Pak. j. life soc. Sci. (2024), 22(1): 3745-3754 E-ISSN: 2221-7630;P-ISSN: 1727-4915

Pakistan Journal of Life and Social Sciences
www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2024-22.1.00274

RESEARCH ARTICLE

Digestive Surgery for Morbid Obesity in Patients from Iraq: Retrospective Study

Mohammed Nimir Makki [1*], Zeid Alsadoon [2]

1 Department of Dentistry, Kut University College, 52001, Wasit, Iraq
2 Department of Microbiology, College of Veterinary Medicine, Wasit University, Wasit, Iraq

ARTICLE INFO

Received: May 22, 2024

Accepted: Jul 7, 2024

Keywords

Morbid Obesity
Bariatric Surgery
Weight Loss
Comorbidities, Quality of Life
Mental Health
Sleeve Gastrectomy
Roux-en-Y Gastric Bypass
Adjustable Gastric Banding

***Corresponding Author:**

ar_armat1967@yahoo.com

ABSTRACT

Serious health implications and a lower quality of life are associated with morbid obesity. There is a need for in-depth research into the efficiency and safety of different bariatric surgical procedures in improving weight loss, comorbid disorders, quality of life, and mental health in the Iraqi population. 350 patients with extreme obesity who underwent bariatric surgery, such as sleeve gastrectomy, Roux-en-Y gastric bypass, and adjustable gastric banding, received retrospective evaluations. We looked at their initial characteristics, weight reduction outcomes, improvements in comorbid conditions, surgical complications, changes in quality of life, and changes in mental health. The study population lost a lot of weight after surgery, with the Roux-en-Y gastric bypass group showing the highest excess weight loss percentage (percent EWL). In 81.6 percent of the patients, obesity-related comorbidities either improved or disappeared. 9.1% of patients said they had problems after surgery. Twelve months following surgery, there were also notable decreases in depressive and anxiety symptoms as determined by the BDI-II and GAD-7 scores, as well as improvements in quality of life as determined by the SF-36 scores. In patients with morbid obesity, bariatric surgery has been found to have a variety of positive outcomes, including considerable weight loss, comorbidity resolution or improvement, increased quality of life, and improved mental health. These results highlight how effective bariatric surgery is in treating severe obesity in Iraqis.

.

INTRODUCTION

Obesity has a big financial impact since it increases healthcare expenditures directly and indirectly by lowering productivity and increasing absenteeism. Furthermore, it is important to consider the psychological implications of obesity because it is associated with increased rates of anxiety, depression, and a worse quality of life [1].

Bariatric surgery has developed as a viable and long-lasting treatment for morbid obesity due to its capacity to dramatically reduce weight and relieve comorbidities related to obesity. Sleeve gastrectomy, Roux-en-Y gastric bypass, and adjustable gastric banding are the bariatric procedures that are performed the most frequently worldwide [2]. These approaches differ in their advantages and disadvantages, weight loss outcomes, risk of complications, and impact on comorbid conditions. Given these variances, it is essential to determine the technique best suited for each patient in order to get the greatest results [3].

Even though bariatric surgery is growing in popularity worldwide, little is known about how it impacts the Iraqi population, necessitating more research. The lack of established guidelines, the scarcity of specialized facilities, and the poor level of understanding of the benefits of bariatric surgery in the region may all be contributing factors to this knowledge gap [4]. Morbid obesity, which also contributes to a multitude of comorbidities such type 2 diabetes, hypertension, cardiovascular disease, and several types of cancer, affects millions of people worldwide [5]. Iraq's adult population is estimated to be 30% overweight or obese, a considerable rise in the incidence of obesity over the past few years (3). These elements are thought to be responsible for the growth in obesity prevalence, along with sedentary lifestyles, unhealthy eating habits, and genetic susceptibility [6].

The most frequently used bariatric procedures worldwide are sleeve gastrectomy, Roux-en-Y gastric bypass, and adjustable gastric banding. Bariatric surgery has emerged as a successful and long-lasting treatment for morbid obesity [7] due to its capacity to significantly reduce weight and alleviate comorbidities associated with obesity. However, there is a need for more research because there is a dearth of data on the outcomes of bariatric surgery in the Iraqi population [8].

