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ORIGINAL ARTICLE

Risk factors for nonadherence to nutritional treatment in post-bariatric surgery patients. A single-center observational study.

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Abstract

Introduction: Bariatric surgery has grown exponentially to combat obesity, but despite its benefits, it is estimated that between 20% and 50% of patients fail to maintain adherence to postoperative nutritional follow-up, which compromises long-term results.

Methodology: A prospective, observational study was conducted at the "Medical Center for Metabolism and Obesity" in Guayaquil, Ecuador, between January and April 2025. The probabilistic sample included adults under 65 years of age who had undergone bariatric surgery in the previous two years and were divided into two groups according to adherence to nutritional follow-up. Demographic, clinical, lifestyle, treatment perception and barrier variables were recorded.

Results: Twenty patients were included in group 1 (adherence), and 30 patients were included in group 2 (nonadherence). Four men (20%) were in group 1, and 20 women (66.7%) were in group 2 ($P = 0.0012$). No significant differences were found in age, marital status, social conditions, smoking or alcohol consumption habits, comorbidities, or type of surgery. Difficulty accessing a nutritionist (OR 6.0; 95% CI 1.69–21.26; $P = 0.0055$) and lack of family support (OR 3.5; 95% CI 1.05–11.66; $P = 0.0413$) were identified as risk factors. Female sex ($P = 0.0022$) was shown to be a protective factor.

Conclusion: Adherence to nutritional follow-up after bariatric surgery is determined primarily by psychosocial and logistical barriers, with male sex, difficulty accessing a nutritionist, and lack of family support being the most influential risk factors. These findings necessitate that multidisciplinary teams develop and implement personalized and urgent intervention protocols aimed at mitigating the risk of dropout and the long-term development of serious nutritional deficiencies.

Keywords:

Lack of nutritional adherence, bariatric surgery, and lack of family support.

Abbreviations

OR: odds ratio.

Supplementary information

No supplementary materials are declared.

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Authors' contributions

Andres J. Huerta Gil, Methodology, Data Curation, Formal Analysis, Fundraising, Project Management, Validation, Visualization, Writing – Review and Editing.

María Antonieta Touriz Bonifaz, Research, Formal Analysis, Fundraising, Project Management, Validation, Visualization, Writing – Review and Editing

Financing

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Availability of data and materials

The datasets used and analyzed during this study are available to the corresponding author upon reasonable request.

Introduction

Bariatric surgery has experienced exponential growth in recent decades in response to the global rise in obesity. Despite its proven benefits and the importance of nutritional follow-up, it is estimated that between 20% and 50% of patients fail to maintain adequate adherence to postoperative nutritional treatment, which negatively impacts long-term outcomes [1].

A lack of adherence to nutritional treatment in these patients can manifest in various ways: inadequate protein intake, insufficient intake of vitamin and mineral supplements, noncompliance with meal frequency and volume, and consumption of contraindicated foods, among other eating disorders. These behaviors increase the risk of regaining weight, protein malnutrition, specific nutritional deficiencies such as anemia and osteoporosis, and gastrointestinal complications [2].

The factors that influence therapeutic adherence are complex and multidimensional and may relate to sociodemographic, psychological, socioeconomic, educational, cultural, and health system factors. However, there is limited knowledge of the specific interactions among these factors in the postbariatric surgery patient population [3].

The objective of this study was to identify risk factors for nonadherence to nutritional treatment in postbariatric surgery patients.

Materials and methods

Studio design

This study is observational. The data source is prospective.

Scenery

The study was conducted at the Metabolism and Obesity Service of the "Medical Center for Metabolism and Obesity" in Guayaquil, Guayas Province, Ecuador. The research period ran from January 1, 2025, to April 30, 2025.

Participants

Adult patients who underwent bariatric surgery within 2 years before study enrollment were included. Patients aged 65 or older were excluded. The sample was divided into 2 groups: the first included patients who attended nutritional follow-up appointments, and the second included those who did not.

Variables

The variables included age, sex, marital status, occupation, physical activity (type and frequency), body mass index, smoking status, alcohol consumption, comorbidities, type of surgery, supplement intake, perception of treatment, reasons for not following treatment, attendance at nutritional check-ups, difficulties in access and adherence, and family support.

Data sources/measurements

The source was direct; an electronic form was completed using data from the institutional medical records.

Biases

Observation and selection bias were avoided by applying participant selection criteria. To prevent potential interviewer, information, and memory biases, the principal investigator maintained data collection under a set of guidelines and with records approved in accordance with the research protocol. Two researchers independently analyzed each record in duplicate, and variables were entered into the database after their consistency was verified.

