

Effect of Educational Guidelines on Postoperative Health Outcomes among Post Bariatric Surgery Patients

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Abstract:

Background: Bariatric surgeries are a class of surgical procedures that are thought to be the safest and most efficient ways to treat obesity and the disorders associated with it. **Aim:** To evaluate the effect of educational guidelines on postoperative health outcomes among post-bariatric surgery patients. **Design:** a quasi-experimental research design was used (one group, pre-posttest). **Setting:** This study was applied in the Out-Patients Surgery Clinic at Damietta University Hospital. **Sample:** Included fifty post-bariatric surgery patients using a convenient sample. **Tools:** **Tool I:** patient assessment tool, **Tool II:** Malnutrition Universal Screening System (MUSS), **Tool III:** Complications assessment sheet, and **Tool IV:** International physical activity questionnaire. **Results:** Total post-bariatric surgery patients' knowledge level distribution as regards bariatric surgery pre and post-applying educational guidelines demonstrates that 16% of the post-bariatric surgery patients had a satisfactory level of total knowledge of pre-applying educational guidelines. Compared to the intervention, this total knowledge level improved and became satisfactory among 95% of the post-bariatric surgery patients. A statistically significant difference was observed (P-value = <0.001) and 4% of the patients had high levels of physical activity on the pretest, but 38% had high levels on the post-test. **Conclusion:** Applying educational guidelines has a positive effect on improving postoperative health outcomes among post-bariatric surgery patients. **Recommendations:** Provide post-bariatric surgery patients with a well-planned health education printed copy of educational guidelines to improve their awareness regarding bariatric surgery.

Keywords: Educational guidelines, Postoperative health outcomes & Post-bariatric surgery patients

Introduction:

Being overweight or obese is associated with an excess of body fat and is a treatable ailment that affects people worldwide. It is brought on by both environmental and genetic causes, and dieting on its own may not always be the best way to manage it. Healthcare professionals identify obesity as a body mass index (BMI) of 30 or more. Obesity is associated with a high risk of type II diabetes, cardiometabolic illnesses, and premature mortality. Furthermore, morbid obesity has significant psychological and social burdens, particularly when it comes to the medical effects on patients (Al-Daydamouni, 2019). The prevalence of overweight and obesity in the Eastern Mediterranean Region varies, according to recent estimates from the World Health Organisation (WHO), from 74% to 86% in females and 69% to 77% in males. In Egypt alone, almost 19 million people are obese, making up 35% of the adult population and the highest rate in the world (Obesity Action Coalition, 2019).

According to Osland, et al. (2020), there is a complex relationship between obesity and a worse quality of life connected to health. This relationship may be attributed to a variety of factors, including musculoskeletal pain in morbidly obese individuals and numerous other disorders. Bariatric surgery, also known as weight loss surgery, encompasses a variety of surgical procedures and is the most secure and efficient way to treat obesity and its associated conditions.

Bariatric surgery procedures include gastric bypass, sleeve gastrectomy, gastric band, and duodenal switch. These operations have proven results in treating class III obesity. They also help normalize your metabolism, including blood sugar, blood pressure, and cholesterol. Several types of bariatric surgery can be carried out, some of which involve restrictive techniques like vertical gastrectomy and adjustable gastric bands, or a combination of malabsorption and gastric restriction like gastric bypass, which reduces calories and promotes early satiety (Camden, 2020).

It is crucial that patients who have had bariatric surgery adhere to these suggested protocols following their procedure to guarantee long-term postoperative performance. Following these recommendations will help patients maintain muscle mass and prevent nutrient deficits by restricting their calorie intake and offering balanced meals along with extra supplements and multivitamins. A weight-loss and healthy lifestyle plan that is designed to be sustained over time, as well as an exercise program to build muscle, boost metabolism, elevate mood, reduce stress, and strengthen bones and heart, are offered in the guidelines (Bellicha et al., 2021).

Specialized nurses have an important role in the evaluation of improper nutritional behavior. The most important works by nutritionists are to educate patients about proper eating and how to rationalize liquids, protein, carbohydrate, and fat intake. The decrease in eating iron-rich foods because of the intolerance of some patients to the consumption of red meat, as well as the weakness of the absorption of iron due to insufficient stomach acid (Camden, 2020).

Females due to menstrual period are more prone to anemia and iron shortage consequently; it's advised that those patients take 325 mg of iron sulphate along with vitamin C to increase absorption. Chronic malnutrition problems occur due to the absorption of nutrients differently after the surgery and the symptoms can occur as muscle soreness and tingling of the feet and legs or hands. To prevent malnutrition, patients must consume healthy foods and always take vitamin/mineral supplements as guidance (Balsiger et al.; 2022).

Lactose intolerance is characterized by gas, bloating, cramping, and diarrhea after drinking milk. For the prevention of these symptoms, patients are advised to drink small amounts of milk at a time, use lactose-free milk or lactose-reduced or try soy milk. Weight loss, along with a decrease in the protein or vitamins/minerals in the food could cause hair loss temporarily. To prevent this, the patient must consume the recommended amount of protein as well as take vitamins/ minerals as guided. Dehydration is caused by a lack of adequate consumption of fluids quantity or by recurrent vomiting. The symptoms include dark and strong-smelling urine, dry mouth, headache, and fatigue. To avoid this, patients must drink small amounts of fluids frequently throughout the day (Martin et al.; 2017).

