

Original

Does bariatric surgery improve the patient's quality of life?

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Abstract

Objective: The aim of this investigation was to assess the effect of malabsorptive bariatric surgery (BS) on the quality of life (QoL), applying the Nottingham Health Profile (NHP) and the bariatric analysis and reporting outcome system (BAROS).

Design: A prospective cohort study was performed in 100 adult patients (> 18 years) undergoing bariatric surgery by malabsorptive technique for one year.

Research methods and procedures: Patients were monitored from the beginning of the BS program until a year after the intervention, applying the NHP and the BAROS test. At baseline, the mean weight of the women was 132 ± 22 kg and the Body Mass Index (BMI) was 50.7 kg/m².

Results: The values obtained from different areas applying the NHP questionnaire showed statistical significant differences ($p < 0.001$) with respect to baseline values. According to the BAROS test, 48% of patients lost 25-49% of weight excess and 80.8% had resolved major comorbidities at 1 yr. According to the Moorehead-Ardelt QoL score, there were major improvements in employment and self-esteem in 89% and 87% of patients, respectively, and improvements in physical activity, sexual and social relationships. According to the total mean BAROS score, the outcome was considered "very good".

Conclusion: NHP and BAROS questionnaires appear to be useful and easily applicable tools to assess the QoL of obese patients.

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Key words: Morbid obesity. Bariatric surgery. Quality of life. BAROS Test. Nottingham health profile.

¿LA CIRUGÍA BARIÁTRICA MEJORA SENSIBLEMENTE LA CALIDAD DE VIDA DEL PACIENTE?

Resumen

Introducción: La obesidad mórbida suele acompañarse de enfermedades graves asociadas que provocan una menor expectativa y peor calidad de vida (CV).

Objetivos: evaluar el efecto de la cirugía bariátrica (CB) por técnicas malabsortivas sobre la CV, utilizado (Perfil de Salud del Nottingham (PSN) y el Bariatric analysis and reporting outcome system (BAROS).

Material y métodos: Estudio prospectivo, descriptivo, desde Octubre del 2002 hasta Mayo de 2006, seguimiento a los pacientes desde el inicio al protocolo de CB hasta el año post-intervención, donde se incluyeron 100 pacientes. El 86% mujeres, el peso inicial medio 132±22 kg y IMC de 50,7 kg/m².

Se aplicaron 2 cuestionarios: PSN y el BAROS.

Resultado: Los valores obtenidos de las diferentes áreas aplicando el cuestionario PSN al año de la intervención muestran diferencias estadísticamente significativas ($p < 0,001$) con los valores iniciales.

Según BAROS:

Porcentaje de sobrepeso perdido (%SP). El 48% de los pacientes perdió entre el 25 y el 49% de su exceso de peso.

Condiciones médicas. El 80,8% habían resuelto todas las comorbilidades mayores.

CV de Moorehead Ardelt. El aspecto más mejorado fue el empleo el 89%, autoestima solo el 13% no presentó cambios, las áreas de la actividad física, relaciones sexuales y sociales fueron consideradas como mucho mejor.

Basándonos en esta clasificación nuestros resultados se pueden calificar de "muy buenos".

Conclusión: Los cuestionarios PSN y BAROS parecen ser herramientas útiles y de fácil aplicación para evaluar la calidad de vida de los pacientes obesos.

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Palabras clave: Obesidad mórbida. Cirugía bariátrica. Calidad de vida. BAROS. Nottingham health profile.

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Introduction

Obesity is one of the greatest public health challenges of the 21st century. It is now described as an epidemic, and a global strategy of "Diet, physical activity and health" for its prevention was approved by almost 200 countries at the last World Health Assembly held in Geneva in May, 2004.¹ Morbid obesity (MO) has reached epidemic levels in developed countries.² The latest data from the World Health Organization³ reported 1.6 billion overweight and 400 million obese adults (> 15 years) worldwide. In Europe, more than half of the adults between 35 and 65 years old are overweight or obese.² In Spain, the prevalence of obesity in the adult population (25-64 yrs) is estimated to be 15.5% and is higher in women (17.5%) than in men (13.2%), with 0.79% of men and 3.1% of women between 25 and 60 years of age having obesity grade II.^{4,5} Patients with MO are at higher risk of associated diseases (diabetes type II, hypertension, hyperlipidemia, obstructive sleep apnea, coronary disease) and a lower quality of life (QoL).