Study size

The sample was probabilistic. In 2024, 24 bariatric surgeries were performed at the Metabolism and Obesity Medical Center. The prevalence was 56 cases. With a 99.9% confidence level, a 5% confidence interval, and an expected frequency of 50%, the calculated sample size was 50 cases. Epi Info™ version 7.2 (CDC, Atlanta, March 9, 2025) was used for data collection.

Quantitative variables

The variables were treated as continuous, as their entire original distributions were used. No mathematical transformations (such as logarithms or square roots) were applied. Outliers were identified using a Tukey diagram, and extreme values were addressed through primary-source verification. Missing data were handled by exclusion. No dichotomization or categorization was used for the continuous variables.

Statistical analysis

Qualitative variables were analyzed using frequencies and percentages. Chi-square tests were used to compare percentages. An association analysis using odds ratios for risk factors for attending or not attending nutritional follow-up is presented. The statistical package used was IBM Corp. Released 2025. IBM SPSS Statistics for Windows, Version 31.0. Armonk, NY: IBM Corp.

Results

Participants

A total of 50 patients who met the inclusion criteria were analyzed, allowing us to reach 100% of the sample.

Characteristics of the study groups

There were 4 men in group 1 (adherence) and 20 (66.7%) in group 2 (nonadherence). There were no differences in age distribution. Demographic and social characteristics and background data are presented in Table 1.

Risk factors

Table 2 presents the protective and risk factors for patient adherence to the nutritional program.

Discussion

The main findings of this research on adherence to the post-bariatric surgery nutritional program (N=50) were as follows: there was a sex difference in adherence: women showed significantly greater adherence (80% in the group that attended vs. 33.3% in the group that did not attend; P=0.0012). Female sex was identified as a protective factor (odds ratio [OR] of 0.125). Regarding socioeconomic and support barriers, difficulty accessing a nutritionist was the strongest risk factor for nonadherence (66.7% in the group that did not attend vs. 25% in the group that did attend; P=0.003892). This difficulty increased the risk of nonadherence by a factor of 6.0 (OR = 6.0). Lack of family support was also a significant risk factor for nonadherence (60% in the group that did not attend vs. 30% in the group that did attend (P=0.03751)), increasing the risk 3.5 times (OR=3.5). Regarding treatment perception, patients who considered the treatment important showed greater adherence (50% in the group that did attend vs. 13.3% in the group that did not attend; P=0.004571). Other demographic and clinical factors were not significant: no statistically significant differences were found between the groups in terms of age distribution, marital status, having children, employment status, habits (smoking/alcohol), comorbidities (diabetes, hypertension, etc.), type of bariatric surgery, or year of surgery.

The marked difference in adherence, with males being at high risk for dropping out of follow-up, forces bariatric teams to develop care and communication protocols specifically aimed at men.

Table 1. Characteristic of study groups.

	If you attend N=20	He does not attend N=30	*P*
Male	4 (20%)	20 (66.7%)	0.0012
Female	16 (80%)	10 (33.3%)	
Age			
60 and over	6 (30%)	6 (20%)	0.2598
Ages 45-59	8 (40%)	7 (23.3%)	
From 30 to 44 years old	4 (20%)	8 (26.7%)	
From 18 to 29 years old	2 (10%)	9 (30.0%)	
Marital status			
Married	5 (25%)	8 (26.7%)	0.9976
common-law union	5 (25%)	7 (23.3%)	
Single	3 (15%)	5 (16.7%)	
Separate	4 (20%)	5 (16.7%)	
Widower	3 (15%)	5 (16.7%)	
Social conditions			
With children	8 (40%)	13 (43.3%)	0.815
Unemployed	4 (20%)	7 (23.3%)	0.784
Physical activity			
Without regular physical activity	3 (15%)	12 (40.0%)	0.05878
Activity 5 times per week	3 (15%)	1 (3.3%)	
Activity 4 times per week	5 (25%)	4 (13.3%)	
Activity 3 times per week	2 (10%)	3 (10%)	
Activity 2 times per week	4 (20%)	4 (13.3%)	
Activity once a week	1 (15%)	6 (20%)	
Habits			
Smoking	10 (50%)	14 (46.7%)	0.8172
Alcohol consumption	9 (45%)	14 (46.7%)	0.9078
Comorbidities			
Type 2 diabetes mellitus	3 (15%)	6 (20%)	0.6521
Hypertension	2 (10%)	3 (10%)	1.0
Sleep apnea	3 (15%)	4 (13.%)	0.8679
Hyperlipidemia	1 (5%)	1 (3.3%)	0.7683
Type of surgery			
Gastric bypass	8 (40%)	11 (36.7%	0.812
gastric sleeve	7 (35%)	12 (40%)	0.7212
Other	5 (25%)	7 (23.3%)	0.8925
Year of surgery			
2018	2 (10%)	4 (13.3%)	0.9976
2019	3 (15%)	5 (16.7%)	
2020	4 (20%)	5 (16.7%)	
2021	4 (20%)	5 (16.7%)	
2022	4 (20%)	6 (20.0%)	
2023	3 (20%)	5 (16.7%)	
Taking supplements	12 (60%)	10 (33.3%)	0.0625
He considers the treatment important.	10 (50%)	4 (13.3%0	0.004571
Difficulty of treatment (opinion)			
Very difficult	2 (10%)	10 (33.3%)	0.1613
Difficult	2 (10%)	6 (20%)	
Moderate	3 (15%)	4 (13.3%)	
Easy	6 (30%)	6 (20%)	
Very easy	7 (35%)	4 (13.3%)	
Difficulty accessing a nutritionist	5 (25%)	20 (66.7%)	0.003892
Without family support	6 (30%)	18 (60%)	0..03751b

