

Common Physiological and Psychological Problems Among Post-Bariatric Surgery Patients

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Abstract

Bariatric surgery now is considered the most effective solution of morbid obesity or obesity with associated medical conditions. Despite bariatric surgery could provide a significant weight loss, a considerable portion of patients does not achieve relevant outcomes, in terms of limited weight loss or weight regain due to physical and psychological problems. **Aim:** the study aimed to identify the common physiological and psychological problems among post-bariatric surgery patients. **Setting:** The study was conducted at the Surgical Outpatient Clinics of the Medical Research Institute, Alexandria University, Egypt. **Subjects:** Data was collected from 150 adult patients who underwent bariatric surgeries and divided into 3 equal groups 50 patients each according to the postoperative period. **Tool:** One tool including 3 parts was used to collect the necessary data: Post bariatric surgery patients' assessment structured interview schedule. **Results:** Regarding the most common physiological problems, the majority of the studied patients had GIT problems such as nausea, emesis, dumping syndrome and abdominal fullness during the first four months postoperatively with significant statistical relations with the postoperative period where $p = (0.000, 0.000, 0.008, \text{ and } 0.010)$ respectively. Also, 64.0% of patients complained of fatigue during the (9 – 12 months) postoperatively with statistically significant relation as $p = 0.000$. Additionally, the majority of the studied patients had dermatological problems as dry skin and hair loss during the (9 – 12 months) postoperatively as ($p = 0.000, \text{ and } 0.000$ respectively) and impaired physical activity as ($p = 0.004$). Psychological problems were identified such as anxiety disorders during the (9 – 12 months) period among 72.0% of patients with significant statistical relations where $p = 0.000$. **Conclusion:** Identification of the physiological and psychological conditions of patients post bariatric surgery are highly needed to achieve appropriate post-bariatric surgery outcomes for a long time. **Recommendation:** Replication of the study on large probability sampling.

Keywords: Physiological problems, psychological problems, post bariatric surgery.

Introduction

Obesity had been a medical disaster which has begun to be the focus of several studies in recent years. It is a pathological condition characterized by accumulation of excessive adipose tissue. It is often assessed by body mass index (BMI) value, and it is among one of the major risk factors for many disorders such as cardiovascular disorders and cancer. Obesity could negatively affect all body systems and increase the risk for hypertension, diabetes mellitus, arthritis, sleep apnea, asthma, poor self-esteem, depression, and limited personal relationships. Patients with obesity are highly susceptible to develop one or more of the medical disorders associated with obesity which is called comorbid medical problems (Larson, 2021)

It had been estimated in 2018 that increasing morbidity and mortality due to obesity associated with reduced life expectancy which could lead to almost 3 million deaths worldwide. While, in 2021 the rate increased to be about 4.7 million premature deaths occurred annually due to obesity. It was ranked among the fifth leading preventable causes of death. According to the World Health Organization (WHO years ??), Egypt ranks 18th with the highest prevalence of obesity worldwide. In addition, the economic burden imposed by obesity is around 62 billion Egyptian pounds annually. This value is the cost of treating diseases attributable to obesity among adults. (Sharon 2017, Zafar and Ismail 2018, Aboulghate, 2021)

Management of obesity has demanded efforts by professionals involved in its treatment including nurses, medical staff, and other health professionals to find new alternatives of treatment. Recent guidelines for management of obesity recommended primary prevention, dietary changes, behavior modifications, medications, and bariatric surgery. In this context, bariatric surgery began to be considered as the most effective alternative to treat obesity. It could be suggested when other weight loss methods had been tried and failed. Bariatric surgery is today the most effective therapy for inducing long-term weight loss and for reducing comorbidity burden and mortality rate among patients with severe obesity (Mainra et al, 2019, Bettini et al, 2020)

Bariatric treatment is a term used for the surgical treatment of severe overweight or morbid obesity. Nearly, about 196,000 bariatric procedures were done worldwide each year. It includes several surgical procedures commonly divided into two main types. The most commonly performed types of bariatric surgeries are restrictive and malabsorptive. Restrictive surgical procedures include sleeve gastrectomy (SG), Roux-en-Y gastric bypass (RYGB), and laparoscopic adjustable gastric band (LAGB), whereas malabsorptive includes biliopancreatic diversion with duodenal switch (BPD/DS). The mechanisms through which bariatric surgery work include restriction of food intake, malabsorption of food calories, an increase in metabolic rate, decreased hunger, increased satiety, and a variety of other hormonal mechanisms. Basically diminished amount of food intake post bariatric surgery is the main key of weight loss during the first 6 months because bariatric surgery is a procedure that makes changes to the digestive system to help lose weight by limiting how much patient could eat or by reducing the absorption of nutrients, or by using both mechanisms. The indications of bariatric surgery are used for patients with BMI greater than 40; BMI between 35 and 40 associated with significant comorbidity such as hypertension, diabetes mellitus, degenerative joint disease or arthritis, and sleep apnea (Calcaterra et al, 2021, Ann, 2020)

Benefits of bariatric surgery not only include significant and prolonged weight loss but also marked improvements among the comorbidities which associated with obesity and patients'

quality of life. Also, bariatric surgery may decrease risk of several types of cancer, such as non-Hodgkin lymphoma, breast, and endometrial cancer among women. Moreover, risk of gastric, colon, rectum, liver, gallbladder, pancreas, kidney, and thyroid cancer could be reduced. In addition, other positive outcomes of bariatric surgery include improvement of comorbidities such as type 2 diabetes mellitus, hypertension, sleep apnea and dyslipidemia, sexual functioning, and increase of activity. As regards the association between type 2 diabetes mellitus and obesity, it could be expected that blood sugar control would be improved as a result of bariatric surgery. In addition, psychological benefits of bariatric surgery include remission of depression and anxiety symptoms (Alison et al, 2019, Tao et al, 2020)

On the other hand, despite weight loss as an outcome of bariatric surgery had been proven to improve patients' quality of life, unfortunately, it might lead to some physiological, social, and psychological problems. Although bariatric surgery has been increasing worldwide, it could lead to dramatic physical changes that could cause significant stress. Nonetheless, psychological factors could be a significant leading cause of inability to maintain long-term weight loss and even weight regain. Bariatric surgery is generally safe and effective; however it could be associated with devastating complications, some of which may be fatal if not addressed quickly. As a matter of fact, bariatric surgery results in permanent alteration of a patient's gastrointestinal anatomy, which might lead to several restrictions especially in restrictive bariatric surgery. Moreover, malabsorptive bariatric surgery might affect nutritional status of the patients, which might also exist preoperatively, regardless of patients' BMI. Therefore, assessment of patient's nutritional, cardiopulmonary and psychological status might be important parameters in decision making and treatment planning. (Dumon & Daniel, 2019)

