

# Evaluation of quality of life, weight loss and comorbidities of patients undergoing bariatric surgery

## *Avaliação da qualidade de vida, perda de peso e comorbidades de pacientes submetidos à cirurgia bariátrica*

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### ABSTRACT

**Objective:** to assess the efficacy of weight loss, the evolution of comorbidities, the quality of life and the BAROS protocol (Bariatric Analysis and Reporting Outcome System) in the postoperative period of patients undergoing bariatric surgery. **Methods:** we conducted a cross-sectional, quantitative study with 95% true strength ( $P=0.05$ ), with 103 patients submitted to SLEEVE Vertical Gastrectomy (40) and Roux-en-Y Gastric Bypass (63), from four months after surgery. We carried out the research at the Ambulatory of General Surgery of the Clinics Hospital of the Federal University of Pernambuco, using the BAROS protocol. **Results:** the majority of the patients were female (89.3%). The mean age was 44.23 years. The mean percentage loss of excess weight was 69.35%. The mean postoperative follow-up time was 41.87 months ( $\pm 37.35$ ). The comorbidities with the highest percentage of resolution were sleep apnea (90.2%), diabetes (80.7%) and hypertension (70.8%). The most frequent complications were hair loss (79.6%), nutritional deficiency (37.9%) and anemia (35%). The BAROS protocol demonstrated that patients positively evaluated quality of life in 93.2% of the cases. The Moorehead-Ardelt questionnaire showed that quality of life "improved" or "improved greatly" for 94.1% of patients. **Conclusion:** bariatric surgery has been shown to be an effective procedure in the treatment of morbid obesity and in the control of comorbidities. Quality of life analysis was evaluated positively through the BAROS protocol.

**Keywords:** Bariatric Surgery. Comorbidity. Obesity. Weight Loss. Quality of Life.

### INTRODUCTION

The impact of obesity is not limited only to health-related issues, but also to longevity and quality of life (QoL), since it increases the probability of death and decreases QoL indicators, which are characterized by social interaction, low self-esteem, social isolation, stress, depression and negative consequences also on work performance<sup>1</sup>.

Patients with a  $BMI \geq 40 \text{ kg/m}^2$  are considered to be severely obese and have an even greater risk of presenting comorbidities related to excessive weight<sup>2</sup>. Among the cases of diabetes, 80 to 90% are type II and usually affect obese patients and over 40 years of age<sup>3</sup>. More than 80% of these patients also have metabolic syndrome (dyslipidemia, abdominal obesity, impaired glucose tolerance or diabetes and hypertension), leading to a high cardiovascular risk<sup>3,4</sup>. In addition, there

is an association between obesity and the onset of various types of cancer<sup>5</sup>.

For those individuals with  $BMI \geq 40 \text{ kg/m}^2$ , as well as for those with  $BMI \geq 35 \text{ kg/m}^2$  and who already have obesity-related diseases, bariatric surgery is the most effective therapeutic option for the loss of weight and reduction of complications resulting from overweight, thus offering a differentiated life and health perspective with an increase in QoL<sup>6-10</sup>. Thus, it is possible to notice that bariatric surgery works beyond weight loss, and its efficacy is also supported by the valorization of aspects that are important for patients, such as dietary reeducation, healthier lifestyle and psychological and social behaviors that improve quality of life and physical and mental health<sup>9,10</sup>.

In this context, the definition of the success of surgical treatment for obesity should transcend the simple measurement of the weight curve, which,

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although important, does not encompass all factors that are important to be evaluated, such as the improvement of the associated clinical conditions and of QoL, the latter represented by aspects of self-esteem, physical status, social status, work capacity and sexual performance<sup>10,11</sup>. The evaluation of QoL in the context of obesity after bariatric surgery is extremely valid, since the instruments that propose to evaluate QoL, such as the Bariatric Analysis and Reporting Outcome System (BAROS), allow to know the reality of the patient, as well as to evaluate the changes after some therapeutic intervention, such as educational, pharmacological or surgical treatment<sup>10,12,13</sup>.

