RESEARCH PAPER

Effect of a Nurse-Led Mindful Eating and Psychosomatic Care Program on Gastrointestinal Symptoms, Nutritional Adherence, Emotional Eating, and Psychological Well-Being among Patients Following Bariatric Surgery: A Quasi-Experimental Study

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ABSTRACT

Background:
Bariatric surgery is an effective intervention for severe obesity; however, postoperative patients may experience gastrointestinal symptoms, difficulties with nutritional adherence, emotional eating, and psychological distress that can negatively affect recovery and long-term outcomes. A nurse-led program integrating mindful eating with psychosomatic care may support patients in managing postoperative symptoms, improving dietary behaviors, and enhancing psychological well-being.

Aim:
The aim of this study was to evaluate the effect of a nurse-led mindful eating and psychosomatic care program on gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being among patients following bariatric surgery.

Design:
A quasi-experimental one-group pretest–posttest design was used.

Setting:
The study was conducted in the General Surgery and Surgical Outpatient Clinics at Sohag University Hospitals, Egypt.

Sample:
A convenience sample of 100 adult patients who had undergone bariatric surgery was recruited.

Tools:
Data were collected using a structured patient assessment questionnaire, a gastrointestinal symptoms assessment scale, a nutritional adherence assessment scale, the Emotional Eating Scale, and a psychological well-being assessment scale.

Methods:
Patients received a nurse-led program incorporating mindful eating techniques, recognition of hunger and satiety cues, slow and attentive eating, portion control, postoperative dietary adherence, management of common gastrointestinal symptoms, emotional regulation, stress management, relaxation techniques, and psychosomatic self-care. The program was delivered through structured educational and practical sessions with follow-up reinforcement. Patients were assessed before and after implementation of the program.

Results:
Following implementation of the program, the studied patients demonstrated a marked reduction in gastrointestinal symptoms and emotional eating, accompanied by significant improvement in nutritional adherence and psychological well-being compared with baseline ($p<0.001$). The proportion of patients with poor nutritional adherence and high emotional eating decreased substantially after the intervention, while higher levels of adherence and psychological well-being increased.

Conclusion:
The nurse-led mindful eating and psychosomatic care program was associated with significant improvements in gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being among patients following bariatric surgery.

Recommendations:
Nurse-led mindful eating and psychosomatic care programs should be integrated into postoperative bariatric nursing care, with continued follow-up to reinforce nutritional adherence, symptom management, emotional regulation, and psychological well-being.

Keywords: Mindful eating, Psychosomatic care, Bariatric surgery, Gastrointestinal symptoms, Nutritional adherence, Psychological well-being

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Introduction

Bariatric surgery has become an established and effective treatment for severe obesity and obesity-related comorbidities. Current international guidelines recognize metabolic and bariatric surgery as an evidence-based intervention that can produce substantial and sustained weight loss and improve obesity-related health conditions and quality of life. However, successful postoperative outcomes depend not only on the surgical procedure and weight reduction but also on patients' ability to adapt to substantial changes in eating patterns, nutritional requirements, gastrointestinal function, and health-related behaviors. Therefore, comprehensive and long-term postoperative nursing care is essential to support patients in maintaining the benefits of bariatric surgery **(Eisenberg et al., 2022).**

Following bariatric surgery, patients may experience various gastrointestinal symptoms resulting from anatomical and physiological changes in the gastrointestinal tract and from difficulties in adapting to new dietary behaviors. Common postoperative problems may include nausea, vomiting, abdominal discomfort, reflux, bloating, altered bowel habits, and food intolerance. These symptoms may interfere with adequate nutritional intake and negatively affect patients' comfort and quality of life. Appropriate postoperative nutritional management, including small portion sizes, slow eating, adequate chewing, appropriate fluid intake, sufficient protein consumption, and adherence to prescribed vitamin and mineral supplementation, is therefore essential for preventing nutritional complications and supporting recovery **(British Obesity and Metabolic Surgery Society [BOMSS], 2023).**

Nutritional adherence represents an important determinant of long-term outcomes following bariatric surgery. Patients are required to establish new eating behaviors and maintain adherence to individualized dietary recommendations despite changes in gastric capacity, appetite, food tolerance, and lifestyle. Failure to follow postoperative nutritional recommendations may contribute to inadequate nutrient intake, gastrointestinal discomfort, poor weight-management outcomes, and nutritional deficiencies. Consequently, continuous assessment and individualized nutritional education are important components of postoperative nursing care, particularly during the transition from the immediate postoperative period to long-term self-management **(Ab Majid et al., 2024).**

Emotional eating is another behavioral concern that may influence postoperative eating patterns and long-term weight-management outcomes. Emotional eating refers to eating in response to emotional states such as stress, anxiety, sadness, boredom, or other negative emotions rather than physiological hunger. Although emotional eating may decrease during the early period following bariatric surgery, evidence indicates that these improvements may not necessarily persist over longer periods. A systematic review and meta-analysis found significant reductions in emotional eating after bariatric surgery, while also emphasizing variability in longer-term outcomes. These findings highlight the importance of continued behavioral and psychological support following surgery **(Wong et al., 2020).**

Mindful eating has emerged as a behavioral approach that may help patients develop greater awareness of eating-related experiences and behaviors. It involves paying deliberate attention to hunger and satiety signals, eating slowly, recognizing sensory experiences during meals, and identifying emotional or environmental triggers that may influence food intake. Mindfulness-based interventions have been investigated among individuals undergoing bariatric surgery and have addressed outcomes such as emotional eating, food cravings, eating behaviors, and psychological health. Incorporating mindful eating principles into postoperative care may therefore provide patients with practical skills for developing more conscious and controlled eating behaviors **(Almuhtadi & Alageel, 2023).**