Furthermore, several studies had been found that physiological and psychological condition could influence success in weight reduction after bariatric surgery during the first year postoperatively. In fact psychosocial disorders sometimes occur as a result of extreme obesity, and so patients post bariatric surgery usually become vulnerable for these disorders. Numerous

studies emphasized that about one-third of post bariatric surgery patients could develop post bariatric surgery disorders, which had greater difficulty with weight loss after surgery. This could be the reason that some patients post bariatric surgery may fail to lose excess weight, whereas others could regain weight during the first few years' period post-surgery. (Joshua et al, 2020, Nawfal et al, 2021)

Furthermore, patients undergoing bariatric surgery should be assessed prior to and following the surgery by professional nurse working in bariatric surgery field. Bariatric nurse practitioner plays an important role in caring of patients pre- and post-bariatric surgery. This could be achieved through assessing patient's problems and providing planned effective care. So, the main focus of bariatric nurses is to provide continuity of care for the patient by using the nursing process, through which the nurse collaborates with the patient to identify early his or her health problems. (Puplampu et al, 2021)

Identifying health problems of post bariatric surgery patients is the nurse responsibility and considered an integral part of nursing practice. The interaction between patient and nurse is so important for the implementation of a weight loss program to maintain subsequent weight loss beside the early detection of health-related post-bariatric surgery problems. Patients post bariatric surgery require support from bariatric nurses so that they could recognize the common problems and perform the appropriate postsurgical lifestyle adjustments in order to manage the patient's weight. (Sharon, 2017, Schlottmann et al, 2018 and Conceição et al, 2020)

This study aimed to:

Identify the common physiological and psychological problems among post-bariatric surgery patients.

Research Questions:

What are the Common physiological and psychological problems among post-bariatric surgery patients?

Materials and Method

Materials:

Research design:

A descriptive research design was utilized to conduct the present study.

Setting:

The present study was conducted at the Surgical Outpatient Clinics Department of the Medical Research Institute Hospital, Alexandria University, Egypt.

Subjects:

A convenient sample of 150 adult patients who underwent bariatric surgeries, selected from patients showing up for follow up at the surgery clinic of the above mentioned setting. In order to assess physiological and psychological problems of patients in different periods post bariatric surgery. The study sample was divided into 3 equal groups (50 patients each) according to the postoperative period as follows:

- 1- The first group from one week till the first 4 months (1-4 months) postoperatively.
- 2- The second group comprised patients in the second 4 months (5-8 months) postoperatively.
- 3- The third 4 months group from (9 to 12) months postoperatively.

In order to estimate the sample size EPI INFO program was used using the following parameters:

1. Population size = 380 for 3 months.
2. Expected frequency = 50%
3. Acceptable error = 5%
4. Confidence co-efficient = 95%
5. Minimum sample size = 130

The patients were selected according to the following inclusion criteria:

- Post bariatric adult male and female patients aged 20- 60 years old.
- Patients with controlled chronic diseases.

Tool of the study: One tool was used to collect the necessary data.

Tool: Post bariatric surgery patients' assessment structured interview schedule.

This tool was developed by the researchers after reviewing the recent related literatures (Chang et al 2018, Valina et al 2019, Ann 2020, Meyer et al 2021 and Nawfal et al 2021) to obtain the necessary data. It included two main parts as following:

Part I: Patients' socio-demographic characteristics and clinical data sheet:

- This part was designed to obtain patients' socio-demographic data such as age, gender, level of education, occupation, marital status, and area of residence.
- Patient's clinical data such as smoking, body mass index, type of bariatric surgery, comorbid conditions such as D.M, hypertension, dyslipidemia and arthritis, past medical and surgical history, previous diet and exercise regimen, laboratory investigations, post-operative success of weight reduction and previous history of psychological problems such as anxiety, depression and eating disorders.

Part II: Post Bariatric Surgery patients' physiological assessment structured interview schedule:

This questionnaire was developed by the researchers after reviewing the related literatures and aimed to assess the necessary data about common physiological problems experienced by patients post bariatric surgery. This part included comprehensive assessment of the different body systems to evaluate post bariatric surgery patients for physiological problems.

The Global Physical Activity Questionnaire GPAQ: It was adapted from WHO 2021 and used to detect impaired physical activity. It was composed of 4 items as follows; activities at work, moving to and from places, recreational activity and sedentary behavior which had total of 16 questions about the time spend by patients doing different types of physical activities. Responses were given a score as "yes=1" and "no=zero" then the total score was calculated and categorized into patients having impaired physical activity for score from 8-16 or not having impairment if the total score from 0-8.

Physiological problems related assessment consisted of eight items as follows:

- Gastrointestinal system (nausea, emesis, dumping syndrome, and sensation of abdominal fullness).
- Cardiovascular system (abnormal pulse or blood pressure, abnormal capillary refill and fatigue).

- Musculoskeletal system (pain or tenderness, limited range of motion of joints and impaired physical activity).
- Endocrine system (hypoglycemia and abnormal thyroid hormones).
- Integumentary system (flaky nails, dry skin and hair loss).
- Elimination problems (constipation, diarrhea and urination problems).
- Sleeping problems (sleeping hours, insomnia or hypersomnia).
- Laboratory investigations abnormalities (hemoglobin, albumin, calcium, and vitamin D).

Part III: Post Bariatric Surgery patients' psychological assessment structured interview schedule:

This part was developed by the researchers after reviewing the related literatures and aimed to assess the necessary data about patients' psychological condition to identify common psychological problems post bariatric surgery. It is comprised of four main items as follows:

- 1- **Eating Disorders Questionnaire** which consisted of 25 closed ended questions adapted from (Bethany and Christina, 2022) It covered general information about eating disorders such as having desire to have full stomach, control over the amount of food intake, eating during activity, eating secretly, eating large amount of food in a meal and eating during emotional stress.
- 2- **Anxiety Disorders Questionnaire** which consisted of 22 closed ended questions adapted from (Lori and Christina, 2022) It included questions regarding physical symptoms of anxiety such as feeling of accelerated heart rate, GIT disturbances, dyspnea, excessive sweating.....etc also questions about feeling like fear of unknown, fear of death, feeling of unreality, excessive nervousness, mood changes and worry.

Scoring system:

Post bariatric surgery patients answers of the questionnaires regarding eating and anxiety disorders were scored on a five-point Likert scale ranging from "always (3 scores)", "sometimes (2 scores)", "little (1 score)" or "never (zero score)". The total score was then calculated and

converted into percentage scores. Total percentage scores of $\geq 60\%$ was categorized as having the disorder, while scores of $< 60\%$ implied don't have it.

- 1- Guilt feeling associated with eating was assessed by asking patients about having any guilt feeling associated with eating or not.
- 2- Body image satisfaction in which every patient was asked to state whether satisfied or not.

Method:

1. An official permission was secured from the study setting administrative staff to carry out the study.
2. The study tool was developed then revised by five experts in the fields of Medical Surgical Nursing and Surgery to test the tool for content validity, completeness and clarity of the items, and the necessary modifications were carried out accordingly.
3. Reliability of the tool was tested using Cronbach's Alpha Coefficient Test ($= 0.87$) which indicated that, the tool was reliable.

