Effect of an Educational Program on Minimizing Complications for Patients Post Bariatric Surgeries

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Abstract

Background: Bariatric surgery refers to weight reduction surgeries for obese persons mainly by restricting their food consuming through a variety of surgical procedures performed on gastrointestinal tract by reducing the size of the stomach. **Aim** was to evaluate the effect of an educational program on minimizing complications for patients post bariatric surgeries. **Design:** One group quasi-experimental design was utilized to fulfill the aim of the present study. **Setting:** Surgical departments and outpatient clinics at Benha University Hospital. **Sample:** A purposive sample of 45 bariatric patients. **Tools:** Two tools were used in this study; **tool I:** Patients' structured interview questionnaire. **Tool II:** Postoperative complications assessment and follow up sheet. **Results**: Only more than one fifth of the studied patients had good level of knowledge at preprogram implementation compared to about half, two thirds & majority of studied patients respectively during 1st month, after 3 & 6 months post program implementation. There was a significant statistical difference between 3 months and 6 months post program implementation in relation to all items of late complication among the studied patients. **Conclusion:** Implementing of an educational program had statistically significant improvement of knowledge and complications among bariatric patients. **Recommendations:** Further studies should be carried out using a wider geographic scope and a larger sample size to acquire progressive improvement in patients' knowledge and complications and to attain more generalizable results.

Keywords: Educational program, Complications, Bariatric Surgeries.

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Introduction

Obesity is a multifactorial chronic disease resulting from the excessive accumulation of body fat as a consequence of the imbalance between energy intake and expenditure, also caused by the interaction of several environmental causes such as inheritance, high-calorie, high-fat intake, and absence of count of physical activity. It is currently a pandemic in developed countries, a product of the change in lifestyle that is the second cause of preventable mortality after tobacco causes **(Luesma, 2022).**

Obesity is classified based on an individual's BMI, calculated by dividing an individual's weight in kilograms by their height in square meters. A BMI of 18.5 to 24.9 kg/m^2 identifies a subject with a normal weight, whereas a BMI of 25 to 29.9 kg/m^2 is considered overweight, a BMI of 30 to 34.9 kg/ m^2 is considered

obese and a BMI of 35 to 39.9 kg/m^2 is considered seriously obese **(Zandomenico, et al., 2022).**

Bariatric surgery is a very effective treatment in the control of obesity, not only in terms of effective and sustained weight loss over time, but also in the resolution or improvement of associated comorbidities and in the improvement of quality of life **(Santos, et al., 2022).**

The mortality rate for bariatric surgeries is poor, but the possibility of postoperative complications is high; potential postoperative complications as early and late complications **(Grinbaum, et al., 2022).**

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 specialized bariatric nurse is an important member of the multidisciplinary bariatric team caring patients before and after the operation **(Torensma, et al., 2022).**

Significance of the study:

Obesity is a worldwide epidemic that currently affects both developed and developing countries. Obesity is the second leading cause of preventable death in the world. According to WHO, 1.7 billion adults, 20 years and older, were overweight or obese. 200 million men and nearly 300 million women were obese. The prevalence of obesity in adults has doubled in the last 25 years. In the Eastern Mediterranean region, the prevalence of obesity and obesity ranges from 74% to 86% in women and 69% to 77% in men **(Al-Daydamouni, 2019)**.

In Egypt, obesity prevalence ranges between 40 and 60%. Being overweight was more prevalent among males than females (42% vs. 35%) and then obesity prevalence was similar among males and females 28% **(Colbert & Kalarchian, 2019).** Also, according to WHO, obesity has reached epidemic proportions worldwide, with approximately 1.9 billion overweight and 650 million obese adults **(Ruban, et al, 2019).**

The latest edition of the Global Registry published by the International Federation for the Surgery of Obesity and Related Disorders (IFSO, 2022) reports that worldwide operations increased from 100092 in 2014 to 833687 in 2022 **(Troisi, 2022).** Benha university hospital documented that the admitted patients for bariatric surgery in year 2018, 2019 and 2020 were about 100, 100 and 50 patients respectively **(Benha University Hospital statistical office, 2020).**

Aim of the study:

The aim of the present study is to evaluate the effect of an educational program on minimizing complications for patients post bariatric surgeries.