The physical and behavioral consequences of bariatric surgery are closely interconnected with patients' psychological experiences. Emotional

distress, stress, anxiety, and difficulties adapting to postoperative lifestyle changes may influence eating behaviors and adherence to nutritional recommendations. Conversely, persistent gastrointestinal symptoms, dietary restrictions, and concerns about postoperative weight management may negatively influence psychological well-being. A psychosomatic approach recognizes the interaction between physical symptoms, psychological responses, and behavioral patterns and may therefore provide a more comprehensive framework for postoperative nursing care **(Tariq et al., 2026).**

Medical-surgical nurses have an important role in the comprehensive management of patients following bariatric surgery. Nursing responsibilities include monitoring gastrointestinal symptoms, reinforcing nutritional recommendations, identifying barriers to dietary adherence, providing individualized health education, supporting behavioral modification, and encouraging appropriate coping and stress-management strategies. Nurses can also help patients recognize emotional triggers for eating, develop mindful eating skills, and practice relaxation and self-regulation techniques. Such interventions complement multidisciplinary postoperative care and may contribute to sustained behavioral and psychological adaptation following bariatric surgery **(Mohammed et al., 2025).**

The psychiatric nurse plays a vital, complementary role in post-bariatric surgery care by managing the psychological and behavioral factors crucial for long-term patient success and lifestyle adjustment. They assess emotional distress, anxiety, and body-image concerns, providing tailored psychological support while monitoring for severe issues like persistent depression to coordinate specialist referrals. Additionally, through behavioral counseling and motivational interviewing, they help patients distinguish between physiological hunger and emotional eating triggers such as stress or boredom. Finally, by teaching stress-management and relaxation techniques like mindfulness and breathing exercises, the nurse empowers patients to handle postoperative challenges effectively without reverting to food as a coping mechanism **(Altaheri et al., 2021).**
The community health nurse plays an essential role in providing continuity of care for patients following bariatric surgery by extending postoperative support from the hospital to the home and community. The nurse provides individualized education about mindful eating, recognition of hunger and satiety cues, slow and attentive eating, portion control, hydration, appropriate food choices, nutritional supplementation, and adherence to prescribed dietary recommendations. The nurse also monitors common gastrointestinal symptoms such as nausea, vomiting, reflux, constipation, diarrhea, and food intolerance, reinforces appropriate self-management, and identifies warning signs requiring medical referral. Regular home visits, telephone follow-up, or outpatient contacts allow the nurse to assess adherence, identify barriers, reinforce behavioral changes, and promote long-term self-management **(Mechanick et al., 2020; O'Kane et al., 2020).**

The community health nurse also supports the psychosomatic and behavioral aspects of postoperative recovery by helping patients recognize emotional eating triggers and teaching stress management, relaxation, breathing, mindfulness, and emotional-regulation techniques. The nurse provides supportive counseling, promotes psychological well-being and self-efficacy, involves family members in creating a supportive home environment, and identifies patients requiring referral to psychological, nutritional, or medical specialists. Through continuous follow-up and multidisciplinary coordination, the community health nurse helps patients maintain nutritional adherence, manage gastrointestinal symptoms, reduce emotional eating, and sustain healthy lifestyle behaviors after bariatric surgery **(Salem et al., 2025).**

Significance of the Study

Bariatric surgery can improve obesity-related health outcomes; however, patients may experience gastrointestinal symptoms, difficulties with nutritional adherence, emotional eating, and psychological challenges. A nurse-led program combining mindful eating and psychosomatic care may support postoperative adaptation by addressing both physical and psychological needs. Medical-surgical nurses can focus on symptom management and nutritional adherence, while psychiatric nurses can support emotional regulation, coping, and emotional eating. Therefore, this study may provide a practical integrated nursing approach to improve postoperative outcomes.

Aim of the Study

The present study aimed to evaluate the effect of a nurse-led mindful eating and psychosomatic care program on gastrointestinal symptoms, nutritional adherence, emotional

eating, and psychological well-being among patients following bariatric surgery.

Research Hypotheses

- **H1:** Patients will have significantly lower gastrointestinal symptoms after the program.
- **H2:** Patients will demonstrate significantly improved nutritional adherence after the program.
- **H3:** Patients will have significantly lower emotional eating after the program.
- **H4:** Patients will demonstrate significantly improved psychological well-being after the program.
- **H5:** Significant relationships will exist among gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being after the program.

Subjects and Methods

Research Design:
A quasi-experimental one-group pretest–posttest design was used.

Setting:
The study was conducted at the General Surgery and Surgical Outpatient Clinics at Sohag University Hospitals, Egypt.

Subjects:
A convenience sample of 100 adult patients who had undergone bariatric surgery was recruited.

Data Collection Tools:
Data were collected using five tools developed or adapted by the researchers based on relevant literature and established bariatric and psychological assessment frameworks.

Tool I: Structured Patient Assessment Questionnaire
A structured patient assessment questionnaire was developed by the researchers based on relevant bariatric surgery literature and guidelines, particularly the recommendations of **Eisenberg et al. (2022)** concerning the multidisciplinary assessment and long-term management of patients undergoing metabolic and bariatric surgery. The questionnaire consisted of two parts:

Part I: Socio-demographic characteristics:
This part included age, sex, marital status, educational level, occupation, and residence,

Part II: Clinical and bariatric surgery characteristics:
This part included type of bariatric surgery, duration since surgery, associated chronic diseases, vitamin and mineral supplementation, previous nutritional counseling, and previous psychological counseling.

Tool II: Gastrointestinal Symptoms Assessment Scale:
The Gastrointestinal Symptoms Assessment Scale was developed by the researchers based on the gastrointestinal symptom domains commonly reported following bariatric surgery and informed by the Gastrointestinal Symptom Rating Scale (GSRS) **(Svedlund et al., 1988)**. Previous bariatric research has used the GSRS to assess postoperative gastrointestinal symptoms, including abdominal pain, reflux, diarrhea, constipation, and indigestion. The original GSRS contains 15 items rated on a 7-point scale ranging from no discomfort to severe discomfort. For the present study, the researchers developed a structured postoperative version covering the symptoms most relevant to bariatric patients, including nausea, vomiting, abdominal pain/discomfort, bloating, early satiety, heartburn/reflux, diarrhea, constipation, and food intolerance.

