

Effect of Hybrid Nursing Guidance on Eating Patterns and Perception among Patients Post Gastric Sleeve

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Abstract

Background: Post gastric sleeve surgery, the changes in gastrointestinal physiology result in altered absorption and nutrient deficiencies. These patients need specialized nursing guidance to prevent unnecessary gastrointestinal symptoms. **Aim:** The study aims to examine the effect of hybrid nursing guidance on eating patterns and perception among patients post gastric sleeve. **Design:** quasi experimental (per-posttest) research design. **Sample:** A convenient sample of Eighty adult male and female patients. The sample was divided into two groups (study group 50 patients) and (control group 30 patients) undergoing gastric sleeve surgery **Setting:** Department of plastic surgery, gastric sleeve surgery unit and obesity outpatient clinic at Assiut university hospital. **Tools:** The data were collected by using three tools: (1) An interview questionnaire sheet (2) three-factor eating questionnaire and (3) Body image perception questionnaire. **Results:** there was a statistically significant difference in knowledge scores between study and control groups between the pre and posttest after 6th months from the application of the hybrid nursing guidance, as well as patients' eating practice pattern wear enhanced significantly post application of the hybrid nursing guidance, also patients complications post gastric sleeve were improved, finally patient' perception was significantly higher comparing to pre application values with (p = 0.001). **Conclusion:** This study showed that implementation of hybrid nursing guidance contributed positively with the changes of the patients post gastric sleeve surgery regarding eating practice pattern, prevent unnecessary gastrointestinal complications, and higher perception comparing to pre application of the hybrid nursing discharge guidance. **Recommendation:** Nurses should apply these guidelines as hospital routine care in the study place, as it will help patients adapt to their situation and increase their wellbeing as the initial aim.

Keywords: *Eating Patterns, Gastric Sleeve & Hybrid guidance & Perception.*

Introduction:

The management of the escalating obesity crisis could be accomplished by the use of the gastric sleeve (Yassin, et al., 2021). More than 650 million persons are obese, according to statistics from the World Health Organization (WHO) (WHO., 2019). There are 1.9 billion overweight adults worldwide. Numerous studies had shown that, in addition to physiological health issues, obesity also leads to psychological issues as it negatively influencing people's self-esteem and mental health. The prevalence of obesity was noted to be higher among those with poorer perceptions of their bodies and those who are more susceptible to chronic illnesses, including cancer, type 2 diabetes, heart disease, and stroke (Zhu, et al., 2022).

The sleeve gastrectomy operation was initially proposed as a substitute for distal stomach resection with duodenal switch in order to reduce the risk of

obesity-related problems (Kwok, et al., 2020). The prevalence of sleeve gastrectomy is increasing comparing to previous years, whereas the prevalence of adjustable gastric bands is significantly declining. Gastric sleeve surgery procedures have proved to be the most effective long-term weight loss, and illnesses control solutions, and they decrease obese people's morbidity rate (Akkayaolu, & Celik, 2020).

The larger curvature of the stomach is removed during the surgical weight-loss surgery which called a sleeve gastrectomy resulting stomach volume reduction among 80% of the patients roughly with severe restriction of food intake. Additionally, the numbers of cells that produce the hunger hormone ghrelin is reduced after stomach fundus ablation. According to Moulla, et al. (2018), a decrease in plasma ghrelin hormone levels encourages satiety and reduces food consumption.

Severe gastrointestinal issues, such as dumping syndrome (severe discomfort following sweet

ingestions followed by nausea, vomiting, bloating, cramps, diarrhea, dizziness, exhaustion, weakness, and sweating). Plugging (issues with food being stuck in the stomach's tiny aperture) had documented its occurrence among cases post-surgery. Following surgery, symptoms of vitamin and mineral deficiencies showed (Poon, & Rosenbluth, 2022). Early or spontaneous vomiting following surgery was showed with an effort from the patient to deal with the discomfort. After having a gastric sleeve, patients frequently describe experiencing reflexive or self-inflicted vomiting in reaction to unpalatable meals, overeating, improper chewing, or simply when eating too quickly (Sahebzamani, 2020).

The healthcare staff must be aware about any metabolic, behavioral, and physical changes that may take place in patients after gastric sleeve surgery in order to obtain the desired results. A nurse plays a crucial role in the treatment and care of patients, during preparation for surgery, as well during educating patients about the potential side effects of surgery, and also during providing the discharge instructions. During conducting the investigations at least, a year following surgery, it was emphasized that there had been a considerable increase in quality of the dietary contented and in the physical wellbeing of patients who had lost weight compared to psychological wellbeing as well (Akkayaolu, & Celik, 2020).

Nurses must identify the link between eating habits, perceptions of one's physique, and nutritional quality. To improve the quality of food consumed or compliance with advised supplement usage, the patient post-sleeve surgery must provide an individualized care through implementation of a nursing guidance, enhancing that nutritional care and food choice important as lifelong considerations. Following gastric sleeve surgery, nursing support will enable the patients to maintain good lifestyle habits (Yuan, et al., 2022). The advantages and positive effects on the patient's health that result from regular nutrient status monitoring, preventing nutrient shortages, and maximizing long-term weight loss (Parretti, et al., 2019).

