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Prevalence of depression in post-bariatric surgery among Saudi females in Riyadh

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ABSTRACT

Background: Obesity is one of the major health problems that can lead to numerous comorbidities such as cardiovascular disease, metabolic syndrome and increased mortality and risk of psychological distress, depression, anxiety, impaired health-related quality of life (HRQoL) and increased risk of depression suicidal ideation, especially women. Higher rate of depression has been observed among patients with obesity-related comorbidities. Bariatric surgery has been shown to improve several psychological symptoms. Our objective is to determine the prevalence of depression among Saudi adult females in post-bariatric surgery in Riyadh. *Methods:* A retrospective study. Targeted Saudi adult females who had bariatric surgery in Riyadh city, Saudi Arabia, the data were collected in April and May 2023, using PHQ-9 questionnaire that was published in social media in general. The data was analyzed through (SPSS). *Result:* The participants were 172 females with post bariatric surgery. The mean age of the participants 43% was from 28-38 years old, 53.5% were married, 62.8% with university educational level. The study revealed most of them 30.8% had minimal to mild severity of depression. Most of them 15.7% diagnosed with Polycystic Ovary Syndrome (PCOS), although 37.2% reveled no complications after surgery. 75.6% did the surgery within the past year and 25.6% most of them got none-minimal depression. *Conclusion:* The majority was diagnosed with PCOS who have had the surgery within the past year and got minimal depression with no complications. There was significant statistical relation between the age and depression.

Keywords: Depression, Post bariatric Surgery, Gastric Bypass, Gastric Sleeve.

1. INTRODUCTION

Obesity is a major health issue that can lead to a variety of comorbidities, including cardiovascular disease, metabolic syndrome, and a higher mortality rate. Obese people are more likely to experience psychological distress,

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depression, anxiety, sadness, suicidal ideation and a reduction in their health-related quality of life (HRQoL) particularly women (Sait et al., 2019; Järvholm et al., 2021). Patients with obesity-related comorbidities like cardiovascular diseases and diabetes mellitus type 2 tend to increase the risk of developing depression (Sait et al., 2019).

Obesity in Saudi Arabia has been one of the major health issues and estimates that 33% of adults suffer from obesity and 10% are morbidly obese (Body mass index (BMI) > 40 kg/m^2) and rising. Recently predicted that by 2022 it may reach 59.5% (Alsubaie et al., 2021). Pharmacological treatments, diets, and lifestyle changes appear to be ineffective in morbidly obese patients (Brandao et al., 2015). The standard treatment for severe obesity in adults is metabolic and bariatric surgery (MBS), studies focusing on safety, weight loss, and the resolution of comorbidities after MBS have found similar favorable outcomes in adolescents and adults (Järvholm et al., 2021).

Several psychological symptoms have been improved with bariatric surgery, but in some situations, it may aggravate it. The assessment of the deterioration of mental health problems after bariatric surgery can be attributed to excessive expectations of the potential physical and mental health benefits of weight loss or unexpected changes in social relationships before surgery. Risk factors currently identified for self-harm and suicide in adults after MBS are male sex, a history of psychiatric disorders, and sleep difficulties; however, a US study of suicidal behaviors (thoughts, plans, and attempts) of adolescents over 4 years of age after MBS identified multiple baseline and postoperative risk factors, including women, lower HRQoL, more weight-related problems, and loss of dietary control (Järvholm et al., 2021).

Increasing prevalence of obesity is a growing global problem (Cassin et al., 2020). Obese people are often stigmatized and face social exclusion and discrimination (Morgan et al., 2020). Many patients seeking surgery or weight-loss procedures are prescribed antidepressants, have untreated psychiatric diagnoses, have a history of substance use disorders, or are affected by their eating behavior. There is a problem (Clark et al., 2020).