Table 2. Risk factors for lack of nutritional adherence.

	If you attend N=20	He does not attend N=30	*OR*	*95% CI*	*P*
Female	16 (80%)	10 (33.3%)	0.125	0.033-0.474	0.0022
He considers the treatment important.	10 (50%)	4 (13.3%0	0.500	0.1318-1.8961	0.3081
Difficulty accessing a nutritionist	5 (25%)	20 (66.7%)	6.0	1.6931 -21.2623	0.0055
Without family support	6 (30%)	18 (60%)	3.5	1.0506-11.6602	0.0413

Low adherence in this group is associated with a greater long-term risk of weight regain (rebound) and serious medical complications associated with chronic nutritional deficiencies (e.g., anemia, vitamin B12 deficiency neuropathy, metabolic bone disease). The fact that clinical variables (type of surgery, preexisting comorbidities, year of surgery) are not significant factors in nonadherence indicates that failure to follow up is not primarily biological but rather psychosocial and logistical. This suggests that the key to optimizing postbariatric outcomes lies not in refining the surgical technique but in strengthening the postoperative support infrastructure. Furthermore, the lack of family support as a risk factor (OR=3.5) indicates that bariatric surgery affects a patient's entire environment. Follow-up programs should include the assessment and active involvement of the family support network to ensure compliance, as these factors are prognostic for clinical success.

The difficulty of accessing a nutritionist, identified as the most significant risk factor (OR=6.0), demonstrates that specialized consultation is perceived as an insurmountable barrier for patients who do not seek care. Nutritionally, this means that the fundamental pillar of preventing postbariatric deficiencies—dietary and supplemental control and adjustment—is being lost in the most vulnerable group. Nutritional programs need to be restructured to eliminate logistical barriers. This implies implementing telenutrition models, flexible scheduling, low-cost group consultations, or using digital platforms to monitor intake and supplementation. The high adherence among those who consider treatment important indicates that initial and ongoing education must go beyond dietary restrictions. Nutritionists should focus on effectively communicating that adherence to diet and supplementation is a vital component of quality of life and longevity, not just weight loss. Given that adherence to nutritional monitoring is low in one-third of the sample, supplementation is likely severely compromised in this group. Programs should prioritize education on the importance of micronutrients to prevent serious deficiencies (e.g., iron, calcium, and fat-soluble vitamin deficiencies) and explore ways to simplify supplementation regimens.

The findings of this research necessitate an urgent and practical restructuring of postbariatric surgery follow-up programs, focusing less on the operating room and more on psychosocial and logistical support. In practice, this implies the creation of targeted and personalized protocols for male patients, the group at highest risk of dropping out, using communication channels that adapt to their preferences to increase adherence and mitigate chronic complications. To combat the most significant logistical barrier—the difficulty of accessing a nutritionist—the solution lies in the decisive expansion of telenutrition, offering flexible schedules and subsidized consultation models that eliminate this obstacle for nonadherent patients. Simultaneously, family support, crucial for success, must be formalized through mandatory family inclusion programs that integrate the support network into lifestyle changes. Finally, continuing education must evolve to emphasize longevity and the prevention of serious deficiencies (such as iron and vitamin B12), rather than focusing solely on weight loss, and to simplify supplementation regimens through digital reminders to ensure long-term commitment to micronutrients.