In the postoperative phase, there are some essential factors. Laboratory testing, pain management, respiratory therapy, venous thromboembolism prophylaxis, radiological evaluation, diet progression, wound care, and postoperative follow-up are all examples of these services. Several complications

will arise when the patient arrives at the surgery facility, so the nurse plays a critical role in preventing these complications during this time (Gouda et al., 2019).

According to Olsén et al. (2021), people who are morbidly obese may benefit more from bariatric surgery than from lifestyle therapies. One such procedure is the laparoscopic Roux-en-Y gastric bypass. In long-term evaluations, about one-third of patients exhibit failure with less than 50% average weight loss or weight gain. The average weight loss following surgery is roughly 70% for gastric bypass surgery and 65% for sleeve gastrectomy surgery after a year (Köhler et al., 2020).

Exercise and physical activity are required to maintain a healthy weight, aid in weight loss, and promote weight stability. Additionally, exercise and PA can maintain general health and well-being while preventing or assisting in the management of the multisystemic effects of obesity. One of the most important roles that nurses play in the healthcare system is patient education. Research from the past has demonstrated that nurse-led education and follow-ups lower readmission rates to hospitals while also enhancing quality of life, self-care practices, and treatment compliance in various patient populations (Bellicha et al., 2021).

A community health nurse is crucial to the management of obesity. She is also a major factor in helping people maintain stable weight following surgery by encouraging good habits like exercise and a balanced diet. In addition, nurses ought to support, instruct, and provide patients with best practice guidelines following bariatric surgery (Pearce et al., 2019). A nurse plays a vital role in the treatment and care of patients, in their planning for surgery, in teaching patients about future complications after surgery, and in preparing for discharge. The nurse plays an important role in the follow-up to ensure the best results of weight loss with minimal nutritional risk. There is a need for standardized protocols of nutrition for the monitoring and treatment of patients with obesity surgery. To improve long-term health after bariatric surgery it is important to detect and recognize the symptoms of deficiency describe the proper supplements and treat common and rare undernutrition that may arise in both the short term and the long term after the operation (Akkayaoglu & Çelik, 2020).

Significance of the study:

The number of surgeries like this has now risen exponentially worldwide, including in Asia. In 2016 alone, approximately 700,000 surgeries were carried out worldwide. Obesity has become a major health problem not only in the West but also in the East,

especially in Egypt (WHO, 2024). Obesity affects not only the aesthetic side, but also increases the risk of diseases and health problems like cardiovascular disease, type diabetes, and hypertension and can substantially interfere with patients' health. Bariatric surgery is considered one of the effective and increasingly available treatments for obesity and related comorbidities (Vuori, 2022).

After surgery, weight regain usually happens 12 to 24 months later. It's usually blamed on people not making the required lifestyle adjustments or not maintaining them. Inadequate exercise and reverting to previous eating habits are the most frequent causes of weight gain following bariatric surgery. Consequently, leading an active lifestyle is essential for improving physical function results (Ajlouni et al., 2021). The success rate of bariatric surgery will rise with an educational program that will also improve weight loss. Between 12 and 24 months following bariatric surgery, weight gain becomes evident. A considerable portion of the weight lost by some patients is regained at long-term follow-up, while others fail to meet their intended weight objectives (Ansari & Elhag, 2021). One of the suggested lifestyle changes following surgery is physical activity. Because of this, the investigation was carried out to ascertain how adopting instructional recommendations affected the postoperative health outcomes of individuals who had bariatric surgery.

Aim of the study:

To evaluate the effect of educational guidelines on postoperative health outcomes among post-bariatric surgery patients

Research hypothesis:

- H1:** Applying educational guidelines is expected to have a positive effect on improving knowledge about bariatric surgery.
- H2:** Post-bariatric surgery patients who receive the educational guidelines are expected to have less nutritional problems.
- H3:** Post-bariatric surgery patients who receive the educational guidelines are expected to have fewer complications post-applying educational guidelines regarding bariatric surgery.
- H4:** Post-bariatric surgery patients who receive the educational guidelines are expected to have high physical activity.

Subjects and Method:

Research design:

To achieve the aim of the study a quasi-experimental research design was used (one group, pre-posttest) in the present study

Research Setting:

This study was applied in the Out-Patients Surgery Clinic at Damietta University Hospital, Egypt.

Subjects:

Included fifty post-bariatric surgery patients using a convenient sample between the ages of 20–65 years old from both sexes.

Tool of the study: - Five tools were used:

Tool (I): patients' knowledge assessment tool:

This tool was developed by the current researcher (WHO, 2021; Al-Mutawa & Anderson 2018); It is divided into three parts:

Part (I): Patient's demographic data: This part includes data related to age, gender, level of education, occupation, height, weight, and Body Mass Index (BMI).

Part (II): Patient's physical data such as height, weight, chronic diseases, and body mass index.