Research Hypotheses:

H1: Knowledge of patients with bariatric surgery will be improved after implementing the educational program compared with before. **H2:** Postoperative complications of patients with bariatric surgery will be minimized after implementing the educational program compared with before.

Research design:

A Quasi-experimental design was utilized to fulfill the aim of the present study.

Settings:

This study was conducted at surgical departments and outpatient clinic at Benha University Hospital in Qualubia Governorate, Egypt.

Subjects:

A purposive sample of 45 adult patients with bariatric surgeries were recruited in

this study from both sexes, their age ranged from 20 to 60 years who agreed to participate in the study.

Exclusion criteria:

Patients diagnosed with critical and mental disorders and also, disoriented & comatose patients were excluded from the study.

Tools for data collection:

Two tools for data collection were used as the following:

Tool I: Patients' structured interview questionnaire: This tool was designed by the researcher after reviewing of relevant and recent literatures **(Ustundag, et al., 2020; Baheeg, et al., 2022; Almezaien, 2022; & Mohammed, et al., 2022).**

It was consisted of three parts:-

Part 1: patients' personal data; it included 6 questions and aimed to assess patients' age, gender, marital status, residence, educational level & occupation.

Part 2: **patients' health history**; it composed of 16 multiple choice questions and aimed to assess patients' clinical data such as patients' past and present health history, family history and personal habits.

Part 3: Patients' knowledge assessment: It was prepared by the researcher after reviewing the related and recent literature **(Maghrabi, et al., 2019; Elsayed, et al., 2020; Altaheri, et al., 2020; Ibrahiem, 2021; El-Maghawry, et al., 2021; & Tan, et al**., 2022). It composed of 86 closed ended multiple choice questions and aimed to assess bariatric patients' knowledge regarding operation about obesity, bariatric surgery, preoperative preparations, postoperative bariatric surgery complications, preventive measures for complications, wound care, pain management and medication, general nutrition, nutrition at post bariatric surgery phases and discharge instructions post bariatric surgery.

Scoring system:

Patient answer for each question was checked with model key answer. One score was given for each correct answer & zero score for incorrect answer.

The total scores ranged from 0 – 86 score where 86 score equal 100%. The total scores of knowledge was summed up, converted into a percentage and classified as following **(El-dawoody, et al., 2016 & Ali, 2019).**

Good knowledge if total score ≥ 75%.
Average knowledge if score 50% - <75%.
Poor knowledge if total score < 50 %.

Tool II: Postoperative complications assessment and follow up sheet:

It was designed by the researcher after reviewing related literatures **(Hasan, et al., 2020; Abd El-shaheed, et al, 2020; Głuszyńska, etal., 2022 & Giannopoulos, et al., 2022)**. It included 12 closed ended questions categorized under two domains.

Early complications*:* it included 5 selected complications: bleeding, staple line leakage, wound infection, anastomotic stenosis and deep venous thrombosis.

Late complications*:* it included 7 selected complications: dumping syndrome, internal hernia, bowel obstruction, impaired skin integrity, marginal ulceration, recurrence of obesity and vitamins and minerals deficiency.

Scoring system:

Each postoperative complication was coded 1 for the presence of complication and zero for the absence of complication.

Educational program (Booklet) about bariatric surgeries:

Educational program was designed by researcher into Arabic language based on patient's assessment and needs after reviewing the most recent relevant literatures **(Deabes, et al., 2020; Tiryag & Atiyah, 2021; Stenberg, et al., 2022 &**

De Simone et al., 2022), to meet patients' needs about knowledge and minimize complications for patients post-surgery.

Content validity

The data collection tools were revised and ascertained by a panel of five experts of medical surgical nursing, Benha Nursing Faculty. Their opinions were regarding the content, format, layout, consistency, accuracy and relevancy of the tools. According to their opinion minor modifications were applied.

Reliability:

Reliability test of the developed tool was done statistically through Cronbach's alpha test that was 0.83 for patient's knowledge questionnaire.

