Evaluation of quality of life in severely obese patients after bariatric surgery carried out in the public healthcare system

Avaliação da qualidade de vida de pacientes com obesidade grave submetidos à cirurgia bariátrica em um sistema público de saúde

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ABSTRACT

Objectives: To assess QoL of obese patients in the Brazilian public healthcare system, before and after bariatric surgery, and to determine the appropriateness of the Moorehead-Ardelt Questionnaire II (M-A-QoLQII) compared with the Short-Form Health Survey (SF-36). **Subjects and methods:** Forty-one severe obese patients in a waiting-list, and 84 patients who underwent bariatric surgery were included. Correlations were tested and reliability determined by the Cronbach's coefficient. **Results:** BMI differed between the pre- and post-surgery groups (52.3 ± 8.3 kg/m^2 *vs.* 32.5 ± 6.4 kg/m^2, p < 0.001). The latter showed better scores in the SF-36 domains than in the pre-surgery. SF-36 and M-A-QoLQII categories were correlated (r = 0.53, 0.49 and 0.47, for vitality, mental health, and general health domains, p < 0.001). In the logistic regression, age, previous BMI, and loss of excess weight were associated with functional capacity. **Conclusions:** The outcomes of bariatric surgery obtained in a Brazilian public healthcare center were successful. M-A-QoLII represents a useful tool to assess surgery outcomes, including QoL. Arq Bras Endocrinol Metab. 2012;56(1):33-8

Keywords

Severe obesity; quality of life; assessment; bariatric surgery; public health system

RESUMO

Objetivos: Avaliar a qualidade de vida de pacientes obesos do sistema público de saúde brasileiro antes e após cirurgia bariátrica e a adequação do questionário Moorehead-Ardelt II (M-A-QoLQII) em relação ao SF-36. **Sujeitos e métodos:** Quarenta e um pacientes obesos graves em lista de espera e 84 submetidos à cirurgia bariátrica foram incluídos. Correlações foram testadas e confiabilidade determinada pelo coeficiente de Cronbach. **Resultados:** O IMC diferiu entre os grupos pré- e pós-cirurgia (52,3 ± 8,3 kg/m^2 *vs.* 32,5 ± 6,4 kg/m^2, p < 0,001). O último apresentou melhores escores nos domínios do SF-36 que o pré-cirurgia. As categorias do SF-36 e M-A-QoLQII se correlacionaram (r = 0,53; 0,49; 0,47 para vitalidade, saúde mental e saúde geral, p 0,001). Na regressão logística, idade, IMC prévio e excesso de peso perdido associaram-se independentemente à capacidade funcional. **Conclusões:** Resultados da cirurgia bariátrica em centro de saúde público brasileiro foram promissores. O M-A-QoLQII representa ferramenta útil para avaliar seus resultados, inclusive a QV. Arq Bras Endocrinol Metab. 2012;56(1):33-8

Descritores

Obesidade grave; qualidade de vida; avaliação; cirurgia bariátrica; sistema público de saúde

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Received on 3/Aug/2011
Accepted on 27/Dec/2011

INTRODUCTION

The obesity epidemic is a global public health problem (1). Recent data from the U.S. adult population revealed that the combined rates of obese and overweight individuals reached 66%, with 4.8% of them being severely obese individuals [body mass index (BMI) ≥ 40 kg/m^2] (2). The number of obese individuals reaches alarming proportions even in developing countries (3).

In Brazil, undernutrition – which was the major public health problem 40 years ago – was replaced by excess weight, affecting 40.6% of the adult population (4).

In parallel with physical consequences – such as type 2 diabetes, hypertension, hyperlipidemia, atherosclerotic disease, sleep apnea, joint disorders – obesity causes psychosocial disability and deteriorates quality of life (QoL) (5). The Swedish Obese Subjects study found that QoL was worse in the severely obese than in the other groups of patients with chronic diseases (6). Emotional factors may play a bidirectional role in obesity, favoring weight gain and worsening adherence to therapies (7).