Part (III): Postoperative patients' knowledge assessment sheet: To gauge patients' knowledge of bariatric surgery, the researcher created this section. Answers to fifteen closed-and open-ended questions covered topics such as definitions of bariatric surgery, indications, contraindications, preoperative instructions, and preparation, laboratory and radiological investigations, pre/postoperative care, postoperative complications, postoperative diet and exercise, and discharge instructions.

Scoring system:

After revision, each question was categorized and given a score. Every complete and accurate response received two grades, whereas an improper response received zero. Each knowledge component's score was totaled up and turned into a percentage. A total score of 30 was classified as having an unsatisfactory degree of knowledge if the score was less than 60% and a satisfactory level of knowledge if the score was greater than 60%.

Tool (II): Malnutrition Universal Screening System (MUSS):

This instrument was adapted by Elia, (2003) and modified by the researcher to comply with the nutritional guidelines in the study and control group and screen nutrition to identify malnutrition risk. It was translated into the Arabic language.

The scoring system used by MUSS (malnutrition universal screening system) to estimate the risk of nutritional problems after using bariatric assessment. It contains the following two parts:

Part (1): Clinical presentation data: including general appearance pallor, hypotension, hair loss, abdominal pain, diarrhea, constipation, vomiting, and feeding intolerance.

Part (2): Nutritional behavior includes awareness of proper eating behavior (this is achieved through the correct eating habits, which consist of eating

regularly, not mixing between eating and drinking, being slow to eat, chewing food well, stopping drinking before the meal by 30 minutes), knowing right portion size (This is achieved through the caloric intake, which depends on age, weight, sex and physical activity, and is also achieved by following the food pyramid, which determines the number of servings from each group: five group nutrients; fat, oils, bread and cereal, poultry, vegetables and fruits), self-monitoring of body weight, self-monitoring of body mass index, and daily food intake record.

Tool (III): Complications assessment sheet:

The researcher (WHO, 2021; Al-Mutawa & Anderson, 2018) developed it to evaluate postoperative complications that occurred after surgery. Eleven specific complications were included in the assessment, including internal and external bleeding, pulmonary embolism, postoperative leakage, deep vein thrombosis, splenic injury, bowel obstruction, impaired skin integrity, wound infection, and vitamin and mineral deficiencies.

Scoring system:

If there were complications following surgery, a score of (zero) was assigned, and if not, a score of (one).

Tool (IV): International physical activity questionnaire:

Five subscales comprise the self-administered International Physical Activity Questionnaire (Arabic translation) (Fogelholm et al., 2006).

Section 1: Physical activity related to work including paid employment, volunteer work, course work, farming, and any other unpaid outside-the-home labor performed by the patients. Unpaid labor that may be performed around the house was not included.

Section 2: Physical Activity related to Transportation: this section covered the patients' routes to and from various locations, such as stores, cinemas, and places of employment.

Section 3: Seated time: Last but not least, they were asked how much time they spend sitting during their free time, at work, at home, and when completing their homework. This can include time spent reading, visiting friends, working at a desk, lounging, or sitting down to watch TV.

Scoring the International Physical Activity Questionnaire (IPAQ)

As a continuous variable (MET minutes per week), levels degrees of physical activity are proposed: low, intermediate, and high. The quantity of energy required to do physical exercise is measured in MET minutes. The estimated resting energy expenditure is multiplied by one to get a MET. The amount of energy the patients used when they were at rest was one MET. Hence, two METS were double what they used when they were at rest. 3.3 METS was assigned

to walking, 4 METS to moderate physical activity, and 8 METS to strenuous physical activity.

Validity and reliability:

A panel of five experts in the fields of community health nursing and medical-surgical nursing determined the face and content validity of the tools (I&IV), and the correction was made by their findings after a review of the tools to assess their clarity, relevance, comprehensiveness, applicability, and administrative ease. After making a few minor adjustments in light of the expert's advice, the final forms were created. Test-retest procedures were used to determine the consistency of these instruments, which included the patient's knowledge of bariatric surgery tool I ($r = 0.72$) and the patient's complications tool IV ($r = 0.89$).

Pilot Study:

A pilot study was conducted with five patients (10%) from the sample to assess the tools' clarity and applicability as well as to identify any issues that might have interfered with the data-gathering procedure. Following an analysis of the pilot research data, no significant modifications were made to the evaluation instruments; hence, the five patients who participated in the pilot study were included in the study sample.

Ethical Consideration:

The Damietta University Hospital's manager provided official authorization. The ethical committee of Sohag University's nursing faculty approved the research idea. The study subject did not face any risks while the research was being applied. Clinical research ethics guidelines were adhered to by the study. Additionally, after describing the nature and goals of the study to each patient, a signed agreement was acquired. Every volunteer was advised by the researcher that they could decline to take part in the study at any time or leave it without giving a reason. We guarantee privacy and confidentiality.

Fieldwork:

There were three stages to the fieldwork: (preparatory phase, implementation phase, and evaluation phase).

The Preparatory phase:

After studying recent and relevant literature, the researcher created educational guidelines and tools throughout this phase. Arabic guidelines booklets, educational places, teaching aids and media (pictures, posters, videos), and educational places were produced to make the execution of the educational guidelines easier. With a pilot study and content validity and reliability, this phase came to a close.