Significant of the study:

The general health of patient's post-gastric sleeve surgery was severely impacted by complications. The mortality rate varies from 0.18% to 0.27% depending on age, sex, and comorbidities (Hajer, et al., 2018). The incidence of postoperative complications after gastric sleeve surgery is 2.12%. Studies had concentrated on giving patients post-gastric sleeve surgery, nursing-hybrid discharge counselling on issues including adjusting and keeping a healthy lifestyle during the postoperative period to benefit

from the operation as much as possible (Maurice, et al., 2020).

Patients' overall quality of eating patterns and general health significantly improved because of patient education and follow-ups. However, the issue of contact loss in the lengthy term of follow-up will be resolved by the 6-month education and follow-up program employing two forms of interactions with the patient. These gastric sleeve surgery guidelines should assist in reducing post-operative problems and enhancing the patients' quality of eating habits. So, the study aimed to examined the effect of hybrid nursing guidance on eating patterns and perception among patients post gastric sleeve.

Aim of the study:

This study examined the effect of hybrid nursing guidance on eating patterns and perception among patients post gastric sleeve.

Research Hypothesis:

Patients who follow hybrid nursing guidance will have:

H1: The knowledge scores will be higher among the study group than the control group post the application of hybrid nursing guidance in the 1st and after 6th months.

H2: There will be differences between the eating practice pattern post the application of hybrid nursing guidance in 1st and after 6th months among patients post gastric sleeve surgery.

H3: Postoperative complications will be lesser among the study group than the control group.

H4: Better perceptions will be detected among patients post gastric sleeve surgery

Operational definition:

Hybrid nursing guidance: A technology dependent and organizationally driven instructional strategy that enables flexible face-to-face learning sessions for patients, as well as asynchronous remote access to guidance sessions.

Methods:

Design: a quasi-experimental (pre- posttest) research design is utilized in the study.

Subjects: The study was conducted with patients undergoing gastric sleeve surgery take one-year duration from April 23, 2021, to April 23, 2022.

Setting: The study conducted at the department of plastic surgery, gastric sleeve surgery unit and obesity outpatient clinic at Assiut University Hospital.

Sample: A convenient sample of 80 adult patients (62 males and 18 females divided as study (50) and control groups (30) patients) who would undergo sleeve surgery and admitted to the department of plastic surgery, gastric sleeve surgery unit and obesity outpatient clinic at Assiut University

Hospital. This clinic team selecting the patients at the Wednesday then listed in the surgery list.

Patients who fit the following criteria are chosen for the study: both sexes, between the ages of 20 and 60 years old, with a BMI more than or equal to 40 kg/m², with major comorbid medical disorders connected to obesity, able to speak and work cooperatively with the researcher.

One day following the procedure, the first group (the study group) received and started to implement the nursing instructions and patient care regarding the gastric sleeve surgery facility. Later, the department continued to guide and care the patients for at least 3 days. Patients who did not have any issues throughout this time were released from care. The researchers provided hybrid nursing guidance throughout this phase. The physician and researchers regularly checked the patient after discharge.

The second group, (the control group), was exposed only to the standard medical and nursing care and did not take part during hybrid nursing supervision over the course of the study.

Sample size:

It was estimated using the G POWER 3.1 package program (Faul, et al., 2007). The study's minimal sample size was determined to be 42 patients, with an alpha error of 5%, a power of 80%, and an effect size of 0.39. 50 patients who agreed to participate in the study and who had no known mental or psychological health issues, no communication-impairing medical conditions, and no complications that might have prolonged their hospital stay were used in the study.

Tools of data collection:

The data were collected by using three tools:

Tool I: An interview questionnaire sheet:

After reviewing the study literature, the researchers created and employed this technique, which had two parts:

Part 1: Patient's personal characteristics as: age, gender.

Part 2: Health relevant data and Measurements include:

BMI (kg/m), overweight, obese, morbid obsess., and anthropometry measurement: RBC, WBC, hemoglobin level, and length of hospital stay (LOS).

Part 3: Complications post-surgery: Dumping syndrome, Vitamin deficiencies. Heartburn, Abdominal pain, Vomiting, Severe Constipation, Feeding intolerance.

Tool (II): The Three-Factors Eating Questionnaire:

It was developed by (Kırac, et al., 2015) and was used by the researchers to assess patients who eat regular meals – avoid skipping meals, consume smaller amounts, cut food into small pieces, chew

well, eat slowly, avoid distraction when eating – practice mindful eating, avoid eating and drinking at the same time. The 51-item Three-Factors Eating Questionnaire (TFEQ-R21) is a scale that measures three domains of eating behavior: (cognitive restraint (CR) Factor I - 21 items), (uncontrolled eating (UE) Factor II - 16 items) and (emotional eating (EE) Factor III - 14 items)

Individuals' degrees of limiting food intake consciously, uncontrolled eating levels and the degree of eating at emotional moments are measured with this form. Akkayaolu, & Celik, (2020) found during the validity and reliability study of its Turkish version that this questionnaire also measures hunger sensitivity.

Scoring system:

There are 0 or 1 points assigned to each item. Therefore, the maximum attainable score of 21-16-14 is the required minimum for factors I, II, and III.