Bariatric surgery (BS) is currently considered the only effective treatment to obtain an adequate and sustained weight loss and a reduction of morbidity and obesity-related co-morbidities in patients with MO.⁶ BS can be classified into three procedures: a) mal-absorptive technique, which decreases the absorption of nutrients; b) restrictive technique, which causes a reduction in the gastric reservoir and a subsequent reduction of food intake; and c) mixed technique, with characteristics of the previous two procedures. Restrictive and mixed approaches have been described as the most effective to achieve weight loss.^{7,8} Novel therapies for obese patients must be evaluated in terms of both objective (e.g., mortality, co-morbidity, weight loss) and subjective (e.g., QoL) criteria.⁹ Researchers have addressed the impact of obesity on morbidity and mortality, also highlighting the social problems and costs produced by the disease.¹⁰ However, the repercussion of obesity on the QoL has only been investigated in the past decade.

The bariatric analysis and report outcome system (BAROS) has been available since 1998 and evaluates excess weight loss, improvement in obesity related comorbidities and postoperative QoL.¹¹ The aim of this study was to measure the long-term effect of malabsorptive BS on the QoL in morbidly obese patients, applying a generic test that measures health related QoL (Nottingham Health Profile, NHP)¹² and the BAROS test.

Subjects, methods and procedures

We carried out a prospective, descriptive, and dynamic cohort study, which followed the patients (> 18 years) from the start of the protocol for bariatric surgery using malabsorptive techniques until one year post-intervention.

Participants

Participants were 100 persons undergoing treatment for obesity with bariatric surgery, over the age of 18 years (86 women and 14 men), the mean age was 39 ± 10 years and the mean body mass index (BMI) was 50.7 ± 8.3 kg/m².

Pretreatment evaluation for inclusion in this study consisted of the following: a thorough medical history and physical examination conducted by a study internist, a psychological assessment and structured psychological diagnostic interview conducted by a study psychologist, and a nutritional assessment with a registered dietitian.

The inclusion criteria for BS¹³ were body mass index (BMI) > 35 kg/m²; presence of associated co-morbidities; age 18-55 years; history of morbid obesity for more than five years; absence of alcoholism, other dependencies or severe psychiatric illness; multiple unsuccessful weight loss attempts and signed, informed consent to the surgery. The study was approved by the Ethical Committee of our hospital according to Helsinki Declaration criteria.¹⁴

Assessment instruments

Two questionnaires were administered to patients: the Nottingham Health Profile (NHP) and BAROS. The NHP measures: perception of health and evaluates the effect of health problems on everyday activities; it consists of 38 Yes/No questions and measures energy, pain, emotional reactions, sleep, social isolation, and physical mobility. Scores range from 0 (absence of any health problem) to 100 (presence of all health problems). A validated Spanish version of the NHP was used.¹⁵ The BAROS assesses: percentage of excess weight loss (%EWL); improvement in medical conditions associated with obesity; and post-BS QoL, employing the Moorehead-Ardelt test, which uses simple drawings to offer 5 alternatives for questions on self-esteem, physical activity, social life, employment and sexual sum of scores for each question activity, with a maximum score of 3 points for each question. Final scores (sum of scores for each question) are obtained by deducting points for complications or repeat surgery: > 7 excellent, 7 > 5: very good, 5 > 3: good result, 3-1: fair; 1-0: failure. The test and a full interpretation are available at <http://drmoorehead.com/>.

Data were gathered before surgery and at 3, 6, and 12 months post surgery on: the presence of comorbidities, including diabetes, hypertension, arthrosis, sleep apnea syndrome, hyperlipidemia, cardiovascular disease; weight, height, BMI, and percentage weight loss. Follow up of patients was carried out by the medical nutrition consultation.

