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Prevalence of depression and anxiety disorders among bariatric surgery patients

Bariatrik cerrahi hastalarında depresyon ve anksiyete bozukluklarının sıklığı

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Abstract

Aim: Obesity carries with itself an increased risk of psychological distress, depression and anxiety. Several studies have proven that the best modality of treatment for morbid obesity is bariatric surgery. However, the outcome of bariatric surgery on psychological health varies between individuals. Comprehensive perioperative mental health evaluation for patients seeking bariatric surgery is important, as psychiatric comorbidities could result in poor outcomes, and based on our knowledge, studies on psychiatric outcomes post bariatric surgery are limited in Saudi Arabia. This study is aimed at assessing the impact of bariatric surgery on developing depression and anxiety symptoms.

Methods: Data for this cross-sectional study were collected from patients via an electronic self-administered questionnaire of both genders who underwent bariatric surgery during the period between July 2013 and July 2017 at King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia.

Results: The total number of the participants was 214, wherein 66 (30.8%) were males and 150 (69.2%) were females. Participants who underwent bariatric surgery ranged between 17 and 64 years of age with a median age of 36.69 years. With regards to preoperative assessment, we found that 95.8% of our sample did not visit a psychiatry clinic. The postoperative percentage of depression and anxiety among patients was 67 (31.3%) and 40 (18.7%), respectively. Using multivariate regression analysis, patients' income was found to be significantly associated with anxiety, those who had higher income had less odds of being anxious compared to the group with low income (<3000 riyals) and this was statistically significant.

Conclusion: Compared to general population, the post bariatric surgery prevalence of anxiety and depression is high. We recommend pre- and postoperative psychiatric assessment for all bariatric surgery patients in centers where this has not yet been implemented in the pre- and postoperative protocols.

Keywords: Bariatric surgery, Obesity surgery, Preoperative assessment, Bariatric anxiety, Bariatric depression

Öz

Amaç: Obezite, artmış psikolojik stres, depresyon ve anksiyete riski taşır. Bazı çalışmalar morbid obezite için en iyi tedavi yönteminin bariatrik cerrahi olduğunu kanıtlamıştır. Ancak, bariatrik cerrahinin psikolojik sağlık konusundaki sonucu bireyler arasında değişmektedir. Bariatrik cerrahi arayan hastalar için kapsamlı perioperatif zihinsel sağlık değerlendirmesi önemlidir, çünkü psikiyatrik komorbiditeler kötü sonuçlara neden olabilir ve bilgilerimize dayanarak, Suudi Arabistan'da bariyatrik cerrahi sonrası psikiyatrik sonuçlarla ilgili çalışmalar sınırlıdır. Bu çalışma, bariatrik cerrahinin depresyon ve anksiyete semptomları geliştirmedeki etkisini değerlendirmeyi amaçlamaktadır.

Yöntemler: Bu kesitsel çalışmaya ilişkin veriler, Temmuz 2013 ile Temmuz 2017 arasında Kral Abdulaziz Üniversitesi Hastanesi (KAUH), Cidde, Suudi Arabistan'da bariatrik cerrahi uygulanan her iki cinsiyetten elektronik olarak uygulanan bir anket formu ile hastalardan toplandı.

Bulgular: Katılımcıların toplam sayısı 214 olup, 66'sı (%30,8) erkek, 150'si (%69,2) kadındır. Bariatrik cerrahi geçiren katılımcılar 17-64 yaşları arasındaydı ve ortanca yaşları 36,69 idi. Preoperatif değerlendirme açısından, örneklemimizin %95.8'inin bir psikiyatri kliniğini ziyaret etmediğini bulduk. Postoperatif depresyon ve anksiyete yüzdesi hastalar arasında sırasıyla 67 (%31,3) ve 40 (%18,7) idi. Çok değişkenli regresyon analizini kullanarak, hastaların gelirlerinin kaygı ile anlamlı bir şekilde ilişkili olduğu, daha yüksek geliri olanların düşük gelirli gruplara göre (<3000 riyal) daha az endişeli olma olasılıkları olduğu istatistiksel olarak anlamlı görülmüştür.

Sonuç: Bariatrik cerrahi sonrası genel popülasyona göre kaygı ve depresyon prevalansı yüksektir. Tüm bariatrik cerrahi hastaları için henüz uygulanmayan ve ameliyat öncesi protokollerde uygulanmayan merkezlerde psikiyatrik psikiyatrik değerlendirme yapılmasını öneriyoruz.