Each symptom was rated using a 4-point Likert scale:

- **0 =** No symptom
- **1 =** Mild symptom
- **2 =** Moderate symptom
- **3 =** Severe symptom

The total score was calculated by summing the scores of all items. A higher total score indicated a greater gastrointestinal symptom burden.

Scoring interpretation:

- **Low GI symptom burden:** <60% of the total score
- **Moderate GI symptom burden:** 60–<75%
- **High GI symptom burden:** ≥75%

These categories were determined by the researchers for the present study and do not represent published diagnostic cut-off points for the original GSRS.

Tool III: Nutritional Adherence Assessment Scale:
The Nutritional Adherence Assessment Scale was developed by the researchers based on postoperative bariatric nutritional recommendations and guidelines emphasizing adequate nutritional intake, supplementation, hydration, meal patterns, and long-term nutritional monitoring after bariatric surgery

(British Obesity and Metabolic Surgery Society (BOMSS), 2014). Such postoperative monitoring is considered important because bariatric procedures may affect nutritional intake and increase the risk of deficiencies. The scale assessed adherence to recommended postoperative behaviors, including regular meal consumption, appropriate portion sizes, adequate protein intake, slow eating, thorough chewing, adequate fluid intake, avoidance of inappropriate high-calorie foods, adherence to vitamin/mineral supplementation, avoidance of problematic eating behaviors, and compliance with prescribed dietary instructions.

Each item was rated using a 3-point Likert scale:

- **2 = Always**
- **1 = Sometimes**
- **0 = Never**

The total score was calculated by summing the scores of all items. Higher scores indicated better adherence to postoperative nutritional recommendations.

Scoring interpretation:

- **Poor nutritional adherence:** <60% of the total score
- **Fair nutritional adherence:** 60–<75%
- **Good nutritional adherence:** ≥75%

Tool IV: Emotional Eating Scale (EES)

The **Emotional Eating Scale (EES)** developed by **Arnow et al. (1995)** was used to assess the tendency to eat in response to emotional states rather than physiological hunger. The EES is a 25-item self-report measure with three major emotional domains: **anger/frustration, anxiety, and depression**. Respondents indicate the extent to which different emotional states produce an urge to eat.

Each of the 25 items is scored on a 5-point scale:

- **0 =** No desire to eat
- **1** = Small desire to eat
- **2** = Moderate desire to eat
- **3** = Strong urge to eat
- **4** = Overwhelming urge to eat

The total score ranges from **0 to 100**, with higher scores indicating a greater tendency toward emotional eating.

For the present study, the total EES score was interpreted as follows:

- **Low emotional eating:** 0–25
- **Moderate emotional eating:** 26–46
- **High emotional eating:** 47–100

These categories have been used in previous research applying the 25-item EES; however, the original EES itself does not establish universal clinical cut-off points, so the categories should be reported as study-specific interpretive categories rather than diagnostic thresholds.

Tool V: Psychological Well-Being Assessment Scale

The **Psychological Well-Being Assessment Scale** was developed by the researchers based on the conceptual framework of psychological well-being proposed by **Ryff (1989)**. Ryff's model conceptualizes psychological well-being through dimensions including **self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth**. For the current study, the researcher-developed scale focused on psychological domains particularly relevant to patients following bariatric surgery, including emotional balance, self-acceptance, coping with postoperative changes, interpersonal relationships, perceived control, positive psychological functioning, and satisfaction with life.

Each item was rated using a **5-point Likert scale**:

- **1 = Strongly disagree**
- **2 = Disagree**
- **3 = Neutral**
- **4 = Agree**
- **5 = Strongly agree**

Negatively worded items were reverse scored. The total score was calculated by summing the scores of all items. Higher scores indicated better psychological well-being.

Scoring interpretation:

- **Poor psychological well-being:** <60% of the total score
- **Moderate psychological well-being:** 60–<75%
- **Good psychological well-being:** ≥75%

These categories were determined by the researchers for the present study and are not diagnostic cut-off points from the original Ryff scales.

Validity

The study tools were reviewed by a panel of **five experts** in Medical-Surgical Nursing, Psychiatric/Mental Health Nursing, and related specialties to assess their **content validity, clarity, relevance, comprehensiveness, and applicability**. Their recommendations were considered, and necessary modifications were made before the final application of the tools.

Reliability

The reliability of the study tools was assessed using Cronbach's alpha coefficient to determine their internal consistency. The obtained reliability coefficients was 0.79 indicated acceptable to high internal consistency of the study tools, supporting their use for assessing gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being.

Pilot Study

A pilot study was conducted on 10% of the total sample (10 patients) to assess the clarity, feasibility, sequence, and estimated time required for completing the study tools and implementing the intervention program. The pilot participants were excluded from the final study sample to avoid contamination of the results.

Ethical Considerations

Official approval was obtained from the relevant authorities before conducting the study. Each participant was informed about the purpose, procedures, potential benefits, and voluntary nature of participation. Written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study, and participants had the right to withdraw at any time without affecting their medical care. Data were used exclusively for research purposes.

Data Collection Procedure

Data collection and implementation of the intervention were carried out by the researcher with the collaboration of nurses from medical-surgical, psychiatric, and community health nursing specialties at Sohag University Hospitals. Eligible patients were interviewed individually after explaining the purpose of the study and obtaining written informed consent. Baseline assessment included sociodemographic and clinical characteristics, gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being. The medical-surgical nurse focused on postoperative clinical and gastrointestinal assessment and nutritional practices, the psychiatric nurse assessed emotional eating, stress, coping, and psychological well-being, while the community health nurse assessed patients' lifestyle practices, home environment, family support, and barriers to long-term adherence. Following baseline assessment, patients participated in the structured nurse-led program. The same study tools were reapplied after completion of the intervention to evaluate changes in the studied outcomes.