Implementation phase:

All patients who were part of the study provided their informed consent before they were asked to complete the following questionnaires.

The researcher just provided an overview of the goals and objectives of the educational guidelines during the first interview. Together with routine medical treatment, the patients received individualized instruction in the form of brief classes covering the content of the educational guidelines.

In addition to the initial interview session, a total of three sessions were conducted separately for each patient. These sessions were repeated for each patient, and they lasted anywhere from thirty to forty-five minutes, plus an additional ten minutes for discussion and feedback.

The program's goal and orientation were explained to the patients at the beginning of the first session, along with the session's time and location. Before the educational program was implemented, a pretest was used. At this point, the researcher developed a handout that was handed to each study participant. Following the initial consultation, the patient was given information regarding radiographic and laboratory procedures, investigations, preoperative instructions and preparation, the advantages and disadvantages of bariatric surgery, and postoperative care.

During the second session, patients received information regarding what to eat after bariatric surgery. This included eating small, balanced meals, avoiding excess fat, calories, and sugar, eating slowly, and chewing small bites of food thoroughly. Additionally, patients were instructed to keep a daily log of their protein and calorie intake. Nutritional principles following bariatric surgery, post-op dietary progression, protein and fluid requirements, lifelong vitamin and mineral supplementation, compliance with guidelines through behavioral change (compliance means maintaining lifestyle changes through eating healthy food, health monitoring, and practice exercise), knowing right portion size (how much food choose to eat at one time of meat, milk, vegetables and fruits, grain, cereals, meats, bean, nuts) proper eating behavior, daily food record, monitoring weight and body mass index). Also, the handout contains common nutritional problems, a clinical presentation of nutritional problems and how to prevent them, Complications that may be caused by different types of foods, a brief guide to healthy eating, and tips for an active lifestyle.

In the third session, patients were given instructions regarding follow-up and recommended exercise following bariatric surgery. These included the significance of physical activity, the amount of time that should be spent exercising each day, and the types of exercise that should be done, such as walking, aerobic exercise, and strength training, to maintain weight loss, strengthen the heart and bones, burn calories, develop muscles, increase metabolic

rate, improve mood, reduce stress, and improve control over blood sugar and late postoperative complications. Each session began with an overview of the previous session's contents and objectives. Every session ended with five minutes set aside for feedback and discussion.

In addition to using discussion as a teaching strategy, the researcher employed teaching aids and media for illustration. Each member of the study group also received an Arabic copy of the educational guidelines booklet. - Three days a week, in the morning and afternoon, the researcher gathered data from the patients. For each available patient, a control group was first enrolled for the morning and afternoon shifts. This phase lasted roughly six months, from November 1st, 2023, to April 30th, 2024.

Evaluation phase:

The patients were re-assessed after three months of the study implementation (post-test) using the same pre-test to determine the effect of applying educational guidelines on postoperative health outcomes among post-bariatric surgery patients.

Administrative and ethical considerations:

The researcher first explained the nature and objective of the study and the nursing guidelines to the heads of the departments that were chosen before obtaining official approval to perform the study and gather the necessary data. Furthermore, an oral agreement was voluntarily obtained from the patients following an explanation of the study's objectives and an assurance that their participation or withdrawal would not have any adverse consequences.

Statistical design:

After being examined, the data were coded, examined, tabulated, and ready for computer entry. The SPSS version 22 computer program was used to perform descriptive statistics, such as frequencies, percentages, means, standard deviation, etc. The frequency, percentage, mean, and standard deviation tests for significance were applied. The significance of numeric variables was assessed using the Mann-Whitney test, and the significance of categorical variables was assessed using Chi-Square. ANOVA, t-test, and Pearson correlation were also utilized to compare means and ascertain group correlation. Statistical significance was defined as P-values less than 0.05.

Results:**Table (1): Demographic data among post-bariatric surgery patients (n=50):**

Variables	Study n=(50)	
Age	36.4±7.3	
	No.	%
Sex		
Male	15	30.0
Female	35	70.0
Educational level		
Illiterate	6	12.0
Read & write	10	20.0
Preparatory	9	18.0
Secondary	15	30.0
University	10	20.0
Occupation		
Work	22	44.0
Not work	28	56.0

Table (2): Weight, height, and body mass index Mean score among post-bariatric surgery patients (n=50):

Items	Mean ± SD
Height	164.33 ± 8.59
Weight	125.77 ± 16.55
BMI (pretest)	49.66 ± 5.22
BMI (posttest)	35.87 ± 6.56
P-value	0.000*

Table (3): Differences in Mean Scores of Knowledge regarding bariatric surgery among the Studied post-bariatric surgery patients Pre- and Post-applying educational guidelines (n=50)

