

# Prevalence of Anxiety and Depression Symptoms among Post Bariatric Surgery Patients in Baghdad-Iraq

Abdulnaser M. Mohammed<sup>1\*</sup>, Amer A. Hussien<sup>2</sup>, Abdulrahman M. Mohammed<sup>3</sup>

<sup>1</sup> Baghdad Teaching Hospital, Medical City, MOH, Baghdad, Iraq

<sup>2</sup> Ibn Rushed Psychiatric Teaching Hospital, Baghdad Al-Russafaa Health Directorate, MOH, Baghdad, Iraq

<sup>3</sup> GIT Teaching Hospital, Medical City, MOH, Baghdad, Iraq



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## Abstract

**Background:** Obesity is a major public health concern and is on the rise worldwide. Numerous studies revealed that the best method for treating morbid obesity is bariatric surgery, which has indicated its effectiveness in controlling weight. Published studies reported that patients who had undergone bariatric surgery may have psychiatric illnesses when compared to other obese individuals with similar preoperative characteristics.

**Objectives:** Estimate the rates of anxiety and depression among post-operative bariatric surgery patients.  
**Methods:** A cross-sectional study on 61 patients was conducted at the bariatric clinic in the Gastroenterology and Hepatology Baghdad teaching hospital and the Private Nursing Home Hospital in Medical city, Baghdad-Iraq from 1st of April to the 30th of December 2021. Generalized Anxiety Assessment – 7 (GAD-7) Scale, and Patient Health Questionnaire – 9 (PHQ-9) scale were applied to assess these conditions.

**Results:** The prevalence of depression among the studied patients was 32.8%, while the prevalence of anxiety was 44.3%. Marital status, diabetes mellitus, post-operative BMI, and past psychiatric history were significantly associated with depression. Chronic diseases (diabetes mellitus and hypertension), post-operative BMI, and psychiatric history were significantly associated with anxiety.

**Conclusions:** Anxiety was found to be more common than depression among patients who underwent bariatric surgery. Variables predicting both depression and anxiety were diabetes mellitus, post-operative severe obesity, and history of psychiatric disorders before surgery.

**Keywords:** Anxiety; Bariatric Surgery; Body Mass Index; Depression; Obesity.

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## Introduction:

Obesity is a major public health challenge and is on the rise in both developed and developing regions of the world (1). The number of severely obese individuals (BMI of 40 or over) has also increased significantly (2). Obesity is associated significantly with lower life expectancy and thus becomes a leading cause of preventable death. It has been shown to be associated with high blood pressure, dyslipidemia, diabetes, and other disorders (1).

Numerous studies reported that the best way to treat morbid obesity is bariatric surgery which has been shown to be effective in controlling weight, thus increasing survival and significantly reducing mortality. (3) Other studies reported that patients who had undergone bariatric surgery may have psychiatric illnesses compared to other obese individuals with similar preoperative characteristics (4, 5).

The commonest mental illness among bariatric surgery patients are anxiety disorders and mood disorders (4). Compared to the general population, the post-bariatric surgery prevalence of high anxiety and depression is also reported (5). Suicide, attempted

or committed, was recorded among bariatric surgery patients, and should receive more attention during follow-up., with a higher rate of suicide than others (6). A subsequent meta-analysis showed that suicidal rate post-operative was less, but provided more important evidence that they had a higher suicide rate than the general population (7).

Post-operative cognitive function is precious, and might enhance future weight loss. Better cognition aids weight decrease, and is associated with adherence to post-operative guidelines regarding diet, exercise and other lifestyle changes) (6, 7).

## Aims of the study:

1. To estimate the prevalence of anxiety and depression symptoms among post-operative bariatric surgery patients.
2. To study the association between anxiety and depression symptoms with some socio demographic characteristics of studied group.

## Patients and methods:

A cross-sectional study was carried out at the Gastroenterology and Hepatology- Baghdad teaching hospital and the outpatient bariatric clinic in the Private Nursing Home Hospital in the Medical City

\*Corresponding Author: [nassirmmtaha@gmail.com](mailto:nassirmmtaha@gmail.com)

Complex, from 1st of April to 30th of December 2021.

The target population was patients aged  $\geq 18$  years who have undergone bariatric surgery at least a month prior to enrollment in the study, attending the hospital for follow up.

A convenient sample of 78 patients were initially enrolled in the study. Only 61 patients were fit to be included in the study and have agreed to have their information used in the study. The data was collected by the researcher through direct interview with patients using a structured questionnaire covering the following: Sociodemographic data, Generalized Anxiety Assessment – 7 (GAD-7) Scale (8), Patient Health Questionnaire – 9 (PHQ-9) (9).