Phases of Intervention

Phase I: Initial Assessment and Preparation (session 1)

During this phase, the **medical-surgical nurse** assessed patients' postoperative condition, gastrointestinal symptoms, dietary tolerance, nutritional practices, and adherence to postoperative recommendations. The **psychiatric nurse** assessed emotional eating patterns, emotional triggers, stress, coping strategies, and psychological well-being. The **community health nurse** assessed lifestyle behaviors, home circumstances, family support, and factors that could interfere with adherence. Based on the assessment, individualized educational and psychosocial needs were identified and patients were oriented to the objectives and components of the program.

Phase II: Medical-Surgical Nursing Intervention

The **medical-surgical nurse** provided education and practical training regarding postoperative nutritional requirements, appropriate food choices, portion control, slow eating, adequate hydration, nutritional supplementation, and adherence to prescribed dietary recommendations. The nurse also educated patients about the prevention and management of common gastrointestinal symptoms, including nausea, vomiting, reflux, abdominal discomfort, constipation, diarrhea, and food intolerance. Patients were trained to recognize warning signs and seek appropriate medical assistance when necessary.

Phase III: Psychiatric Nursing Intervention

The **psychiatric nurse** focused on the psychological and behavioral components of

the program. Patients were taught to recognize the relationship between emotions and eating behavior and to identify personal triggers for emotional eating. The nurse provided training in mindful eating, emotional regulation, relaxation, deep-breathing exercises, stress management, positive coping strategies, and problem-solving. Supportive communication was used to enhance self-confidence, psychological adjustment, and the ability to cope with postoperative lifestyle changes.

Phase IV: Community Health Nursing Intervention

The **community health nurse** focused on maintaining behavioral changes in the patient's home visits . The nurse reinforced healthy eating practices, mindful eating, physical activity, hydration, medication and nutritional supplement adherence, and appropriate lifestyle behaviors. Follow-up was conducted through telephone contacts, outpatient reinforcement, or home visits when applicable. The community health nurse also involved family members in supporting the patient, identified barriers to adherence, reinforced learned skills, monitored progress, and facilitated referral to the appropriate healthcare professional when needed.

Intervention Session

Session 2 – Principles of Mindful Eating

- Definition and importance of mindful eating.
- Recognition of physiological hunger versus emotional hunger.
- Identification of hunger and satiety cues.
- Eating slowly and paying attention to taste, texture, and chewing.
- Avoiding distractions during meals.

Session 3 – Postoperative Nutritional Adherence

- Appropriate meal portions and meal frequency.
- Adequate chewing and slow eating.
- Protein-rich food choices.
- Appropriate fluid intake.
- Adherence to prescribed vitamin and mineral supplementation.
- Strategies for overcoming barriers to dietary adherence.

Session 4 – Gastrointestinal Symptom Management

- Identification of common postoperative gastrointestinal symptoms.
- Dietary and behavioral factors that may aggravate symptoms.
- Strategies for reducing nausea, vomiting, bloating, reflux, and abdominal discomfort.
- Recognition of warning symptoms requiring medical consultation.

Session 5 – Emotional Eating and Emotional Awareness

- Identification of emotional triggers for eating.
- Relationship between stress, emotions, and eating behavior.
- Recognition of automatic eating patterns.
- Development of alternative coping strategies.
- Practical mindful-eating exercises.

Session 6 – Stress Management and Emotional Regulation

- Identification of common postoperative stressors.
- Deep-breathing exercises.
- Progressive muscle relaxation.
- Guided imagery.
- Emotional regulation and adaptive coping techniques.

Session 7 – Integrating Mindful Eating with Psychosomatic Self-Care

- Integration of mindful eating into daily life.
- Applying relaxation techniques before or after meals.
- Managing emotional triggers without using food.
- Developing an individualized self-care plan.
- Problem-solving common postoperative challenges.

Session 8 – Review, Reinforcement, and Follow-up

- Review of all previously discussed concepts.
- Practical demonstration and feedback.
- Reinforcement of nutritional and psychological self-care behaviors.
- Identification of remaining barriers.

- Development of a personal maintenance plan.
- Post-intervention assessment.

Phase V: Integrated Reinforcement and Follow-up

The three nursing specialties worked collaboratively to reinforce the intervention. The **medical-surgical nurse** followed clinical and gastrointestinal progress, the **psychiatric nurse** reinforced emotional regulation and psychological coping, and the **community health nurse** reinforced lifestyle modification and adherence within the home environment. Patient questions and difficulties were discussed, individualized feedback was provided, and previously learned skills were reinforced to promote sustained behavioral change.

Phase VI: Post-intervention Evaluation

At the end of the intervention, the researcher reassessed all patients using the same study instruments administered at baseline. Changes in **gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being** were compared between pre-intervention and post-intervention assessments to determine the effectiveness of the integrated nurse-led mindful eating and psychosomatic care program.

Duration and Follow-up

Component	Description
Total duration	4 weeks
Number of sessions	8 sessions
Frequency	2 sessions/week
Session duration	45–60 minutes
Delivery	Individual/group education + practical training
Assessment	Pre-intervention and immediately post-intervention
Follow-up reinforcement	Telephone/clinic-based reinforcement as appropriate

Statistical Analysis

Data were coded, tabulated, and statistically analyzed using the Statistical Package for the Social Sciences (SPSS), version 26. Descriptive statistics were used to summarize the studied variables, including frequencies and percentages for categorical variables, and means and standard deviations for normally distributed continuous variables. Median and interquartile range were used when continuous data were not normally distributed. The paired t-test was used to compare the mean scores of gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being before and after implementation of the nurse-led program when the data were normally distributed. For non-normally distributed continuous data, the Wilcoxon signed-rank test was used. For categorical or ordinal variables classified into levels such as low/moderate/high or poor/fair/good, the McNemar-Bowker test of symmetry was used to examine changes in the distribution of paired categories between pre- and post-intervention measurements. The Pearson correlation coefficient (r) was used to examine relationships between normally distributed continuous study variables, whereas the Spearman rank correlation coefficient (ρ) was used for non-normally distributed or ordinal variables. Correlations were examined particularly among gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being. The level of statistical significance was set at **$p < 0.05$**, while **$p < 0.001$** was considered highly statistically significant. A **p-value ≥0.05** was considered statistically non-significant.