Anahtar kelimeler: Bariatrik cerrahi, Obezite cerrahisi, Preoperatif değerlendirme, Bariatrik kaygı, Bariatrik depresyon

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Introduction

Obesity is one of the major health problems that can lead to numerous comorbidities such as cardiovascular disease, metabolic syndrome and increased mortality [1-6]. Obese individuals have an increased risk of psychological distress, depression, anxiety and impaired health-related quality of life (HRQoL) [7]. Clinical significance of psychiatric disorders among obese patients is not fully understood; higher rate of depression has been observed among patients with obesity-related comorbidities like cardiovascular diseases and diabetes mellitus type 2 [8].

Several studies has shown that the best modality of treatment for morbid obesity is bariatric surgery [3, 4] which has been proven to be effective in controlling weight, thereby, increasing the survival rate and remarkably decreasing the overall mortality [9]. However, the outcome of bariatric surgery on psychological health, depression and anxiety varies between individuals. The most common psychiatric diseases among bariatric surgery candidates are anxiety disorders, mood disorders, binge eating disorder (BED), and personality disorders [10-12].

A study conducted in Norway reported a significant reduction in prevalence of psychiatric disorders from pre-operative assessment to follow-up for a one-year period after surgery [13], while a study in Germany revealed a gradual decrease in depression from 32.7% at baseline, to 16.5% at 6–12 months, and 14.3% at 2–3 years after surgery [14]. Other studies have also reported decreases in levels of depression up to two and even four years postoperatively [15]. However, some studies suggested the opposite including conditions wherein the improvements following surgery may not be maintained after the first post-operative year [16] and that the depressive symptoms may worsen in some patients [17]. Others suggested that patients who have undergone bariatric surgery may have a higher chance of depression, anxiety and other psychiatric illnesses compared to other obese individuals with similar preoperative characteristics [7]. Further studies have also reported that up to 65% of bariatric surgery patients endorsed a lifetime history of depression or mood disturbance [18,19]. As far as our knowledge on this subject is concerned, studies addressing the prevalence of psychiatric disorders among bariatric patients are limited in Saudi Arabia. This study is aimed at assessing the prevalence of depression and anxiety symptoms among patients who underwent bariatric surgery.

Materials and methods

Study design and data collection

This is a cross-sectional study targeting patients of both genders who underwent bariatric surgery at King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia. For a better representation of our data, we aimed at including all patients who underwent bariatric procedures in KAUH during July 2013 to July 2017. Patients with a history of major medical problems, such as psychiatric illness, drug or alcohol addiction were excluded from the study as were those with a case of pregnancy or malignant neoplasm. Informed consent was taken from all participants. The study protocol was reviewed and approved by Research Committee of the Unit of Biomedical Ethics at KAUH.

After reviewing the literature, we constructed an electronic self-administered questionnaire made of three parts. First is the demographic information – age, nationality, gender, marital status, education, household income, place of residence, and whether the patient has any chronic illness. Second is the preoperative data including body mass index (BMI), type of the bariatric surgery, and history of any psychiatric illness (based on record of visiting psychiatry clinic before and after the surgery). The third part consists of two questionnaires used to assess patient's anxiety and depression disorders, in which we adopted the Generalized Anxiety Disorder – 7 (GAD-7) assessment for anxiety evaluation, and Patient Health Questionnaire – 9 (PHQ-9) for depression evaluation.

The PHQ-9 and GAD-7 were developed by Robert L. Spitzer, MD, and colleagues, with an educational grant from Pfizer Inc. [20,21]. Different studies have confirmed the validity and reliability of the GAD-7 and PHQ-9 as suitable instruments to measure perceived anxiety and depression. The Arabic version of the PHQ-9 and GAD-7 were also approved to be valid and reliable among Arabic individuals [22]. The questionnaires were validated and piloted prior to the study.

Measures

Generalized Anxiety Assessment – 7 (GAD-7) Scale

The GAD-7 has been validated as a screening tool and a severity assessment scale for general anxiety disorder in clinical practice and research [20]. GAD-7 consists of seven items that reflected the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) [20], that asked the patients how often during the last 2 weeks they were complaining of each item. Response options were "not at all", "several days", "more than half the days", and "nearly every day," scored as 0, 1, 2, and 3, respectively. An eighth item was added to the questionnaire to assess the functional status of the participants and it was not used in the severity scale. Scores for the seven items range from 0 to 21. Severity scores were as follows: minimal (0-4), mild (5-9), moderate (10-14) and severe (15-21) [20]. A score of 10 or more was given for having good diagnostic sensitivity and specificity for identifying cases of GAD [20]. Participants within this category should be assessed by psychiatrist and may require further evaluation [23].