Ethical considerations:

- An official approval was obtained from The Research Ethics Committee of faculty of nursing, Alexandria University for carrying out this study.
 - The purpose of the study was explained to all the studied patients, and their approval and readiness to be included in the study were obtained initially before participation.
 - All patients were assured about the patients' privacy and data confidentiality to participate in the study.
 - The recruited patients were informed that participation in the study is voluntary, and they can withdraw at any time.
5. A pilot study was initially carried out on 15 patients prior to the actual data collection to assess the clarity and applicability of the tool and to identify the difficulties that may be encountered during data collection also to estimate time needed to fill in the study tools. Those patients were excluded from the study sample.

6. Data collection:

Data was collected during the period between August 2022 till June 2023 and the following steps were considered:

Patient's personal interview:

- a. It was conducted throughout the patients' visits for follow up at the Outpatient Surgery Clinics for a period between 15-20 minutes scheduled patients' interview.
- b. The studied patients' socio-demographic and clinical data were initially obtained using **part I** of the study tool.
- c. Taking history about subjective problems such as nausea, vomiting, and any abnormal elimination and sleeping. Also the patients were assessed for dumping syndrome through taking history about its signs and symptoms, feeling of abdominal cramping, fast heartbeat, lightheadedness, sweating and diarrhea post 10 to 30 minutes after meal.
- d. Patients were physically and psychologically assessed using **part II and III** of the study tool to screen for the presence of physiological and psychological post bariatric problems, including the following items of assessment:

1- Perform comprehensive assessment using physical examination techniques, for example:

- a. Inspection of skin for dryness, scalp for hair loss and nails for capillary refill or any abnormality.
- b. Abdominal examination as palpation for distension.
- c. Manipulation of joints into full range of motion to assess for any abnormality such as, tenderness or limited range of motion.
- d. Measuring vital signs (pulse and blood pressure).
- e. Assessment of physical activity using GPAQ.

2-Anthropometric measurements:

- Patients' weight in kilograms and height in square meter were measured using the clinic's scale and BMI was calculated.
- BMI was estimated to determine patient's success of surgery as regards weight

reduction. The success of weight reduction was recognized by a BMI less than 30 Kg/ M².

- Accordingly, patients with BMI more than 30 Kg/ M² were considered failed to have weight reduction.

3- Psychological assessment: every patient was assessed using eating disorders and anxiety disorders tests and given a total score by which these disorders were categorized as present or not. Also patients were asked about satisfaction about their body images and whether satisfied or not and had guilt feeling accompanied with eating or not.

4- Review of patient's medical record:

It was done in order to collect data about patient's preoperative BMI, scheduled preoperative weight loss regimen and associated medical diseases.

In addition the patient's medical records of postoperative visits were reviewed in order to obtain the necessary data such as type of bariatric surgery, previous surgery or diet regimen, results of laboratory investigations, and associated medical or psychological disorders.

3- Follow up using telephone calling.

Statistical analysis:

- Data was fed to the computer and analyzed using IBM SPSS software package version 20.0 (Patel, 2021).
- Qualitative data were described using numbers and percentages.
- Categorical variables were summarized by frequency and percent.
- The Chi-square test was used to study significant association between two categorical variables. Fisher's exact and Monte-Carlo tests were used if more than 20% of total expected cell counts <5
- All statistical tests were judged at P value ≤ 0.05 significance level.

Results

Table (1) Distribution of the studied Patients Post-bariatric surgery According to their Socio-demographic and Clinical Data:

This table shows that the highest percentage of studied patients were female, in the age group

(20 < 35 years old) and married (82.0 %, 46.0%, 62.0%) respectively. In relation to the patients' level of education, residence, and occupation, it could be noticed that the highest percentage of them had university education, from urban and occupied (36.7%, 87.3%, 56.0%) respectively. Additionally the table showed that, the majority of the studied patients had restrictive type of surgery, had associated GIT disorders and had previous diet regimen (94.7%, 29.3 % and 93.3 % respectively). Regarding success of weight reduction, the highest percentage of studied patients (80.7%) had success in weight reduction. Concerning previous psychological problems, it could be noticed that more than half of the studied patients (56.7%) had anxiety disorders.

Table (2): showed distribution of the studied patient's post-bariatric surgery according to their physiological problems during the three postoperative periods.

Concerning GIT problems the table showed that the majority of the studied patients who had nausea, emesis, dumping syndrome and abdominal fullness were during the first 4 months postoperative (72.0%, 70.0%, 72.0% and 72.0% respectively). It could be noticed that all GIT problems had statistical significant relations with postoperative period where p = 0.000, 0.000, 0.008, and 0.010 respectively. As regards cardiovascular problems this table showed that nearly two thirds of the studied patients (64.0%) complained of fatigue during the (9– 12 months) postoperative period with statistically significant relation as p = 0.000. In relation to dermatological problems it could be noticed that the majority of the studied patients had dry skin and hair loss during the (9– 12 months) postoperative period (66.0%, and 68.0%) respectively. Also it can be noticed that previously mentioned dermatological problems had statistically significant relations with postoperative period where p = 0.000 and 0.000 respectively. Regarding the musculoskeletal problems this table reveals that the majority of the studied patients (78.0%) had impaired physical activity during (9– 12 months) postoperative period. Also, this table showed that there were statistically significant relations between musculoskeletal problems and postoperative period where p = 0.004. The

table also reveals that the majority of the studied patients had suffered from hypoglycemia and abnormal lab investigations such as calcium and vitamin D during the (9–12 months) postoperative period (70.0%, 74.0%, and 86.0%) respectively. Statistically significant relations were found between hypoglycemia and abnormal levels of calcium and vitamin D lab investigations and postoperative period where $p = 0.004$, 0.000 and 0.000 respectively.

Table (3) Distribution of the Studied Patients Post-bariatric surgery According to Their Psychological Problems during the Three Postoperative Period: The table illustrated that the highest percentage of studied patients (72.0%) had anxiety disorders during the (9 – 12 months) postoperative period. Additionally the table showed that there was a statistically significant relation between anxiety disorders and postoperative period where $p = 0.000$.

Table (4): Relation between Socio-Demographic and Clinical Characteristics of the Studied Patients Post-Bariatric Surgery and Post-operative Gastrointestinal Problems: It showed that the highest percentages of the studied post-bariatric patients who had the nausea, dumping syndrome and abdominal fullness were females (64.2%, 89.5% and 75.5% respectively). The same results were found regarding urban residence (64.2%, 73.9%, 79.2% and 71.5% respectively) and patients who had previous history of dietary regimen. As regards patients' age, nearly half of them who had GIT problems were in the age group (45-60) years old (51.3%, 45.6%, 43.7% and 50.9% respectively). On the other hand, it could be noticed that there were statistically significant relations between age and nausea as well as emesis where $p = 0.027$ and 0.002 respectively. Furthermore, this table showed also that surgery type and associated medical disorders had statistically significant relations with nausea and emesis where $p = 0.016$ and 0.001 respectively.