Pilot study:

Pilot study was conducted on 10% of the study sample in order to test feasibility, clarity and applicability of the tools then necessary modifications were carried out. The patients who were included in the pilot study were excluded from the study sample because minor modifications were done after conducting the pilot study.

Ethical consideration:

Approval was obtained from ethical committee in the faculty of nursing and faculty of nursing dean and director of Benha University Hospital before starting the study. The aim of this study was explained to patients and they were assured that all information would be confidential and it would be used only for research purpose only. Patients were informed that they are allowed to choose to participate or not in the study and they have the right to withdraw from the study at any time without giving any reasons.

Field work: The fieldwork was performed over a period of eight months started from the beginning of October, 2021 till the end of May, 2022. The study was conducted on four phases as the following: preparatory & assessment phase, planning, implementation and evaluation phase.

1a - Preparatory Phase: Preparatory phase included reviewing of the current and past available literature using books, articles and magazines to develop the tool for data collection. An official permission for data collection and implementation of the research was obtained from dean of Faculty of Nursing to the chief administrator of Benha university Hospital and head at surgical departments (male and female surgical department) and outpatient clinic at Benha University Hospital to request permission and cooperation to conduct the study.

1b- Assessment phase: oral permission was taken from patients after explaining the purpose of the study. During this phase the researcher interviewed each patient after his/her admission to the hospital in the patient's room to maintained privacy, to collect baseline data on personal data, medical data and knowledge assessment using tool I for studied patients pre-program implementation. Also, they were assessed for postoperative complications using tool II postoperative complications assessment and follow up sheet pre-program implementation.

2-Planning phase:

Researcher collected data about the study setting to put plan for carrying out the study. Based on the information obtained from pilot study and patients' assessment, in addition to the recent related literature, the researcher designed an educational program. This program was designed according to patients' needs and deficiencies. The general objective was to improve knowledge and minimize

complications for patients post bariatric surgeries and patient outcome. Moreover teaching material was prepared e.g. demonstration, power point, data show and printed handout was helped in covering the theoretical and all information.

Teaching methods: included lectures, group discussion, demonstration on patients and brain storming. **Media used:** suitable teaching aids were specially prepared for intervention booklets, posters, pictures power point presentation &videos.

3- Implementation phase :

The form of booklet which was color printed and was supplemented by photos for more illustration to help patients to understand the content. It was consisted of the following:

Information to patients about bariatric surgery as stomach anatomy, obesity definition & its management, definition, types, indications, contraindication and investigations of bariatric surgery.

Information of post-operative instructions to patient about wound care, how to deal pain, medications, nutrition, preventive measures of complications and instructions on discharge and follow up visits after bariatric surgery**.**

Life style modifications regarding exercise, physical activity for bariatric patients and instructions on getting back to work and returning to usual activities.

Implementation phase was achieved through the educational sessions. It was carried out into five sessions that included, three sessions for theory, two sessions for practice. Total number of the studied sample was 45 patients. Thus, they were divided into 11 groups. Each group included 4-5 patients in every session. The researcher was attended two days/week from 9 A.M o'clock to 4 P.M at surgical departments at Benha University Hospital.

Each session lasted for 30-40 minutes, started with a brief summary about what had been given through the previous session, then the objectives of the new topics, taking into consideration by using simple language to suite the level of all patients' education. Motivation and reinforcement during session were used in order to enhance motivation for the sharing in this, answered any raised questions and gave feedback. The final form of the pinned educational booklet was developed and given to each patient to ensure their understanding which implemented through 72 sessions and total hours for sessions 36-48 hours.

In the first session, the researcher introduced her-self, gave introduction on educational program and explained the objectives of the educational program. Patients received information about bariatric surgery overview as anatomy of the stomach, definition of obesity and its management, definition, types, indications, contraindications of bariatric surgery. **In the second session,** patients received information about investigations of bariatric surgery, post-operative complications and factors affecting complications and preoperative instructions & care of bariatric surgery.