Items	Pre-applying educational guidelines	Post-applying educational guidelines	X ²	P-value
Meaning of bariatric surgery	2.7 ± 0.9	3.7 ± 0.4	19.183	0.0001**
Indications	3.6 ± 1.4	8.1 ± 1.0	17.532	0.0001**
Contraindications	3.1 ± 1.5	6.8 ± 0.4	16.627	0.0001**
Preoperative instructions and preparation	2.7 ± 0.9	3.7 ± 0.4	19.183	0.0001**
Radiological and laboratory investigations	3.6 ± 1.4	8.1 ± 1.0	17.532	0.0001**
Pre/post-operative care	3.1 ± 1.5	6.8 ± 0.4	16.627	0.0001**
Postoperative complications	2.7 ± 0.9	3.7 ± 0.4	19.183	0.0001**
Postoperative diet	3.6 ± 1.4	8.1 ± 1.0	17.532	0.0001**
Exercise	3.1 ± 1.5	6.8 ± 0.4	16.627	0.0001**
Instructions on discharge	3.6 ± 1.4	8.1 ± 1.0	17.532	0.0001**

(*) statistically significant at $p \leq 0.05$

(**) highly statistical significance at $p < 0.001$

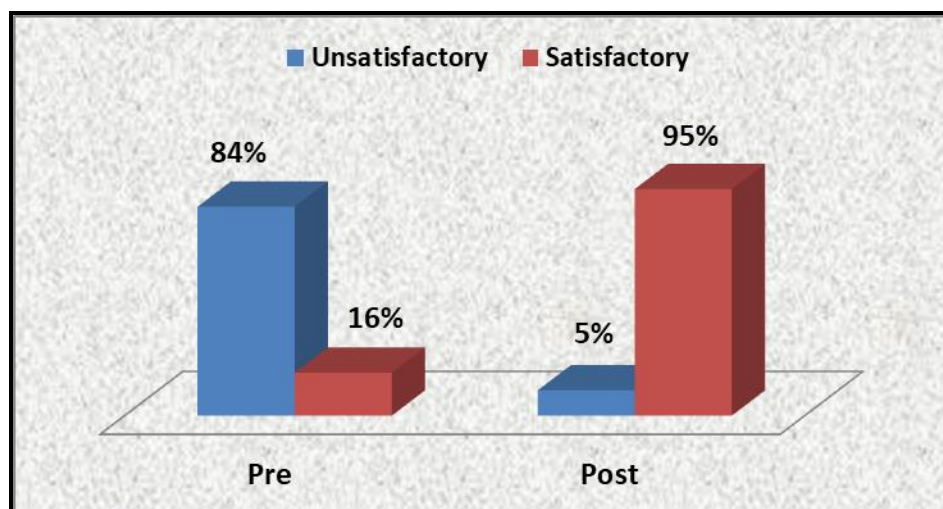


Figure (1): Total level of patient knowledge pre and post educational guideline regarding bariatric surgery (n= 50)

Table (4): Distribution of post-bariatric surgery patients' examination pre and post educational guidelines for (n= 50)

Clinical examination	Pre-test 1 st month		Post-test 1 st month		Pre-test 3 rd month		Post-test 3 rd month		X ²	P- value
	No.	%	No.	%	No.	%	No.	%		
Pallor	1	2	14	28	1	2	12	24	49.165	0.000**
Hair loss	10	20	16	32	8	16	0	0		
Hypotension	2	4	8	16	1	2	0	0		
Abdominal pain	12	24	17	34	3	6	0	0		
Vomiting	12	24	9	18	0	0	20	40		
Constipation	2	4	0	0	2	4	18	36		
Diarrhea	0	0	0	0	1	2	0	0		
Feeding intolerance	0	0	1	2	0	0	0	0		

* Significant difference at p. value<0.05

Table (5): Nutritional behavioral changes distribution post-bariatric surgery patients 1st-month visit and 3rd-month visit post-applying educational guidelines (n= 50)

Nutritional behavior follow-up	Awareness of proper eating behavior		Knowing the right portion size for each food group		Self-monitoring of body weight		Self-monitoring of body mass index		Daily food record		X ²	P- value
	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre		
1 st -month visit	22	4	13	7	35	25	24	6	14	0	12.33	0.029*
3 rd -month visit	47	5	44	15	50	34	45	17	48	0	56.44	0.000**

* Significant difference at p. value<0.05

Table (6): Correlation between behavioral changes and nutritional problems among post-bariatric surgery patients pre and post-applying educational guidelines

Nutritional problems	Behavioral changes			
	1 st -month visit		3 rd -month visit	
	r	P	R	P
	-0.107	0.287	0.518**	0.000**