In view of the above, the objectives of the present study were: 1) to measure the efficacy of weight loss after bariatric surgery, given by the Excess Weight Loss Percentage (EWL%) greater than 50%; 2) to analyze the evolution of comorbidities; 3) to assess QoL; and 4) to evaluate the BAROS protocol postoperatively.

## **METHODS**

We carried out the research at the Ambulatory of General Surgery of the Clinics Hospital of the Federal University of Pernambuco, Recife, Brazil. It was approved by the Ethics Committee of the Health Sciences Center of the Federal University of Pernambuco, CAAE: 26595114.4.0000.5208. All participants signed an informed consent form.

We performed a cross-sectional, quantitative study, with a true strength of 95% (P=0.05), with 103 patients of both genders between 22 and 63 years of age submitted to Sleeve Vertical Gastrectomy (n=40) or to Roux-en-Y Gastric Bypass (n=63). The mean postoperative follow-up time was 41.87 months ( $\pm 37.35$ ). Patients were attended from April to August 2016.

We excluded Individuals who lacked the ability to understand the study procedures and/or other disabling complications.

We collected data through an individual interview with a questionnaire with identification data (age, gender, date of surgery, education, profession, marital status, family income and technique used) and anthropometric data (weight, height, BMI and overweight). In addition, we investigated postoperative complications and the evolution of obesity-related comorbidities.

We evaluated weight loss by means of the excess weight loss percentage (EWL%), using the values proposed by Metropolitan Height and Weight Tables<sup>13</sup> as the parameter of ideal weight.

We assessed Quality of life with the questionnaire developed by Moorehead-Ardelt of the BAROS protocol<sup>14</sup>. It consists of five domains, namely, self-esteem, physical activities, social relationships, sexual activity and work performance. For each domain there is one question, each with five response alternatives, representing a gradual level of satisfaction, with each answer varying from a minimum of -1 to a maximum of 1, associated with a ranking, ranging from "Much Worse" to "Much Better"<sup>14</sup>.

To obtain the total BAROS score, it is necessary to first add the points of the QoL, Excess Weight Loss and Comorbidities, and then subtract the points related to the following conditions: need for reoperation (one point for each reoperation), major complications (one point, even if there is more than one) and minor complications (0.2 points, also regardless of the amount)<sup>14</sup>. In the analysis of the final score, the presence of comorbidities is considered and the evaluations can be classified as "Insufficient", "Moderate", "Good", "Very good" and "Excellent"<sup>14</sup>.

To analyze the data, we built a database in the EPI INFO program, which was exported

to the SPSS software, where we performed the analysis. To evaluate the profile of the patients participating in the study and the comorbidities presented by them after surgery, we calculated the percentage frequencies and constructed the respective frequency distributions of the evaluated factors. In the analysis of the quantitative variables, we calculated the statistics minimum, maximum, mean and standard deviation. We used a 95% true strength ( $P=0.05$ ).

## RESULTS

### Demographic and Anthropometric Data

The demographic and anthropometric data of the evaluated patients were distributed by gender, mean age, initial BMI and overweight, as shown in table 1. The majority of patients were female (89.3%). Mean age, initial BMI and overweight were 44.23 years, 48.11kg/m<sup>2</sup> and 65.17kg, respectively.

**Table 1.** Demographic and anthropometric data.

Evaluated factor	Statistic
Gender	
Male	11 (10.7%)
Female	92 (89.3%)
Age	
Minimum	22.00
Maximum	63.00
Mean±SD	44.23±10.84
Initial BMI	
Minimum	33.10
Maximum	78.70
Mean±SD	48.11±8.10
Excess weight	
Minimum	28.00
Maximum	147.40
Mean±SD	65.17±23.39

SD: Standard Deviation; BMI: Body mass index.

### Weight loss

As a result of the evaluation of EWL% and of the pre and post-surgical BMI, with mean postoperative follow-up time of 41.87 months ( $\pm 37.35$ ), we found that the mean BMI before surgery and after surgery was 48.10kg/m<sup>2</sup> and 31.05kg/m<sup>2</sup>, respectively. Additionally, we observed that the average EWL% reached 69.35%, as shown in table 2.

