the patient in the postoperative period with the understanding of a multidisciplinary team can enable early diagnosis of complications, development of positive eating behavior in patients and increased compliance. Similar to results of this study, it may be recommended to monitor patients' levels such as zinc, biotin, and iron, to take supplements if necessary, and to provide structured training and consultancy services starting in the preoperative period in order to eliminate effects that will negatively affect the body image of patients, such as hair loss. Again, according to the results of our study, it is noteworthy that patients most frequently undergo gallbladder surgery after bariatric surgery. In this context, it is recommended to perform ultrasonography routinely to detect stones and mud before surgery, to follow up patients with pathological findings and provide consultancy services, and to provide patients with a healthy lifestyle regarding proper nutrition and physical activity in the postoperative period.

## ETHICAL DECLARATIONS

### Ethics Committee Approval

The study was carried out with the permission of Ankara Yıldırım Beyazıt University Health Sciences Ethics Committee (Date: 16.03.2023, Decision No: 03-95).

### Informed Consent

All patients signed and free and informed consent form.

### Referee Evaluation Process

Externally peer-reviewed.

### Conflict of Interest Statement

The authors have no conflicts of interest to declare.

### Financial Disclosure

The authors declared that this study has received no financial support.

### Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

### Data availability statement

All data generated or analyzed during the present study are included in this published article.

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