In the third session, patients were provided by information about post-operative instructions about wound care, how to deal pain, medications, nutrition, preventive measures of complications and instructions on discharge after bariatric surgery and follow up visits. **In the fourth session,** patients carried out and follow the dietary educational program after bariatric surgery regarding minimizing of bariatric complications such as eating balanced meals with small portions, follow a diet low in calories, fats and sweets, eat slowly

and chew small bites of food thoroughly, as well as the vitamins and minerals supplementary with the keep a daily record for calories and protein intake.

In the fifth session, patients carried out and received exercise, physical activity for bariatric patients and instructions on getting back to work and returning to usual activities and the recommended exercise after bariatric surgery such as walking, aerobic exercise and strength training to maintain weight loss and minimize postoperative complications.

At the end of these sessions, the researcher informed the patients that they will be evaluated by the researcher after three and six months from sessions.

4- The evaluation phase:

After the educational program, the researcher interviewed bariatric patients individually and evaluated them using the same pre-test tools (tool I part 3) patients' knowledge assessment questionnaire, tool (II) postoperative complications assessment and follow up sheet by comparing to baseline assessment. Comparison between all patient's pre-test and post-test finding was done at the end of the study during1st month and after 3rd months and 6th months to determine the effect of an educational program on minimizing complications for patients post bariatric surgeries.

Statistical analysis

Results were collected, statistically analyzed and tabulated using statistical package of social science (SPSS) version 21 and Microsoft Excel version 2010. Quantitative data were presented as mean and standard deviation (SD) while qualitative data were expressed as frequency and percentage. The observed statistical differences were considered:

Non-significant (NS) if P-value > 0.05.

Significant (NS) if ≤0.05.

Results:

Table (1) shows that, 30.2%& 25.6% of the studied patients 37.2 % of the studied patients were in age group 31- 40 years old with mean age ± SD 36.66±8.34, as well, 62.2% of them were female. Regarding marital status, 71.2% & 64.4% of the studied patients were married and were residents in urban areas respectively, while, 66.6% & 53.4% of them had university education and practical office work.

Table (2) represents that, there were a significant statistical differences between preprogram and during 1st month, after 3 months as well 6 months post program implementation among studied patients regarding their mean weight and BMI at P-value ≤ 0.000.

Figure (1) shows that, there was a significant statistical difference among studied patients' regarding their total knowledge level preprogram implementation and during 1st month, after 3 months as well 6 months post program implementation.

Table (3) shows that, 4.5% & 4.5% of the studied patients had symptoms of staple line leakage and wound infection respectively during 1st month post program implementation. While, 15.5% & 15.5% of the studied patients had symptoms of anastomotic stenosis and deep vein thrombosis (DVT) respectively during 1st month post program implementation.

Table (4) shows that, there was a significant statistical relation between residence, educational level and occupation among the studied patients and their total knowledge score preprogram as well after 3 month post program implementation at P-value < 0.05.

Table (1): Distribution of studied patients regarding personal characteristics (n=45).

Personal characteristics		N	%
Age (in years)	20- <30	15	33.4
	30- <40	17	**37.2**
	40- <50	5	11.2
	50- 60	8	17.7
	Mean ±SD	36.66±8.34	
Gender	Male	17	37.8
	Female	28	**62.2**
Marital status	Single	10	22.3
	Married	32	**71.2**
	Widow	0	0.0
	Divorced	3	6.6
Residence	Urban	29	**64.4**
	Rural	16	35.6
Educational level	Read and write	4	8.8
	Secondary	11	24.4
	University	30	**66.6**
Occupation	Office work	24	**53.4**
	Hand work	3	6.6
	House wife/ Not working	18	40.0

Table (2): Distribution of studied patients regarding their mean weight, height and BMI pre and post program (n=45).