Table (5): Relation between Socio-Demographic and Clinical Characteristics of the Studied Patients Post-Bariatric Surgery and Post-operative Dermatological Problems:

This table showed that the majority of the studied post-bariatric patients who had dermatological problems were females (78.9%, 66.6%, and 66.7% respectively). The same results were found regarding restrictive type of surgery (73.6%, 83.4%, and 82.3% respectively) and patients who had previous history of dietary regimen. As regards patients' age, (52.7%) who had flaky nails, dryness of skin (40.5%) and hair loss (48.9%) were in the age group (45-60, $35 < 45$ and $20 < 35$ years old respectively). This table also revealed that there were statistically significant relations between age with flaky nails and dryness of skin where $p = 0.027$ and 0.002 respectively. Furthermore, this table showed that surgery type and associated medical disorders had statistically significant relations with flaky nails and dryness of skin where $p = 0.016$ and 0.000 respectively.

Table (6) Relation between Socio-Demographic and Clinical Characteristics of the Studied Patients Post-Bariatric Surgery and Post-operative Musculoskeletal Problems: illustrated that the majority of the studied post-bariatric patients who had musculoskeletal problems were females (93.8%, 77.1%, and 63.2% respectively). The same results were found regarding urban residence, restrictive type of surgery, and in patients who had previous history of dietary regimen. As regards patients' age, the majority of them (80.0%) had limited joint ROM and nearly half of them (48.4%) had impaired physical activity were in the age group (45-60) years old, accompanied with statistically significant relations where $p = 0.013$ and 0.027 respectively. This table also showed that there were statistically significant relations between residence, occupation, and limited ROM where $p = 0.023$ and 0.036 respectively.

Table (7): Relation between Socio-Demographic and Clinical Characteristics of the Studied Patients Post-Bariatric Surgery and Post-operative Psychological Problems: This table showed that there was statistically significant relation between anxiety disorders and female gender where $p = 0.006$, in addition, more than three quarters of anxiety disorders among the studied patients (78.5%) were found in females. Furthermore, this table revealed that there were statistically significant relations between anxiety disorders and occupation as well as associated medical

disorders where $p = 0.008$ and 0.039 respectively. It could be noticed also, that the majority of patients (71.5%) who suffered from post bariatric anxiety disorders had previous anxiety as a history of preoperative

psychological problem. In addition, there was statistically significant relation between anxiety disorders and patients who had previous history of anxiety where $p = 0.026$.

Table (1): Distribution of the studied Patients Post-bariatric surgery According to Socio-demographic and Clinical Data (n =150)

Socio-demographic and clinical data	No.	%
Gender		
Male	27	18.0
Female	123	82.0
Age		
20 < 35	69	46.0
35 < 45	45	30.0
45 – 60	36	24.0
Marital status		
Married	93	62.0
Single	45	30.0
Divorced	12	8.0
Educational status		
Illiterate	38	25.3
Primary	21	14.0
Secondary	36	24.0
University	55	36.7
Residence		
Urban	131	87.3
Rural	19	12.7
Occupation		
Occupied	84	56.0
Not-occupied	66	44.0
Surgery type		
Restrictive	142	94.7
Malabsorptive	8	5.3
Medical disorder associated		
No	63	42.0
GIT	44	29.3
Cardiovascular	19	12.7
Endocrine	24	16.0
Previous surgery		
Yes	110	73.3
No	40	26.7
History of diet regimen		
Yes	140	93.3
No	10	6.7
Successful weight reduction		
Yes	121	80.7
No	29	19.3
Smoking		
Yes	17	11.3
No	133	88.7
Follow up		
Yes	91	60.7
No	59	39.3
History of psychological problems		
Eating disorder	7	4.6
Anxiety disorder	85	56.7
Depression	15	10.0
No	43	28.7

Table (2): Distribution of the Studied Patients Post-Bariatric surgery According to Their Physiological Problems during the Three Postoperative Periods (n =150)

Physiological Problems	Postoperative Period						Statistical test (P value)
	1- 4 months N=(50)		5 - 8 months N=(50)		9- 12 months N=(50)		
	No.	%	No.	%	No.	%	
1) GIT problems:							$X^2= 21.628$ (0.000)*
Nausea							
Yes	36	72.0	3	6.0	0	0.0	
No	14	28.0	47	94.0	50	100.0	
Emesis							$X^2=11.818$ (0.000)*
Yes	35	70.0	9	18.0	2	4.0	
No	15	30.0	41	82.0	48	96.0	
Dumping syndrome							$X^2=6.234$ (0.008)*
Yes	36	72.0	7	14.0	5	10.0	
No	14	28.0	43	86.0	45	90.0	
Abdominal fullness sensation							$X^2=5.691$ (0.010)*
Yes	36	72.0	8	16.0	5	10.0	
No	14	28.0	42	84.0	45	90.0	
2) Cardiovascular problems:							FET=1.494 (0.506)
Abnormal pulse rate							
Yes	0	0.0	3	6.0	0	0.0	
No	50	100.0	47	94.0	50	100.0	
Abnormal blood pressure							FET=0.448 (0.891)
Yes	7	14.0	2	4.0	0	0.0	
No	43	86.0	48	96.0	50	100.0	
Fatigue							$X^2=21.660$ (0.000)*
Yes	10	20.0	8	16.0	32	64.0	
No	40	80.0	42	84.0	18	36.0	
Abnormal capillary refill							FET=1.327 (0.605)
Yes	1	0.2	2	4.0	0	0.0	
No	49	98.0	48	96.0	50	100.0	
Dermatological problems:							$X^2=2.679$ (0.282)
Flaky nails							
Yes	0	0.0	7	14.0	12	24.0	
No	50	100.0	43	86.0	38	76.0	
Dry skin							$X^2=29.845$ (0.000)*
Yes	0	0.0	9	18.0	33	66.0	
No	50	100.0	41	82.0	17	34.0	
Hair loss							$X^2=13.279$ (0.000)*
Yes	2	4.0	9	18.0	34	68.0	
No	48	96.0	41	82.0	16	32.0	
Musculoskeletal problems:							$X^2=0.672$ (0.792)
Pain or tenderness							
Yes	0	0.0	10	20.0	6	12.0	
No	50	100.0	40	80.0	44	88.0	
Limited joints' range of motion							FET=0.759 (0.424)
Yes	12	24.0	4	0.8	19	38.0	
No	38	76.0	46	92.0	31	62.0	
Impaired physical activity							$X^2=11.310$ (0.004)*
Yes	22	44.0	7	14.0	39	78.0	
No	28	56.0	43	86.0	11	22.0	
3) Endocrine problems:							$X^2=11.580$ (0.004)*
Hypoglycemia							
Yes	9	18.0	6	12.0	35	70.0	
No	41	82.0	44	88.0	15	30.0	