Anxiety, depression, eating disorders, suicide and body image dissatisfaction also substance abuse have been reported in some cases. In Arab countries including Saudi Arabia, the literature on psychological changes after bariatric surgery is limited. Several studies have reported that the risk of attempted suicide or even complete suicide increases after MBS. Depression and anxiety after bariatric surgery are of clinical importance, because this stage is a critical stage in the development of these diseases and symptoms, and is sometimes overlooked in clinical practice (Alsubaie et al., 2021).

Psychiatric symptoms appear to be common in these patients and risk factors for symptoms are unknown (Miller-Matero et al., 2016). Investigations further the relationships between continuums of depression symptoms among Saudi adult females post-bariatric surgery. We aim to estimate the prevalence of depression in post-bariatric surgery among Saudi adult females in Riyadh 2022.

2. METHODS

This study was a retrospective study. Targeted Saudi adult females 18 years old or more who had bariatric surgery. With a sample of 172 participants were eligible to participate in this study, exclusion criteria was: Who did not complete the questionnaire, who does not live in Riyadh city, who is less than 18 years old, who did not had bariatric surgery, who was not Saudi, and male participants. 324 participants were excluded. The data was collected in April and May 2023 in Riyadh city, using Patient Health Questionnaire-9 (PHQ-9).

The questionnaire was published in WhatsApp, Telegram, Instagram and Twitter in social media. The PHQ-9 is validated and a multipurpose instrument for screening, diagnosing, monitoring and measuring the severity of depression. The PHQ-9 questionnaire, which is extensively used, is self-administered and employs a scoring technique to particularly quantify depression-related symptoms. The PHQ-9 has been adopted as a standard measure for depression risk and severity by the Veterans Administration, Department of Defense, and several integrated health care systems and public health departments, as well as the United Kingdom's National Health Service, in less than a decade (Pfizer, 2010).

The data was cleared, coded, and entered through the Statistical Package for the Social Sciences (SPSS) after the data was organized using Microsoft Excel. The results presented in tables as frequencies and percentages. Graphs also used to present data. A p-value of < 0.05 considered significant.

3. RESULTS

This study included a total of 172 women with post bariatric surgery. Half of these patients in the age group from 28-38 years 43% (n=74). More than half of the participants were married 53.5% (n=92), and most of them are university students 62.8% (n=108) (Table 2). This study involved 172 women. Their nationality, age, social status and education are displayed in (Table 2).

Table 1 Descriptive statistics of the Age of the Participants

Mean	31.05
Std. Deviation	8.608
Minimum	17
Maximum	59

N=172

Table 2 Demographic Data

Age		Frequency	Percent
	17-27 years	63	36.6
	28-38 years	74	43.0
	39-49 years	29	16.9
	Above 50 years	6	3.5
	Total	172	100.0
Social Status		Frequency	Percent
	Single	70	40.7
	Married	92	53.5
	Divorced	8	4.7
	Widowed	2	1.2
	Total	172	100.0
Educational Level		Frequency	Percent
	Middle School	13	7.6
	High School	46	26.7
	University	108	62.8
	Higher Education	5	2.9
	Total	172	100.0

N=172

Table 3 Participants Responds

When did had your surgery before		Frequency	Percent
	Within the past year	130	75.6
	Last 1-2 years	18	10.5
	More than 3 years	24	14.0
	Total	172	100.0
How much weight have you been able to lose before surgery		Frequency	Percent
	Less than 10 KG	48	27.9
	11-20 KG	49	28.5
	21-30 KG	36	20.9
	More than 31 KG	39	22.7
	Total	172	100.0
Why do you want to have the surgery		Frequency	Percent
	Psychological reason	60	34.9
	Social reason	15	8.7
	Health reason	97	56.4
	Total	172	100.0

N=172

Table 3 shows that about 75.6% (n=130) of them had their surgery within the past year, and about 28.5% (n=49) were be able to lose weight before surgery 11-20 kg. 56.4% (n=97) of them did the surgery for health reasons. Table 4 shows that 15.7% (n=27)

diagnosed with Polycystic ovary syndrome, while the least 1.7% (n=3) diagnosed with liver and heart diseases. Table 5 shows the majority of the participants have no complications after the surgery 37.2% (n=64).