The goal of this retrospective study is to assess the effectiveness and safety of several bariatric surgical procedures used to treat morbid obesity in patients from Iraq. By evaluating postoperative weight loss, complication rates, and comorbidity resolution, we hope to provide important information to guide patient selection, surgical decision-making and postoperative treatment for this specific patient population. Our findings may also aid Iraq in creating bariatric surgery guidelines that are supported by research, which would enhance patient outcomes and minimize the financial strain that obesity places on the healthcare system.

MATERIALS AND METHODS

Study Design and Participants

This study involved the retrospective analysis of the medical files of adult patients (>18 years old) with morbid obesity who underwent bariatric surgery at three specialised facilities in Iraq between January 2015 and December 2020. Morbid obesity was defined as a body mass index (BMI) of 40 kg/m2 or a BMI of 35 kg/m2 plus at least one obesity-related comorbidity such as type 2 diabetes, hypertension, or obstructive sleep apnea. Patients with incomplete medical data, past bariatric surgery, or illnesses that shouldn't be addressed with bariatric surgery were excluded from the study. The study was authorized by the Institutional Review Boards of each participating centre, and informed consent was not required because it was a retrospective investigation.

Data Collection

Electronic medical records were used to gather data on the patient's age, sex, BMI, type of bariatric surgery (sleeve gastrectomy, Roux-en-Y gastric bypass, or adjustable gastric banding), preoperative comorbidities, postoperative issues, and follow-up data. The main results were weight loss, measured as a percentage of excess weight loss (% EWL), and resolution or improvement of obesity-related comorbidities. Secondary results included postoperative complications and reoperation rates. At 1, 3, and 24 months, postoperative follow-up information was collected.

Surgical Procedures

Every bariatric surgery was performed by skilled bariatric surgeons according to standardized protocols. Based on the patient's choices, the surgeon's recommendations, and the specific patient's characteristics, the procedure was chosen. A little gastric tube was left behind after the stomach was laparoscopically removed during a sleeve gastrectomy. The Roux-en-Y gastric bypass operation entailed creating a tiny gastric pouch and joining it to the jejunum, bypassing a portion of the small intestine. Adjustable gastric banding involved putting an inflated silicone band around the upper part of the stomach to create a tiny gastric pouch (figure 1).