Patient Health Questionnaire – 9 (PHQ-9) Scale

The PHQ-9 contains nine items that corresponded to the nine symptoms of depression according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition [21]. Here, each item is rated on a frequency scale of 0–3 with a maximum score for the 9 items being 27. Response options were "not at all," "several days," "more than half the days," and "nearly every day," scored as 0, 1, 2, and 3, respectively. A tenth item was added to the questionnaire to assess the functional status of the participants and it was not used in the severity scale. Categories of depressive symptom severity scale were – minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27). Those who scored ≥10 (moderate - severe) were categorized as needing further evaluation and medical treatment [24].

Statistical analysis

Patient characteristics were presented across different categories by proportions. Continuous data was presented using mean and standard deviation, mean(SD). Unadjusted and adjusted logistic regression was carried out to analyze the association of anxiety and depression with baseline parameters and BMI after operation and reported in odds ratio (OR). Two-sided *P*-value of 0.05 or less were considered significant. Participants were categorized into two groups due to the small sample size for anxiety and depression: group 1 included minimal and mild; and group 2 included moderate and severe. Statistical analysis was performed using the Statistical Package for Social Sciences version 24.0 for Windows (SPSS Inc., Chicago, IL, USA).

Results

A total of 300 questionnaires were distributed, the response rate for which was 71.6%. Participants who reported psychiatric disorder preoperatively were excluded from the study. The analysis included 214 participants; 66 (30.8%) were males and 148 (69.2%), females. The median age of study participants was 36.69 years (17– 64 years). About half of our population (53.3%) had a bachelor's degree. Chronic medical diseases were present in (34.1%) of the patients; furthermore, 72.9% were morbidly obese. Demographic data of the participants has been documented in Table 1.

The mean preoperative and postoperative Body Mass Index (BMI) of the participants was 46.2 (8.8) kg/m^2 and 31.2 (7.6) kg/m^2, respectively (Figure 1). 182 (84.3%) of the participants underwent Sleeve Gastrectomy and 24 (11.1%) of the sample reported some sort of postoperative complications. With regards to preoperative assessment, we found that 95.8% of our sample population had not undergone any psychiatric assessment. Out of the 214 patients in our study, the percentage of patients who reported depression and anxiety post-bariatric surgery was 67 (31.3%) and 40 (18.7%), respectively (Figures 2 and 3). With regards to unadjusted univariate analysis of predictors of anxiety, we found that marital status, income and preoperative BMI were associated with anxiety. Using the multivariate regression analysis (Table 2), patients' income was found to be significantly associated with anxiety – those who had higher income had lower odds of being anxious compared to the group with low income (<5000 riyals) and this factor was statistically significant. Other factors such as marital status, preoperative BMI and post-operative BMI were not significant (Table 3). On the other hand, using unadjusted univariate analysis of predictors of depression, we found that income and post-operative BMI were associated with depression (Table 2). The multivariate regression analysis of predictors of depression in our study population did not show any significant predictors of depression in these patients' population (Table 3).

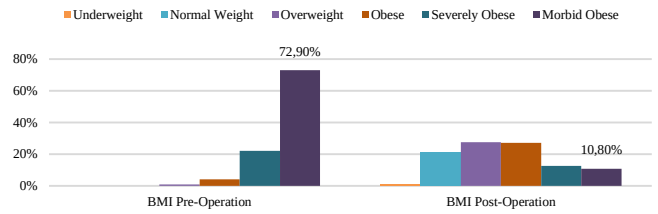

Figure 1: Differences in Body Mass Index (BMI) pre and post-operative

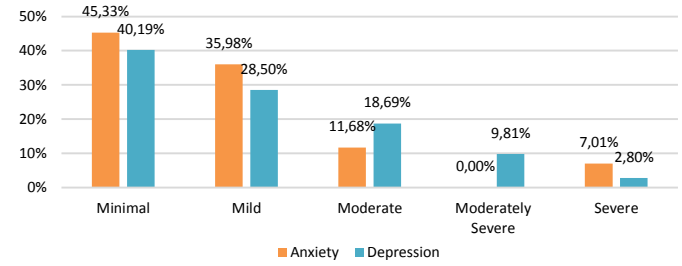

Figure 2: The distribution of anxiety and depression post-operative

Table 1: Demographic data for patients with anxiety and depression post-bariatric surgery