Longitudinal studies have shown that the highest rise in obesity prevalence occurred in the severe obesity category (8), in which lifestyle modifications and drug therapy are not effective. Bariatric surgery provides the most long-lasting results for those individuals in whom clinical strategies fail (9). Several parameters have been proposed to assess the outcomes of bariatric surgery (9,10). Surgeons have used the amount of weight loss as the main post-operative outcome, although the improvement of the multiple obesity-associated medical conditions should be considered, including physical and psychological parameters (11). Considering that, from the patient perspective, QoL is the most important outcome of the weight-reducing procedure (12), interest in measuring of health-related QoL has increased in recent years (13).

Instruments of QoL assessment include subjective and objective features of well-being. The Medical Outcome Study 36-Item Short-Form Health Survey (SF-36) was designed for clinical practice and research (14), and validated in several populations (15-17). In studies conducted in the US, the SF-36 was used as the gold standard for QoL assessment (10). The same instrument employed in studies of individuals undergoing bariatric surgery (18,19) was considered a useful tool for population-based surveys and for the evaluation of health policies.

The use of a disease-specific QoL instrument has been recommended in combination with a generic questionnaire (20). One of the most commonly used questionnaires to assess bariatric surgery outcomes is the Bariatric Analysis and Reporting Outcome System (BAROS). It includes three main fields of analysis, weight loss, improvement of medical conditions, and QoL. Changes of QoL in BAROS are assessed by means of the Moorehead-Ardelt Quality of Life Questionnaire II (M-A-QoLQII), considered an adequate tool to examine the QoL of severely obese individuals (21,22). The increasing availability of bariatric surgery as a therapeutic option in developing countries, and the simplicity of the questionnaires to assess QoL made it possible to evaluate severe obese patients seen in the public healthcare system.

Our objectives were: a) to compare QoL using two different instruments (SF-36 and M-A-QoQLII), in subsets of obese patients seen in the Brazilian public healthcare system, before and after bariatric surgery; b) to assess the appropriateness of M-A-QoLQII measures in relation to the SF-36; and c) to assess independent predictors of QoL.

SUBJECTS AND METHODS

This cross-sectional study was carried out at the Obesity and Bariatric Surgery Outpatient Clinic of the Universidade Federal de São Paulo, and was approved by the ethics committee of the institution (approval number 1122/05).

Eligible individuals were those with BMI ≥ 40 kg/m^2, who had undergone gastrojejunal derivation with Roux-en-Y bypass (Fobi-Capella technique) at least one year before the study, between 1999 to 2005. This surgical technique combines restrictive and malabsorptive procedures. From 150 patients operated on during this period ("post-surgery group"), 66 were lost to follow-up, and 84 agreed to participate in the study after signing an informed consent form. Distribution by gender and mean age were similar between patients included and those who were lost to follow-up. Prior to surgery, BMI of the post-surgery group was 51.5 ± 10.3 kg/m^2. Besides this group, a sample of 41 patients who were on the waiting list of the outpatient clinic ("pre-surgery group") was included. Those patients were followed up by a psychologist, nutritionist and an endocrinologist before and after surgery.

BAROS was used and specific changes of QoL were assessed by means of the M-A-QoLQII. Individuals reported their self-esteem, physical activity, social life, labor, sexual activity, and the way they approached food, in scores ranging from -0.5 to +0.5 (21). The sum of these 6 scores generates an overall QoL score. Each score is classified into 5 categories (very poor: -3.0 to -2.1; poor: -2.0 to -1.1; fair: -1.0 to +1.0; good: 1.1 to 2.0: and very good: 2.1 to 3.0).

The SF-36 includes questions about 8 health concepts: limitations in physical activities, social activities,

usual role activities, bodily pain, general mental health, vitality, and general health perception. Due to literacy issues, a single examiner applied the SF-36. QoL was analyzed by each of 8 domains, as well as by two summary measures related to physical and mental aspects (14).

Data was collected from October 2005 to December 2006. Demographic, social and clinical characteristics of population in the public healthcare center did not change during of the study. Records from the post-surgery group regarding comorbidities, complications and reoperations were recovered from the medical records. Therefore, frequency of type 2 diabetes, hypertension, dyslipidemia, sleep apnea, and joint disorders, before and after surgical intervention, were obtained. Cure or reduction in number and/or doses of medications were interpreted as improvement in comorbidities.