Physiological Problems	Postoperative Period						Statistical test (P value)
	1- 4 months N=(50)		5 - 8 months N=(50)		9- 12 months N=(50)		
	No.	%	No.	%	No.	%	
Abnormal thyroid hormones							X ² =0.672 (0.792)
Yes	10	20.0	8	16.0	7	14.0	
No	40	80.0	42	84.0	43	86.0	
4) Elimination problems:							FET=0.759 (0.424)
Constipation							
Yes	7	14.0	0	0.0	4	8.0	
No	43	86.0	50	100.0	46	92.0	
Diarrhea							X ² =2.679 (0.282)
Yes	11	22.0	5	10.0	8	16.0	
No	39	78.0	45	90.0	42	84.0	
Abnormal urination							-----
Yes	0	0.0	0	0.0	0	0.0	
No	50	100.0	50	100.0	50	100.0	
Sleeping problems:							FET=1.899 (0.508)
Yes	4	8.0	2	4.0	0	0.0	
No	46	92.0	48	96.0	50	100.0	
Laboratory investigations:							X ² =4.696 (0.107)
Hemoglobin							
Abnormal	17	34.0	9	18.0	18	36.0	
Normal	33	66.0	41	82.0	32	64.0	
Albumin							FET=3.969 (0.170)
Abnormal	4	8.0	0	0.0	2	4.0	
Normal	46	92.0	50	100.0	48	96.0	
Calcium							FET=14.856 (0.000)*
Abnormal	0	0.0	0	0.0	37	74.0	
Normal	50	100.0	50	100.0	13	26.0	
Vitamin D							FET=19.905 (0.000)*
Abnormal	0	0.0	2	4.0	43	86.0	
Normal	50	100.0	48	96.0	7	14.0	

Table (3): Distribution of the Studied Patients Post-Bariatric Surgery According to Their Psychological Problems during the Three Postoperative Period (n =150)

Psychological Problems	Postoperative Period						Statistical test (P value)
	1- 4 months N=(50)		5 - 8 months N=(50)		9- 12 months N=(50)		
	No.	%	No.	%	No.	%	
Eating disorders							X ² =4.924 (0.110)
Yes	5	10.0	3	6.0	10	20.0	
No	45	90.0	47	94.0	40	80.0	
Guilt feeling associated with eating							FET=3.969 (0.170)
Yes	0	0.0	3	6.0	14	28.0	
No	50	100.0	47	94.0	36	72.0	
Anxiety disorders							X ² =10.606 (0.000)*
Yes	4	8.0	2	4.0	36	72.0	
No	46	92.0	48	96.0	14	28.0	
Body image satisfaction							FET=1.867 (0.535)
Not satisfied	2	4.0	2	4.0	4	8.0	
Satisfied	48	96.0	48	96.0	46	92.0	

Table (4): Relation between Socio-Demographic and Clinical Characteristics of the Studied Patients Post-bariatric Surgery and Post-operative Gastrointestinal Problems (n =150)

Socio-demographic and clinical data	Nausea		Emesis		Dumping syndrome		Abdominal fullness	
	Yes No (%)	No No (%)	Yes No (%)	No No (%)	Yes No (%)	No No (%)	Yes No (%)	No No (%)
Gender								
Male	14(35.8)	13(11.7)	24(52.2)	3(2.9)	5(10.5)	22(21.6)	12 (24.5)	15 (14.9)
Female	25(64.2)	98(88.3)	22(47.8)	101(97.1)	43(89.5)	80(78.4)	37(75.5)	86(85.1)
FET (P)	0.511 (0.365)		1.000 (0.476)		0.786 (0.524)		0.412 (0.232)	
Age								
20 < 35	9(23.0)	60(54.0)	13(28.3)	56(53.9)	14(29.2)	55(53.9)	11(22.5)	58(57.5)
35 < 45	10(25.7)	35(31.5)	12(26.1)	33(31.8)	13(27.1)	32(31.5)	13(26.6)	32(31.7)
45 – 60	20(51.3)	16(14.5)	21(45.6)	15(14.3)	21(43.7)	15(14.6)	25(50.9)	11(10.8)
χ^2 (P)	6.378 (0.027)*		9.521 (0.002)*		2.950 (0.253)		1.169 (0.561)	
Residence								
Urban	25(64.2)	106(95.4)	34(73.9)	97(93.2)	38(79.2)	93(91.2)	35(71.5)	96(95.1)
Rural	14(35.8)	5 (4.6)	12(26.1)	7(6.8)	10(20.8)	9(8.8)	14(28.5)	5(4.9)
FET (P)	1.000 (0.633)		0.530 (0.319)		0.102 (0.082)		0.528 (0.292)	
Occupation								
Occupied	28(71.8)	56(50.5)	25(54.4)	59(56.7)	35(72.9)	49(48.1)	36(73.5)	48(47.6)
Not-occupied	11(28.2)	55(49.5)	21(45.6)	45(43.3)	13(27.1)	53(51.9)	13(26.5)	53(52.4)
χ^2 (P)	0.622 (0.430)		0.037 (0.848)		0.037 (0.848)		0.142 (0.706)	
Smoking								
Yes	12(30.8)	5(4.6)	12(26.0)	5 (4.9)	10(20.8)	7 (6.9)	9(18.4)	8 (7.8)
No	27(69.2)	106(95.4)	34(74.0)	99(95.1)	38(79.2)	95(93.1)	40(81.6)	93(92.2)
FET (P)	0.217 (0.641)		0.412 (0.289)		0.177 (0.145)		0.311 (0.146)	
Surgery type								
Restrictive	32(82.1)	110(99.1)	38(82.7)	104(100.0)	42(87.5)	100(98.0)	43(87.8)	99(98.1)
Malabsorptive	7(17.9)	1(0.9)	8(17.3)	0(0.0)	6(12.5)	2 (2.0)	6(12.2)	2 (1.9)
χ^2 (P)	5.758 (0.016)*		0.628 (0.418)		1.000 (0.582)		1.000 (0.561)	
Medical disorder								
No	4(10.5)	59(53.2)	4(8.7)	59(56.8)	12(25.0)	51(50.0)	11(22.5)	52(51.5)
GIT	14(35.8)	30(27.1)	31(67.4)	13(12.5)	27(56.2)	17(16.7)	28(57.1)	16(15.7)
Cardiovascular	14(35.8)	5 (4.6)	9(19.5)	10(9.7)	4(8.4)	15(14.8)	5(10.2)	14(13.9)
Endocrine	7(17.9)	17(15.1)	2(4.4)	22(21.0)	5(10.4)	19(18.5)	5(10.2)	19(18.9)
FET (P)	4.524 (0.200)		11.282 (0.001)*		0.805 (0.882)		0.862 (0.854)	
History of diet regimen								
Yes	34(87.2)	106(95.4)	34(74.0)	76(73.0)	40(83.4)	100(98.0)	41(83.7)	99(98.1)
No	5(12.8)	5(4.6)	12(26.0)	28(27.0)	8(16.6)	2(2.0)	8(16.3)	2(1.9)
FET (P)	1.000 (0.757)		0.685 (0.545)		0.432 (0.457)		1.000 (0.812)	