Variables		Total		Anxiety No		Anxiety Yes		Depression No		Depression Yes	
		n=214	100%	n=174	%	n=40	%	n=147	%	n=67	%
Age	Less than 30	57	26.6	46	21.5	11	5.1	42	19.6%	15	7.0
	30 - 39	75	35.0	62	29.0	13	6.1	50	23.4%	25	11.7
	40 - 49	56	26.2	45	21.0	11	5.1	39	18.2%	17	7.9
	50 and above	26	12.1	21	9.8	5	2.3	16	7.5%	10	4.7
Nationality	Saudi	178	83.2	146	68.2	32	15.0	124	57.9%	54	25.2
	Non Saudi	36	16.8	28	13.1	8	3.7	23	10.7%	13	6.1
Gender	Male	66	30.8	54	25.2	12	5.6	49	22.9%	17	7.9
	Female	148	69.2	120	56.1	28	13.1	98	45.8%	50	23.4
Marital Status	Single	58	27.1	42	19.6	16	7.5	39	18.2%	19	8.9
	Married	129	60.3	108	50.5	21	9.8	90	42.1%	39	18.2
	Divorced / Widowed	27	12.6	24	11.2	3	1.4	18	8.4	9	4.2
Education	High School or Less	58	27.1	47	22.0	11	5.1	39	18.2%	19	8.9
	Diploma	23	10.7	17	7.9	6	2.8	15	7.0	8	3.7
	Bachelor degree	114	53.3	94	43.9	20	9.3	81	37.9%	33	15.4
	Masters or PhD	19	8.9	16	7.5	3	1.4	12	5.6	7	3.3
Income	< 5000 SR	41	19.2	28	13.1	13	6.1	22	10.3%	19	8.9
	5000 - 10000 SR	86	40.2	73	34.1	13	6.1	64	29.9%	22	10.3
	> 10000 - 20000 SR	51	23.8	42	19.6	9	4.2	34	15.9%	17	7.9
	> 20000 SR	36	16.8	31	14.5	5	2.3	27	12.6%	9	4.2
Chronic Disease	No	141	65.9	117	54.7	24	11.2	99	46.3%	42	19.6
	Yes	73	34.1	57	26.6	16	7.5	48	22.4%	25	11.7
Pre-Operation BMI	Overweight / Obese	11	5.1	8	3.7	3	1.4	8	3.7	3	1.4
	Severely Obese	47	22.0	44	20.6	3	1.4	34	15.9%	13	6.1
	Morbid Obese	156	72.9	122	57.0	34	15.9	105	49.1%	51	23.8
Post-Operation BMI	Underweight / Normal	47	22.0	38	17.8	9	4.2	36	16.8%	11	5.1
	Overweight	59	27.6	53	24.8	6	2.8	42	19.6%	17	7.9
	Obese	58	27.1	45	21.0	13	6.1	41	19.2%	17	7.9
	Severely Obese	27	12.6	19	8.9	8	3.7	16	7.5	11	5.1
	Morbid Obese	23	10.7	19	8.9	4	1.9	12	5.6	11	5.1
Surgery Type	Sleeve	177	82.7	145	67.8	32	15.0	123	57.5%	54	25.2
	Bypass	32	15.0	25	11.7	7	3.3	22	10.3%	10	4.7
	Sleeve & Bypass	5	2.3	4	1.9	1	0.5	2	0.9	3	1.4
Date since operation	Less than 1 Year	71	33.2	59	27.6	12	5.6	47	22.0%	24	11.2
	1 - 2 Years	49	22.9	37	17.3	12	5.6	34	15.9%	15	7.0
	2 - 3 Years	49	22.9	40	18.7	9	4.2	32	15.0%	17	7.9
	More than 3 Years	45	21.0	38	17.8	7	3.3	34	15.9%	11	5.1
Post-surgical complications	No	190	88.8	157	73.4	33	15.4	132	61.7%	58	27.1
	Yes	24	11.2	17	7.9	7	3.3	15	7.0	9	4.2