** Correlation is significant at the 0.01 level (2-tailed).*

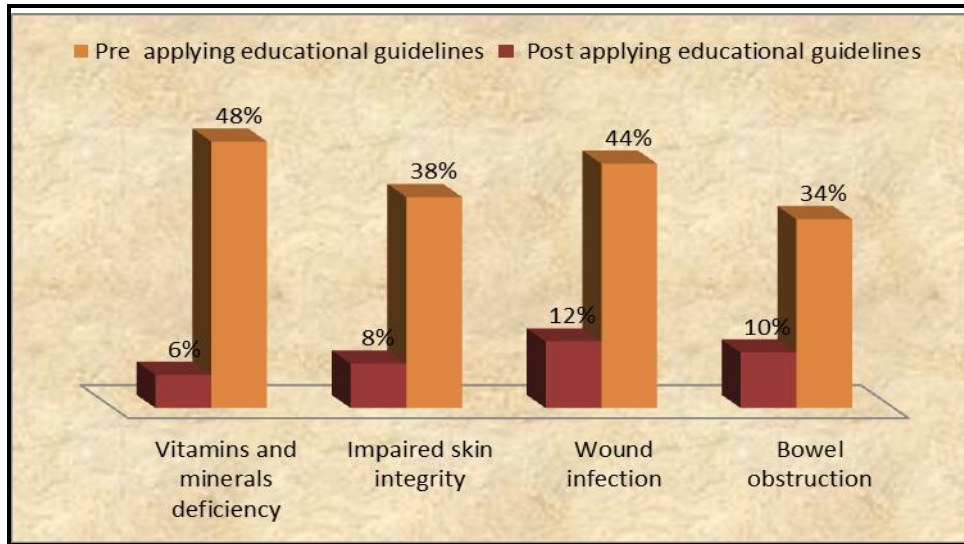


Figure (2): Late complications distribution among post-bariatric surgery patients post-applying educational guidelines (n=50)

Table (7): Differences in physical activity scores pre and post-applying educational guidelines among post-bariatric surgery patients (n=50)

Physical activity	Pretest (n= 50)	Post-test(n= 50)	P-value
	No. (%)	No. (%)	
Work:			
Low	33 (66.0)	19 (28.0)	
Moderate	7 (14.0)	12 (24)	0.000*
High	10 (20.0)	24 (48.0)	
Transportation:			
Low	45 (90.0)	8 (16.0)	
Moderate	5 (10)	34 (66.0)	0.000*
High	0 (0.0)	9 (18.0)	
Domestic:			
Low	38 (76.0)	18 (36.0)	
Moderate	10 (20.0)	19 (38.0)	0.000*
High	2 (4.0)	17 (26.0)	
Leisure time:			
Low	49 (98.0)	13 (26.0)	
Moderate	1(2.0)	27 (54.0)	0.000*
High	0 (0.0)	10 (20.0)	

* Significant difference at p. value<0.05

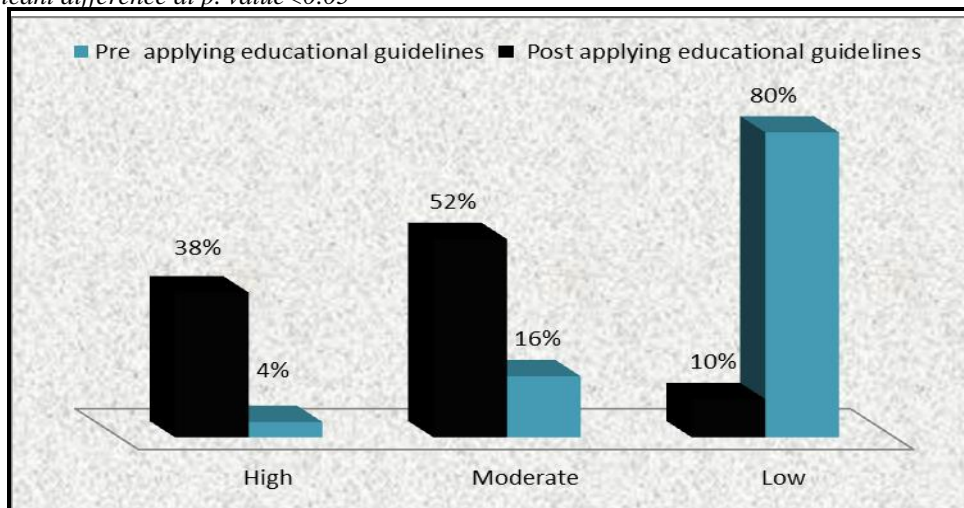


Figure (3): Total physical activity level distribution among post-bariatric surgery patients' pre and post-applying educational guidelines (n= 50)

Table (1): Shows that the mean age among post bariatric surgery patients was 36.4 ± 7.3 and the majority of the sample (70%) of them were female. According to their educational level, 30.0% of them were secondary educated. Concerning occupation 56% of the post bariatric surgery patients were not working.

Table (2): Illustrates that the mean height and weight of them were (164.33 ± 8.59) , & (125.77 ± 16.55) respectively. As regards body mass index among post-bariatric surgery patients, it was 49.66 ± 5.22 in the pretest compared to 35.87 ± 6.56 .

Table (3): Shows the total score of knowledge pre/post- applying educational guidelines among post-bariatric surgery patients. It was observed that, the knowledge score among post bariatric surgery patients after guidelines had improved compared to before application, with statistically significant differences between pre and post-applying educational guidelines regarding the level of knowledge about bariatric surgery (at <0.001).

Figure (1): Indicates the **Total** post-bariatric surgery patients' **Knowledge Level Distribution as regards** bariatric surgery pre and post-applying educational guidelines and demonstrates that 16% of the post-bariatric surgery patients had a satisfactory level of total knowledge of pre-applying educational guidelines. Compared to the intervention, this total knowledge level improved and became satisfactory among 95% of the post-bariatric surgery patients.

Table (4): Illustrates the patient clinical presentation pre and post-applying educational guidelines among post-bariatric surgery patients, it indicates that there was a significant reduction and difference between pre and post-applying educational guidelines regarding their clinical presentation at $P < 0.001$.