The ethical approval was obtained from the Ethics Committee of the Scientific Board of Psychiatry-Iraqi Council for Medical Specialization. An official approval was obtained from Medical City Directorate. Verbal consent was obtained from patients prior to participation and before filling up the questionnaire by the researcher.

Microsoft Excel 2010 was used for data entry. Statistical Package for Social Sciences (SPSS-26) program was used for analyzing data. The Chi square or fishers exact test was used for categorical variables while independent student t test was used for numerical data. Data was represented by frequencies

and percentages using tables and figures. The level of significances was considered at P value  $< 0.05$ .

## Results

This cross-sectional study included 61 patients who underwent bariatric surgery, whose mean age was  $35.10 \pm 6.205$  years. There were more females (57%) in the study group than males with a male to female ratio of 0.74: 1). Married people were 62% of the sample, single 30%, and widowed and divorced represented only 8%.

Those with college / university education were the majority of the study group (diploma, bachelor, and master or PhD representing 13%, 46% and 13% respectively), while 28% had high school or less. Self-employed were 39%, employed were 30%, housewives or unemployed were 28%, and 3% were retired.

Of those studied 52.5% had diabetes mellitus, 47.5% had hypertension, 31.1% had a psychiatric history before surgery and 16.4% had a family history of obesity. Sleeve type was the most common bariatric surgery done (68.9%).

As for the BMI one month after surgery, 31.1% of participants became underweight or within normal range, 32.8% with overweight, 26.2% were obese, 6.6% with severe obesity, and 3.3% still had morbid obesity, as shown in table (1).

**Table (1): Socio-demographic data and clinical characteristics**

Variables	Categories	Number	Percent
Age group (years)	< 30	16	26.2
	30-39	28	45.9
	40-49	14	23.0
	$\geq 50$	3	4.9
Gender	Male	26	42.6
	Female	35	57.4
Marital status	Single	18	29.5
	Married	38	62.3
	Others	5	8.2
Education	High school or less	17	27.9
	Diploma	8	13.1
	Bachelor degree	28	45.9
	Master or PhD	8	13.1
Occupation	Housewife or unemployed	17	27.9
	Self-employed	24	39.3
	Employed	18	29.5
	Retired	2	3.3
Chronic diseases	Diabetes mellitus	32	52.5
	Hypertension	23	37.7
	Past psychiatric condition	19	31.1
Family history of obesity		10	16.4
Surgery type	Sleeve	42	68.9
	bypass	16	26.2
	Sleeve & bypass	3	4.9
BMI after operation (Kg/m <sup>2</sup> )	Underweight/ normal (<18.5 - 24.9)	19	31.1
	Overweight (25 - 29.9)	20	32.8
	Obese (30 - 34.9)	16	26.2
	Severely obese (35 - 39.9)	4	6.6
	Morbid obese ( $\geq 40$ )	2	3.3
Total		61	100.0

Figure 1 shows that the prevalence of depression among participants was 32.4%, and the prevalence of anxiety was 44.3%.

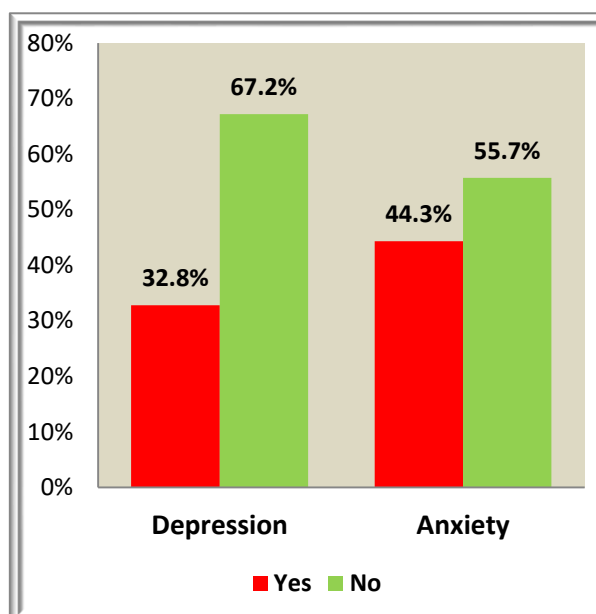


Figure (1) Prevalence of depression and anxiety among participants

The severity of depression and anxiety according to (PHQ-9, GAD-7) classification are shown in table 2.