The possible scores from the questionnaire's variables are 5–20 for degrees of uncontrolled eating, 3–12 for emotional eating, 6–24 for intentional calorie restriction, and 4–16 for hunger sensitivity increases in all but one of the scores.

Tool validity:

In the Turkish validity and reliability assessment, the questionnaire's Cronbach's alpha coefficient was determined to be 0.721 (Bahadır, et al., 2015). The Cronbach's alpha coefficients for this study were determined as follows: 0.781 for uncontrolled eating, 0.594 for emotional eating, 0.931 for intentional calorie restriction, and 0.84 for hunger sensitivity.

Tool (III): The Body Image Perception Questionnaire (BIPQ)

Secord, & Jourard, created this questionnaire in 1953. Patient Perception on Comorbidities and Complications, Patient Perception on Motivations for Surgery, Patient Perception on Other Weight Loss Methods Tried, Patient Perception on Gastric Sleeve Effect on Exercise and Diet, and Patient Perception on Gastric Sleeve Effect on Relationships are some of the topics covered in this article. I am not satisfied at all, I am not satisfied, I am neither satisfied nor unsatisfied, I am satisfied, and I am quite satisfied in response to this question. A higher BIPQ score indicates a larger percentage of extremely satisfied 5 degrees.

Scoring system:

High levels of discontent are indicated by low scores on this questionnaire's 40 items, each of which has a 5-point Likert scale. Each item's score, which includes responses like "I am not at all satisfied," "I am not satisfied," "I am neither satisfied nor dissatisfied," "I am satisfied," and "I am very satisfied," can range from 1 to 5, while the overall score can range from 40 to 200.

Tool Validity:

Hovardaoglu, (1993) conducted a validity and reliability assessment on the questionnaire, and the Cronbach's alpha coefficient was found to be 0.91. For this investigation, the scale's Cronbach's alpha value was estimated to be 0.939. The cut-off score for the questionnaire is 135; those who score less than 135 are classified as belonging to "the group with a low body image perception".

The hybrid nursing guidance:

It was created by researchers based on a review of the literature (**Parretti, et al., 2019; WHO, 2019**) which were used to improve the eating practice pattern and perception of patients undergoing gastric sleeve during 1st and 6th months postoperatively.

It consists of the basic knowledge about gastric sleeves surgery as postoperative eating, healthy eating habits, regimen, prohibited unsafe practices for preventing post-operative negative changes: Routine adult multivitamin plus mineral (includes iron, folic acid and thiamine), Eat nutrient-dense foods and balanced meals, Establish a regular eating pattern to avoid meal skipping, Avoid high calories containing drinks, Avoid energy-dense & nutrient poor foods, Take recommended vitamin and mineral supplements, Monitor weight to identify relapse early, Exercise and become more active within abilities at least 30 minutes and Maintain ongoing follow up with surgeon & dietitian, to improve their self-image perception.

The printed flyer contained colored pictures explaining the content clearly and seen easily and was given to the patient in the ward after gastric sleeve surgery. While the soft copy for continuous patient guiding virtually through telegram and WhatsApp groups during their follow up period.

Content Validity:

For content validity of tool, I, and hybrid nursing guidance the researchers designed the tool and was revised by five medical-surgical nursing experts in Faculty of Nursing Assiut University and two staff members from the faculty of medicine Assiut University. The using five-point Likert-type scale 5 degree if present complication 0 for absent. The content validity index per item ranged from 0.8 to 1.0 for both relevancy and clarity.

Ethical Consideration

Following an explanation of the study's purpose and advantages to each patient, written consent was obtained. Each patient has the right to withdraw from the study at any time without providing a reason, the researchers emphasized, that participation is entirely voluntary. Additionally, the data were coded and tabulated to ensure anonymity and secrecy.

Pilot study:

Five patients who underwent gastric sleeve surgery in a pilot test filled out the survey form, as 10% of the sample was used for the pilot test. The survey form was left unchanged and was clear to the patients.

Field Work:

The study was carried out in three stages: interviewing and assessment phase, implementation phase, and evaluation phase. The data collecting period lasted for one year from the begging of April 1st, 2021, and ended on April 1st, 2022.

Interviewing and Assessment Phase:

During this phase, the researchers specified the goals of the study, the elements of the data collection instrument, and the hybrid nurse discharge guide contained. Every patient needed to complete the entire questionnaire, which needed about 30 and 45 minutes to fill in.

The implementation phase:

Between April 1st, 2021, to April 1st, 2022, face-to-face interviews sessions were held with the patients in order to assess their information employed the hybrid guiding content to assess their data about this phase. Before the assessment, the patients were met at the clinic, on Wednesday, by the researcher, who also obtained their informed permission prior the interview.

The initial interview period for the pretest, conducted in two sections:

The first section: Involved gathering the baseline information about each participant's demographics data, clinical findings, and medical measurements at the gastric sleeve surgery unit at the plastic surgery department. The interview was conducted in the afore mentioned hospital departments throughout the morning and afternoon shifts. Utilizing the three components of the tool, I, which need about 20 to 30 minutes to fill in.

After that, the patients were asked to complete the tools, the Three-Factor Eating Questionnaire (tool II), and the Body Image Perception Questionnaire (tool III), which needed about 45 minutes to fill in.

Second section: It was carried out individually and addressed A simple flyer nursing guidance which was designed by the researchers, based on the results obtained from the assessment of the patient needs.