Results

Table (1): Distribution of the Studied Patients According to Their Socio-demographic Characteristics (n=100)

Socio-demographic characteristics	No.	%
Age (years)		
20–<30	18	18.0
30–<40	35	35.0
40–<50	29	29.0
≥50	18	18.0
Mean ± SD	39.2 ± 8.7	
Sex		
Male	24	24.0
Female	76	76.0
Marital status		
Married	72	72.0

Socio-demographic characteristics	No.	%
Single	20	20.0
Divorced/Widowed	8	8.0
Educational level		
Illiterate/Basic education	19	19.0
Secondary education	43	43.0
University or higher	38	38.0
Residence		
Rural	61	61.0
Urban	39	39.0

Table (1) shows that more than one-third of the studied patients (35.0%) were aged 30–<40 years, with a mean age of 39.2 ± 8.7 years. Females represented the majority of the sample (76.0%). Regarding marital status, 72.0% of the patients were married. Concerning educational level, 43.0% had secondary education, while 38.0% had university education or higher. More than half of the studied patients (61.0%) were from rural areas.

Table (2): Distribution of the Studied Patients According to Their Clinical and Bariatric Surgery Characteristics (n=100)

Clinical characteristics	No.	%
Type of bariatric surgery		
Sleeve gastrectomy	64	64.0
Roux-en-Y gastric bypass	24	24.0
Other procedures	12	12.0
Duration since surgery		
<6 months	31	31.0
6–<12 months	39	39.0
≥12 months	30	30.0
Previous nutritional counseling		
Yes	57	57.0
No	43	43.0
Previous psychological counseling		
Yes	22	22.0
No	78	78.0
Presence of associated chronic disease		
Yes	46	46.0
No	54	54.0
Regular vitamin/mineral supplementation		
Yes	58	58.0
No	42	42.0

Table (2) indicates that sleeve gastrectomy was the most common bariatric procedure, accounting for 64.0% of the studied patients. Regarding postoperative duration, 39.0% had undergone surgery 6–<12 months previously. More than half of the patients (57.0%) had received previous nutritional counseling, whereas only 22.0% had received previous psychological counseling. Nearly half of the patients (46.0%) reported associated chronic diseases. Although 58.0% reported regular vitamin and mineral supplementation, 42.0% did not regularly adhere to supplementation, indicating an important area for nursing intervention.

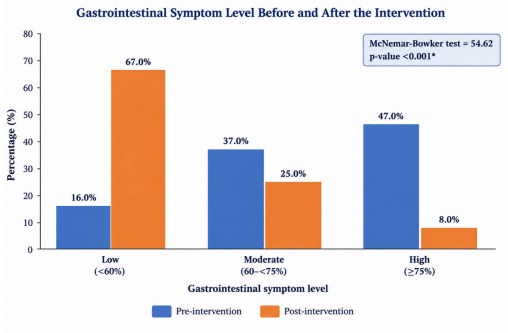


Figure (1): Distribution of the Studied Patients According to Their Gastrointestinal Symptom Level Before and After the Nurse-Led Program (n=100)

Figure (1): demonstrates a marked improvement in gastrointestinal symptom status following implementation of the nurse-led program. Before the intervention, nearly half of the studied patients (47.0%) had a high gastrointestinal symptom burden, compared with only 8.0% after the intervention. The proportion with low symptom burden increased substantially from 16.0% before the program to 67.0% after it. This improvement was statistically significant, as demonstrated by the McNemar-Bowker test (54.62, p<0.001).

Table (3): Comparison of Mean Gastrointestinal Symptom Scores among the Studied Patients Before and After the Nurse-Led Program (n=100)

Gastrointestinal symptoms	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Paired t-test	p-value
Nausea	1.84 ± 0.91	0.72 ± 0.68	10.84	<0.001*
Vomiting	1.36 ± 0.88	0.49 ± 0.61	8.41	<0.001*
Abdominal discomfort	1.92 ± 0.82	0.81 ± 0.67	11.25	<0.001*
Bloating	1.78 ± 0.89	0.76 ± 0.65	10.16	<0.001*
Reflux/heartburn	1.67 ± 0.94	0.69 ± 0.66	8.93	<0.001*
Constipation	1.51 ± 0.93	0.71 ± 0.69	7.54	<0.001*
Total GI symptom score	10.08 ± 3.21	4.18 ± 2.26	15.72	<0.001*

Table (3) reveals significant reductions in all assessed gastrointestinal symptoms after the intervention. The total gastrointestinal symptom score decreased from 10.08 ± 3.21 before the program to 4.18 ± 2.26 after the program. Significant improvements were also observed in nausea, vomiting, abdominal discomfort, bloating, reflux/heartburn, and constipation, with all comparisons reaching statistical significance ($p<0.001$). These findings indicate that the integrated mindful eating and postoperative symptom-management components of the program were associated with reduced gastrointestinal symptom burden.