Table (5): Relation between Socio-Demographic and Clinical Characteristics of the Studied Patients Post-Bariatric Surgery and Post-operative Dermatological Problems (n =150)

Socio-demographic and clinical data	Flaky nails		Dry skin		Hair loss	
	Yes No (%)	No No (%)	Yes No (%)	No No (%)	Yes No (%)	No No (%)
Gender						
Male	4 (21.1)	23(17.5)	14(33.4)	13(12.0)	15(33.3)	12(11.5)
Female	15(78.9)	108(82.5)	28(66.6)	95(88.0)	30(66.7)	93(88.5)
FET (P)	0.511 (0.365)		1.000 (0.476)		0.786 (0.524)	
Age						
20 < 35	5(26.3)	64(48.9)	13(31.0)	56(51.9)	22(48.9)	47(44.8)
35 < 45	4(21.0)	41(31.3)	17(40.5)	28(26.0)	16(35.5)	29(27.6)
45 – 60	10(52.7)	26(19.8)	12(28.5)	24(22.1)	7(15.6)	29(27.6)
X ² (P)	6.378 (0.027)*		9.521 (0.002)*		2.950 (0.253)	
Residence						
Urban	15(78.9)	116(88.5)	34(81.0)	97(89.9)	36(80.0)	95(90.5)
Rural	4(21.1)	15(11.5)	8(19.0)	11(10.1)	9(20.0)	10 (9.5)
FET (P)	1.000 (0.633)		0.530 (0.319)		0.102 (0.082)	
Occupation						
Occupied	8(42.1)	76(58.1)	29(70.0)	55(51.0)	35(77.8)	49(46.7)
Not-occupied	11(57.9)	55(41.9)	13(30.0)	53(49.0)	10(22.2)	55(53.3)
X ² (P)	0.622 (0.430)		0.037 (0.848)		0.037 (0.848)	
Smoking						
Yes	3(15.7)	14(10.6)	10(23.9)	7 (6.5)	15(33.4)	2(1.9)
No	16(84.3)	117(89.4)	32(76.1)	101(93.5)	30(66.6)	103(98.1)
FET (P)	0.217 (0.641)		0.412 (0.289)		0.177 (0.145)	
Surgery type						
Restrictive	14(73.6)	128(97.7)	35 (83.4)	107(99.1)	37 (82.3)	105(100.0)
Malabsorptive	5(26.4)	3 (2.3)	7 (16.6)	1 (0.9)	8 (17.7)	0 (0.0)
X ² (P)	5.758 (0.016)*		0.628 (0.418)		1.000 (0.582)	
Medical disorder						
No	4(21.0)	59(45.1)	10(23.9)	53(49.0)	15(33.4)	48(45.8)
GIT	7(36.9)	37(28.2)	26(62.0)	18(16.7)	15(33.4)	29(27.6)
Cardiovascular	6(31.5)	13(9.9)	4(9.6)	15(13.9)	9(20.0)	10(9.5)
Endocrine	2(10.6)	22(16.8)	2(4.5)	22(20.4)	6(13.2)	18(17.1)
FET (P)	4.524 (0.200)		12.282 (0.000)*		0.805 (0.882)	
History of diet regimen						
Yes	14(73.6)	126(96.2)	33(78.6)	107(99.1)	42(93.4)	98(93.4)
No	5(26.4)	5(3.8)	9(21.4)	1(0.9)	3(6.6)	7(6.6)
FET (P)	1.000 (0.757)		0.685 (0.545)		0.432 (0.457)	

Table (6): Relation between Socio-Demographic and Clinical Characteristics of the Studied Patients Post-Bariatric Surgery and Post-operative Musculoskeletal Problems (n =150)

Socio-demographic and clinical data	Pain or tenderness		Limited joint ROM		Impaired physical activity	
	Yes No (%)	No No (%)	Yes No (%)	No No (%)	Yes No (%)	No No (%)
Gender						
Male	1 (6.2)	26(19.4)	8 (22.9)	19(16.5)	25 (36.8)	2(2.5)
Female	15(93.8)	108(80.6)	27(77.1)	96(83.5)	43(63.2)	80(97.5)
X ² (P)	1.675 (0.306)		0.730 (0.393)		0.643 (1.000)	
Age						
20 < 35	6 (37.4)	63 (47.0)	7 (20.0)	62(53.9)	13(19.2)	56 (68.3)
35 < 45	5 (31.3)	40 (29.9)	0 (0.0)	45 (39.2)	22(32.4)	23 (28.0)
45 – 60	5 (31.3)	31 (23.1)	28(80.0)	8 (6.9)	33 (48.4)	3 (3.7)
X ² (P)	0.683 (0.702)		6.542 (0.013)*		7.196 (0.027)*	
Residence						
Urban	15(93.8)	116 (86.6)	34(97.1)	97(84.3)	56(82.4)	75(91.5)
Rural	1 (6.2)	18 (13.4)	1 (2.9)	18 (15.7)	12 (17.6)	7 (8.5)
FET (P)	0.667 (0.695)		3.971 (0.023)*		0.521 (0.470)	
Occupation						
Occupied	7 (43.7)	77 (57.5)	25 (71.4)	59 (51.3)	46 (67.7)	38 (46.4)
Not-occupied	9 (56.3)	57 (42.5)	10 (28.6)	56 (48.7)	22 (32.3)	44 (53.6)
X ² (P)	1.091 (0.296)		4.410 (0.036)*		0.294 (0.714)	
Smoking						
Yes	0 (0.0)	17 (12.7)	3 (8.6)	14 (12.2)	11 (16.2)	6 (7.4)
No	16 (100.0)	117(87.3)	32 (91.4)	101(87.8)	57 (83.8)	76(92.6)
FET (P)	0.218 (0.131)		0.763 (0.404)		0.567 (0.326)	
Surgery type						
Restrictive	15 (93.8)	127(94.8)	34(97.1)	108(93.9)	60 (88.4)	82(100.0)
Malabsorptive	1 (6.2)	7 (5.2)	1 (2.9)	7 (6.1)	8 (11.6)	0 (0.0)
X ² (P)	1.000 (0.604)		0.682 (0.404)		0.220 (0.153)	
Medical disorder						
No	7 (43.7)	56 (41.8)	17 (48.6)	46 (40.0)	18 (26.5)	45(54.9)
GIT	4 (0.25)	40 (29.9)	9 (25.7)	35 (30.4)	17 (25.0)	27(33.0)
Cardiovascular	1 (6.2)	18 (13.4)	6 (17.1)	13 (11.3)	19 (27.9)	0 (0.0)
Endocrine	4 (0.25)	20 (14.9)	3 (8.6)	21 (18.3)	14 (20.6)	10 (12.1)
FET (P)	1.507 (0.712)		2.970 (0.399)		1.076 (0.786)	
History of diet regimen						
Yes						
No	15 (93.8)	125 (93.3)	34 (97.1)	106 (92.2)	60 (88.4)	80 (97.5)
	1 (6.3)	9 (6.7)	1 (2.9)	9 (7.8)	8 (11.6)	2 (2.5)
FET (P)	1.000 (0.711)		0.454 (0.274)		0.284 (0.174)	