The content of the flyer was written in simple Arabic language and consistent with the related literature (**Akkayaolu, & Celik, 2020**), (**Yayla, & Menevşe, 2022**) and (**Zhu, et al., 2022**).

The content of the hybrid guidance covered two parts related to data collection tools (Tools II and III).

The patient received the face-to-face nursing discharge guidance about how to select meals and how to deal with the possible conditions, or

complications as well. The session needed about 15 minutes for each patient individually.

The same form and questionnaires (Tool I-part B and tool II) both were given to the patients at discharge from the hospital to be completed at the end of the first month after the surgery.

The hybrid nursing guidance contents were available to the patients, with continual communication with the researchers through electronic methods and providing feedback regarding the effectiveness of the hybrid nursing guidance on their eating habits as well as their perception.

The researchers obtained the telephone number from each patient and assessed the availability of internet access to communicate (virtually) with the patients via telephone call, Telegram or WhatsApp.

These methods were used by the researchers to communicate with patients and to re-present the content of the hybrid nursing guidance (flyer and online contact) until patients come back for follow up as a continuous educational method.

The researchers determined one day weekly to contact with the patients individually to represent the contents of each part of the hybrid nursing guidance as the patient was informed to join this virtual meeting on time to allow for open discussion which need about 30 minutes at two time.

The second interview time: It was carried out by the researchers for each patient at the obesity outpatient clinic. When the patients came to the hospital for checking up through the first month following the

surgery the researcher meets the participant patients three time during this period. The same forms and questionnaires (Tools I, II and III) were given to them again to be complete during their three-month check-up and they were retrieved. The data collection period was also completely anonymous.

The evaluation phase:

The objective of this phase was to compare between the study and the control groups after the implementation of the hybrid nursing guidance for the study group about BMI (kg/m), anthropometry measurement: RBC, WBC, hemoglobin level, LOS, complications, post-surgery eating pattern, and perception in order to estimate the effect of the hybrid nursing guidance and determine whether the study's goal had been achieved or not.

Statistical analysis:

Categorical variables were described by number and percent (N, %), where continuous variables described by the mean and standard deviation (Mean, SD). Chi-square test and Fisher exact test used to compare categorical variables where compare between continuous variables by t-test. A two-tailed $p < 0.05$ was considered statistically significant. We are used a person correlation to appear in the association between scores. All analyses were performed with the IBM SPSS (26) software.

Results:

Table (1): Demographic and clinical characteristics of the studied patients

Demographic characteristics.	Hybrid guidance group (N=50)		Control group (N=30)		P-value
	N	%	N	%	
Age:					0.477
▪ 25<35	0	0	1	3.3	
▪ 35 <45	30	60	19	63.3	
▪ 45 <60	10	20	5	16.7	
▪ >60	10	20	5	16.7	
Mean ± SD=	36.34 ±10.89				
Gender:					0.835
Male:	39	78	23	76.7	
Female:	11	22	7	23.3	
Anthropometry measurement:					0.968
▪ RBC ($10^6 \mu/L$)	5.01 ± 0.5		4.9 ± 0.5		
▪ WBCs ($10^3 \mu/L$):	6.6 ± 1.6		6.7 ± 1.5		
▪ Hemoglobin level(g/L):	14.4 ± 1.5		13.8 ± 1.5		
length of hospital stays (LOS):	5.5 ± 0.71 days		4.9 ± 1.81 days		0.039

Table (2): The differences between the control and study groups regarding knowledge level pre and post implementation of the hybrid nursing guidance (N=80).

		Knowledge score						P- value
		Pre		Post 1 Month		Post 6 Months		
	Groups	N.	%	N.	%	N.	%	
Satisfactory Knowledge	Control	9	30	10	33.3	12	40	0.415
Unsatisfactory Knowledge		21	70	20	66.7	18	60	
Satisfactory Knowledge	Study	15	30	33	66	46	92	0.001*
Unsatisfactory Knowledge		35	70	17	34	4	8	
Total Knowledge		0.143		0.003		0.001*		