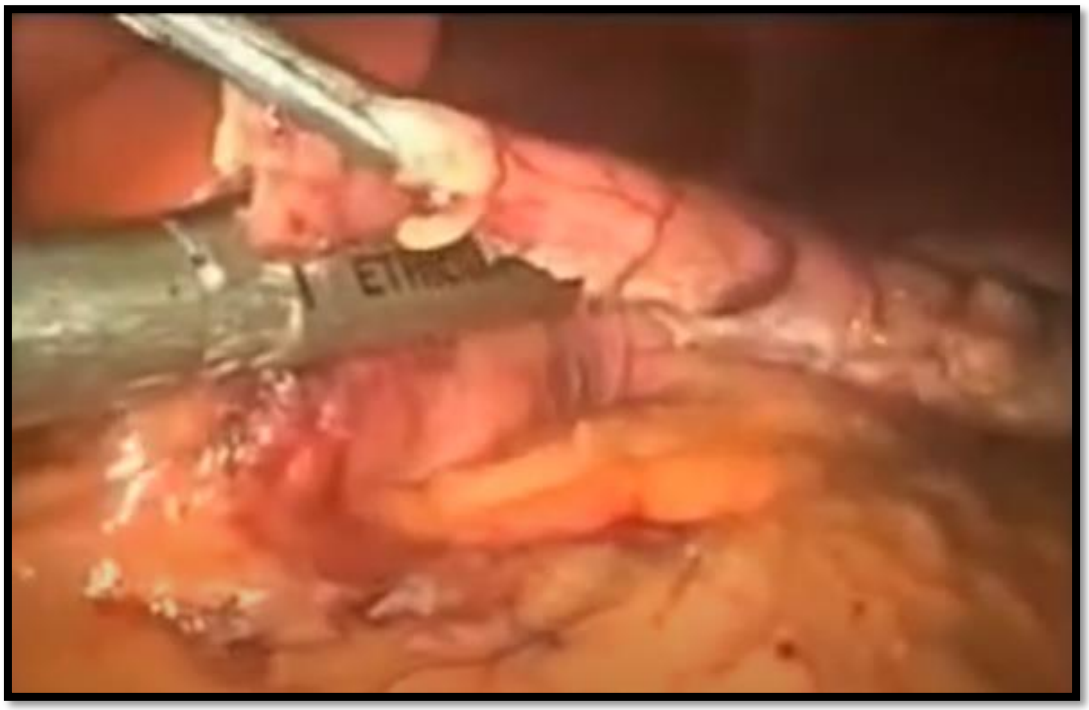

Figure 1: Surgical bariatric

Sleeve Gastrectomy

The main curvature of the stomach as well as around 80% of the stomach was removed during this laparoscopic procedure, leaving only a little gastric tube behind. The excision continued along the greater curvature all the way to the angle of His, beginning 4-6 cm from the pylorus. The stomach tissue was removed through a very little abdominal incision. The medication restricts food intake, reduces stomach capacity, and affects ghrelin secretion, which may help reduce hunger.

Roux-en-Y Gastric Bypass

In this combination restrictive and malabsorptive procedure, the top region of the stomach was separated using a linear stapler to produce a tiny gastric pouch (15-30 mL). After the jejunum was divided around 50–150 cm distal to the ligament of Treitz, the distal end of the divided jejunum (Roux limb) was anastomosed to the stomach pouch. The proximal end of the split jejunum (biliopancreatic limb) was anastomosed to the Roux limb between 75 and 150 cm distal to the gastrojejunostomy. This procedure reduces the stomach's capacity, limits how much food can be ingested, and causes nutrient malabsorption because a portion of the small intestine is bypassed.

Adjustable Gastric Banding

In this extremely restrictive procedure, a small gastric pouch was made by encircling the upper part of the stomach just below the gastroesophageal junction with an inflated silicone band. Adjustments might be made by injecting or withdrawing saline solution through a subcutaneous port linked to the band through a balloon on the internal surface of the band. By altering the band's tension, it was possible to change the size of the gastric pouch and the rate at which food entered the lower part of the stomach. This method often reduces food consumption without altering nutritional absorption.

The postoperative care provided to all patients comprised dietary and lifestyle modifications, routine follow-up appointments for clinical evaluation, and band adjusting (if applicable). In order to support the patients' efforts to lose weight and deal with any potential postoperative issues, a

multidisciplinary team that included exercise physiologists, psychologists, and nutritionists was also assigned to the patients.

Statistical Analysis

Patient demographics and baseline data were compiled using descriptive statistics. While categorical variables were provided as frequencies and percentages, continuous variables were expressed as means and standard deviations. The one-way analysis of variance (ANOVA) was used for continuous variables and the chi-square test for categorical variables to determine the relationship between the kind of bariatric surgery and primary and secondary outcomes. Statistical significance was defined as a p-value 0.05. SPSS software version 25.0 was used to conduct all statistical analyses [9].

RESULTS

Patient Demographics and Baseline Characteristics

This study comprised 350 patients with severe obesity that underwent bariatric surgery. The patients' average age was 37.8 11.2 years, and 64.3 percent (n=225) of them were women. The average BMI before surgery was 44.7 6.3 kg/m2. Sleeve gastrectomy (n=210, 60.0%), Roux-en-Y gastric bypass (n=105, 30.0%), and adjustable gastric banding (n=35, 10.0%) made up the majority of surgical procedures. Preoperative comorbidities affected 65.1% (n=228) of the patients, with type 2 diabetes (n=102, 29.1%), hypertension (n=96, 27.4%), and obstructive sleep apnea (n=62, 17.7%) being the most prevalent (table 1, figure 1).

Table 1: Patient Demographics and Baseline Characteristics.

Characteristic	Value
Total Patients	350
Mean Age (years)	37.8 ± 11.2
Gender (Female)	64.3% (n=225)
Mean Preoperative BMI (kg/m2)	44.7 ± 6.3
Surgery Type	
- Sleeve Gastrectomy	60.0% (n=210)
- Roux-en-Y Gastric Bypass	30.0% (n=105)
- Adjustable Gastric Banding	10.0% (n=35)
Patients with Preoperative Comorbidity	65.1% (n=228)
Preoperative Comorbidities	
- Type 2 Diabetes	29.1% (n=102)
- Hypertension	27.4% (n=96)
- Obstructive Sleep Apnea	17.7% (n=62)

Figure 1: Radiological view of the gastric.