According to PHQ-9 scale, there were 20 (32.8%) participants with depression; (mild 24.6%, moderate 6.6%, and moderate to severe 1.6%). According to GAD-7 scale there were 27 (44.3%) participants with anxiety; (mild 32.8%, moderate 8.2%, and severe 3.3%).

Table (2): Severity of depression and anxiety according to (PHQ-9&GAD-7) scale scores

Scale	Severity According to scores	Number	%
PHQ-9	Normal (0-4)	41	67.2
	Mild depression (5-9)	15	24.6
	Moderate depression (10-14)	4	6.6
	Moderate to severe (15-19)	1	1.6
	Severe depression (20-27)	0	0.0
Total		61	100
GAD-7	Normal (0-4)	34	55.7
	Mild anxiety (5-9)	20	32.8
	Moderate anxiety (10-14)	5	8.2
	Severe anxiety (15-21)	2	3.3
Total		61	100

Table 3 shows that marital status, diabetes mellitus, post-operative BMI, and past psychiatric history were significantly associated with depression,  $p$  value < 0.05.

Table (3): Association between sociodemographic and clinical data with depression

Variables	Categories	Total	Depression				$p$ value
			Yes	%	No	%	
Age group (years)	< 30	16	8	50.0	8	50.0	0.228
	30-39	28	9	32.1	19	67.9	
	40-49	14	2	14.3	12	85.7	
	≥ 50	3	1	33.3	2	66.7	
Gender	Male	26	10	38.5	16	61.5	0.416
	Female	35	10	28.6	25	71.4	
Marital status	Single	18	1	5.6	17	94.4	0.009
	Married	38	16	42.1	22	57.9	
	Others	5	3	60.0	2	40.0	
Education	≥High school	17	5	29.4	12	70.6	0.9194
	Diploma	8	2	25.0	6	75.0	
	Bachelor degree	28	10	35.7	18	64.3	
	Master or PhD	8	3	37.5	5	62.5	
Occupation	Unemployed	17	8	47.1	9	52.9	0.174
	Self-employed	24	4	16.7	20	83.3	
	Employed	18	7	38.9	11	61.1	
	Retired	2	1	50.0	1	50.0	
Diabetes mellitus	Yes	32	15	46.9	17	53.1	0.012
	No	29	5	17.2	24	82.8	
Hypertension	Yes	23	10	43.5	13	56.5	0.166
	No	38	10	26.3	25	73.7	
Post-operative BMI (Kg/m <sup>2</sup> )	Under-weight	19	1	5.3	18	94.7	0.007
	Overweight	20	6	30.0	14	70.0	
	Obese	16	9	56.3	7	43.8	
	Severely obese	4	3	75.0	1	25.0	
	Morbid obese	2	1	50.0	1	50.0	
Surgery type	Sleeve	42	11	26.2	31	73.8	0.195
	bypass	16	7	43.8	9	56.3	
	Sleeve & bypass	3	2	66.7	1	33.3	
Past psychiatric history	Yes	19	17	89.5	2	10.5	<0.001
	No	42	3	7.1	39	92.9	
Family history of obesity	Yes	10	5	50.0	5	50.0	0.205
	No	51	15	29.4	36	70.6	

Table 4 shows that chronic disease (diabetes mellitus and hypertension), post-operative BMI, and

psychiatric history were significantly associated with anxiety,  $P$  value < 0.05.