*Satisfactory level ≥ 50

*significant at P. values ≤ 0.05

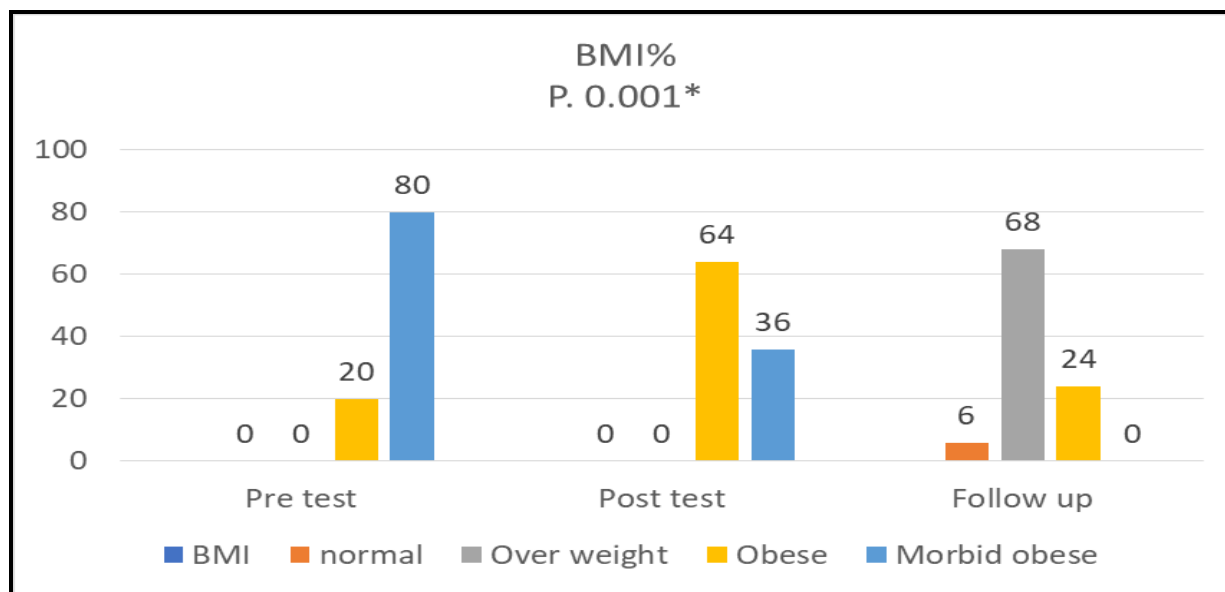


Figure (1): Relation between pre, post and follow up after application of the nursing hybrid guidance regarding BMI level among hybrid nursing guidance group (n.=50).

Table (3): Comparison between studied groups according to their complications pre and post implementation of the hybrid nursing guidance (N=80).

Complications post-surgery:	Hybrid guidance group (N=50)						Control group (N=30)						Test of Sig. P (1)	Test of Sig. P (2)	Test of Sig. P (3)
	Pre		Post 1 Month		Post 6 Months		Pre		Post 1 Month		Post 6 Months				
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Dumping syndrome	17	34	6	12	2	4	10	33.3	11	36.6	11	36.6	0.654	0.160	0.133
Vitamin deficiencies	7	14	3	6	1	2	5	16.6	6	20	7	23.3			
Heartburn (GERD)	18	36	4	8	1	2	11	36.6	12	40	11	36.6			
Abdominal pain	32	64	3	6	0	0	20	66.6	21	70	21	70			
Vomiting	2	4	1	2	0	0	2	6.6	3	10	2	6.6			
Severe Constipation	11	22	3	6	1	2	7	23.3	8	26.6	10	33.3			
Feeding intolerance	8	16	1	2	0	0	5	16.6	3	10	2	6.6			
P. value	0.155						0.881								

Significant difference at p .value <0.05 ,

Significant difference at p .value <0.001

(P1) p value for comparing between the studied groups both study and control pre.

(P2) p value for comparing between the studied groups both study and control post one month.

(P3) p value for comparing between the studied groups both study and control post six month.

Table (4): Comparison between studied groups according to the Three-Factors Eating Questionnaire (TFEQ-R21) pre and post implementation of the hybrid nursing guidance (N=80).

Eating pattern (Three factor questionnaire)	Hybrid guidance group)N=50(Control group (N=30)						Test of Sig. P (1)	Test of Sig. P (2)	Test of Sig. P (3)
	Pre		Post 1 Month		Post 6 Months		Pre		Post 1 Month		Post 6 Months				
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Uncontrolled eating.	23	56	18	32	13	26	17	56.7	22	73.3	25	83.3	0.346	0.001	0.001
Mean ± SD	15.28±2.48		10.52±2.67		8.52±2.01		14.85±3.78		17.82± 2.87		18.52±1.91				
Emotional eating levels.	26	52	14	28	9	18	16	53.3	20	66.7	23	76.7	0.953	0.001	0.001
Mean ± SD	9.80±2.30		5.56±2.43		4.32±1.28		9.76±3.07		10.06±1.43		10.32±2.01				
Limiting food intake consciously.	14	28	31	62	42	84	4	16.7	8	26.7	16	53	0.265	0.001	0.001
Mean ± SD	10.12±2.86		19.28±3.76		20.68±2.11		10.72±2.16		12.98±5.76		13.66±3.68				
Hunger sensitivity.	32	64	17	34	10	20	10	33.3	13	43.3	18	60	0.563	0.001	0.001
Mean ± SD	13.50±2.23		9.18±2.51		5.64±1.47		14.90±1.77		19.98±4.59		24.94±6.27				
Total score	48.70±9.87		44.54±11.37		39.16±6.55		49.63±11.48		60.84±14.65		67.44±13.87		0.593	0.001	0.0001

Significant difference at *p* .value <0.05, Significant difference at *p* .value <0.001
 (P1) *p* value for comparing between the studied groups both study and control pre.
 (P2) *p* value for comparing between the studied groups both study and control post one month.
 (P3) *p* value for comparing between the studied groups both study and control post six month.

Table (5): Comparison between studied groups according to the patient perception questionnaire pre and post implementation of the hybrid nursing guidance (N=80).