Table 4 Diagnosis of Chronic Diseases

Chronic Diseases	Frequency	Percent
Diabetes Mellitus	8	4.7
Hypertension	11	6.4
High Cholesterol	9	5.2
Polycystic ovary syndrome	27	15.7
Gout	8	4.7
Heart Diseases	3	1.7
Asthma	8	4.7
Daytime drowsiness	5	2.9
Vitamin D Dif.	23	13.4
Anxiety & Nervousness	9	5.2
Anemia	14	8.1
Peptic Ulcer	7	4.1
Thyroid Disease	15	8.7
Liver Disease	3	1.7
None	22	12.8
Total	172	100.0

N=172

Table 5 Complications after the Surgery

Complications	Frequency	Percent
Shortness of breath	14	8.1
Blood Clot	1	0.6
Abdominal pain	18	10.5
Bowel Obstruction	1	0.6
Vomit, Diarrhea	13	7.6
Gallstone	12	7.0
Hernia	2	1.2
Low Blood Sugar	11	6.4
Malnutrition	36	20.9
None	64	37.2
Total	172	100.0

N=172

Table 6 BMI Before and After the Surgery

BMI before surgery	Frequency	Percent
I don't know	16	9.3
Less than 18.5	1	0.6
18.5-24.9	3	1.7
25-29.9	12	7.0
More than 30	140	81.4
Total	172	100.0
BMI after surgery	Frequency	Percent
I don't know	61	35.5
Less than 18.5	9	5.2

18.5-24.9	44	25.6
25-29.9	34	19.8
More than 30	24	14.0
Total	172	100.0

N=172

Table 6 shows the comparing between the BMI before and after the surgery, most of them 81.4% (n=140) were more than 30, whilst 35.5% (n=61) responds don't know the BMI after surgery.

Table 7 Correlation between Age and Severity of Depression

		Severity of Depression					
		None-minimal	Mild	Moderate	Moderately severe	Severe	Total
Age	17-27 years	8	17	15	11	12	63
		4.7%	9.9%	8.7%	6.4%	7.0%	36.6%
	28-38 years	31	26	8	6	3	74
		18.0%	15.1%	4.7%	3.5%	1.7%	43.0%
	39-49 years	12	9	4	2	2	29
		7.0%	5.2%	2.3%	1.2%	1.2%	16.9%
	Above 50 years	2	1	2	0	1	6
		1.2%	0.6%	1.2%	0.0%	0.6%	3.5%
	Total	53	53	29	19	18	172
		30.8%	30.8%	16.9%	11.0%	10.5%	100.0%