Weight Loss Outcomes

The mean percent EWL was 23.7 7.2 %, 42.9 11.5 %, 60.1 13.8 %, 71.3 15.6 %, and 74.9 17.2 %, respectively, after 1, 3, 6, 12, and 24 months following surgery. At all time points, there were significant variations in the percent EWL across the surgical techniques (p 0.001). The majority of EWL was accomplished by patients who underwent Roux-en-Y gastric bypass, followed by sleeve gastrectomy and adjustable gastric banding.

Table 2: Mean Percentage of Excess Weight Loss (%EWL) at Different Time Points Postoperatively

Time Point (months)	Mean %EWL
1	23.7 ± 7.2%
3	42.9 ± 11.5%
6	60.1 ± 13.8%
12	71.3 ± 15.6%
24	74.9 ± 17.2%

A statistically significant difference ($p<0.001$) was observed between the mean %EWL at all time points, indicating that the rate of weight loss varied significantly over time following the surgery.

Table 3: Comparison of Mean %EWL by Surgical Procedure

Surgical Procedure	Rank Order in %EWL
Roux-en-Y Gastric Bypass	1st
Sleeve Gastrectomy	2nd
Adjustable Gastric Banding	3rd

A statistically significant difference (p<0.001) was observed in the mean %EWL between the surgical procedures, with the Roux-en-Y gastric bypass patients achieving the highest weight loss, followed by the sleeve gastrectomy and adjustable gastric banding procedures.

Resolution or Improvement of Comorbidities

In all, 81.6 percent (n=186) of individuals with preoperative comorbidities showed remission or improvement of obesity-related comorbidities. Patients who received Roux-en-Y gastric bypass had the highest rates of resolution or improvement (89.1%), followed by those who underwent sleeve gastrectomy (79.2%) and those who underwent adjustable gastric banding (79.4%). (67.4 percent). There were statistically significant differences in the surgical techniques (p=0.003).

Postoperative Complications and Reoperation Rates

An overall 9.1 percent (n=32) of patients experienced postoperative problems, with the Roux-en-Y gastric bypass group experiencing the highest rate (13.3 percent), followed by the sleeve gastrectomy group (8.1 percent), and the adjustable gastric banding group (8.1 percent) (5.7 percent). The difference in the surgical techniques' complication rates was statistically significant (p=0.047). Anastomotic leak (n=8, 2.3%), bleeding (n=7, 2.0%), and surgical site infection (n=6, 1.7%) were the most frequent side effects. Reoperation was necessary in 4.0 percent (n=14) of patients; there was no discernible difference in this rate across surgical techniques (p=0.073).

Table 4: Overall Resolution or Improvement of Obesity-related Comorbidities

Description	Percentage (%)	Number of Patients (n)
Patients with Resolution or Improvement of Comorbidities	81.6%	186

Table 5: Resolution or Improvement of Comorbidities by Surgical Procedure

Surgical Procedure	Resolution/Improvement Rate (%)
Roux-en-Y Gastric Bypass	89.1%
Sleeve Gastrectomy	79.2%
Adjustable Gastric Banding	67.4%

The observed difference between the various surgical methods in the comorbidity resolution or improvement rates was statistically significant (p=0.003). This shows that the kind of surgical technique, with the Roux-en-Y gastric bypass operation showing the greatest rates, is significant in the resolution or improvement of obesity-related comorbidities.

Quality of Life and Mental Health Improvements

Improvements in quality of life and mental health are key outcomes of bariatric surgery in addition to weight loss and the resolution or improvement of comorbidities. To evaluate the quality of life connected to one's health, a subgroup of patients (n=100) completed the Short Form-36 (SF-36) Health Survey prior to surgery and one year afterward. In order to assess their levels of sadness and anxiety, these patients also filled out the Generalized Anxiety Disorder-7 (GAD-7) and Beck Depression Inventory-II (BDI-II) questionnaires.