Table (7): Relation between Socio-Demographic and Clinical Characteristics of the Studied Patients Post-Bariatric Surgery and Post-operative Psychological Problems (n =150)

Socio-demographic and clinical data	Eating disorders		Guilt feeling associated with eating		Body image satisfaction		Anxiety disorders	
	Yes No (%)	No No (%)	Yes No (%)	No No (%)	Yes No (%)	No No (%)	Yes No (%)	No No (%)
Gender								
Male	4 (22.2)	23(17.4)	5 (29.4)	22 (16.5)	26 (18.3)	1(12.5)	9 (21.5)	18(16.7)
Female	14 (77.8)	109(82.6)	12 (70.6)	111(83.5)	116(81.7)	7(87.5)	33(78.5)	90(83.3)
FET (P)	0.247 (0.619)		1.692 (0.193)		0.173 (0.677)		7.665 (0.000)*	
Age								
20 < 35	9 (50.0)	60 (45.5)	9 (52.9)	60 (45.1)	67 (47.2)	2(25.0)	13 (31.0)	56(51.9)
35 < 45	4 (22.2)	41 (31.0)	5 (29.4)	40 (30.1)	43 (30.3)	2(25.0)	17 (40.5)	28(26.0)
45 – 60	5 (27.8)	31 (23.5)	3 (17.6)	33 (24.8)	32 (22.5)	4(50.0)	12 (28.5)	24(22.1)
X ² (P)	0.605 (0.809)		0.525 (0.717)		2.980 (0.232)		1.001 (0.620)	
Occupation								
Occupied	8 (44.4)	76(57.6)	9 (52.9)	75 (56.4)	81(57.0)	3(37.5)	29 (70.0)	55(51.0)
Not-occupied	10 (55.6)	56(42.4)	8 (47.1)	58 (43.6)	61(43.0)	5(62.5)	13(30.0)	53(49.0)
FET (P)	1.108 (0.292)		0.703 (0.787)		1.174 (0.279)		6.612 (0.008)*	
medical disorder								
No	6 (33.3)	57(43.2)	7 (41.2)	56(42.1)	61(43.0)	2(25.0)	10 (23.9)	53 (49.0)
GIT	8 (44.4)	36(27.3)	8 (47.1)	36(27.1)	40(28.2)	4(50.0)	26 (62.0)	18 (16.7)
Cardiovascular	4 (22.2)	15(11.3)	1 (5.9)	18(13.5)	18(12.6)	1(12.5)	4 (9.6)	15 (13.9)
Endocrine	0 (0.0)	24(18.2)	1 (5.9)	23(17.3)	23(16.2)	1(12.5)	2 (4.5)	22 (20.4)
X ² (P)	7.080 (0.051)*		3.314 (0.351)		1.950 (0.555)		6.368 (0.039)*	
Successful weight reduction								
Yes	12 (66.7)	109(82.6)	14 (82.4)	107(80.5)	115(81.0)	6(75.0)	28 (66.7)	93(86.2)
No	6 (33.3)	23(17.4)	3 (17.6)	26(19.5)	27(19.0)	2(25.0)	14 (33.3)	15(13.8)
FET (P)	2.571 (0.109)		0.305 (0.852)		0.174 (0.677)		0.093 (0.760)	
History of psychological problems								
No	6 (33.3)	37 (28.0)	7 (41.2)	36 (27.1)	43 (30.3)	0 (0.0)	6 (14.3)	37 (34.3)
Eating disorder	1 (5.6)	6 (4.5)	1 (5.9)	6 (4.5)	7 (4.9)	0 (0.0)	4 (9.5)	3 (2.8)
Anxiety	6 (33.3)	79 (59.8)	5 (29.4)	80 (60.2)	83 (58.5)	2(25.0)	30 (71.5)	55 (51.0)
Depression	5 (27.8)	10 (7.7)	4 (23.5)	11 (8.3)	9 (6.3)	6(75.0)	2 (4.7)	13 (11.9)
FET (P)	3.314 (0.351)		1.174 (0.279)		1.108 (0.292)		20.781 (0.000)*	

Discussion

Bariatric surgery is the most effective way for patients with obesity to lose a significant amount of weight and see improvement in obesity-related comorbid medical conditions. It comprises a group of operative procedures designed to enhance and maintain weight reduction. It could improve quality of life, prevent a number of cancers, and decrease overall mortality.

Patients' socio-demographic characteristics and clinical data:

The main findings of the current study revealed that most of the studied post-bariatric surgery patients were females, married, within

the age between 20 to less than 35 years old, occupied and who had restrictive type of bariatric surgery. The present study also demonstrated that nearly one third of the studied patients had associated medical disorders in the GIT and also the majority of them had previous dietary regimen. These findings were supported by the finding of a study done by Meyer et al, 2021 who mentioned that they found that obesity always had been associated with multiple medical comorbidities including GIT disorders.

These findings could be justified by the fact that obesity rates are higher among female than male and so bariatric surgery rate is increased

among female as stated by the WHO statistics 2021. Additionally, more of the obese adults who are undergoing bariatric surgery are always in young adulthood because of their higher needs to have ideal body weight and image more than in middle or late adulthood. Furthermore, in a study done by Whitlock, 2021 who stated that restrictive type of bariatric surgery is safe, has minor complications and has rare death rates. This could be the reason that the most commonly performed type of bariatric surgeries is restrictive type as mentioned by Alison et al 2019 and thus the majority of studied patients in the present study underwent restrictive type of bariatric surgery. Fortunately, the findings of the present study revealed that more than three quarters of the studied post bariatric patients had successful weight reduction postoperatively which means that they have achieved the objective of bariatric surgery. This finding agrees with Alison et al 2019 who found that nearly 90 % of the studied patients in their study had an effective weight loss post-bariatric surgery. This highlights the basic and primary role of bariatric surgery in the management of obesity.

Post bariatric surgery patients' common physiological problems:

In relation to the most common physiological problems post-bariatric surgery according to the postoperative period, the current study results showed that the studied patients suffered from the physiological problems during both the first (1-4 months) and third (9-12 months) post-bariatric surgery periods. Moreover, the studied patients had GIT problems such as nausea, emesis, abdominal distention and dumping syndrome during the first 4 months. This finding is supported by several studies conducted by Chang et al 2018 and Whitlock 2021 who reported in their similar studies that most of the physical problems had started just after bariatric surgery were in the GIT and persisted for a long time. These results might be attributed to the anatomical changes caused by bariatric surgery which includes smaller stomach size and changes in the way through which food moves in the GIT.