**Table 4: Association between socio-demographic and clinical data with anxiety**

Variables	Categories	Total	Anxiety				P value	
			Yes	%	No	%		
Age group (years)	< 30	16	9	56.3	7	43.8	0.553	
	30-39	28	10	35.7	18	64.3		
	40-49	14	7	50.0	7	50.0		
	≥ 50	3	1	33.3	2	66.7		
Gender	Male	26	12	46.2	14	53.8	0.798	
	Female	35	15	42.9	20	57.1		
Marital status	Single	18	4	22.2	14	77.8	0.077	
	Married	38	20	52.6	18	47.4		
	Others	5	3	60.0	2	40.0		
Education	≥High school	17	8	47.1	9	52.9	0.251	
	Diploma	8	3	37.5	5	62.5		
	Bachelor degree	28	10	35.7	18	64.3		
	Master or PhD	8	6	75.0	2	25.0		
Occupation	Unemployed	17	7	41.2	10	58.8	0.344	
	Self-employed	24	8	33.3	16	66.7		
	Employed	18	11	61.1	7	38.9		
	Retired	2	1	50.0	1	50.0		
Diabetes mellitus	Yes	32	20	62.5	12	37.5	0.002	
	No	29	7	24.1	22	75.9		
Hypertension	Yes	23	15	65.2	8	34.8	0.01	
	No	38	12	31.6	26	68.4		
Post-operative (Kg/m <sup>2</sup> )	BMI	Under-weight	19	3	15.8	16	84.2	0.008
		Overweight	20	7	35.0	13	65.0	
		Obese	16	13	81.3	3	18.8	
		Severely obese	4	3	75.0	1	25.0	
		Morbid obese	2	1	50.0	1	50.0	
Surgery type	Sleeve	42	16	38.1	26	61.9	0.229	
	bypass	16	10	62.5	6	37.5		
	Sleeve & bypass	3	1	33.3	2	66.7		
Past psychiatric history	Yes	19	14	73.7	5	26.3	0.001	
	No	42	13	31.0	29	69.0		
Family history of obesity	Yes	10	7	70.0	3	30.0	0.073	
	No	51	20	39.2	31	60.8		

**Discussion:**

Obesity is an epidemic that can lead to a wide range of physical and mental problems. When traditional weight loss methods are not effective, bariatric surgery is a viable weight loss option. (2-4)

The rate of depression found in the current study was close to the results of Sait et al who reported a 31.3% prevalence of depression (10) and a study from the USA which reported a prevalence of 32% (11). Mitchell (13) reported that depressive symptoms were mostly mild in his study, which is similar to the current study. A cohort study of nine years' follow-up of patients who underwent bariatric surgery found that patients had high depression scores. (14) The prevalence of anxiety in the current study was higher than that reported by Alsubaie et al study (33%) (4), and that reported by de Zwaan et al (16.8%). (15) Other studies reported no change of anxiety after surgery(16). The mean age of the patients in the current study was similar to that reported by other studies. (4, 17, 18) The lack of association between age with anxiety and depression was also reported by Sait S et al. (10) However, Alsubaie et al reported that depression was associated with age while other studies reported that severe depression was associated with younger age (4, 19, 20). This finding may be due to the small sample size of the current study.

Gender was not found to be associated with anxiety or depression, similar to the result reported by Sait et al. (10) However, Susmallian et al concluded that

depression was more common in male (43%) than female (31.5%), with a significant association. Other studies reported that anxiety was associated with female gender while depression was associated with male gender. (19-21) these contradicting results may be due to different sample selection methods and different study instruments. The percent of married patients in the current study was very close to that reported by Alsubaie et al (4) Depression was significantly lower in single patients in the current study in contrast to the divorced/widowed and married patients. The contradicts the results of other studies; Susmallian et al and Sait aet al.(10, 21) More than half of the cases in the current study were diabetic, which was associated with both anxiety and depression, in agreement with the results of Atlantis and Baker who reported that obesity may increase the risk of depression outcomes among individuals with comorbidities like DM and HT. (22) This was similar to the results of Susmallian et al who found that depression was higher among diabetic patients (21). This might be due to the patient's perception of chronic diseases being significantly associated with the presence of depression and anxiety. The significant association between hypertensive and anxiety found in the current study was in disagreement with Susmallian et al who found that depression was more prevalent among hypertensive patients (21).

Past psychiatric history (minor disorders) in the current study was associated significantly with both anxiety and depression. A quarter of Alsubaie et al cases reported pre-operative psychological disorders. (4) Herpertz et al reported that those who had depressive disorders prior to bariatric surgery were at a higher risk of psychological disorders after surgery. (14)

BMI after surgery was associated significantly with depression which was highly prevalent among all levels of obesity among cases. On the other hand, Burgmer et al reported that according to the weight loss after bariatric surgery, important aspects of mental health improved significantly during the 4-year follow-up period. However, parallel to weight regain, psychological improvements showed a slow but not significant decline over time (18). Sait et al reported no criteria of depression and anxiety after surgery (10).

In Iraq, a study found that sleeve gastrectomy is a relatively safe and effective procedure to decrease weight for morbid obesity and it improves the quality of life (including decreased anxiety and depression) (23). Another study compared between patients who underwent bariatric surgery and the general population, and found that post bariatric surgery prevalence of anxiety and depression was higher than that of other groups (5).

After all, bariatric surgery may be associated with a transient reduction in clinical depression following the procedure; but many patients have significant psychological comorbidity (24). In contrast to our results, corresponding to the considerable weight loss after bariatric surgery, important aspects of mental health improved significantly during the 4-year follow-up period. While after weight regain, psychological improvements showed a slow but insignificant decline over time (18, 25, 26).