Statistical analysis

Results were expressed as means and standard deviations. Unpaired Student's t test was used to compare QoL scores, and the chi-square test was used to compare frequencies between pre- and post-surgery groups. Pearson's coefficient was employed to test the correlation between each domain of both QoL instruments (M-A-QoLQII and SF-36). The reliability of M-A-QoLQII was determined by calculating the Cronbach's alpha coefficient, considered useful at 0.70. Whereas there are no scores for the domains of a normal SF-36 Brazilian population, two arbitrary categories were created in this study: "optimal" for scores ≥ 70 in each domain, and "non-optimal" for scores < 70. Stepwise, logistic regression models were used to identify independent predictors of optimal QoL after surgery for each domain of the SF-36 as dependent variable. The independent variables included were age, sex, skin color, marital status, income, years of study, previous BMI, and previous hypertension, type 2 diabetes, dyslipidemia, sleep apnea, and joint disorders. In addition, other models were built, including post-surgery complications, which could interfere in the self-reported QoL.

RESULTS

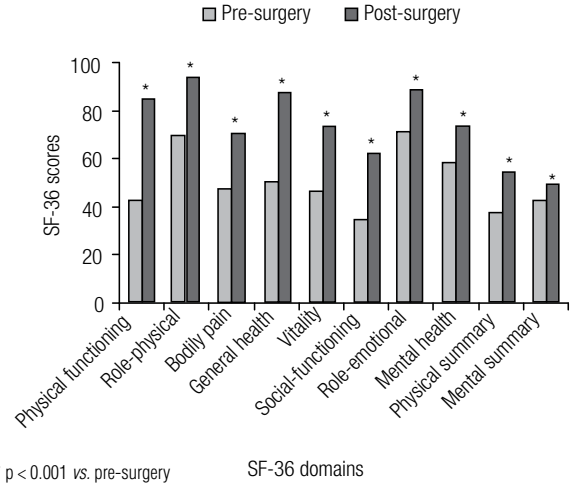
The main characteristics of both groups of patients are shown in table 1. Mean age was similar between the two groups, but they differed in gender distribution. Considering the significantly higher proportion of women in the post-surgery group, all the analyses were performed including and excluding men, but results were consistently similar. Mean body mass indices of the pre- and post-surgery patients were 52.3 ± 8.3 kg/m² and 32.5 ± 6.4 kg/m² ($p < 0.001$). As expected, the frequency of comorbidities in the pre-surgery group was higher than in the post-surgery one.

Table 1. Demographic and clinical characteristics of pre- and post-surgery groups of patients

	Pre-surgery	Post-surgery	P
Age (years)	43.6 ± 10.4	45.4 ± 11.1	0.23
Women (%)	58.5	84.5	0.002
Body mass index (kg/m²)	52.3 ± 8.3	32.5 ± 6.4	< 0.001
Time after surgery (years)	-	3.3 ± 1.7	-
Time in waiting list (years)	3.4 ± 1.7	-	-
Loss of excess weight (%)	-	72.2 ± 37.2	-
Diabetes (%)	36.0	1.2	< 0.001
Hypertension (%)	73.1	20.2	< 0.001
Dyslipidemia (%)	34.0	9.5	< 0.001
Joint disorders (%)	63.0	25.0	<0.001
Sleep apnea (%)	61.5	1.2	< 0.001

Cross-sectional data expressed as means and SD, or percentage.

All domains and the two summary measures (physical and mental summaries) of SF-36 in the post-surgery group corresponded to significantly better scores regarding QoL than those in the pre-surgery group (Figure 1).



* $p < 0.001$ *vs.* pre-surgery

Figure 1. Mean values of quality of life scores in the 8 domains, and summary components SF-36 of obese patients in the waiting list for bariatric surgery (pre) and after surgery (post).