**Table 2.** Evaluation of EWL% and pre and postoperative BMI.

Evaluated factor	Mean±SD
Preoperative BMI	48.10±8.10
Postoperative BMI	31.05±6.03
EWL%	69.35±19.01

EWL%: Excess Weight Loss Percentage; BMI: Body Mass Index.

### Comorbidities

The most prevalent comorbidity was hypertension (42.4%), followed by sleep apnea (24.1%) and diabetes (18.2%). In addition, for all comorbidities evaluated, the majority of the patients presented resolution of hypertension (70.8%), diabetes (80.7%), dyslipidemia (68.8%) and sleep apnea (90.2%). Regarding peripheral vascular disease and difficulty to conceive, the resolution occurred in 50% of cases, as shown in table 3.

### Quality of life

We classified the evolution of quality of life based on the Moorehead-Ardelt quality of life questionnaire, which identified that 41.7% of the patients showed much improvement, 52.4% had improvement, 4.9% did not show improvement, while in 1% there was a decrease in quality of life. Table 4 shows the classification of the Moorehead-Ardelt quality of life questionnaire. We found that the majority of the patients presented better/much better evaluation of the quality of life items after surgery.

**Table 3.** Prevalence and evolution of the evaluated comorbidities.

Comorbidity	Prevalence	Evolution			
		Worse	Unaltered	Improved	Resolved
Hipertension	72 (42.4%)	0 (0.0%)	3 (4.2%)	18 (25.0%)	51 (70.8%)
Diabetes	31 (18.2%)	0 (0.0%)	1 (3.2%)	5 (16.1%)	25 (80.7%)
Peripheral vascular disease	6 (3.5%)	0 (0.0%)	2 (33.3%)	1 (16.7%)	3 (50.0%)
Dyslipidemia	16 (9.4%)	0 (0.0%)	3 (18.8%)	2 (12.4%)	11 (68.8%)
Sleep apnea	41 (24.1%)	0 (0.0%)	2 (4.9%)	2 (4.9%)	37 (90.2%)
Difficulty to conceive	4 (2.4%)	0 (0.0%)	1 (25.0%)	1 (25.0%)	2 (50.0%)

**Table 4.** Classification of the Moorehead-Ardelt quality of life questionnaire.

Question	Assessment				
	Much worse	Worse	Unaltered	Better	Much better
How do you feel comparing with the time before treatment (self-esteem)	1 (1.0%)	0 (0.0%)	3 (2.9%)	22 (21.4%)	77 (74.8%)
Ability to participate in physical activities	0 (0.0%)	1 (1.0%)	9 (8.7%)	35 (34.0%)	58 (56.3%)
Social relationships	2 (1.9%)	1 (1.0%)	43 (41.7%)	20 (19.4%)	37 (35.9%)
Work	1 (1.0%)	4 (3.9%)	16 (15.5%)	23 (22.3%)	59 (57.3%)
Interest in sex	6 (5.8%)	9 (8.7%)	35 (34.0%)	23 (22.3%)	30 (29.1%)

### Total Score and Final Standings

From the total classification of patients evaluated according to BAROS<sup>14</sup>, we found that 37.9% of patients presented a "very good" classification, 32% were classified as "excellent", 23.3% presented "good" classification, while 5.8% were considered "moderate", and 1%, "insufficient".

### Prevalence of Postoperative Complications

The most frequent complications observed in the studied sample were hair loss (79.6%), nutritional deficiency (37.9%) and anemia (35%). Less frequent complications were bleeding (1%), severe infection (3.9%) and depression (13.6%).

## DISCUSSION

The majority of the patients evaluated were female (89.3%), corroborating the findings

of several national<sup>15,16</sup> and international<sup>17,18</sup> studies. In Brazil, epidemiological data revealed a prevalence of obesity of 17.6% among men and 18.2% among women<sup>19</sup>. In addition to the epidemiological data confirming a growth and prevalence of obesity in women, some studies also point to other factors that could explain the predominance of women in relation to bariatric surgery, such as personal aesthetic motivations<sup>20</sup> and stigma from a society that has a beauty pattern of lean women<sup>21</sup>. Unlike women, men tend to seek this resource only when their daily physical activities are compromised<sup>22</sup>.