Items	Pre program	Post- program			Friedman Test	P-value
		During 1st month	3 months	6 months		
Weight	**126.38 ± 24.97**	**119.49±22.57**	**103.51±23.14**	**81.41 ± 20.87**	2.297	0.000*
Height	**164.42 ± 9.14**	**164.42 ± 9.14**	**164.42 ± 9.14**	**164.42 ± 9.14**	-	-
BMI	**46.78 ±7.73**	**44.2±6.87**	**38.3±7.91**	**30.56 ±7.53**	1.698	0.000*

Friedman Test : *Difference between pre-program and post 1 month, 3 months & 6 months* ***P-value** ≤ 0.05= Significant (S)

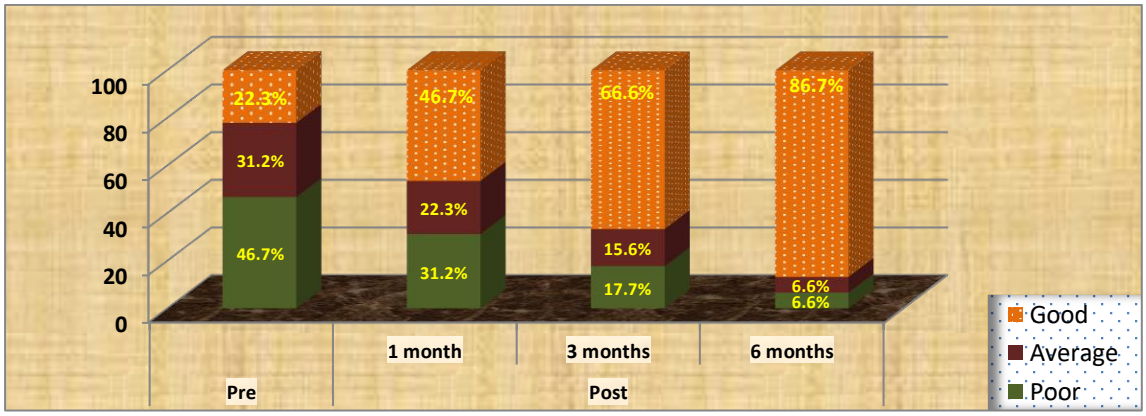

Figure (1): Distribution of studied patients regarding their total level knowledge pre and post program (n=45).

Table (3): Distribution of studied patients regarding their early complications post program (n=45).

Early complication		During 1 month	
		N	%
Bleeding	**Yes**	**4**	**8.8**
	No	**41**	**91.2**
Staple line leakage	**Yes**	**2**	**4.5**
	No	**43**	**95.5**
Wound infection	**Yes**	**2**	**4.5**
	No	**43**	**95.5**
Anastomotic stenosis	**Yes**	**7**	**15.5**
	No	**38**	**84.5**
Deep vein thrombosis (DVT)	**Yes**	**7**	**15.5**
	No	**38**	**84.5**

Table (4): Statistical relation between total knowledge score and personal characteristics of the studied patients pre and post 3 months implementation of program (n=45).

Variables		Total knowledge score												
		Pre- program						X^2 & P-value	Post 3 months						X^2 & P-value
		Poor		Average		Good			Poor		Average		Good		
		N	%	N	%	N	%		N	%	N	%	N	%	
Age (in years)	20- <30	7	15.6	4	8.9	4	8.9	5.660 & 0.462	2	4.4	1	2.2	12	26.7	4.589& 0.597
	30- <40	9	20.0	3	6.7	5	11.1		0	0.0	2	4.4	15	33.3	
	40- <50	2	4.4	3	6.7	0	0.0		0	0.0	0	0.0	5	11.1	
	50-60	3	6.7	4	8.9	1	2.2		1	2.2	0	0.0	7	15.6	
Sex	Male	5	11.1	7	15.6	5	11.1	3.268 & 0.195	0	0.0	3	6.7	14	31.1	6.821 & 0.822
	Female	16	35.6	7	15.6	5	11.1		3	6.7	0	0.0	25	55.6	
Residence	Urban	11	24.4	10	22.2	8	17.8	2.688& **0.008***	2	4.4	3	6.7	24	53.3	1.805& **0. 045***
	Rural	10	22.2	4	8.9	2	4.4		1	2.2	0	0.0	15	33.3	
Educational level	Read and write	0	0.0	3	6.7	1	2.2	10.368& **0. 035***	0	0.0	1	2.2	3	6.7	4.199& **0.038***
	Secondary	3	6.7	3	6.7	5	11.1		0	0.0	1	2.2	10	22.2	
	University	18	40.0	8	17.8	4	89		3	6.7	1	2.2	26	57.8	
Occupation	Office work	12	26.7	10	22.2	2	4.4	9.321& **0.052***	0	0.0	2	4.4	22	48.9	9.231& **0.056***
	Hand work	0	0.0	1	2.2	2	4.4		0	0.0	1	2.2	2	4.4	
	House wife /Not	9	20.0	3	6.7	6	13.3		.3	6.7	0	0.0	15	33.3	