Statistical analysis

Results were expressed as means \pm standard deviation. Quantitative variables with normal distribution

| | Men | Women | Total |
|--------------------------|--------------|--------------|------------|
| Sample (n) | 14 | 86 | 100 |
| Age (yrs) | 34 ± 12.8 | 40.8 ± 9.5** | 39 ± 10 |
| Weight (kg) | 153.6 ± 25.5 | 128 ± 19.7* | 132 ± 22 |
| Height (cm) | 171.8 ± 10.0 | 159 ± 5.8* | 161 ± 7.6 |
| BMI (kg/m ²) | 52.1 ± 8.1 | 50.1 ± 8.4 | 50.7 ± 8.3 |

*p < 0.001 **p < 0.05.

were analyzed with the Student-t and ANOVA tests. Non-parametric variables were analyzed using the chi-square test. The Lambda de Wilks test was applied for the multivariate analysis. p < 0.05 was considered significant. SPSS v.15 software for Windows (SPSS Inc, 2008) was used for the analysis.

Results

The study included 100 patients. The mean age was 39 years, and 86% were female. According to pre-BS interview results, all patients had made attempts to lose weight: 65% with a hypocaloric diet, 21% with liquid diets, and 10% with lifestyle diets. With regard to physical activity, 7% performed aerobics, 10% exercised with fitness equipment, 44% walked regularly and 38% were not engaged in any physical activity to lose weight. A solution had been sought from an herbalist by 43% and from a physician by 36%, with 20% seeking no advice. Table I shows the age, weight, height and BMI of the patients before the BS, showing significant differences between men and women except in BMI. According to the BMI values, patients presented obesity grade IV or extreme obesity.

Weight changes

After the intervention was a follow-up that shows the evolution of these parameters at 3, 6 and 12 months (table II). Significant differences (p < 0.001) in weight and BMI were found between sexes and between time points (3 vs. 6 months and 12 vs. 6 months).

| Sample | Men (n = 14) Women (86) | | | |
|--------------------------|--|--|---|--|
| | 1 | 3 | 6 | 12 |
| Weight (kg) | 153.6 ± 25.5 ^a 130.3 ± 20 ^b | 122.2 ± 2 ^a 106.8 ± 18 ^b | 104.8 ± 17.7 ^a 93.4 ± 15 ^b | 87.6 ± 17.2 ^a 81.7 ± 13 ^b |
| BMI (kg/m ²) | 52.1 ± 8.1 ^a 51.3 ± 8.6 ^b | 41.4 ± 7.4 ^a 42.0 ± 7.5 ^b | 35.6 ± 5.8 ^a 36.8 ± 6.7 ^b | 29.7 ± 5.5 ^a 32.2 ± 5.9 ^b |

^a = Men ^b = Female.

Secondary complications

There was a follow-up of gastrointestinal secondary complications (e.g., diarrhea, constipation, vomiting, trouble swallowing and flatulence) throughout the clinical history after the intervention of these patients at 3, 6 and 12 months. A significant reduction (p < 0.001) over time was observed in the number of patients with diarrhea (from 71 to 21), trouble swallowing, (from 57 to 45) and vomiting (from 53 to 25). At one year after the BS, 58% tolerated a normal diet without restrictions, 28% did not tolerate bread, and 14% did not tolerate dry rice or white fish.

Comorbidities

Patients had a mean of 2.38 ± 2 comorbidities before the BS, with only 4 patients having no obesity-related comorbidities and 67 having more than one. Hyperlipemia was the most frequent comorbidity, followed by articular overload and hypertension. A significant reduction (p < 0.001) in comorbidities was found one year after the intervention (hyperlipemia from 68 to 6%, articular overload from 59 to 3%, hypertension from 48 to 2%, diabetes mellitus from 22 to 1 %, sleep apnea from 17% to 0%).

Quality of life

Table III lists NHP questionnaire results before and at one year after BS. Before the intervention, patients showed a major impairment of physical activity (energy), with no significant differences between sexes, and a positive correlation was found between this and weight and also with BMI (p < 0.001).

NHP results significantly differed (p < 0.001) between before and one year after the BS (table III). A significant correlation (p < 0.05) between mobility and weight was observed during the post-intervention period.

| | Pre-intervention | 12 months |
|---------------------|------------------|---------------|
| Energy | 90.6 ± 16.4 | 23.6 ± 18.5** |
| Pain | 72.7 ± 19.6 | 11.0 ± 7.7** |
| Sleep | 81.0 ± 15.1 | 18.4 ± 11.9** |
| Social isolation | 84.4 ± 20.6 | 18.6 ± 15.6** |
| Emotional Reactions | 70.5 ± 21.2 | 13.6 ± 9.9** |
| Mobility | 70.0 ± 20.2 | 12.8 ± 11.5** |