**Conclusions:** Anxiety was found to be more common than depression among patients who underwent bariatric surgery. Marital status (widowed/divorced), diabetes mellitus, post-operative severe obesity, and history of psychiatric disorder before surgery were predictors of depression. Diabetes mellitus, hypertension, post-operative obesity, and history of psychiatric disorder before surgery were predictors of anxiety.

#### Authors' declaration:

The manuscript is an original work, not previously published or sent to other journals. We hereby confirm that all the Figures and Tables in the manuscript are ours. The project was approved by the local ethical committee of Iraqi board for medical specialization. (824 in 10/3/2022)

**Conflicts of Interest:** None

#### Authors' contributions:

Study conception & design: (Amer A. Hussien & Abdulrahman M. Mohammed). Literature search: (Abdulnaser M. Mohammed & Abdulrahman M.

Mohammed.). Data acquisition: (Abdulnaser M. Mohammed.). Data analysis & interpretation: (Amer A. Hussien, Abdulrahman M. Mohammed & Abdulrahman M. Mohammed). Manuscript preparation: (Amer A. Hussien, Abdulrahman M. Mohammed & Abdulrahman M. Mohammed). Manuscript editing & review: (Abdulrahman M. Mohammed & Abdulrahman M. Mohammed).

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## انتشار أعراض القلق والإكتئاب بين مرضى جراحة السمنة بعد التداخل الجراحي، في العراق- بغداد

عبدالناصر محمود محمد<sup>1</sup>، عامر عماش حسين<sup>2</sup>، عبدالرحمن محمود احمد<sup>3</sup>

<sup>1</sup>مستشفى بغداد التعليمي، مدينة الطب، وزارة الصحة، بغداد، العراق

<sup>2</sup>مستشفى ابن رشد التعليمي، دائرة صحة بغداد الرصافة، بغداد، العراق

<sup>3</sup>مستشفى الجهاز الهضمي التعليمي، مدينة الطب، مدينة الطب، وزارة الصحة، بغداد، العراق

### الخلاصة

**الخلفية:** تعتبر السمنة من أهم التحديات التي تواجه الصحة العامة وتزايد في جميع أنحاء العالم. أظهرت العديد من الدراسات أن أفضل طريقة لعلاج السمنة المرضية هي جراحة السمنة التي ثبت أنها فعالة في السيطرة على الوزن. أفادت دراسات أخرى أن المرضى الذين خضعوا لجراحة السمنة قد يعانون من أمراض نفسية مقارنة بالأفراد البدينين الآخرين الذين لديهم خصائص مماثلة قبل الجراحة.

**الهدف من الدراسة:** لتقدير مدى انتشار القلق والاكتئاب بين مرضى جراحة السمنة بعد الجراحة.

**الطرائق والمرضى:** أجريت دراسة مقطعية على 61 مريضاً في عيادة السمنة في المستشفى التعليمي لأمراض الجهاز الهضمي والكبد ومستشفى دار التمرريض الخاص في المدينة الطبية، بغداد-العراق من 1 أبريل إلى 30 ديسمبر 2021. تم تطبيق وتقييم مقياس القلق المعمم - 7 (GAD-7)، واستبيان صحة المريض - 9 (PHQ-9).

**النتائج:** بلغ معدل انتشار الإكتئاب بين المرضى 32.8٪، بينما بلغ انتشار القلق بين المرضى 44.3٪. ارتبطت الحالة الزوجية، وداء السكري، ومؤشر كتلة الجسم بعد الجراحة، والتاريخ النفسي السابق بشكل معنوي مع الإكتئاب، قيمة  $P > 0.05$ . بينما ارتبطت الأمراض المزمنة (داء السكري وارتفاع ضغط الدم) ومؤشر كتلة الجسم بعد الجراحة والتاريخ النفسي بشكل معنوي مع القلق، قيمة  $P > 0.05$ .

**الإستنتاجات:** وجد أن القلق أكثر شيوعاً من الإكتئاب بين المرضى الذين خضعوا لجراحة السمنة. كانت المتغيرات التي تنبئ بالاكتئاب والقلق هي داء السكري، والسمنة الشديدة بعد الجراحة، وتاريخ الاضطرابات النفسية قبل الجراحة.

**الكلمات المفتاحية:** السمنة، القلق، الإكتئاب، جراحة السمنة، مؤشر كتلة الجسم.