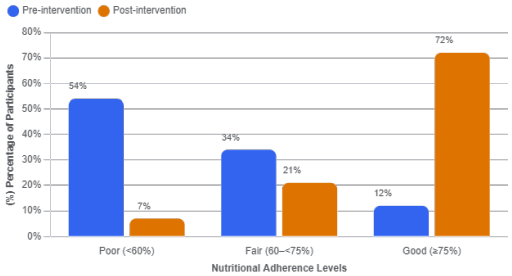


Figure (2): Distribution of the Studied Patients According to Their Nutritional Adherence Level Before and After the Nurse-Led Program (n=100)

Figure (2): shows a substantial improvement in nutritional adherence following the nurse-led program. Before the intervention, more than half of the patients (54.0%) had poor nutritional adherence, compared with only 7.0% after the intervention. The percentage of patients with good adherence increased markedly from 15.0% before the program to 75.0% after it.

Table (4): Comparison of Mean Nutritional Adherence Scores Before and After the Nurse-Led Program (n=100)

Nutritional adherence domains	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Paired t-test	p-value
Regular meal pattern	1.21 ± 0.62	1.73 ± 0.45	7.12	<0.001*
Appropriate portion size	1.18 ± 0.65	1.76 ± 0.43	7.94	<0.001*
Adequate protein intake	1.26 ± 0.61	1.78 ± 0.41	7.45	<0.001*
Slow eating/thorough chewing	1.15 ± 0.68	1.81 ± 0.39	8.63	<0.001*
Adequate fluid intake	1.31 ± 0.59	1.79 ± 0.40	6.81	<0.001*
Vitamin/mineral supplementation	1.24 ± 0.69	1.76 ± 0.44	6.72	<0.001*
Total adherence score	7.35 ± 2.18	10.63 ± 1.57	12.91	<0.001*

Table (4) demonstrates significant improvement across all nutritional adherence domains following the intervention. The total adherence score increased from 7.35 ± 2.18 before the program to 10.63 ± 1.57 after implementation. The greatest improvements were observed in slow eating and thorough chewing, appropriate portion control, and adequate protein intake. All domains showed statistically significant improvement ($p<0.001$).

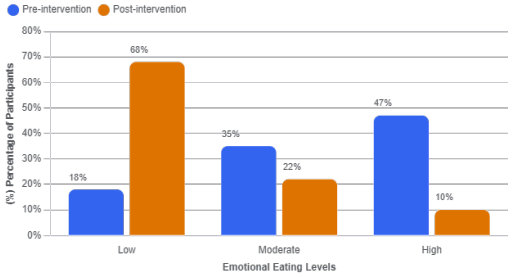


Figure (3): Distribution of the Studied Patients According to Their Emotional Eating Level Before and After the Nurse-Led Program (n=100)

Figure (3): illustrates a pronounced reduction in emotional eating following the intervention. Before the program, 47.0% of the studied patients demonstrated high emotional eating, whereas this proportion decreased to 10.0% after the intervention. Conversely, the percentage of patients with low emotional eating increased from 18.0% to 63.0%. The change was statistically significant (McNemar-Bowker=51.36, p<0.001). This improvement may reflect the program's emphasis on recognizing emotional triggers, distinguishing emotional from physiological hunger, developing alternative coping strategies, and applying mindfulness during eating.

Table (5): Comparison of Emotional Eating Scores Before and After the Nurse-Led Program (n=100)

Emotional eating domains	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Paired t-test	p-value
Anxiety-related eating	2.41 ± 0.83	1.31 ± 0.72	10.21	<0.001*
Anger/frustration-related eating	2.28 ± 0.87	1.22 ± 0.69	9.84	<0.001*
Depression/sadness-related eating	2.36 ± 0.91	1.28 ± 0.71	9.97	<0.001*
Total emotional eating score	58.42 ± 13.16	34.67 ± 11.21	15.08	<0.001*

Table (5) shows significant reductions in all emotional eating domains after the intervention. The total emotional eating score decreased from 58.42 ± 13.16 before the program to 34.67 ± 11.21 after it. Significant reductions were observed in eating associated with anxiety, anger/frustration, and sadness/depression (p<0.001). These findings suggest that combining mindful eating with psychosomatic nursing interventions may help patients recognize emotional triggers and replace automatic eating responses with more adaptive coping strategies.

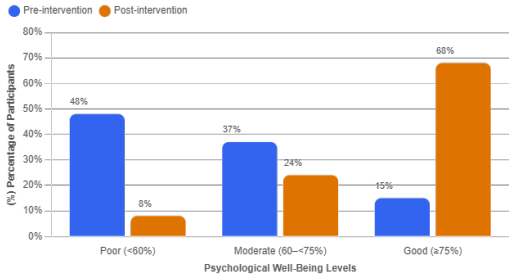


Figure (4): Distribution of the Studied Patients According to Their Psychological Well-Being Level Before and After the Nurse-Led Program (n=100)

Figure (4) demonstrates a marked improvement in psychological well-being following the intervention. Before implementation, 48.0% of the patients had poor psychological well-being, compared with only 8.0% after the intervention. The percentage of patients with good psychological well-being increased substantially from 15.0% to 68.0%.

Table (6): Comparison of Mean Psychological Well-Being Scores Before and After the Nurse-Led Program (n=100)

Psychological well-being domains	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Paired t-test	p-value
Self-acceptance	2.81 ± 0.76	3.91 ± 0.61	11.18	<0.001*
Emotional balance	2.74 ± 0.81	3.87 ± 0.64	10.73	<0.001*
Coping ability	2.68 ± 0.79	3.94 ± 0.58	12.14	<0.001*
Sense of control	2.76 ± 0.77	3.82 ± 0.63	10.28	<0.001*
Positive relationships	3.02 ± 0.73	3.96 ± 0.59	9.76	<0.001*
Life satisfaction	2.71 ± 0.82	3.88 ± 0.62	10.92	<0.001*

Psychological well-being domains	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	Paired t-test	p-value
Total psychological well-being score	16.72 ± 3.84	23.38 ± 3.21	15.46	<0.001*

Table (6) reveals statistically significant improvement in all assessed dimensions of psychological well-being following the intervention. The total psychological well-being score increased from 16.72 ± 3.84 before the intervention to 23.38 ± 3.21 after the program ($p<0.001$).