BAROS showed that almost 93% of patients achieved good, very good or excellent results, 5.8% fair, and only 1.2% did not reach the expected outcome (failure). Specifically considering the QoL evaluation, mean values of each domain of M-A-QoLQII showed that post-surgery results were invariably better than pre-surgery ones (Table 2). Taking into consideration the overall score, almost 17% of the pre-surgery group indicated poor or very poor QoL. No patient in the post-surgery group had such response ($p < 0.001$). Otherwise, 82.2% of the post-surgery group showed good and very good QoL, *versus* 40% in pre-surgery group ($p < 0.001$).

Table 2. Means (standard deviation) of scores in each domain of the Moorehead-Ardelt Quality of Life Questionnaire II in pre- and post-surgery groups of patients

Domains	Pre-surgery	Pos-surgery	p
General self-esteem	0.08 ± 0.35	0.32 ± 0.21	< 0.01
Physical activity	-0.10 ± 0.30	0.18 ± 0.27	< 0.01
Social contact	0.16 ± 0.38	0.35 ± 0.20	< 0.01
Labor	0.16 ± 0.32	0.37 ± 0.19	< 0.01
Sexual activity	0.06 ± 0.34	0.20 ± 0.30	< 0.01
Eating behavior	0.19 ± 0.28	0.30 ± 0.20	< 0.01

Table 3. Pearson's correlation coefficients between each domain, and summary measures of SF-36 and M-A-QoLII obtained from 84 obese patients who underwent bariatric surgery

SF-36 domains	Correlation coefficient	p
Physical functioning	0.31	0.004
Role-physical	0.27	0.015
Pain	0.42	< 0.001
General health	0.47	< 0.001
Vitality	0.53	< 0.001
Social-functioning	- 0.17	0.12
Role-emotional	0.41	< 0.001
Mental health	0.49	< 0.001
Physical summary	0.26	0.016
Mental summary	0.46	< 0.001

Table 4. Logistic regression model for "optimal" functional capacity adjusted for clinical and social variables

	β	Standard error	P
Age	0.164	0.056	0.004
Pre-surgical BMI	0.063	0.022	0.005
Loss of excess weight	0.102	0.048	0.034

Variables included in the initial model: age, sex, years of study, body mass index (BMI), hypertension, *diabetes mellitus*, joint disorders, and loss of excess weight.

Correlation coefficients for each SF-36 domain, physical and mental summary components, and M-A-QoLQII are presented in table 3. The strongest correlation coefficients were found for the vitality, mental health, and general health domains of the instruments ($r = 0.53$, 0.49 and 0.47, respectively, $p < 0.001$). Cronbach's alpha coefficient was 0.87.

In logistic regression, only the model that used functional capacity as the dependent variable, demonstrated that age, previous BMI, and loss of excess weight were independently associated with QoL, as assessed by the SF-36. For the other domains, no variable was predictive of QoL (Table 4).

DISCUSSION

The present study reinforces the benefits of marked weight loss achieved by bariatric surgery on QoL and on the frequency of comorbidities of severely obese patients seen in the public healthcare system in Brazil.

Our findings of considerably lower frequencies of diabetes, hypertension, dyslipidemia, joint problems, and sleep disorders in the post-surgery group are in agreement with other studies (23,24). A prospective study found that 80% of associated diseases have either improved or resolved completely only 3 years after bariatric surgery (25). Martínez and cols. observed an improvement in *diabetes mellitus* and hypertension control, a marked decrease in lipid alterations, and complete resolution of sleep apnea syndrome (26).

In the post-surgery group, all the domains of SF-36, as well as physical and mental summary measures were better than in the pre-surgery group, and reached levels similar to those observed in normal populations (27). These results are in agreement with the findings of marked improvement or even normalization of all 8 domains of SF-36 obtained prospectively by other investigators (27,28).

One weakness of the present study was the fact that the patients included in pre- and post-surgery groups were not the same, limiting adequate comparisons of changes in clinical characteristics and QoL over time. However, there is no apparent reason to suppose that our random pre-surgery group had different characteristics from those of the post-surgery patients in their pre-intervention period. In fact, similar rates of diabetes, hypertension, dyslipidemia, joint disorders, and sleep apnea were found in the post-surgery group, considering their status in the pre-surgery period (data

not shown). Therefore, despite that limitation, we speculate that the better profile of operated patients compared to the pre-surgery group indicates that improvement in QoL could be, at least in part, induced by bariatric surgery.