X^2=chi square test **// P-value > 0.05=** Non-significant (NS)// ***P-value ≤ 0.05= Significant (S)**

Discussion:

Obesity pandemic has become a global health priority. Complications increase commensurate with increasing body mass, particularly with increasing abdominal fat. Complications include type 2 diabetes, hypertension, myocardial infarction, gallstones, sleep apnea, and musculoskeletal complaints **(Olsén, et al., 2021).**

Regarding age, the current study findings showed that more than one third of the studied patients were in age 31-40 years old with mean age 36.66 ± SD 8.34. This may be due to this age is called early adulthood during it people can care of their body image and general appearance. This finding was consistent with **Elsayed, et al., (2020),** in the study entitled "ERAS protocols for bariatric surgery, El-Minia, Egypt" who reported that more than two

fifths of patients ranged from 27 to 40 years with a mean age 33.2 years.

Owing to gender; the result of the present study revealed that about two thirds of the studied patients were females. This may be due to females are more interested in caring about their body shape, image and appearance more than males and may be related to social issues as chance for marriage. This result was supported by **Sabry, et al., (2020),** in a study entitled "laparoscopic mini gastric bypass as a revisional procedure after failed primary restrictive bariatric surgery, Ain Shams University Hospitals, Egypt" who found that, about more than half of the studied patients were females.

Concerning marital status, results of present study revealed that approximately three quarters of the studied patients were married. It might be explained that age categories of the studied subjects were within the marital age. This result agreed with **Alsubaie, et al., (2021),** in the study entitled "depression and anxiety on post-bariatric surgery among Saudi adults residing in Abha, Saudi Arabia" who documented that approximately two thirds of studied patients were married. **Pertaining residence,** the results of the present study illustrated that nearly two thirds of the studied patients resided in urban areas. This may be due to the nature of industrial life in the urban areas where the fast foods restaurants present, people using elevator instead of climbing stairs. This result agreed with **Ibrahiem, et al., (2021),** in a study entitled "assessment of compliance for postoperative patients with bariatric surgery, El-Demerdash Hospital of Ain Shams University, Egypt" who mentioned that about three quarters of the studied patients were living in urban areas.

Concerning the educational level, the result of the present study documented that two thirds of the studied patients had university education. This may be due to the educated patients is more aware of obesity problems. This result was in the same line with **Mohammed, et al., (2022),** in their study entitled "health promotion program regarding lifestyle behaviors among bariatric surgery patients at Assuit University Hospital" who illustrated that, nearly half of the studied patients had university graduates.

Owing to the occupation, the current study findings showed that more than half of the studied patients had practical office work. This may be due to more than half of the studied patients were employed and depend in their most eating on fast foods, because they didn't have any time to prepare healthy foods at their homes. This result was supported by **Tolvanen, et al., (2022),** in the study entitled "patients' experiences of weight regain after bariatric surgery, Sweden" who illustrated that majority of the studied patients were employed.

Concerning mean weight, height and BMI, current study findings showed that mean BMI of the studied patients was 46.78 ±7.73 preprogram implementation which improved to 44.2±6.87, 38.3±7.91 & 30.56 ±7.53 respectively during 1st month, after 3 & 6 months post program implementation. Additionally, there were a significant statistical differences between preprogram implementation and during 1st month, after 3 month as well 6 months among patients regarding their mean weight and BMI at P-value $\leq$ 0.000.

This result was consistent with **Mahran, et al., (2022),** who emphasized that change in mean BMI, preprogram, two-weeks and two-months post-program

in sleeve gastrectomy and minigastric bypass were 48.44±5.08, 45.44±4.87 & 42.69±5.02 and 49.70±8.62, 45.89±8.51 & 41.82 ±8.24 respectively. So, there is a significant change in BMI post-program.