Understanding these motivational differences between men and women is of paramount importance, since they can be worked both in the pre- and postoperative period to try to approximate patients' expectations with the real results that can be achieved with bariatric

surgery, including its positive aspects (weight loss, improvement/remission of comorbidities), as well as negative aspects (excess skin, scars, need to adhere to a new lifestyle and possible complications)<sup>10,12,22,23</sup>.

When analyzing the relationship between bariatric surgery and its impact on weight loss, we noted, as others did, that this procedure has been shown to be quite effective<sup>12,20,21,23</sup>. The mean BMI before and after surgery was 48.10kg/m<sup>2</sup> and 31.05kg/m<sup>2</sup>, respectively, which implies a significant reduction in cardiovascular mortality and in mortality from all causes associated with excessive weight<sup>7,18</sup>. After surgery, patients on average achieved a significant improvement in the severity of obesity, going from grade III to grade I (33.9%). When evaluating patients who had a post-surgical BMI below 30 (minimum index for obesity grade I), we observed that 36.9% were classified as overweight and 12.6%, as normal weight. The mean EWL% was 69.35%, proving that there was success in relation to bariatric surgery, in which the minimum value required is a EWL%>50%<sup>7,10,18</sup>. Similar data were reported by other authors, such as Costa *et al.*<sup>12</sup>, who observed satisfactory EWL% in 94.7% of the patients investigated. In the study by Sanchez-Santos *et al.*<sup>24</sup>, 86.5% of the patients had EWL%>50%.

The present study demonstrated that 87 of the 103 patients (84.5%) had some comorbidity, thus showing that obesity is a clinical condition that acts as a risk factor for the emergence of other diseases. The most common comorbidities were hypertension (42.4%), sleep apnea (24.1%) and diabetes (18.2%). These data were also found in other studies<sup>17,18,20,23</sup>. Barros *et al.*<sup>23</sup> found an even higher prevalence of hypertension (50%) in the preoperative period.

Regarding the evolution of comorbidities after bariatric surgery, the data obtained in the

present study show that sleep apnea was the condition that obtained the highest resolution index, in 90.2% of the patients evaluated, followed by diabetes (80.7%) and hypertension (70.8%). Consistently, several studies have shown the efficacy of bariatric surgery in the various comorbidities associated with obesity. A retrospective study of 59 patients evaluated the evolution of Type II Diabetes *Mellitus*, systemic arterial hypertension and dyslipidemia after Roux-en-Y gastroplasty using anthropometric (height and weight) and laboratory data (low density lipoprotein, high density lipoprotein, triglycerides and glycemia) in the pre- and postoperative periods (mean time 7±3 years)<sup>25</sup>. The study showed that after surgery, 40% of patients continued to be treated for systemic arterial hypertension and that remission of diabetes (81%) and dyslipidemia (94%) had occurred. Sanchez-Santos *et al.*<sup>24</sup> showed that, in 50 patients, after five years of Roux-en-Y gastric bypass, 85.7% had improved comorbidities associated with obesity.

Although we observed, as others did, that there is a higher rate of resolution of type II diabetes *mellitus*, some authors point to a decrease in the tendency to resolve this comorbidity related to the longer post-surgical follow-up time, in which the main variable associated with this factor may be weight regain<sup>12</sup>.

The occurrence of major and minor postoperative complications such as hair loss (79.6%), nutritional deficiency (37.9%), anemia (35%), nausea (33%), frequent vomiting (32%), intestinal obstruction (21.4%), incisional hernia (14.6%), depression (13.6%), severe infection (3.9%) and hemorrhage (1%) were similar to those described in the literature<sup>7,18,21,26</sup>. Nutritional deficiency was the second most common complication (37.9%) and one of the side effects of bariatric surgery. Among these deficiencies

are malnutrition and deficiency of nutrients such as iron, vitamin B12, folate, calcium, vitamin D and proteins. Deficiencies usually occur due to the restriction in food intake, the physiological impact of anatomical changes, as well as food intolerance and non-adherence to treatment with the use of multivitamins. Thus, patients undergoing bariatric surgery have to receive supplemental vitamins and minerals, as well as undergo clinical and nutritional monitoring to detect possible nutritional deficiencies<sup>21</sup>. Depression was identified in 13.6% of the patients after surgery and had as one of the main reasons the difficulty in accepting this new body image due to excess skin, as well as in relation to the post-surgical adaptation process.