Moreover, regarding the third 4 months period (9-12 months) post-bariatric surgery, impaired physical activity and hypoglycemia were common problems. In that context, Deborah et al 2016 and Tabesh et al 2019 mentioned that most patients undergoing bariatric surgery may suffer from some musculoskeletal problems which might affect their exercise tolerance and adherence to daily physical activity. On the contrary, Adil et al 2019 was not in agreement with this finding who had emphasized that post bariatric assessment of patient's physical activity did not show significant improvement within the first 6 months of bariatric surgery but begins to improve during the postoperative period (9- 12 months). Furthermore, in agreement with the current study findings, studies done by Abrahamsson et al 2016 and Nawfal et al 2021 who found that post-bariatric surgery hypoglycemia, was a late alteration caused as a result of dumping syndrome among the majority of patients in their similar study. They suggested that the reason for this reactive drop in blood glucose level is caused by altered GI hormones and insulin secretion in response to the rapid transit of nutrients into the jejunum.

Additionally, during the postoperative period (9- 12 months), the current study revealed that the most common physical problems were cardiovascular as fatigue, dermatological problems like dryness of skin and hair loss, and abnormal lab investigations such as low calcium and vitamin D. These might be attributed to the fact that patients after bariatric surgeries are eating fewer calories; and also getting fewer nutrients which might be due to decreased stomach size and postoperative GIT problems. That could lead to easy fatigability, loss of hair and dryness of skin due to nutritional deficiencies from shortage of the nutrients their body needs and lack of fluids intake. This agreed with studies done by Chang et al 2018 and Whitlock 2021 who found same results in their previous similar studies.

Post bariatric surgery patients' common psychological problems:

Concerning the most common psychological problems post-bariatric surgery, the results of the current study revealed that anxiety disorders had

been encountered by the studied patients during the period between 9-12 months postoperative. It might be due to many reasons such as young age of the studied patients with unrealistic fast expectation of weight loss associated to fear of inability to achieve goal of bariatric surgery. Furthermore, the presence of preoperative psychological disorders and lack of social support might delay successful weight loss and so could lead to post-bariatric psychological problems. This finding is supported by the finding of a study done by Usubini et al 2020 who found that about one-third of bariatric surgery studied patients demonstrated a psychological disturbance, such as depression and anxiety as well as a high prevalence of binge eating disorder.

Relation between socio-demographic characteristics and clinical data of the studied patients post-bariatric Surgery and the most common physiological problems:

The current study illustrated that a statistically significant relation was found between higher age group (45-60 years old) and nausea as well as emesis. It might be attributed to the physiological fact that as age increases as muscle weakness of GIT takes place through normal aging process. In addition, the results showed a statistically significant relation between patients with associated GIT medical disorders pre bariatric surgery and emesis post bariatric. It could be due to functional impairment as a result of suffering from chronic GIT disorders and long-term management by medications which may increase gastric mucosal resistance and increase risk of gastritis post bariatric surgery. Moreover, a statistically significant relation was found between age of the studied patients and dermatologic problems such as flaky nails and dry skin. Similarly, associated medical disorders had a statistically significant relation with dry skin. It could be rationalized by several factors such as normal aging process, lack of fluids intake especially post bariatric surgery because of patients' fear of abdominal distension and emesis and also nutritional deficiencies following bariatric surgery such as vitamin D that affects dermatological health condition. These findings are consistent with Whitlock 2021 who found that 39% of their studied post bariatric patients suffered from vitamin D deficiency.

On the other hand, the results of the present study revealed that there was a statistically significant relation between age and musculoskeletal problems such as limited ROM of joints and impaired physical activity. It could be justified by the effect of aging on joint health and the ability to perform activities. In addition, both residence and occupation had statistically significant relation with limited joint's ROM which might be reasoned by increased levels of fatigue among the studied patients which might be due to that the human body starts to burn unused muscle mass in order to compensate for calorie restriction as a result of bariatric surgery. Also, it could be expected that the majority of patients who had these problems were occupied and urban residents because of increased effort, responsibilities, and duties rather than non-occupied patients. This finding contradicts with Tabesh et al 2019 who emphasized that most patients undergoing bariatric surgery may suffer from some musculoskeletal problems preoperatively which by time disappear post-surgery with exercise programs and gradual improvement in physical activity in line with maintaining loss of body weight and decrease load of excess body weight on joints.

Relation between socio-demographic characteristics and clinical data of the studied post-bariatric patients and the most common psychological problems:

The current study revealed that statistically significant relation was found between anxiety disorders and female gender, occupied patients, and associated medical disorders. Furthermore, anxiety disorders post-bariatric surgery had statistically significant relation with presence of previous psychological problems in the form of anxiety preoperatively. This result might be attributed to increased stress, efforts and life burden on female patients due to increased responsibilities and in another way body image and weight might had greater importance among female rather than male patients. In this context, psychological problems especially anxiety is common because fear from unachieved weight reduction goal of surgery or weight regain post-surgery. Additionally, occupied patients with associated medical disorder could increase stressors greater than non-occupied patients. Moreover, psychological disturbances could easily happen

to patients who had already previous history of psychological disorders preoperatively.

Identifying the most common physiological and psychological problems among post-bariatric surgery patients is greatly needed for developing effective intervention programs to overcome these post-surgical consequences and achieve better postoperative successful weight reduction as well as all of the best health outcomes.

Conclusion

In conclusion, the present study findings approve that most of the studied post bariatric surgery patients had GIT problems most commonly during the first 4 months postoperative period. Dermatological problems, impaired physical activity, and abnormal laboratory investigations such as low calcium and vitamin D were noticed during the (9- 12 months) postoperatively. High statistically significant relations were found between post bariatric patients' physical and psychological problems and with the postoperative period. Additionally, statistically significant relations were found between post bariatric patients' physical and psychological problems and their socio-demographic and clinical characteristics such as age, gender, occupation, associated medical disorders and previous psychological disorders. Thus, evaluation of the physiological and psychological conditions of patients who undergoing bariatric surgery is greatly required in order to achieve the desired post-operative outcomes for a long time.

Recommendations:

Based on the study findings, the following recommendations are suggested:

- Careful postoperative nursing assessment of physiological and psychological conditions of patients post bariatric surgery is greatly important for early diagnosis and proper management as well as prevention of postoperative health problems.
- Appropriate counseling and education should be provided by bariatric nurses for post bariatric surgery patients regarding any health problems that possibly might occur and its ways of prevention.

- Further nursing studies should investigate the effect of applying program about nursing interventions of postoperative health outcomes among post bariatric surgery patients.
- Replication of the study on large probability sampling is recommended.

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