**p < 0.05.

Table IV
Bariatric Analysis and Reporting Outcome System (BAROS)

I. Weight loss

| <i>Weight loss % of excess</i> | <i>number of patients</i> | <i>percentage</i> |
|--------------------------------|---------------------------|-------------------|
| Weing gain | 0 | 0 |
| 0-24 | 6 | 6 |
| 25-49 | 48 | 48 |
| 50-74 | 38 | 38 |
| 75-100 | 8 | 8 |
| Total | 100 | 100 |

II. Medical condition

| <i>Outcomes groups</i> | <i>Aggravated</i> | <i>Unchanged</i> | <i>Improved</i> | <i>One major resolved, others improved</i> | <i>All major resolved, others improved</i> | <i>Total</i> |
|------------------------|-------------------|------------------|-----------------|--|--|--------------|
| Number of patients | 3 | 7 | 3 | 6 | 81 | 100 |
| Percentage | 3 | 7 | 3 | 6 | 81 | 100 |

III. Quality of life (Moorehead ardel)

| <i>Quality of life</i> | <i>The same</i> | <i>More</i> | <i>Much more</i> |
|------------------------|-----------------|-------------|------------------|
| Self-esteem | 13% | 42% | 45% |
| Physical | 18.7% | 22.5% | 58.8% |
| Social | 24.2% | 27% | 48.8% |
| Labor | 11% | 30% | 59% |
| Sexual | 24.2% | 20% | 53.8% |

BAROS

BAROS test results in different areas were:

a) % excess weight loss (%EWL).

Table IV shows that 48% of patients lost 25-49% of excess weight and 38% of patients lost 50-74% of excess weight.

b) Medical conditions

Major comorbidities were resolved in 81% of patients with regard to QoL (table IV).

c) Quality of life (Moorehead-Ardelt).

Table IV shows the results of each of the areas studied in this part of the test. 89% of patients considered that the intervention had improved their possibilities of finding employment, and 87% reported an increase in their self-esteem. More than 80% of patients described improved physical activity and sexual relationships as a result of the surgery.

The BAROS test used to define success or failure of the intervention. Figure 1 shows the results of the surgery according to the score BAROS.

According to the total mean BAROS score, the outcome was considered "very good", can be seen in table V.

Discussion

Surgery is the optimal approach to the treatment of MO according to the North American Public Health Institute (NAPHI 1991), which stated that the results and benefits of surgery exceed its intrinsic risk.¹³

The study population had made major efforts to lose weight using different strategies without any success due to any improvement in eating habits, life style or compliance with psychological or medical treatment.¹⁶ Lack of success can also be attributed to an absence of nutritional education, aggressive and misleading com-

Table V
Total mean BAROS score

| | <i>Points</i> |
|-------------------|---------------|
| Weight loss | 1.48 |
| Medical condition | 2.55 |
| Quality of life | 1.98 |
| Total | 6.01 |
| Score BAROS | Very good |

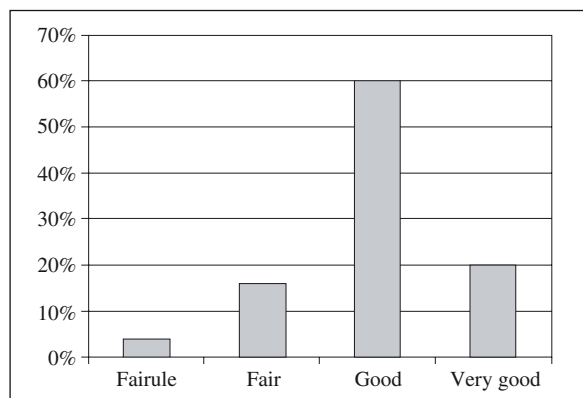


Fig. 1.—BAROS total score outcome.

mercial publicity campaigns and ineffective controls by official health bodies and the patient's rejection of medical assistance for a variety of reasons.¹⁷ Some of these reasons include: the relationship between obesity-overweight and health is not well-assumed, doctors not helping create enough strategies to overcome the overweight situation, long procedures to initiate the consultation, no medical follow-up for more than 6 months, and standard diets without continual monitoring.

Although obesity represents a major health problem, especially due to its comorbidities, it is also considered an aesthetic problem, since body image has acquired great importance in current, competitive societies and is promoted by advertising and economic interests. This has led to the increasing availability in the community of a wide variety of methods for losing weight, which are followed by numerous individuals with different income levels and risk factors.