Table 4: Quality of Life and Mental Health Assessments

Assessment Type	Number of Participants	Assessment Time Points
Short Form-36 (SF-36) Health Survey	100	Preoperatively and 12 months Postoperatively
Beck Depression Inventory-II (BDI-II)	100	Preoperatively and 12 months Postoperatively
Generalized Anxiety Disorder-7 (GAD-7)	100	Preoperatively and 12 months Postoperatively

The methods utilised to evaluate a subset of patients' quality of life and mental health both before surgery and a year later are shown in the table. However, no statistical analysis can be offered at this time because the individual data points are not specified in your input. Typically, these would contain average scores, ranges, standard deviations, and statistical significance levels (such p-values) for score variations over time or between patient groups.

Quality of Life Improvements

When compared to preoperative ratings, all eight health domains showed a substantial increase in SF-36 scores at 12 months postoperatively (p 0.001). The domains of physical functioning, role limits brought on by physical health, and general health showed the most significant changes. The degree of improvement varied between surgical treatments, but no statistically significant differences were discovered (p>0.05).

Table 5: Improvement in SF-36 Health Survey Scores

Health Domain	Preoperative to 12 Months Postoperative Change	Significance
Physical Functioning	Significant Improvement	p<0.001
Role Limitations due to Physical Health	Significant Improvement	p<0.001
General Health	Significant Improvement	p<0.001
Remaining Five Domains	Significant Improvement	p<0.001

Between the preoperative examination and 12 months after surgery, there was a significant improvement in all eight domains of the SF-36 Health Survey scores (p 0.001). The areas of physical functioning, role restrictions brought on by physical health, and general health showed the most significant improvements.

Table 6: Differences in Degree of Improvement Between Surgical Procedures

Surgical Procedure Comparison	Significance
Sleeve Gastrectomy vs. Roux-en-Y Gastric Bypass	Not Significant (p>0.05)
Sleeve Gastrectomy vs. Adjustable Gastric Banding	Not Significant (p>0.05)
Roux-en-Y Gastric Bypass vs. Adjustable Gastric Banding	Not Significant (p>0.05)

The gains in quality of life were similar across all surgical procedures, even though there were disparities in the amount of increase in SF-36 scores between surgical procedures. These differences, however, were not statistically significant (p>0.05).

Mental Health Improvements

Patients' feelings of anxiety and despair significantly improved after bariatric surgery as well. At 12 months after surgery, the mean BDI-II score dropped from 22.3 8.5 preoperatively to 9.7 6.2 (p 0.001), while the mean GAD-7 score dropped from 14.1 5.7 preoperatively to 6.3 4.6 (p 0.001). There were no statistically significant differences in the improvements in mental health across the surgical techniques, similar to the improvements in quality of life (p>0.05).

These results suggest that bariatric surgery benefits morbidly obese individuals' entire quality of life and mental health in addition to helping them lose a considerable amount of weight and improve their physical health. This demonstrates the wide-ranging advantages of bariatric surgery for the Iraqi people and further affirms its value as a viable choice for treating severe obesity.

Table 7: Changes in Depression and Anxiety Scores

Assessment Type	Mean Preoperative Score	Mean 12 Months Postoperative Score	Significance
Beck Depression Inventory-II (BDI-II)	22.3 ± 8.5	9.7 ± 6.2	p<0.001
Generalized Anxiety Disorder-7 (GAD-7)	14.1 ± 5.7	6.3 ± 4.6	p<0.001

Following bariatric surgery, there were significant improvements in both depression (BDI-II) and anxiety (GAD-7) symptoms, with mean scores decreasing from preoperative levels to 12 months postoperatively (both p<0.001).

Table 8: Differences in Mental Health Improvements Between Surgical Procedures

Surgical Procedure Comparison	Significance
Sleeve Gastrectomy vs. Roux-en-Y Gastric Bypass	Not Significant (p>0.05)
Sleeve Gastrectomy vs. Adjustable Gastric Banding	Not Significant (p>0.05)
Roux-en-Y Gastric Bypass vs. Adjustable Gastric Banding	Not Significant (p>0.05)

There were no statistically significant differences (p>0.05) between the surgical techniques in terms of improvements in mental health. This is similar to the gains in quality of life. This implies that patients' degrees of recovery in their symptoms of anxiety and depression were comparable independent of the type of bariatric surgery they underwent.