Owing to total knowledge level, the result of the current study revealed that there were a significant statistical differences between preprogram implementation and during 1st month, after 3 months as well 6 months post program implementation regarding studied patients' total knowledge level post program implementation at P-value <0.05. This can be explained by fact that pre-and post-operative training sessions offer practical knowledge, expertise and support to bariatric patient in order to make necessary changes and reduce weight.

This finding was in accordance with **Ali, (2019),** in the study entitled "effects of nursing guidelines on postoperative complications and quality of life in patients undergoing bariatric surgeries, Egypt" who found that nearly majority of studied candidates had a low level of knowledge before guidelines, while after implementation of the nursing guidelines, more than three quarters of the studied candidates had improved with statistically significant difference in level of knowledge as compared to pre-implementation of nursing guidelines.

Also, **El-Maghawry, et al., (2021),** who mentioned that vast majority of patients, had unsatisfactory knowledge about life style modification after surgery before applying health education program, while the knowledge of patients was satisfactory after applying health education program in the 1st, 2nd and 3rd postoperative assessments. And this difference was statistically significant.

Pertaining to early complications the results of the current study revealed that minority of the studied patients had symptoms of bleeding, staple line leakage, wound infection, anastomotic stenosis and deep vein thrombosis during 1st month post program implementation.

This result supported by **Giannopoulos, et al., (2022),** in the study entitled "management of gastrointestinal bleeding following bariatric surgery, USA" who reported that when bleeding develops within 30 days of surgery, it is characterized as early. Bleeding complications most frequently occur in immediate postoperative period. Also, report that up to three quarters of postoperative bleeding complications present within the first 4 hours after surgery and minority of it present during month following bariatric surgery.

As well, **Głuszyńska, et al., (2022),** in the study entitled "risk factors for early and late complications after laparoscopic sleeve gastrectomy in one-year observation, Poland" who illustrated that the most common early complications that were observed in our studied patient were staple-line leakage. Staple-line leak is one the most serious and life-threatening complication that occurs in minority of patients undergoing laparoscopic sleeve gastrectomy.

Furthermore, **Strong & Guerrón, (2022),** in the study entitled "revisional bariatric surgery for chronic complications necessitates custom surgical solutions, USA" who documented that after laparoscopic sleeve gastrectomy, strictures and stenosis occur at the incisura angularis or at the gastro-esophageal junction, and after roux-en-Y gastric bypass, they usually occur at GJ anastomosis (when less than 10mm in diameter).

Moreover, **Sadeghi, et al., (2022),** in the study entitled "post-bariatric plastic surgery: abdominoplasty, the state of the art in body contouring, USA" who mentioned that an overall complication rate of more than one quarter was found. Type I complications (minor wound problems) occurred in about one fifth. Type II complications occurred in minority of patients, deep venous thrombosis occurred in about one fifth.

Owing statistical relation between total knowledge score and personal data of patients through program, the results of the current study revealed that there was a significant statistical relation between residence, educational level and occupation among the studied patients and their total knowledge score preprogram implementation as well after 3 month post program implementation at P-value < 0.05.

This result was similar to **Cadena-Obando, et al., (2020),** in the study entitled "are there really any predictive factors for a successful weight loss after bariatric surgery?, Mexico" who displayed that there was no a statistically significant difference between educational level, residences, and total knowledge score (P-value= 0.000). While, in the posttest, there was a significant relationship between age, educational level, residences, and total knowledge score (P-value= 0.044, 0.000, 0.004) respectively.

Conclusion

A significant statistical improvement was found among studied patients during 1st month, after 3 months as well 6 months post program implementation among studied patients regarding their mean weight and BMI, knowledge level, complications. Significant statistical relation between residence, educational level and occupation among the studied patients and their total knowledge score preprogram implementation as well after 3 month post program implementation.

Recommendations:

1- Replication of the study using a larger probability sample from different geographical regions for generalization of results.

2- Similar studies are needed to assess the long-term effects of such educational programs. 3- Further research is needed to assess effects of preoperative education on postoperative complications and surgical outcomes in bariatric patients.

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