Patient Perception Questionnaire	Hybrid guidance group (N=50)						Control group (N=30)						Test of Sig. P (1)	Test of Sig. P (2)	Test of Sig. P (3)
	Pre		Post 1 Month		Post 6 Months		Pre		Post 1 Month		Post 6 Months				
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Not satisfied at all - One degree	48	96	36	72	9	18	27	90	28	93.3	29	96.7	0.286	0.001	0.001
Not satisfied - Two degree	45	90	33	66	6	12	28	93.3	28	93.3	29	96.7	0.300	0.001	0.001
Neither satisfied nor dissatisfied - Three degree	6	12	7	14	10	20	4	13.3	5	16.7	8	26.7	0.0842	0.001	0.001
Satisfied - Four degree	4	8	29	58	41	82	3	10	5	16.7	7	23.3	0.216	0.001	0.001
Very satisfied - Five degree	2	4	39	78	48	96	2	6.7	4	13.3	9	30	0.254	0.001	0.001
General Coping	3	6	28	56	47	94	1	3.3	6	20	8	26.7	0.066	0.001	0.001
Total score	88.10±23.9		109.82±16.4		171.56±14.5		87.17±13.88		99.72±11.57		101.16±12.5		0.785	0.005	0.001

Significant difference at *p* .value <0.05, Significant difference at *p* .value <0.001
 (P1) *p* value for comparing between the studied groups both study and control pre.
 (P2) *p* value for comparing between the studied groups both study and control post one month.
 (P3) *p* value for comparing between the studied groups both study and control post six month.

Table (6): Correlation between the different parameters pre and post implementation of the hybrid nursing guidance, after one month, and post six-months period among the study groups (n = 80).

Parameters		Hybrid guidance group (N=50)			Control group (N=30)			P. r.
		Pre	1-month follow-up (Time 2)	6-months follow-up (Time 3)	Pre	1-month follow-up	6-months follow-up (Time 3)	
		Post-Surgery Complications			Post-Surgery complications			
Eating pattern: (Three factor questionnaire)	P.	0.763	0.081	0.001	0.773	0.192	0.181	0.001
	r.	1.811	0.976	0.224	1.817	0.131	0.129	-0.341
Patient Perception Questionnaire: (General Coping)	P	0.871	0.071	0.003	0.971	0.981	0.871	0.003
	r.	1.970	0.806	0.341	2.070	0.152	0.197	-0.521
Total Knowledge	P.	0.871	0.091	0.001	0.991	0.197	0.765	0.002
	r.	1.661	0.911	0.215	2.021	0.166	0.162	-0.541

r: Pearson coefficient *: Statistically significant at $p \leq 0.05$

Table (7): Multivariate Linear regression for factor affecting the patient complications among the hybrid guidance group (n.=50).

Factors	Complication		
	B	Beta	P
Age	3.922	2.208	0.049
Gender /female	2.990	2.191	0.001
Eating pattern	3.822	2.208	0.001
patient perception	1.004	2.729	0.144
General Coping	2.952	2.018	0.033

B: Coefficient of determination Beta: Standardized p values for the model *: Statistically significant at $p \leq 0.05$

Table (1): Showed that, there was no statistically significant difference between **hybrid** guidance group and control group regarding their demographic and medical characteristics except their length of stay (0.039*). The table also, showed that the mean age of the patients was 36.34 ± 10.89 years old, 78 and 76.7 % respectively were females. It was found that the patients stayed at the hospital for a mean duration from 5.5 ± 0.71 and 4.9 ± 1.81 days (respectively). The mean results of both **hybrid** guidance group and control group, RBC ($10^6 \mu/L$) were 5.01 ± 0.5 and 4.9 ± 0.5 , WBCs ($10^3 \mu/L$) were 6.6 ± 1.6 and 6.7 ± 1.5 and Hemoglobin level(g/L) were 14.4 ± 1.5 and 13.8 ± 1.5 (respectively).

Table (2): Revealed that, there was a statically significant difference between the study and control groups regarding their knowledge level (0.001*). While there was a significance improvement in the knowledge level among the **hybrid** guidance group after application of the nursing hybrid guidance.

Figure (1): showed that there was a statistically significant difference between pre, post and follow up after application of the nursing hybrid guidance regarding BMI level among the discharge guidance group. It also found that 80% were morbidly obese

before the surgery, and 36% were morbidly obese at the first month following the surgery. Also, it was determined that there was no morbid obesity among the patients, and 84% of the patients were obese at the one month following the surgery. While after six months postoperative, 24% of the patients were found to be obese, and 8% had normal weight. There was an increase in percentage of normal weight among the **hybrid** guidance group.

Table (3): Reported that, there was statistically significant difference between the studied groups according to their complications pre and post application of nursing hybrid guidance regarding vomiting post-operatively with ($p = 0.001$).

Table (4): demonstrated that there were statistically significant differences between the mean factor scores of the patients from the Three-Factor Eating Questionnaire before and after the surgery (follow up for 6 months) with ($p = 0.001$). Also, it was shown that the patients' mean scores for uncontrollable eating behavior, emotional eating intensity, and hunger sensitivity were highest before surgery and decrease sixth months postoperative among the discharge advice group compared to the control group. Additionally, it was observed that patients' unhealthy

eating habits got worse after surgery. The patients' mean score for consciously restricting food intake was low before surgery and become high after 6 months post-surgery. Also, it was found that the Discharge guidance group demonstrated greater improvement in this behavior than the control group.