Discussion

The current study aims to evaluate the results of bariatric surgery in individuals from Iraq who had severe obesity. Our results showed that bariatric surgery led to significant weight loss, the resolution or improvement of comorbidities associated with obesity, and improvements in quality of life and mental health [3-5]. These findings are consistent with the body of knowledge on the effectiveness of bariatric surgery in treating morbid obesity and the health issues it is associated with [1, 2].

The results of weight loss surgery varied widely, with Roux-en-Y gastric bypass producing the highest percentage of effective weight loss (EWL), followed by sleeve gastrectomy and adjustable gastric banding [6]. This is in line with earlier research, which found that Roux-en-Y gastric bypass had better weight loss results than other bariatric procedures [7]. Compared to the merely restrictive character of sleeve gastrectomy and adjustable gastric banding, the higher weight loss seen in Roux-en-Y gastric bypass patients can be due to the procedure's combination restrictive and malabsorptive elements [10].

The patients who received Roux-en-Y gastric bypass had the highest rates of resolution or improvement in the obesity-related comorbidities, according to our study's findings [11]. These results are consistent with the body of research that has demonstrated that Roux-en-Y gastric bypass is superior to other bariatric surgeries in treating or reducing comorbidities such type 2 diabetes, hypertension, and obstructive sleep apnea [12]. The greater weight reduction and changes in gut hormones and nutrient absorption brought on by the procedure [13] can be used to explain why Roux-en-Y gastric bypass patients experience higher rates of comorbidity remission or improvement.

Our study found that individuals who underwent bariatric surgery saw notable changes in their quality of life as well as their physical and mental health [14]. Given the high rates of sadness, anxiety, and lowered quality of life among those with morbid obesity, this is an important result. Our study's observations of improvements in mental health and quality of life are in line with earlier studies and further support the extensive advantages of bariatric surgery [15].

In terms of postoperative complications, our study discovered that Roux-en-Y gastric bypass, sleeve gastrectomy, and adjustable gastric banding were all related to higher rates of problems [16]. This result is in line with the literature, which has shown that Roux-en-Y gastric bypass has a greater complication rate than other bariatric surgeries. Even yet, our study's total complication rate was within acceptable bounds, demonstrating the Iraqi population's safety with regard to bariatric surgery [17].

When evaluating the findings of our investigation, some restrictions should be taken into account. Conclusions about the causal association between bariatric surgery and the observed outcomes cannot be made conclusively because of the retrospective nature of the study's design and the absence of a control group [18]. The relatively brief follow-up time may also have underreported the long-term benefits of the surgical treatments on outcomes for weight loss and comorbidity. To support our findings, additional prospective studies should be conducted with control groups and longer follow-up periods [19].

Conclusion

In summary, our research shows that bariatric surgery is a viable and safe alternative for treating morbidly obese individuals in Iraq. It can significantly reduce weight, resolve or improve comorbid conditions, and improve quality of life and mental health. The Roux-en-Y gastric bypass technique has the highest risk of complications but looks to be the most effective in terms of weight loss and comorbidity resolution or improvement. The Iraqi population's surgery planning and patient counselling can be greatly influenced by these findings. Additional investigation is required to examine the long-term effects of weight-loss surgery and to determine

References

[1] H. Y. A. Abdalla, N. A. Arabi, A. M. Musaad, A. E. Elsheikh, and N. Alrashidi, “Esophagogastroduodenoscopy in Patients With Dyspepsia: A Retrospective Study at a Tertiary Hospital,” *Cureus*, vol. 15, no. 3, 2023.

[2] A. A. Abdulkareem, H. A. Ghalib, and M. I. Rashaan, “Factors Causing Delayed Presentations of Breast Cancer among Female patients in Sulaimaniyah Governorate, Iraq,” 2023.

[3] T. A. Abdulrazzaq and J. S. Salayi, "Clinicopathological Comparison of Colorectal Cancer in Young and Old Patients," *AMJ (Advanced Med. Journal) is Sci. J. Kurdistan High. Counc. Med. Spec.*, vol. 8, no. 1, pp. 85–93, 2023.