Duarte *et al.*<sup>16</sup>, when analyzing clinical complications, using the formal classification system of the BAROS protocol, found nausea, vomiting, hair loss, diarrhea and fetid flatulence. Silva *et al.*<sup>21</sup> identified that alopecia was the most frequent clinical complication (62.9%), followed by vomiting (38.6%), diarrhea (27.0%), Dumping Syndrome (20%) and constipation (17%). As seen in the present study, as in the others found in the literature, postoperative complications are frequent, requiring professionals to be prepared to make early diagnosis and treatment, thus obtaining the best results and, consequently, reducing the impact on health and quality of these patients.

Regarding quality of life assessment, our analysis of the total score, according to the BAROS protocol, showed that the evaluation was "excellent" in 32% of cases, "very good" in 37.9%, "good" in 23.3%, "moderate" in 5.8% and "insufficient" in 1% of cases. In general, these data are consistent with the literature. A study with 160 patients submitted to Roux-en-Y Gastric Bypass (Fobi-Capella), identified through the BAROS protocol that 60.6% of the patients

evaluated the quality of life as "excellent", 26.8% as "very good", 9.8% as "good" and 2.8% as "bad"<sup>25</sup>. Another study, using BAROS in 70 patients, showed that the highest proportion of patients presented a "good" quality of life (50%), followed by "acceptable" (35.8%), "very good" (12.8%) and "insufficient" (1.4%)<sup>21</sup>.

According to the classification of the Moorehead-Ardelt quality of life questionnaire in the present study, 94.1% of the patients evaluated that, after bariatric surgery, quality of life improved or greatly improved, and only 5.9% evaluated it as decreased or unchanged. Our data corroborate those found in the literature on the subject. Barros *et al.*<sup>23</sup> assessed quality of life using the Moorehead-Ardelt II quality of life questionnaire with 92 patients submitted to Roux-en-Y gastric bypass (Fobi-Capella) from the third postoperative month on, and reached the following conclusions: 75% of participants considered their QoL to be "much better", 19.6%, "better", and 5.4% rated the QoL as "unchanged." There was no rating as "bad" or "too bad." Costa *et al.*<sup>12</sup> assessed the quality of life of 143 patients, who scored "better" or "much better" in more than 90% of cases in all groups.

In the present study, in the five domains of Moorehead-Ardelt questionnaire self-esteem was considered better or much better by 94.2% of patients, 90.3% of them increased the frequency of physical activities, 55.3% improved their social relationships, 79.6% felt more able to work, and 51.4% evaluated that the interest for sex is better or much better, corroborating the literature findings<sup>8,10,12,14</sup>. Consistently, a study of 57 patients undergoing Roux-en-Y gastric bypass (Fobi-Capella) showed that self-esteem and ability to work had the highest mean score's between the domains evaluated, while physical activity and sexual interest had the lowest ones. A study

using the Moorehead-Ardelt questionnaire with 50 patients after five years of Roux-en-Y gastric bypass showed significant improvements in self-esteem (94%), working conditions (72.6%), physical activity (66.7%) and sexual interest (50.9%)<sup>17</sup>.

In our study, self-esteem was also one of the items that presented the highest mean score, and interest by sex was one of the domains that had lower mean. We also observed that, in general, the majority of the patients evaluated the quality of life in a positive way and presented improvement in all items evaluated. However, we observed that 5.9% of the patients considered that quality of life decreased or remained unchanged in the general evaluation of the Moorehead-Ardelt questionnaire. There were also evaluations that indicated that the QoL remained the same or that there was worsening, as can be observed in the following percentages: interest by sex (48.5%), work (20.4%), social relationship (44.6%), ability to participate in physical activities (9.7%) and self-esteem (3.9%). These data are relevant because it is expected that, with bariatric surgery and consequent weight loss and improvement and/or resolution of comorbidities, there will be a positive impact not only on physical health, but also on mental health, reflecting positively on the patients' QoL. After analyzing these findings in terms of surgery success, we verified that, although patients had met the criterion to evaluate the success with regard to weight loss, that is, EWL%>50%, the impact on QoL in 5.9% of the them was not as expected.