Table (5): Revealed that there was statistically significant difference between the study and control group with ($p = 0.001$), following the implementation of the nurse hybrid discharge advice among the study group, as well it was shown that the patients' perceptions of their bodies after 6 months post gastric sleeve surgery were much greater than during their studied time with ($p = 0.001$). Also, when compared between the study group and the control group, low body image perceptions were improved pre and post implementation of the nursing hybrid guidance by one month and six months after the operation.

Table (6): Showed a negative correlation between eating pattern and patient perception with post-surgery complications pre, post implementation of the Nursing Hybrid guidance by one month and post six-months period among the study groups.

Table (7): Displayed the most frequent factors that could had an impact on a patient's risk for developing a post-gastrectomy complication over the course of the study period, with P value = 0.001, as patient's gender was the first factor to have an impact on a patient's complications. Additionally, the third and fourth factors were not significantly connected with patient perception and overall coping with P values 0.144 and 0.033, respectively, while the second factor was the eating pattern with P value = 0.001.

Discussion:

Weight loss, or more specifically, a reduction in body fat tissue, is the main factor used to assess the effectiveness of gastric sleeve surgery. In order to ensure weight reduction and the absence of issues after gastric sleeve surgery, patients' eating habits are crucial (Akkayaolu, & Celik, 2020).

The postoperative BMI ratios of the patients were significantly lower than their pre- implementation of nursing discharged hybrid nursing guidance values and eventually reached a level that was close to normal, according to the aim of the current study which examine the effect of hybrid nursing guidance on eating patterns changes, post-operative complications, patients' perception, body image perceptions, and the overall knowledge of obese patients before and after 6 months post-surgery.

Through using the hybrid technique of patient guidance and its reflection on patient complications and overall health, this outcome demonstrates preservation of long-term dietary management regardless of the type of gastric sleeve surgery.

According to the recently published study, there was a statistically significant difference regarding the knowledge levels of the study and control groups. However, after the application of the nurse hybrid discharge guidance by three months there was a significant improvement among the study group regarding the discharge guidance's knowledge level.

The uncomplete information that provided to patients by the medical staff may be the cause that many patients among the study and control groups were illiterate regarding their condition, and other patients showed no interest in learning anything at all. However, other patients were curious to understand all but their condition but couldn't locate somebody with enough time to give them the knowledge they needed.

This can be linked to their poor reading levels and the inadequate education services provided by the primary healthcare institutions (Applegate, et al., 2020). It may be difficult to provide patients with high-quality surgical and medical care in underdeveloped nations due to shortages of resource.

In this respect, Huber, et al., (2021) indicated that patient health education will raise the patients' knowledge regarding their health issues in their study entitled "Patient-related complexity of nursing care in acute care hospitals-an updated concept". This is consistent with the Davids, & Frenken, (2018) study, which demonstrated a strong association between the patient's knowledge about gastric sleeves and their educational level.

There was a connection between patient education and information received regarding to their illness process, recovery, and potential consequences, that had been described in the literature, so it come in agreement with a study done by Koivisto, et al., (2020) who fund a substantial diversity.

In this way, Roche, & Jones, (2021) verified that the teaching sessions which held with the study group following the insertion of gastric sleeves had a substantial influence on patient's weight reduction, as well with differences particularly noticeable items regarding the motivation to follow instructions and check-ups.

The current study found a statistically significant difference between the patients' mean factor scores on the Three-Factor Eating Questionnaire before and after the surgery. As it was found that the patients' mean ratings for the uncontrollable eating behavior, emotional eating intensity, and hunger sensitivity were highest prior to surgery and one month following surgery and become low six months post-surgery. It was also observed that after surgery, the patients' negative eating habits diminished.

The patients' mean score for intentionally restricting their food intake was computed as the lowest before

surgery and increase six months after surgery, and it was decided that they became better at this activity.

Sasaki, et al. (2022) in their study, stressed that the patients' nutritional status need to be monitored throughout the stages of the surgical procedure, starting from the preoperative care period.

Additionally, this study found that three months following gastric sleeve surgery, patients' uncontrolled eating behavior, emotional eating degree, and hunger sensitivity scores all gradually decreased and showed favorable eating behaviors with ($p < 0.05$), while in a study done by **David, et al., (2020)** they reported that after sleeve gastrectomy, the patients' ratings for uncontrollable eating, emotional eating, and hunger sensitivity all dropped, but their scores for actively restricting food intake increased, according to study done by **Storman et al., (2022)**. While the findings of a study done by **Yassin, et al., (2021)** they were consistent with the finding of other research, that gastric sleeve surgical therapy reduced the patients' unhealthy eating habits.

According to this study's findings, there was a post-operative vomiting item improved post the application of the hybrid discharge guidance with statistically significant difference between the studied groups' problems before and after the operative periods. According to study done by **Mohamed, & Bahgat, (2019)** who also agreed with the findings of the current study, regarding the effect of inadequate patient education which could had a negative impact on the surgery's ability to achieve its intended goals and result in undesirable effect.

Three months following gastric sleeve surgery, the patients' perception of their bodies was found to be much worse than they had been previously with ($p = 0.001$). It became obviously that three months after surgery, low body image perceptions that was existed before the procedure improved.