P Value = 0.005

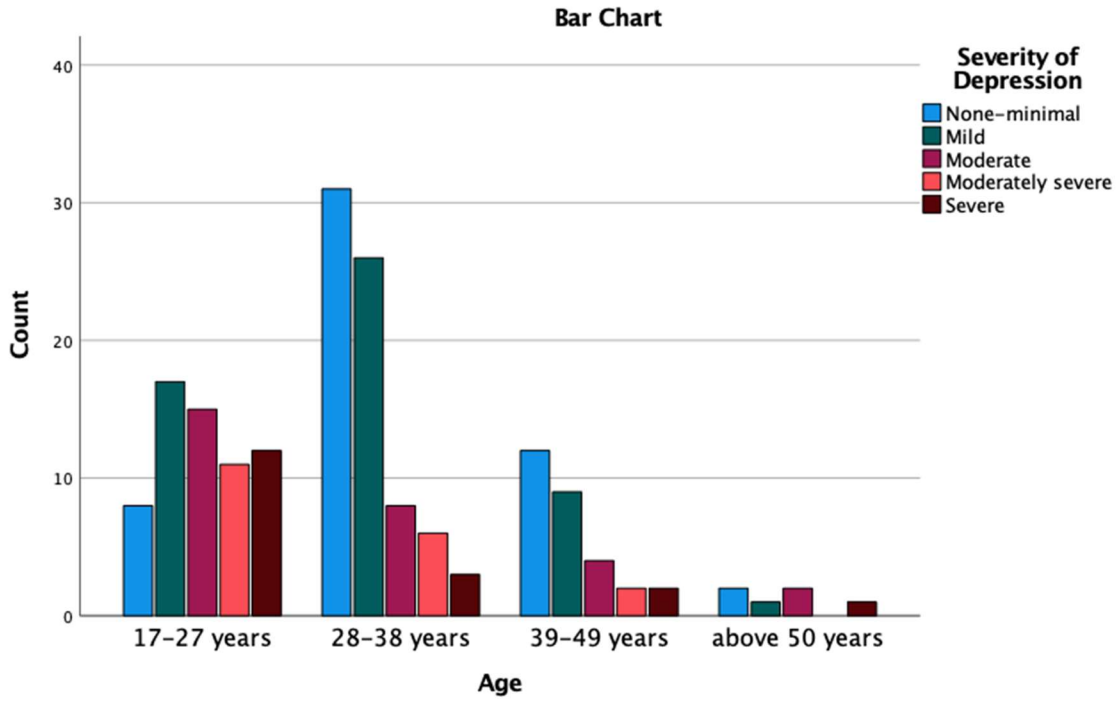

Figure 1 Significant Relation between Age and Severity of Depression

Table 7 and Figure 1 show the Correlation between Age and Severity of Depression. We found that in the age between 17-27 years 9.9% (n=17) mild severity of depression while the total was 36.6% (n=63). The majority in the age between 28-38 years was none-minimal depression 18% (n=31) while the total 43% (n=74). We found that in the age between 39-49 years have 7% (n=12) none -minimal depression and the total was 16.9% (n=29). Above 50 years 1.2% (n=2) were between none-minimal depression and

moderate depression, and the total was 3.5% (n=6). 30.8% (n=53) of the total were between none- minimal depression and mild. Which means that the relationship between them is statistically significant (P-value=0.005).

Table 8 Correlation between Social Status and Severity of Depression

		Severity of Depression					
		None-minimal	Mild	Moderate	Moderately severe	Severe	Total
Social Status	Single	12	23	12	12	11	70
		7.0%	13.4%	7.0%	7.0%	6.4%	40.7%
	Married	38	28	15	6	5	92
		22.1%	16.3%	8.7%	3.5%	2.9%	53.5%
	Divorced	2	2	1	1	2	8
		1.2%	1.2%	0.6%	0.6%	1.2%	4.7%
	Widowed	1	0	1	0	0	2
		0.6%	0.0%	0.6%	0.0%	0.0%	1.2%
	Total	53	53	29	19	18	172
		30.8%	30.8%	16.9%	11.0%	10.5%	100.0%

P Value= 0.062

Table 8 shows Correlation between Social Status and Severity of Depression. We found 53.5% (n=92) of them were married and the majority 22.1% (n=38) with none-minimal depression. Which means that the relationship between them is statistically significant (P- value = 0.062). Table 9 and Figure 2 shows prevalence of depression 30.8% (n=53) were between none-minimal and mild depression. 30% of them had severe depression.