Despite the weight loss and improved health conditions, the impact that obesity brings on self-esteem cannot be overcome only with these factors, thus showing the need for a multiprofessional follow-up to improve self-esteem, enabling a new meaning to this new body, working, for example, on changes in the

perception of body image, and thus providing an improvement in social relationships and interest in sex<sup>10,11</sup>. When considering factors that may be negatively affecting sexuality, physical activities, social relationships, work and self-esteem even after bariatric surgery, it is possible to point out some: 1) postoperative complications such as depression, weight gain and difficulty in acquiring new habits of life make improving self-esteem difficult; 2) Bariatric surgery, by itself, is not capable, nor has the objective, of promoting the resolution of interpersonal and marital conflicts, often prior to surgery, as well as changes in personality characteristics; 3) there may be an emotional destabilization after surgery related to the presence of pain and/or the need to adapt to food restrictions; 4) feelings and behaviors related to sudden weight loss may occur, such as depression, anxiety, use and abuse of alcohol and other drugs; 5) if, on the one hand, weight loss favors self-esteem, on the other, it will lead to increased sagging of muscle tone, excess skin, scarring, which may lead some patients, especially women, to have a low self-esteem, body embarrassment, discomfort, fear of not being accepted, fear of relating and shyness<sup>8,10,11,12,27</sup>.

All of the factors mentioned above can negatively influence the quality of life as a whole and, specifically, the items evaluated in a negative or neutral way in the present research. These data reinforce the importance of multiprofessional work regarding patients' orientation regarding bariatric surgery, not only in the preoperative period, but also in the postoperative period. A follow-up proposal that addresses all these issues is extremely beneficial to these patients.

Bariatric surgery has proven to be an effective procedure in the treatment of morbid obesity and in the control of comorbidities. Quality of life analysis was evaluated positively through the BAROS protocol.

## R E S U M O

**Objetivo:** mensurar a eficácia da perda de peso, analisar a evolução de comorbidades, investigar a qualidade de vida e avaliar o protocolo BAROS (Bariatric Analysis and Reporting Outcome System) no pós-operatório de pacientes submetidos à cirurgia bariátrica. **Métodos:** estudo transversal e quantitativo, com força de verdade de 95% ( $P=0,05$ ), de 103 pacientes submetidos à Gastrectomia Vertical SLEEVE (40) e à Derivação Gástrica em Y de Roux (63), a partir de quatro meses de pós-operatório. A pesquisa foi realizada no Ambulatório de Cirurgia Geral do Hospital das Clínicas da Universidade Federal de Pernambuco, tendo sido utilizado o protocolo BAROS. **Resultados:** a maioria dos pacientes era do sexo feminino (89,3%). A média de idade foi de 44,23 anos. A média de perda percentual do excesso de peso foi de 69,35%. A média de tempo de seguimento pós-cirúrgico foi de 41,87 meses ( $\pm 37,35$ ). As comorbidades com maior percentagem de resolução foram: apneia do sono (90,2%), diabetes (80,7%) e hipertensão (70,8%). As complicações mais frequentes foram queda de cabelo (79,6%), deficiência nutricional (37,9%) e anemia (35%). O protocolo BAROS demonstrou que a qualidade de vida foi avaliada de forma positiva em 93,2% dos casos. O questionário Moorehead-Ardelt demonstrou que a qualidade de vida "melhorou" ou "melhorou muito" para 94,1% dos pacientes. **Conclusão:** a cirurgia bariátrica demonstrou ser um procedimento eficaz no tratamento da obesidade mórbida e no controle das comorbidades. A análise da qualidade de vida foi avaliada de forma positiva através do protocolo BAROS.

**Descritores:** Cirurgia Bariátrica. Comorbidade. Obesidade. Perda de Peso. Qualidade de Vida.

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