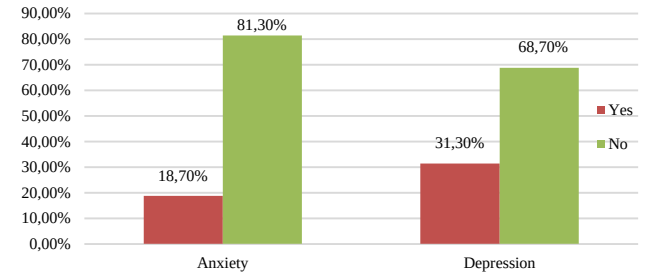

Figure 3: The percentage of anxiety and depression in the sample

Table 2: Unadjusted odds ratio (OR) estimates of factors for Anxiety and Depression (Logistic Regression). Comparisons were set as the reference category is the first

Variables	Anxiety				Depression			
	B	df	OR	*P*-value	B	df	OR	*P*-value
Age		3		0.986		3		0.695
Less than 30		3		0.986		3		0.697
30 – 39	-0.131	1	0.877	0.772	0.336	1	1.400	0.386
40 – 49	0.022	1	1.022	0.963	0.199	1	1.221	0.634
50 & Above	-0.004	1	0.996	0.994	0.560	1	1.750	0.266
Nationality		1		0.558		1		0.500
Saudi								
Non-Saudi	0.265	1	1.304	0.552	0.261	1	1.298	0.496
Gender		1		0.898		1		0.337
Male								
Female	0.049	1	1.050	0.898	0.386	1	1.471	0.244
Marital Status		2		0.111		2		0.915
Single		2		0.112		2		0.915
Married	-0.673	1	0.510	0.076	-0.117	1	0.889	0.730
Divorced or Widowed	-1.114	1	0.328	0.101	0.026	1	1.026	0.958
Education		3		0.808		3		0.862
High school or Less		3		0.797		3		0.862
Diploma	0.411	1	1.508	0.480	0.091	1	1.095	0.862
Bachelor	-0.095	1	0.909	0.819	-0.179	1	0.836	0.607
Masters or PhD	-0.222	1	0.801	0.756	0.180	1	1.197	0.744
Income		3		0.147		3		0.103
> 5000		3		0.131		3		0.102
5000 – 10000	-0.958	1	0.384	0.034	-0.921	1	0.398	0.021
10000 – 20000	-0.773	1	0.462	0.120	-0.547	1	0.579	0.205
> 20000	-1.057	1	0.347	0.072	-0.952	1	0.386	0.055
Chronic Disease		1		0.388		1		0.506
No								
Yes	0.314	1	1.368	0.385	0.205	1	1.228	0.505
Pre-Operation BMI		2		0.025		2		0.771
Overweight or Obese		2		0.067		2		0.774
Severely Obese	-1.705	1	0.182	.0059	0.019	1	1.020	0.979
Morbid Obese	-0.297	1	0.743	0.673	0.259	1	1.295	0.711
Post-Operation BMI		4		0.224		4		0.239
Underweight or Normal		4		0.265		4		0.238
Overweight	-0.738	1	0.478	0.194	0.281	1	1.325	0.531
Obese	0.199	1	1.220	0.683	0.305	1	1.357	0.497
Severely Obese	0.575	1	1.778	0.305	0.811	1	2.250	0.120
Morbid Obese	-0.118	1	0.889	0.859	1.099	1	3.000	0.042
Surgery Type		2		0.881		2		0.408
Sleeve		2		0.877		2		0.416
Bypass	0.238	1	1.269	0.613	0.035	1	1.035	0.933
Sleeve & Bypass	0.125	1	1.133	0.913	1.229	1	3.417	0.185
Date since Operation		3		0.689		3		0.682
Less than 1 Year		3		0.680		3		0.694
1 – 2 Years	0.467	1	1.595	0.309	-0.146	1	0.864	0.714
2 – 3 Years	0.101	1	1.106	0.835	0.040	1	1.040	0.919
More than 3 Years	-0.099	1	0.906	0.849	-0.456	1	0.634	0.286
Post-Operative Complications		1		0.184		1		0.494
No								
Yes	0.672	1	1.959	0.168	0.312	1	1.366	0.489

Table 3: Adjusted odds ratio (OR) of study factors. Comparisons were set as the reference category is the first.