Table (7): Correlation between Gastrointestinal Symptoms, Nutritional Adherence, Emotional Eating, and Psychological Well-Being after the Intervention (n=100)

Variables	Nutritional adherence	Emotional eating	Psychological well-being
Gastrointestinal symptoms	-0.462**	0.418**	-0.493**
Nutritional adherence	—	-0.386**	0.524**
Emotional eating	—	—	-0.571**

Table (7) demonstrates significant relationships among the major study variables after the intervention. Gastrointestinal symptoms were negatively correlated with nutritional adherence ($r=-0.462$, $p<0.001$) and psychological well-being ($r=-0.493$, $p<0.001$). In contrast, gastrointestinal symptoms showed a positive correlation with emotional eating ($r=0.418$, $p<0.001$). Nutritional adherence was positively correlated with psychological well-being ($r=0.524$, $p<0.001$) and negatively correlated with emotional eating ($r=-0.386$, $p<0.001$). Emotional eating was also significantly and negatively correlated with psychological well-being ($r=-0.571$, $p<0.001$).

Discussion:

The present study addressed an important multidimensional aspect of post-bariatric care by evaluating a nurse-led mindful eating and psychosomatic care program targeting gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being. Bariatric surgery can produce substantial benefits; however, postoperative patients may continue to experience gastrointestinal symptoms, difficulties in maintaining recommended dietary behaviors, and psychological or maladaptive eating patterns that may affect long-term adaptation. Previous evidence has shown that gastrointestinal symptoms may negatively affect quality of life after bariatric surgery, while dietary adherence and psychological factors are important components of successful postoperative self-management (**Uribarri-Gonzalez et al., 2023; Chan & Vartanian, 2024**). Moreover, systematic reviews indicate that emotional eating generally decreases after bariatric surgery but may persist or recur in some patients, highlighting the need for continued behavioral and psychological support **(Wong et al., 2020).** Evidence regarding mindfulness-based interventions also suggests potential benefits for problematic eating behaviors and psychological outcomes among bariatric patients, although further well-designed studies are needed **(Almuhtadi & Alageel, 2023).** Therefore, the integration of mindful eating, nutritional education, emotional regulation, stress management, and psychosomatic nursing care represents a comprehensive approach that addresses both the physical and psychological dimensions of postoperative recovery.

The present study evaluated the effect of a nurse-led mindful eating and psychosomatic care program on gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being among patients following bariatric surgery. The findings demonstrated significant improvements across all four major outcome domains after implementation of the program. These improvements suggest that an integrated nursing approach addressing postoperative physical symptoms together with nutritional behaviors, emotional regulation, and psychological well-being may provide a comprehensive strategy for supporting patients during postoperative adaptation.

The present study revealed a marked reduction in gastrointestinal symptom burden following implementation of the nurse-led program. Similarly, significant reductions were observed in nausea, vomiting, abdominal discomfort, bloating, reflux/heartburn, and constipation.

This finding is consistent with the study of **Uribarri-Gonzalez et al. (2023)**, which demonstrated that gastrointestinal symptoms are clinically relevant after bariatric surgery and are associated with psychological disturbances and poorer quality of life. The agreement may be explained by the present program's emphasis on slow and attentive eating, appropriate portion sizes, adequate chewing, recognition of food-related triggers, and early management of postoperative gastrointestinal complaints.

The reduction in gastrointestinal symptoms in the present study also appears clinically meaningful because postoperative gastrointestinal complaints may be influenced by eating speed, meal volume, food tolerance, hydration, and dietary choices. The program did not focus solely on symptom education; rather, it combined nutritional behavior modification with mindful awareness of hunger, satiety, and discomfort. This integrated approach may explain why improvement occurred across several symptom domains simultaneously. In contrast, previous observational studies have primarily described the prevalence and associations of postoperative gastrointestinal symptoms rather than evaluating a structured nurse-led intervention, making direct comparison of intervention effects difficult. **Hasan et al. (2020)** similarly emphasized the importance of postoperative adherence to dietary and lifestyle recommendations in relation to bariatric outcomes, but their retrospective cohort design did not test a structured nursing intervention.

The present study demonstrated a significant improvement in nutritional adherence after the nurse-led program. Significant improvements were also observed in regular meal patterns, portion control, protein intake, slow eating and thorough chewing, fluid intake, and vitamin/mineral supplementation. These findings are consistent with evidence showing that adherence to dietary and lifestyle recommendations is an important component of successful postoperative bariatric care. **Yang et al. (2026)** reported that postoperative bariatric patients may experience difficulties in maintaining recommended dietary and lifestyle behaviors and highlighted adherence as an important component of postoperative management.

The improvement in nutritional adherence may be attributed to the educational and practical nature of the intervention. Rather than providing general dietary information alone, the program trained patients to apply specific behaviors, including appropriate portion sizes, adequate protein intake, slow eating, thorough chewing, adequate fluid intake, and adherence to supplementation. This interpretation is supported by research indicating that bariatric surgery patients remain at risk of nutritional deficiencies when dietary recommendations and supplementation are not consistently followed. A study by **Qadhi et al., (2023)** examining dietary behavior and adherence one year after bariatric surgery similarly emphasized the importance of commitment to dietary recommendations in preventing nutritional problems.

A possible difference between the present findings and some previous observational studies is the magnitude of improvement. The current study demonstrated a large shift from poor to good adherence, whereas observational studies without an active behavioral intervention generally describe adherence patterns rather than substantial pre–post improvement. This difference may be related to the structured nature of the present nurse-led program, which included repeated education, practical demonstrations, individualized problem solving, and reinforcement. In addition, the involvement of nursing staff in follow-up may have provided continuous reinforcement of recommended behaviors rather than relying on one-time postoperative instructions.