Table 9 Prevalence of Depression

Severity of Depression	Frequency	Percent
None-minimal	53	30.8
Mild	53	30.8
Moderate	29	16.9
Moderately severe	19	11.0
Severe	18	10.5
Total	172	100.0

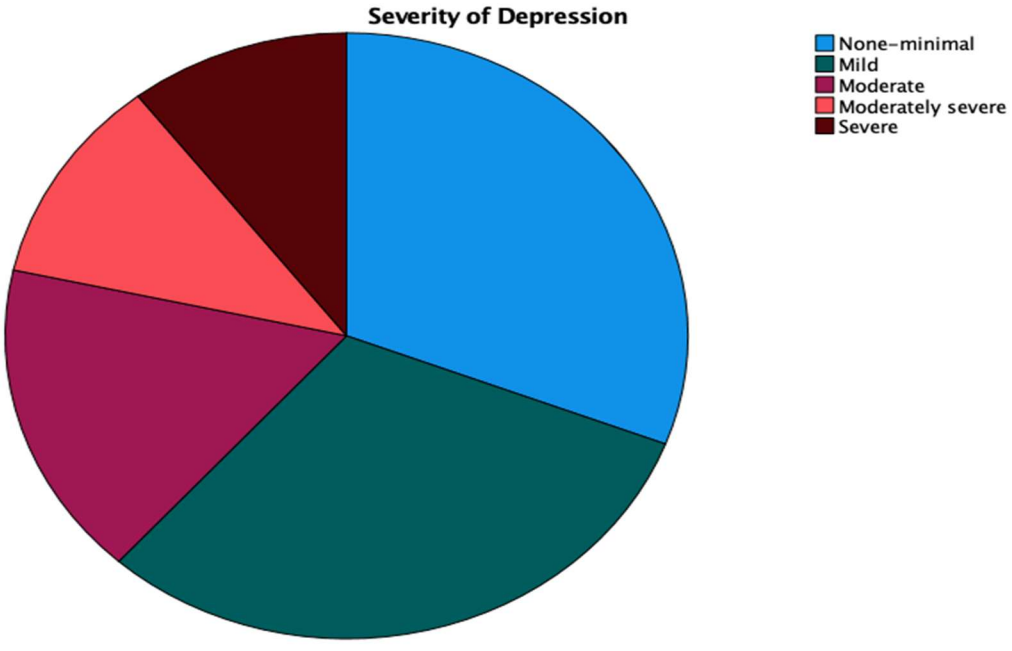

Figure 2 Prevalence of Depression

Table 10 Correlation between the time of Surgery and Severity of Depression

		Severity of Depression					
		None-minimal	Mild	Moderate	Moderately severe	Severe	Total
Surgery Time	Within the past year	44	37	23	14	12	130
		25.6%	21.5%	13.4%	8.1%	7.0%	75.6%
	Last 1-2 years	3	5	5	2	3	18
		1.7%	2.9%	2.9%	1.2%	1.7%	10.5%
	More than 3 years	6	11	1	3	3	24
		3.5%	6.4%	0.6%	1.7%	1.7%	14.0%
	Total	53	53	29	19	18	172
		30.8%	30.8%	16.9%	11.0%	10.5%	100.0%

p value= 0.38

Table 10 and Figure 3 shows Correlation between the time of Surgery and Severity of Depression. Most of them 75.6% (n=130) underwent surgery within the past year with 25.6% (n=44) none-minimal depression. Also, we found who did the surgery in last 1-2 years with total 10.5% (18) had 2.9% (n=5) with mild to moderate depression. Likewise, 14% (n=24) of them did the surgery for more than 3 years 6.4% (n=11) got mild depression. Which means that the relationship between them is statistically significant (P-value=0.38).