Model and Factors Characteristics	Anxiety				Depression			
	B	df	OR	*P*-value	B	df	OR	*P*-value
Model								
Marital Status								
Single		2		0.091				
Married	-0.639	1	0.528	0.107				
Divorced or Widowed	-1.417	1	0.242	0.054				
Income								
< 5000		3		0.054		3		0.264
5000 – 10000	-1.273	1	0.280	0.009	-0.780	1	0.458	0.061
10000 – 20000	-1.090	1	0.336	0.042	-0.438	1	0.645	0.323
> 20000	-1.223	1	0.294	0.064	-0.762	1	0.467	0.139
BMI Pre-Operation								
Overweight or Obese		2		0.056				
Severely Obese	-1.868	1	0.154	0.046				
Morbidly Obese	-0.386	1	0.680	0.606				
BMI Post-Operation								
Underweight or Normal						4		0.507
Overweight					0.144	1	1.155	0.753
Obese					0.256	1	1.291	0.580
Severely Obese					0.640	1	1.897	0.233
Morbidly Obese					0.847	1	2.333	0.131

Discussion

Obesity is one of the main causes of multiple comorbidities and increasing mortality in the world today [1-6]. It is also considered as a main contributor for having depression, anxiety and psychological distress [7]. In this study, we aimed to find the percentages of depression and anxiety post bariatric surgery and the associated risk factors. According to our study, the prevalence of depression after bariatric surgery was 31.3%, and this is in excellent agreement with a study conducted in the United States, which showed that 32% of the candidates had depression in the second year post-operatively [25]. This prevalence is considered to be higher than the normal population; as a recent study in Saudi Arabia showed a much lower prevalence of depression (5.4%) among adults in the general population [26]. Another study showed that the lifetime prevalence of depression in Canada was 8.3% and the United States was 16.9% [27]. All of these percentages are still lower than the prevalence of depression observed in our study. On the other hand, a study that compared the preoperative and post-operative depression rates found that depression decreased postoperatively with no significant difference [28]. Another study in Germany, reported a significant decrease in depression post bariatric surgery from the baseline [14].

In a meta-analysis measuring the prevalence of anxiety across cultures, it was found that the estimated one-year and lifetime prevalence of anxiety disorders is 10.6% and 16.6%, respectively [29]. In our study, the prevalence of anxiety was 18.7%. Interestingly, a prospective study done in Brazil among 32 participants, found that the anxiety actually decreased significantly from 87.0% preoperatively to 56.5% postoperatively [30]. Furthermore, de Zwaan et al. [14] reported that the prevalence of anxiety disorders did not change after surgery in comparison with baseline. Thus, it seems that anxiety decreases post bariatric surgery, but still remains higher than the prevalence in the normal population.

In the current study, we found that marital status, income and preoperative BMI were associated with anxiety. A study published in 2014 among civilians aged more than 18 years showed that factors such as low self-esteem, family history of major depressive disorders (MDD), female gender, childhood sexual abuse, white race, lower educational attainment, number of traumatic experiences by age 21, and disturbed family environment were significantly associated with anxiety [31]. In the current study, we did not measure some of the above-mentioned risk factors. Among the factors that we did analyze, however, we were unable to find any association between years of education and female sex with anxiety; this could be attributed to the fact that our sample had a high proportion of female participants. A study conducted in Portugal concluded that the outcomes of bariatric surgery have a tendency to be related to the presence of depression [32]. Preoperative screening and treatment of anxiety and depression could add to the efficacy and amplify weight loss in patients after surgery, enhancing their quality of life in a more continuous manner. In our study, we were able to uncover the prevalence of postoperative anxiety and depression across the sample size which, compared to the to the prevalence in general population, is high. However, we could not have a measure of the preoperative prevalence of the same disorders in those patients as no routine preoperative screening had been performed prior to undergoing their surgical procedure.

Despite providing many interesting observations, our study has certain limitations. The first limitation is that it was a

cross-sectional study; it did not cover the whole population, and therefore the conclusions might differ across the sociodemographic variables. Consequently, it is imperative to conduct more longitudinal studies, including more assessment of patients in the follow-up aspect that would definitely provide further information to understand the association between psychiatric disorders and post bariatric surgery status. Secondly, the sample size of our study was small which may limit the generalizability of our findings, and therefore we suggest multiple center studies.

Conclusion

The results of our study have shown that the post bariatric surgery prevalence of anxiety and depression is high in comparison to the general population. Therefore, we strongly recommend pre- and postoperative psychiatric assessment for all bariatric surgery patients in centers where this has not yet been implemented in the pre- and postoperative protocols. The implementation of such screening might help control these disorders as well as improve the postoperative outcomes of bariatric surgery.

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