Table (5): Shows that, there were significant differences regarding the nutritional behavioral change (awareness of proper eating behavior, knowing the right portion size, self-monitoring of weight, self-monitoring of body mass index, and daily record of food intake) among post-bariatric surgery patients pre and post applying educational guidelines with a highly significant difference in **1st-month visit and 3rd-month** pre and post applying educational guidelines at $P < 0.001$.

Table (6): Reveals that there was a significant correlation between behavioral changes and nutritional problems among post-bariatric surgery patients pre and post-applying educational guidelines at $P < 0.001$.

Figure (2): Illustrates that there was a significant reduction and improvement between all late complications post-applying educational guidelines.

Table (7): Illustrates that there was a statistically

significant difference between pre-test physical activity mean score compared to a mean score of post-test at (P -value= 0.000) among post bariatric surgery patients.

Figure (3): Shows that there was a significant improvement in total physical activity level, where 4 % of post-bariatric surgery patients had high physical activity pre-applying educational guidelines while in the post-test was increased 38% had high physical activity.

Discussion:

Nursing guidelines, provided before and after bariatric procedures for patients with morbid obesity, can help prevent the detrimental effects of obesity on patients' health and related disorders, such as cardio-metabolic disease and other diseases, particularly in female patients. National organizations like the National Institute for Health and Care Excellence promote bariatric surgery as a therapy option for severe and complex obesity (Nuijten et al., 2021). Frequent physical activity is one of the healthy behaviors that helps avoid excessive weight gain (Hall & Guo, 2019).

Also, Bariatric patients may be at risk of failing to comply with the recommended supplements and need close follow-up for a long period. During the first six months, patients need standardized nutrition guidelines regularly followed up to improve their long-term health after bariatric surgery and to ensure compliance which is often missing (Bruce et al., 2019). So, this study aimed to determine the effect of applying educational guidelines on postoperative health outcomes among post-bariatric surgery patients.

As regards demographic data of post-bariatric surgery patients, the study shows that the mean age among post-bariatric surgery patients was 36.4 ± 7.3 and the majority of the sample of them was female. This study supported the findings of Omar et al., (2020), which indicated that most of the participants who complained of obesity were female. Furthermore, Alebshehy et al. (2016) noted that there has been a notable rise in obesity in Egypt, with over one-third of the population classified as obese. These findings were consistent with their findings. The fact that women are more than twice as likely as men to be obese is a specific problem in Egypt.

Additionally, the same findings came from a study conducted in Ethiopia by Darebo et al. (2019), who discovered that more women than men were representative of the sample and that the bulk of the sample was around 35 years old. Furthermore, almost 50% of the participants demonstrated proficiency in both writing and reading. Furthermore, it has been revealed that Egypt has an extremely high prevalence

of adult obesity, especially among women (Mehanna et al., 2020). Reilly et al. (2018) and Chung et al. (2018), who carried out the study in South Korea, observed considerably higher levels of obesity in males than in women, which is in contradiction to our findings. The disparity, in my judgment, between their research and ours resulted from the variations in sample size.

After three months following bariatric surgery, the body mass index (BMI) of patients who had undergone bariatric surgery was 35.87 ± 6.56 , which was in line with the findings of Mohamed et al. (2018), who reported that the BMI of the sample under study was 37.98 ± 1.24 . The outcomes also matched those of a study by Olsén et al., (2021), titled "Long-term effects of physical activity prescription after bariatric surgery: A randomized controlled trial," which discovered that the preoperative BMI was 43.5 (4.4), but after the procedure, it decreased to 36.6 (3.6). These investigations were conducted by the World Health Organization's classification, which states that morbid obesity ($\text{BMI} \geq 40 \text{ kg/m}^2$), grade II obesity ($\text{BMI} = 35\text{--}39.9 \text{ kg/m}^2$), and grade I obesity ($\text{BMI} = 30\text{--}34.9 \text{ kg/m}^2$). Similarly, these data are comparable to those found by various investigators as Sabera et al, (2021) found that the BMI decreased from $50.4 \pm 7.9 \text{ kg/m}^2$ to $31.9 \pm 5.85 \text{ kg/m}^2$ for the same period.

The present study revealed the total score of knowledge pre/post-applying educational guidelines among post-bariatric surgery patients. It was observed that, the knowledge score among post bariatric surgery patients after guidelines had improved compared to before application, with statistically significant differences between pre and post-applying educational guidelines regarding the level of knowledge about bariatric surgery. From the researcher's point of view, it reflected the positive effects of applying educational guidelines for post-bariatric surgery patients.

Regarding the total post-bariatric surgery patients' **Knowledge Level Distribution as regards** bariatric surgery pre and post-applying educational guidelines, the present study revealed that less than one-fifth of the post-bariatric surgery patients had a satisfactory level of total knowledge of pre-applying educational guidelines. Compared to the intervention, this total knowledge level improved and became satisfactory among almost all post-bariatric surgery patients. These findings are consistent with a study conducted by Goldstein & Hadid (2020) regarding the effect of bariatric preoperative education on patient knowledge and satisfaction with the overall hospital experience. The study found that most patients who attended preoperative education sessions regarding bariatric surgery and follow-up achieved high satisfaction and

knowledge scores. However, the results of the current study also showed that even though two-thirds of the study group's level of knowledge increased as a result of the application of nursing standards, around one-third of this group's level of knowledge remained low. From the researcher's point of view, the low level of knowledge confirmed the need to apply educational guidelines for post-bariatric surgery patients to improve their knowledge.