The high Cronbach's alpha coefficient obtained indicated internal consistency and reliability of M-A-QoLQII. Construct validity between M-A-QoLQII and SF-36 in our study is suggested by significant correlations of 7 out of the 8 domains of SF-36. Moorehead and cols. reported the same results in a validation study (21).

The lowest scores were related to social aspects in the SF-36 domain, for both pre-and post-surgery groups. High frequencies of severe depressive symptoms (84%), anxiety and distorted body image were previously described in the same sample of individuals (29). Besides, the low availability of plastic surgery in our public health system may limit their social life. The domain of social aspects was not correlated with M-A-QoLQII. The main reason may be the different approaches of social aspects presented by each instrument.

SF-36 is a generic health-related QoL measurement, in contrast with M-A-QoLQII which is a disease-specific instrument developed to study samples of obese patients, alone or integrated with BAROS. Considering that M-A-QoLQII is simple, concise, easy to understand and answer, requires minimum time, and human and material resources to be completed, it should be considered when choosing an instrument to evaluate QoL in populations from developing countries.

Successful outcomes after 3 years of open gastric bypass were obtained in our Clinic, since almost 93% of operated patient's responses were classified as good, very good or excellent in BAROS, particularly considering the learning curve of the surgery team. Such favorable experience was previously reported by others using the same surgical procedure (24,30). After five years of surgery, Suter and cols. found very good or excellent QoL in 97% of the patients, using BAROS (31); similarly, Sanchez-Santos and cols. reported excellent, very good, and good BAROS global score in 22%, 56% and 18% of the operated individuals, respectively (32).

Improvement in QoL has been correlated with the degree of weight loss (12,33) and it is known that gastric bypass provides the best outcomes with loss of 50%-80% of the excess weight. In Europe and Australia, laparoscopic adjustable gastric banding is the most common bariatric procedure, which has been associated with 31% to 60% of the loss of excess weight. Such magnitudes of weight loss resulted in considerable improvement in QoL, even when BMI stabilized around 31 kg/m^2 (9,10). Our results indicate that, for people living in a developing country such as Brazil, open gastric bypass could be an appropriate technique to effectively achieve weight loss and QoL. We suggest that availability of bariatric surgery in the public health system should be enhanced in the developing world, since this procedure represents an opportunity for severe obese individuals to improve health conditions, and for the government to save resources.

We also aimed at identifying independent predictors of QoL. Identification of a single predictor for wide clinical use is limited, due to the multidimensional characteristic of QoL (11). Age, body mass index, and percentage of loss of excess weight were significant predictors of functional capacity, but the presence of late surgical complications was not significant in our study. Similar data was reported by others using a different surgical technique (adjustable gastric banding) (11,12,24). Dixon and cols. agreed that weight loss was an independent predictor of greater improvement in QoL using SF-36, but only in relation to the physical component score (12). In a systematic review, the effect of several variables on QoL was examined, and inconsistent results were found (34). Six studies indicated that younger patients lost more weight, whereas no association was detected in four studies (35). The male sex, age and, preoperative weight were associated with increased post-operative complications and worse QoL. Our findings are in agreement with an association between higher pre-surgical BMI and best scores of functional capacity, but no difference was found for gender. This latter finding is partially in contrast with De Zwaan and cols. cross-sectional study who reported that the female gender – in addition to post-gastric bypass surgery hospitalization and lower weight loss – were predictors of impaired QoL (27).

In our study, SF-36 was applied by one single examiner to maximize understanding. This may be considered a strength of our study, as it helped to reduce variability in data collection. On the other hand, no interviewer participated in data collection due to the simplicity of the M-A-QoLQII.

In summary, the outcomes of bariatric surgery obtained in a Brazilian public heathcare center were considered successful. We concluded that M-A-QoLII represents a useful tool to assess bariatric surgery out-

comes, including QoL. Our data should motivate the discussion about the role of such therapeutic modality in other developing countries, as severe obesity is currently affecting people worldwide.

Disclosure: no potential conflict of interest relevant to this article was reported.

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