This may explain why the present study population mainly comprises women. These findings, along with the mean age and BMI results, are in agreement with numerous previous studies.¹⁸⁻¹⁹

Surgeries with restrictive components cause dynamic changes in the size and shape of the stomach. As a result, some patients fail to comply with eating guidelines and require individualized monitoring²⁰⁻²¹ with detailed nutritional information to change eating habits and promote the selection of a diet appropriate to the technique applied and the postoperative stage. Some foods are more suitable than others. Thus, red meat is not tolerated as well as white meat,²²⁻²³ especially if large pieces are eaten, and the same is true for raw vegetables, fruit with peel and legumes.²¹ In the present study, the best tolerated foods were bread, dry rice, and fish.

Some post-surgical gastrointestinal complications (diarrhea, constipation, vomiting) are due to poor compliance with dietary guidelines.²⁰ Vomiting is produced by eating too fast, inadequate mastication of foods, mixing liquids with solids, consuming an amount that is larger than the gastric reservoir, or sometimes because of the intake of a novel food. Most of these problems markedly improve with appropriate re-education,

modification of food texture, and use of prokinetics.

Diarrhea is common after BS and is also caused by the type of food consumed, with the fat content being an important factor in its onset. A high percentage of the present patients had more than five episodes of diarrhea, which were reverted by re-education (table III). The outcomes of BS, the sole effective treatment in many cases should reflect its impact on associated comorbidities,²⁴ weight loss, and QoL.²⁵ With regard to comorbidities, we observed an improvement in diabetes type II and hypertension in 96% and 95% of affected patients, a marked decrease in lipid alterations and complete resolution of sleep apnea syndrome. These findings are in agreement with most previous studies.²⁶⁻²⁷ Psychological disorders are also present in the obese.²⁸ The social disadvantages resulting from prejudice against the obese can produce depression and loss of self-esteem,²⁹ worsening clinical symptoms. All of these factors have a negative effect on the patients' quality of life. In this study major changes were observed in areas related to emotional and social dimensions of quality of life. The social and psychological consequences of the aesthetic impact of obesity are evident.²⁹ In the SEEDO consensus of 2007³⁰ on the assessment of the overweight and obese, it was stated that obese people can suffer from major problems in relating to others.

Application of the Spanish version of the NPH questionnaire demonstrated a clear improvement in the QoL of these patients. Only "energy", which reflects the capacity for performing activities, showed a higher score with respect to the other dimensions. A correlation between "mobility" and weight was found ($p < 0.05$) after the surgery, indicating that patients still found difficulties in mobility, even when the patient had lost weight. However, the above results do not explain the improvements in QoL observed. According to our findings, the BAROS test appears to be more appropriate than the NPH for use in obese populations.

With regard to the percentage of excess weight loss, BAROS results showed a mean value of 60%. Dominguez-Diez *et al*³¹ obtained 45% EWL and 67% EWL at 6 and 12 months after surgery, respectively, and Marceau *et al*³² reported a 73% EWL at 4.5 years.

With regard to the comorbidities, we observed an acceptable reduction of weight at 1 year after the surgery, alongside a favorable outcome for obesity related comorbidities and a notable improvement in patients' perception of their health status.

Moorehead-Ardelt test results (BAROS) showed improvements in employment, self-esteem and physical activity in a high percentage of patients at 1 year, although 24.2% reported no change in their social and sexual relationships. In another study,²² improvements in self-esteem were reported by 94% of patients, in physical activity by 100%, in social life by 69%, in employment situation by 75% and in sexual relationships by 53%.

In the view of our group and many other researchers³¹⁻³³⁻³⁴ the combined mal-absorptive/restrictive technique satisfies the objectives of BS with a good balance between outcome and complications. It improves the QoL and associated comorbidity by achieving an adequate and sustained weight loss with an acceptable morbidity-mortality.

Conclusions

In addition to the BAROS being an easily applicable test, not only does it measure the quality of life of the patient but also the success of the intervention, being the health profile of Nottingham (NHP) a complement to measure quality of life related to health (CVRS). However, we suggest that it would be interesting to include some items that make reference to the food nourishment and digestive complications that tend to be present and that can indirectly skew the result of the test.

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