The present study demonstrated a significant reduction in emotional eating following the nurse-led mindful eating and psychosomatic care program. Significant reductions were also observed in anxiety-, anger/frustration-, and sadness/depression-related eating. These findings are strongly consistent with the systematic review and meta-analysis conducted by **Wong et al. (2020)**, which included 23 studies involving 6,749 bariatric patients and found that emotional eating generally decreased after bariatric surgery, particularly during the first 12 months. Their meta-analysis of 17 studies also demonstrated a significant reduction in emotional eating at 4–18 months after surgery.

The reduction in emotional eating in the present study is also consistent with evidence specifically examining mindfulness-based interventions among bariatric patients. **Chacko et al. (2016)** conducted a randomized controlled pilot trial among post-bariatric patients and found that a mindfulness-based intervention was associated with a significant reduction in emotional eating at six months compared with the standard intervention. The authors

suggested that mindfulness may help patients recognize emotional triggers and modify automatic eating responses. This mechanism closely corresponds to the present program, which included identification of emotional eating triggers, differentiation between physiological and emotional hunger, mindfulness during meals, alternative coping strategies, and emotional regulation techniques.

However, the present findings differ from the mixed longer-term findings reported by **Fu et al. (2026)**. Their review indicated that although emotional eating commonly decreased during the first year after surgery, findings beyond 12 months were inconsistent, with some studies reporting recurrence or increases in emotional eating. The difference may be related to the timing of assessment and, importantly, to the active behavioral intervention used in the present study. Unlike studies that simply observed natural postoperative changes, the current program directly targeted emotional triggers and coping behaviors. Therefore, continued nursing reinforcement may help sustain behavioral improvements that might otherwise diminish over time.

The present study showed a significant improvement in psychological well-being following the intervention. Significant improvements were also observed in self-acceptance, emotional balance, coping ability, sense of control, positive relationships, and life satisfaction. These findings are generally consistent with the broader evidence that bariatric surgery is associated with improvements in several mental health outcomes. An umbrella review by **Law et al. (2023)** found evidence of improvement in anxiety, depression, and eating-related psychological outcomes following bariatric surgery.

The improvement in psychological well-being may also be explained by the specific psychosomatic components of the intervention. Patients were trained in deep breathing, progressive muscle relaxation, guided imagery, emotional regulation, coping strategies, therapeutic communication, and mindfulness. These techniques may reduce psychological reactivity and increase patients' perceived ability to manage postoperative challenges. Supporting this interpretation, **Almuhtadi & Alageel (2023)** reviewed mindfulness-based interventions among pre- and postoperative bariatric patients and reported promising effects on eating behaviors and mental health outcomes, including anxiety and depression. However, the authors emphasized that the available evidence remains heterogeneous and that further well-designed studies are required.

A difference should be noted between the present findings and the results of some mindfulness studies. For example, **Chacko et al. (2016)** found improvement in emotional eating but did not demonstrate consistent improvement in objective psychological measures; their pilot study even observed trends toward increased perceived stress and depressive symptoms in some participants. This difference may be attributable to the broader psychosomatic structure of the present program, which did not rely on mindfulness alone but combined mindful eating with relaxation, emotional regulation, coping skills, therapeutic communication, and psychological follow-up. Differences in sample size, intervention duration, outcome instruments, and study design may also contribute to the discrepant findings.

The present study demonstrated significant relationships among gastrointestinal symptoms, nutritional adherence, emotional eating, and psychological well-being after the intervention. Gastrointestinal symptoms were negatively correlated with nutritional adherence and psychological well-being, while they were positively correlated with emotional eating. Nutritional adherence was positively correlated with psychological well-being and negatively correlated with emotional eating. In addition, emotional eating showed a significant negative correlation with psychological well-being. These findings suggest that the four outcomes should not be considered independent postoperative problems but rather interconnected dimensions of postoperative adaptation. This interpretation is consistent with **Uribarri-Ekici et al. (2025)**, who reported an association between gastrointestinal symptoms, psychological disturbances, and quality of life after bariatric surgery.

The negative association between nutritional adherence and emotional eating in the present study may indicate that patients who were more capable of following structured postoperative dietary behaviors were less likely to use food as an emotional coping mechanism. Similarly, the positive relationship between nutritional adherence and psychological well-being may reflect the reciprocal influence of behavioral control and psychological adjustment. The findings are compatible with the conceptual basis of mindfulness-based care, in which increased awareness of internal states, emotions,

hunger, and satiety may support more deliberate eating behaviors. **Di Rosa et al., (2026)** reported that mindfulness interventions among bariatric patients showed promising effects on eating behaviors and psychological outcomes, supporting the interconnected nature of behavioral and psychological changes.

Conclusion

Based on the findings of the present study, it can be concluded that the nurse-led mindful eating and psychosomatic care program was associated with significant improvements in postoperative outcomes among patients following bariatric surgery. The program contributed to reducing gastrointestinal symptoms and emotional eating while improving nutritional adherence and psychological well-being. These findings support the integration of comprehensive physical, nutritional, behavioral, and psychological nursing care into postoperative bariatric management.

Recommendations

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

- Integrating nurse-led mindful eating and psychosomatic care into routine postoperative nursing care for bariatric surgery patients.
- Providing structured education on mindful eating, appropriate portion sizes, hunger and satiety cues, nutritional adherence, and dietary supplementation.
- Incorporating psychological nursing interventions addressing emotional eating, stress management, emotional regulation, coping, and relaxation techniques.
- Establishing regular medical-surgical and psychiatric nursing follow-up to identify gastrointestinal, nutritional, behavioral, and psychological problems early.
- Developing individualized self-management plans according to patients' postoperative needs and barriers.
- Conducting further controlled studies with larger samples and longer follow-up periods to evaluate the sustained effects of integrated mindful eating and psychosomatic nursing interventions.

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