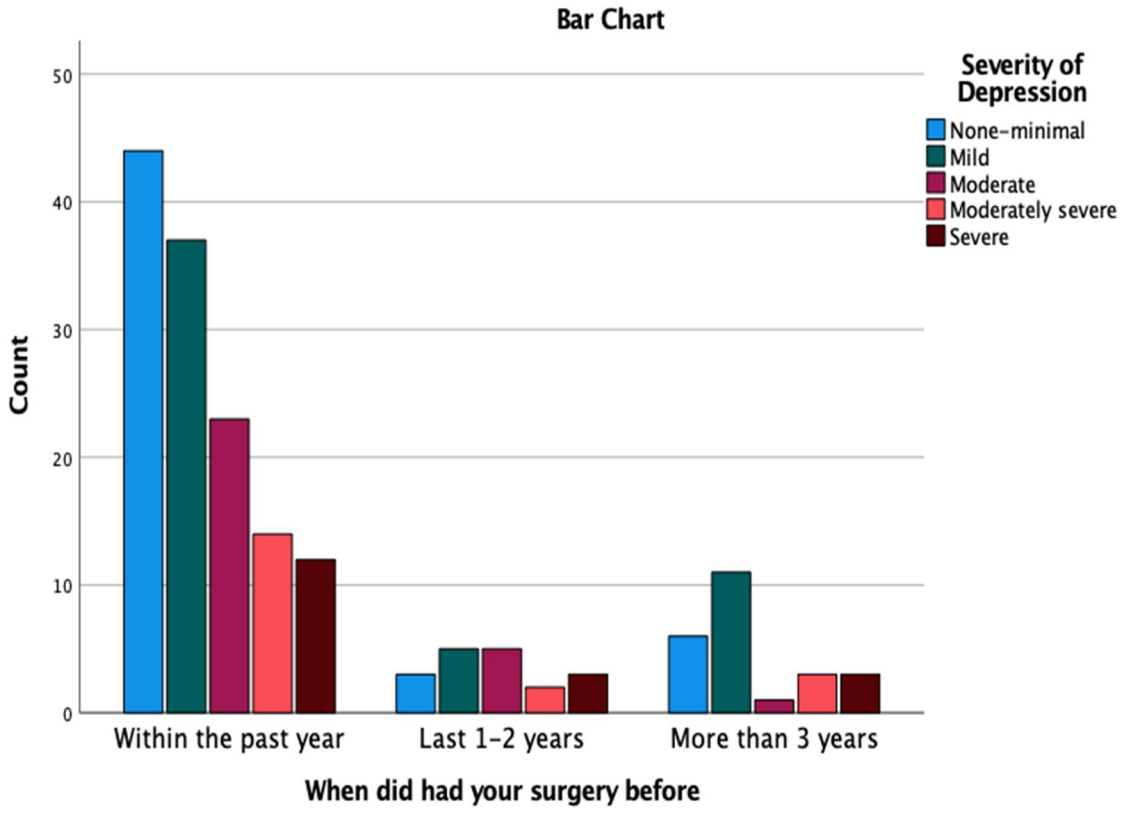

Figure 3 Correlation between the time of Surgery and Severity of Depression

4. DISCUSSION

Obesity is a major health problem that can lead to various comorbidities such as cardiovascular disease, metabolic syndrome and increased mortality. Overweight people, especially women, are more likely to suffer from emotional distress, depression, anxiety, sadness, suicidal thoughts, and poor health-related quality of life (HRQoL) (Darlow et al., 2012). Obesity is one of the major health

problems in Saudi Arabia; with an estimated 33% of adults being obese and 10% being morbidly obese (body mass index (BMI) > 40 kg/m^2). It was recently predicted that it could reach 59.5% by 2022 (Alvarez-Blasco et al., 2006).

The standard treatment for severe obesity in adults is metabolic and bariatric surgery (MBS), and studies focused on safety, weight loss, and resolution of comorbidities after MBS show similar favorable outcomes in adolescents and adults have been found (Al-Tulaihi et al., 2021). This study aimed to estimate the prevalence of depression after bariatric surgery among adult Saudi women in Riyadh in 2022. This study showed a relationship between the timing of surgery and the severity of depression, most of whom had surgery within the past year and who accounted for the majority of non-minimal depression.

We also found that people who had surgery in the past 1-2 years had mild to moderate depression. Similarly, the person who had the surgery more than 3 years later developed mild depression. This is consistent with studies conducted at KSA, in which most of the patients undergoing surgery in their first and second years developed mild depression, and two years and older developed mild depression had an outbreak. The severity of depression relative to surgical time remains relatively constant, ranging from mild to moderate (Al-Tulaihi et al., 2021).