Obesity is known to induce psychosocial issues in addition to physical issues, and psychological issues affect how gastric sleeve surgery works (**Vaishnav, et al., 2022**). Studies done on the idea of ego, found that the physical condition is part of the ego, which centered on body image, and it has been highlighted how obesity grew due to poor quality of life and body image perception (**Oltmanns, et al., 2020**).

According to study done by **Al Mansoori, et al.'s, (2021)** they reported that morbidly obese people had much poorer views of their bodies than people with BMIs under 30. Therefore, **Iossa, et al., (2020)** investigated in their study 50 patients (36 female and 14 male) with a mean age of 43.82 and 12.2 years old, and they found a clear association between BMI and body image perception during the postoperative phase.

Additionally, it was noted in the study done by **Roche, & Jones, (2021)** that female patients were less happy than male patients and that people felt heavier than they were long after having gastric sleeve surgery.

According to a study done by **Brito, et al., (2020)** they observed a positive correlation between patients' quality of life after gastric sleeve surgery and their contentment with their body image. According to a study done by **Graham, et al., (2021)** reported that patients' impressions of their bodies may be severely impacted by the development of loose skin following excessive weight loss post gastric sleeve surgery.

According to the current study finding, individuals who underwent gastric sleeve surgery had poor body image assessments both before and one month after the surgery. However, after one and three months post the operation, these numbers were high. This conclusion, regarding to the researcher's opinion, was related to the decline in BMI levels as well as maintaining weight control through the development of positive eating practices, as indicated in many studies.

Generally, illnesses like obesity and other co-occurring conditions had an adverse impact on eating habits. Within the first year after having gastric sleeve surgery in order to control their obesity, patients report feeling better about their appearance and having a higher quality of life according to a study done by **Graham, et al., (2021)**.

According to study done by (**Le Foll, et al., 2020**) they reported that, patients' body dissatisfaction before gastric sleeve surgery was highly influenced by their BMI, and low body image assessments were common among obese people. While **Iossa, et al. (2020)** in their study reported that improvements in physical, mental, and behavioral health occurred following obesity therapy.

Additionally, according to study done by **Conceição, et al., (2020)** they reported that perception scores dramatically improved with time, particularly beginning in the third month post gastric sleeve surgery. While the finding of a study done by **Yassin, et al., (2021)** highlighted the importance of an improvement in body perception concurrent with an increase in physical activity after surgery and by urging patients to participate in physical exercise training. As, it was emphasized that the quality-of-life scores following gastric sleeve surgery were greater than those in the preoperative period, as demonstrated in all research examining the impact of gastric sleeve surgery on patient's self-image.

The current study results showed that, after six months post the implementation of the nursing hybrid discharge advice, there was a positive association between the patient's complications during the study

period, overall perception, eating practice pattern, and knowledge.

This is consistent with the finding of a study done by **Chen, & Antonelli's, (2020)** and reported that the eating pattern is influenced by knowledge, personal taste preferences, emotion, hunger level, health state, specific diet requirements, ethnicity, and personal income.

The primary scientific emphasis following gastric sleeve surgery is undoubtedly behavioral issues, such as eating habits, calorie consumption, food preferences, and physical activity. According to a study done by **Alvarez, et al. (2016)** they reported that those who gain weight after having a gastric sleeve surgery tend to consume more fat and calories than people who maintain their weight. Like this, retainers who were more likely to give up good eating habits and consume more calories, according to research done by **Essayli, et al., (2018)**. The authors reported that those who gain weight after surgery are more likely to stop keeping a regular food diary.

The current study proved a strong relationship between patient perception, ages, eating habits, and coping style, but there was no relation between patient perception, LOS, BMI, or anthropometry measurements.

According to a study done by **Iossa, et al., (2020)** they reported that patient factors including gender, age, and educational attainment had an impact on how they perceive the patient and his informational demands.

This also agreed with the findings of a study done by **Ji, et al. (2022)** which they emphasized on patient age which might affect knowledge level and perception. While in a study done by **Obuchowska, & Konopinska, (2021)** they disagreed that, patient characteristics do not influence the frequency of postoperative complications.

Six months after the surgery and post using the hybrid nursing discharge guidance, the patient's knowledge, complications, and eating habits were improved, and this enhanced the patient's perspective.

According to a study done by **Burgess, et al., (2019)** they reported that raising patients' awareness and improving their perspective, through preoperative education and counselling their rates of perioperative problems and anxiety levels reduced.

Conclusions:

The results of this study showed that, the eating practice pattern of the patients who underwent gastric sleeve surgery were significantly improved by increasing their knowledge level which related to gastric sleeve, and it is the positive way to improve their follow ups during the six months postoperatively, while their perceptions were enhanced with the time passed over the surgery. This

was reflected on lowering post-surgery complications and quality of nutrition.

Recommendations:

Based on study finding the following items could be recommended:

1. Nurses should follow this guidance as part of standard hospital care in the research location and similar ones.
2. Patients should be helped to adjust to their circumstances and improve their well-being if nursing care standards developed within the agreement of the physiological, psychological, social, and mental effects of gastric sleeve surgery.
3. All patients who will perform gastric sleeve surgery should get a printed copy of the hybrid nurse's guidance.

Conflict of interest statement

No conflict of interest has been declared by the authors.

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