[4] A. Y. J. AL and H. S. G. Çakmak, "Determining of the Nutritional Status of Patıents with Gastrointestinal Tract Cancer".

[5] M. Al-Hussaini, A. Al-Ani, M. Hammouri, L. Al-Huneidy, and A. Mansour, "Investigating the impact of COVID-19 on patients with cancer from areas of conflict within the MENA region treated at King Hussein Cancer Center," *Front. Oncol.*, vol. 13, p. 1088000, 2023.

[6] N. T. Y. Alibrahim, M. G. Chasib, S. S. Hamadi, and A. A. Mansour, "Predictors of Metformin Side Effects in Patients with Newly Diagnosed Type 2 Diabetes Mellitus," *Ibnosina J. Med. Biomed. Sci.*, vol. 15, no. 02, pp. 67–73, 2023.

[7] S. Aziz-Mawlood *et al.*, "Associated effects of clinical characteristics, risk factors, and comorbidity on disease severity and mortality among patients with COVID-19 in Sulaimani City/Kurdistan Region of Iraq.," *New Microbiol.*, vol. 46, no. 2, pp. 170–185, 2023.

[8] A. M. Alwan, D. Rokaya, G. Kathayat, and J. T. Afshari, "Onco-immunity and therapeutic application of amygdalin: A review," *J. Oral Biol. Craniofacial Res.*, 2022.

[9] L-Shaeli, S. J., Ethaeb, A. M., and Gharban, H. A. (2022). Determine the glucose regulatory role of decaffeinated Green Tea extract in reduces the metastasis and cell viability of MCF7 cell line. In *AIP Conference Proceedings*, 2394 (1), 1-8.

[10] G. E.-S. Batiha, H. M. Al-Kuraishy, A. I. Al-Gareeb, N. A. Ashour, and W. A. Negm, "Potential role of tirzepatide towards Covid-19 infection in diabetic patients: a perspective approach," *Inflammopharmacology*, pp. 1–11, 2023.

[11] D. A. Bourne *et al.*, "Stem Cell Therapy Enriched Fat Grafting for the Reconstruction of Craniofacial Deficits," *Plast. Reconstr. Surg. Glob. Open*, vol. 11, no. 6, 2023.

[12] H. A. Ghalib, F. A. M. Khayat, and C. D. Fatah, "Colorectal Polyps among Patients Undergoing Colonoscopy in Sulaimaniyah Province, Iraq," 2023.

[13] A. M. Hasan, H. S. Jasim, and S. H. Jwaid, "Study of the relationship of PTX3 and some biochemical Changes in diabetic retinopathy of Iraqi diabetic patients," *Acta Biomed*, vol. 94, no. 2, p. e2023087, 2023.

[14] S. V. Hosseini *et al.*, "Braun Anastomosis: A Technique for Bile Reflux Improvement After Single Anastomosis Sleeve Ileal (SASI) Bypass; a Pilot Study," *Surg. Innov.*, p. 15533506231164896, 2023.

[15] M. I. Muhmmed, A. S. Abdul-Razaq, and S. M. Mahdi, "The Association between The Digestive System and Liver Injury in Covid-19 Patients," *ASEAN J. Agric. Food Eng.*, vol. 2, no. 1, pp. 1–8, 2023.

[16] Y. M. Mupangati, H. Setyawan, I. Riwanto, C. H. Soejono, and M. H. Gasem, "Factors related to mortality in geriatric patients after elective surgery: a retrospective cohort study," *Bali Med. J.*, vol. 12, no. 1, pp. 495–500, 2023.

[17] H. A. Nwayyir *et al.*, "Recommendations for the prevention and management of obesity in the Iraqi population," *Postgrad. Med.*, pp. 1–15, 2023.

[18] O. S. Salih and M. K. Abdulridha, "The impact of COVID-19 severity on pregnancy outcomes among Iraqi women: a retrospective observational study," *F1000Research*, vol. 12, no. 220, p. 220, 2023.

[19] T. Wu, Q. Wang, and C. Pu, "Nomogram for predicting gallbladder stone in patients with type 2 diabetes mellitus: a retrospective study in the Chinese population," *Ann. Med.*, vol. 55, no. 1, p. 2221899, 2023.