The findings of this study, which indicate that poor adherence to postbariatric follow-up is primarily a logistical and psychosocial issue, are entirely consistent with the current scientific literature. The literature consistently emphasizes that the long-term success and safety of bariatric surgery depend not only on the surgical technique used but also on continuous adherence to nutritional care [1, 2]. Poor adherence is the main pathway to micronutrient deficiencies (such as iron, vitamin B12, and calcium), which are serious and frequent long-term complications that sometimes manifest even more than two years after surgery [3-6]. Furthermore, the identification of female sex as a protective factor, as well as sex differences in outcomes and the risk of complications, are widely reported topics in contemporary research [7]. Therefore, the practical approach of the present study—emphasizing the need for customized protocols to address logistical barriers (telenutrition) and lack of family support—reflects the clinical trend that the management of nutritional and psychosocial risks is as critical as the surgery itself [8-9].

This study has several methodological limitations that restrict the generalizability of its findings. The first is the small sample size (N=50) and its single-center design, which may bias the findings toward local practices and specific demographics, compromising its external validity. Additionally, as an observational study, it can only establish associations between psychosocial factors (such as difficulty of access or lack of family support) and nonadherence, without allowing for a direct causal inference or ruling out the influence of unmeasured confounding factors, such as underlying mental health conditions. Finally, the reliance on subjective opinions to measure key variables introduces potential social desirability or recall biases, and the absence of long-term clinical outcomes prevents the assessment of the ultimate impact of nonadherence on the actual risk of severe nutritional deficiencies or on weight regain in this cohort. All of these limitations should be addressed in future work.

Conclusions

Psychosocial and logistical barriers primarily determine adherence to nutritional follow-up after bariatric surgery. Difficulty accessing a nutritionist (OR=6.0) and lack of family support (OR=3.5) were the most significant risk factors, and men exhibited lower adherence. This underscores the urgent need for multidisciplinary teams to implement personalized protocols to mitigate the risk of dropout and severe long-term nutritional deficiencies. This demonstrates that optimizing post-bariatric outcomes requires strengthening both the support infrastructure and surgical techniques.

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Risk factors for nonadherence to nutritional treatment in patients after bariatric surgery. A single-center observational study.

Abstract

Introduction: Bariatric surgery has expanded rapidly to fight obesity, but despite its benefits, it is estimated that between 20% and 50% of patients fail to adhere to postoperative nutritional follow-up, which affects long-term outcomes.

Methodology: A prospective, observational study was conducted at the "Medical Center for Metabolism and Obesity" in Guayaquil, Ecuador, from January to April 2025. The probabilistic sample included adults under 65 years of age who had undergone bariatric surgery in the past two years and were divided into two groups on the basis of adherence to nutritional controls. Demographic, clinical, habit, perception, and treatment barrier variables were recorded.

Results: There were 20 patients in the adherence group and 30 in the nonadherence group. The adherence group included 4 men (20%), whereas the nonadherence group included 20 men (66.7%) (P = 0.0012). No significant differences were observed in terms of age, marital status, social status, smoking or alcohol habits, comorbidities, or type of surgery. Difficulty accessing a nutritionist (OR 6.0; 95% CI 1.69–21.26; P = 0.0055) and a lack of family support (OR 3.5; 95% CI 1.05–11.66; P = 0.0413) were identified as risk factors. Female sex (P=0.0022) served as a protective factor.

Conclusion: Adherence to nutritional follow-up after bariatric surgery is affected primarily by psychosocial and logistical barriers, with the strongest risk factors being male sex, difficulty accessing a nutritionist, and lack of family support. These findings highlight the need for multidisciplinary teams to develop and implement personalized, urgent intervention protocols to reduce abandonment and the long-term risk of serious nutritional deficiencies.

Keywords: Lack of nutritional adherence, Bariatric surgery, Lack of family support.

Statements

Ethics committee approval and consent to participate

The study was approved by the bioethics committee of the Faculty of Medical Sciences, University of Guayaquil.

Publication consent

This information was not needed, as the present study did not publish images, radiographs, or specific patient studies.

Conflicts of interest

The research has no financial interests or conflicts of interest.

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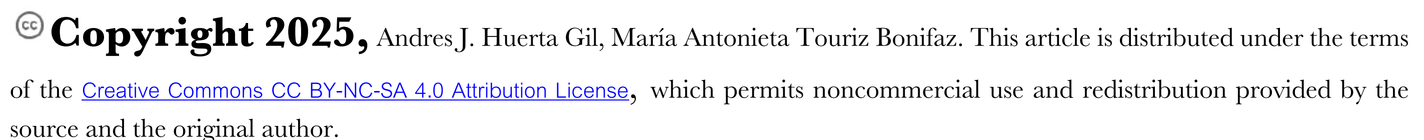
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