Concerning **clinical presentation** pre and post-applying educational guidelines among patients, Vomiting is thought to occur most commonly during the first few postoperative months, when the patients are adapting to a small gastric pouch. Patients had vomited as a reaction to food intolerance, large quantities of food, or eating quickly without chewing. Stevens, (2018) who studied "Patient perspectives on emergency department self-referral after bariatric surgery" found that the most commonly reported chief complaints were abdominal pain and nausea/vomiting.

Regarding nutritional behavioral changes, There were significant differences, according to the current study regarding the behavioral change (awareness of proper eating behavior, knowing the right portion size, self-monitoring of weight, self-monitoring of body mass index, and daily record of food intake) among post-bariatric surgery patients pre and post applying educational guidelines with a highly significant difference in pre and post applying educational guidelines. This finding is supported by Marin, (2017) who studied "Micronutrient supplementation in gastric bypass surgery: a prospective study on inflammation and iron metabolism in premenopausal women" This study found that the effect of two micronutrient supplementation schemes before and 6 months after a Roux-en-Y gastric bypass (RYGB) surgery on inflammation and iron metabolism in premenopausal women. This found Indicators of good health education on patients and needed them to follow up.

The present study shows that there was a significant correlation between behavioral changes and clinical presentation among post-bariatric surgery patients pre and post-applying educational guidelines. This finding is in line with Lara et al., (2020) & Wheeler et al., (2018) who reported that there was an even a strong correlation between the maximum loss of pounds and the sum of meetings with specialists in health care, which enhances the benefit of follow-up after surgery to achieve success with weight loss, so more of the successive sessions of postoperative was associated with less dangerous complications.

The current study demonstrated statistically significant reductions and improvements across all late complications following the application of educational guidelines, which is consistent with the

study's noticeable results regarding late complications following the application of nursing guidelines. In response to these findings, **Mohamed & Bahgat (2019)** noted that the optimal patient outcomes following surgery are highly dependent on suitable preoperative patient education; a lack of instructions may compromise the goal of the surgery and result in unfavorable outcomes. Consistent with the current study's findings, **Chang et al. (2018)** found that noncompliance with dietary recommendations and inactivity may contribute to weight restoration or insufficient weight loss following surgery. Additionally, patients can lower the risk of obesity-related disorders and improve their general vitality and confidence by adopting a healthier lifestyle and successfully losing weight after surgery.

According to the physical activity score (pre & post-test), the study results illustrated that there was a statistically significant difference between the pre-test physical activity mean score compared to a mean score of post-test at (P-value=0.000) among post-bariatric surgery patients. From the researcher's point of view, it reflected the success of educational guidelines application. The current study's findings corroborated those of **Olsén et al. (2021)**, who discovered that the intervention group had increased postoperative physical activity. Furthermore, a study by **Lawson et al. (2020)** titled "Physical activity and psychosocial correlates following bariatric surgery among patients with loss-of-control eating" found that less than two-fifths of the participants had engaged in at least one intense activity session.

Additionally, a study by **Baillet et al. (2018)** titled "Effects of a pre-surgery supervised exercise training 1 year after bariatric surgery: a randomized controlled study" reported improvements in walking cardiac response and functional strength as well as an increase in the studied sample's level of physical activity from light to moderate. According to a different **King & Bond (2019)** study, most bariatric surgery patients are extremely sedentary and inactive before surgery. Many patients reported increasing their physical activity while in the postoperative phase.

Furthermore, **Tettero et al. (2018)** demonstrated a significant increase in sport and leisure activities 24 months postoperatively when compared to baseline. Nonetheless, a marginally noteworthy decline was observed in the work component after 24 months in contrast to the baseline (P < 0.001). Increasing physical activity before surgery, during recovery, and after increased physical activity levels after surgery are linked to better body composition, increased weight loss, and increased fitness (**Tettero et al, 2018**). **Al-Hazzaa (2019)** stated that physical activity alone produced considerable weight loss after a

Cochrane review that assessed 41 randomized controlled trials with 3476 people who were overweight or obese.

The current study's findings demonstrated a considerable rise in overall physical activity levels among patients who had undergone bariatric surgery; on the post-test, slightly less than half of the patients reported high levels of physical activity. Evidence-based practice, according to the study, revealed that physical activity may offer significant post-bariatric health benefits, such as enhanced metabolic and physical fitness.

Conclusion:

According to the findings of the current study, the study concluded that applying educational guidelines has a positive effect on improving postoperative health outcomes among post-bariatric surgery patients.

Recommendations:

In light of the findings of the present study, the following recommendations are suggested:

- Providing post-bariatric surgery patients a well-planned health education printed copy of educational guidelines to improve their awareness regarding bariatric surgery
- Reinforce possible educational programs for nurses caring for patients post-bariatric surgery.
- Physical education programs should be conducted at all levels, with a focus on obese individuals.
- More research is required to validate the findings of this study using a bigger sample size.

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