This similarity of findings relates to patient responses from both a health and personal perspective. According to previous studies and ours, one of the most commonly documented post-obesity complications is vitamin D deficiency, which appears to be involved in depression requires regular re-examination by a nutritionist. It is clear that obese women are more likely to develop chronic diseases such as diabetes and heart disease. This is consistent with a US study of high health literate respondents who believed that obesity as a personal health problem was associated with increased diabetes risk perceptions and heart disease risk perceptions (Darlow et al., 2012).

These results also highlight that obese women are often diagnosed with polycystic ovary syndrome. This is similar to a study conducted in Spain where a total of 113 women were tested and 32 were diagnosed with her PCOS. Female participants may be less aware of the health risks associated with obesity and unhealthy diets. Reducing female obesity requires targeting overweight women and providing health advice to help them lose weight.

The study showed that most complications after bariatric surgery were minor, but only minor complications such as abdominal pain, vomiting, diarrhea, shortness of breath, and malnutrition were noted. This is very much in line with studies conducted in the United States that showed that only a few percent of patients with complications were readmitted within 30 days. Causes were nausea, vomiting, fluid, electrolyte, and nutrient depletion, followed by abdominal pain, anastomotic leakage, and bleeding (Berger et al., 2018).

Bariatric surgery can be performed in several types of procedures that are considered generally safe and pose little risk to the patient. This study showed that the prevalence of depression in patients after bariatric surgery ranged from none, minimal, and mild depression, with very few moderate to severe depression. A study conducted at KSA found that very few people are completely free of symptoms of depression, most people are mildly depressed, mildly depressed, or moderately or very few patients had major depression (Al-Tulaihi et al., 2021).

The prevalence of depression in patients after bariatric surgery was either none, mild or moderate. This is related to patients' attitudes that they developed better self-esteem when they reached targets of normal or even lower BMI after surgery. This indicates that this is similar to studies conducted at his KSA, where the majority said his BMI preoperatively was between 36 and 40, and the majority of his postoperative BMI said "don't know". This is in contrast to a study conducted at KSA, where the majority postoperative BMI was 28.3 ± 8.1 (Alsubaie et al., 2021).

Preoperative BMI was in approximately the same range in both studies and most patients undergoing bariatric surgery must have a preoperative BMI >30 to undergo surgery. Differences between the two postoperative BMI studies relate to patient commitment to postoperative instructions such as diet, exercise, and regular follow-up. Most women from age 28 to age 38 had no or minimal severity of depression. This is consistent with a study conducted at KSA, where most depression in men and women was between the ages of 30 and 39 (Sait et al., 2016).

In both studies, the majority of women with no or minimal depression were between the ages of 28 and 39 years. This is because they tried various weight loss methods and either these methods were not effective or they developed health problems related to weight problems. In this study, the severity of depression in married patients was mostly mild. It turned out to be depression. This is in contrast to a study conducted in Saudi Arabia, where few married women developed mild depression (Sait et al., 2016). This difference in depression severity among married women was influenced by several factors, including social factors or self-acceptance surrounding women.

5. CONCLUSION

It was concluded in this study that the majority of the participants was diagnosed with PCOS who had the surgery within the past year and got minimal depression with no other complications. There was significant statistical relation between the age and depression.

Ethical Considerations

The ethical approval of the IRB (IRB06-06022022-12) in Al-Maarefa University, College of Medicine was fulfilled before the start of the data collection. The aim of this study was clarified to the participants of this study and the data was kept confidential.

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Authors' contribution

All authors had substantial contribution to the paper, SMA and SSA and JSS designed the study and prepared the proposal. ABH analyzed and interpreted data. QAA wrote results. LSA and LSA wrote discussion. ABH checked the paper from plagiarism and did proofreading. KIM checked and revised every step of this paper. All authors critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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