Quality of life evaluation in Mexican patients with severe obesity before and after bariatric surgery

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Abstract

Introduction: In Mexico, neither the 36-item Short Form Health Survey (SF-36) nor the Bariatric Analysis and Reporting Outcome System (BAROS) instruments have been used to assess quality of life (QoL) before and after bariatric surgery (BS). **Objective:** To describe changes in QoL using the SF-36 and BAROS questionnaires in patients with severe obesity before and after BS. **Methods:** Clinical and anthropometric data of patients undergoing bariatric surgery between 2015 and 2016 were collected. Statistical significance was considered with a p -value < 0.05 . **Results:** 230 patients were analyzed, 98 before and 132 after BS; most were females (81 %). Initial body mass index was 48 kg/m^2 (44-53). SF-36-measured QoL showed an increase in the physical component score from 43 to 54.2 points ($p < 0.001$), and in the mental component, from 53.3 to 56.6 points after BS. With BAROS, 98.5 % showed good to excellent QoL results within the first three months after BS. **Conclusion:** When measured with the SF-36 and BAROS questionnaires, QoL of Mexican patients with severe obesity was found to improve after BS.

KEY WORDS: Obesity. Quality of life. Questionnaire. Bariatric surgery.

Evaluación de la calidad de vida en pacientes mexicanos con obesidad severa antes y después de cirugía bariátrica

Resumen

Introducción: En México no se han utilizado los instrumentos Short Form 36 Items (SF-36) ni Bariatric Assessment Reporting Outcomes System (BAROS) para evaluar la calidad de vida (CV) antes y después de la cirugía bariátrica (CB). **Objetivo:** Describir los cambios en la CV con los cuestionarios SF-36 y BAROS, en pacientes con obesidad severa antes y después de la CB. **Métodos:** Se recolectaron los datos clínicos y antropométricos de pacientes sometidos a cirugía bariátrica entre 2015 y 2016. Se consideró con significación estadística una $p < 0.05$. **Resultados:** Se analizaron 230 pacientes, 98 y 132 antes y después de la CB; la mayoría fue del sexo femenino (81 %). El índice de masa corporal inicial fue de 48 kg/m^2 (44-53). La CV medida con el SF-36 demostró un incremento en la puntuación del componente físico de 43 a 54.2 ($p < 0.001$) y en el componente mental, de 53.3 a 56.6 después de la CB. Con BAROS, en 98.5 % se registraron resultados buenos a excelentes en la CV en los primeros tres meses. **Conclusión:** Al ser medida con los cuestionarios SF-36 y BAROS se definió que la CV de los pacientes mexicanos con obesidad severa mejora después de la CB.

PALABRAS CLAVE: Obesidad. Calidad de vida. Cuestionario. Cirugía bariátrica.

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Introduction

The World Health Organization reports that 3 % of the Mexican population has severe or morbid obesity, defined as a body mass index (BMI, kg/m²) higher than 40 kg/m².^{1,2} Bariatric surgery (BS) is the only treatment for severe obesity that has achieved a significant and constant weight reduction in the medium term and that manages to control obesity-associated diseases.³ Increased BMI is related to a lower quality of life (QoL). There is insufficient information on the effect of bariatric surgery on QoL in the Mexican population.⁴⁻⁶

Measuring quality of life is not easy, and there are several instruments to do it. The Bariatric Assessment Reporting Outcomes System (BAROS) questionnaire is a simple, validated and specific instrument for patients who underwent bariatric surgery, which evaluates surgery success according to excess weight loss, as well as to improvement in comorbidities and quality of life.⁶⁻⁸ Favretti et al.⁹ reported good to excellent results in 48 % of the population, while Velásquez Zambrano¹⁰ recorded excellent results within the first six months after bariatric surgery in 31.7 % of patients and in 42.9 % at three years.^{8,9}

The Short Form-36 Health Survey (SF-36) is the general quality of life measurement instrument that is most widely used in the world and is validated in the Mexican population as well. It is self-administered and is scored on a 0 to 100 scale, where a higher score means better quality of life.^{11,12} After bariatric surgery, an improvement has been shown to exist, mainly in the physical component; however, there is limited information in Mexico.^{5,13-15}

The purpose of the study was to find out, with the SF-36 questionnaire, the QoL of a cohort of Mexican patients before and after bariatric surgery, as well as with the BAROS questionnaire after the surgical procedure.

Methods

Between February 2015 and February 2016, BS candidates (n = 98) who attended the Obesity Clinic, as well as subjects who were on post-surgery follow-up at different times from three months to five years (n = 132), were invited to participate. After reading and signing the informed consent form (registration at IMSS no. 3601 Local Health Research Ethics Committee: R-2016-3601-27), the SF-36 questionnaire was applied to all patients before and after

surgery and the BAROS questionnaire after surgical intervention. Age, history of diseases, anthropometric data, and the results of the questionnaires were evaluated and recorded.

Statistical analysis

SPSS software, version 23, was used for statistical analysis. Quantitative variables were described as medians with interquartile ranges owing to their distribution. Qualitative variables were described as frequencies or percentages. For bivariate analysis, Mann-Whitney's U-test (for evaluation between two groups) or ANOVA (for three groups) were used. Qualitative variables were evaluated using the chi-square test. A p-value < 0.05 was considered to be statistically significant.

Results

A total of 230 patients with a median age of 45 years (interquartile range [IQR] = 37-50 years) were included, out of whom 81 % were women; initial weight was 142 kg in men and 125 kg in women. Initial BMI was 48 (44-53); 53 % had a BMI of 40-49.9; 30 %, 50-59.9 (super-obesity); and 9 %, a BMI higher than 60 (super-super-obesity). In the overall population, the nutritional plan achieved a weight reduction from 126 to 110 kg (p < 0.001) and the last weight recorded after bariatric surgery was 79 kg (67-93 kg). The percentage of excess weight lost (EWL %) during the first year after surgery was 59 %. As shown in table 1, the main comorbidities prior to surgery were high blood pressure, prediabetes, diabetes mellitus, dyslipidemia, and obstructive sleep apnea. Most patients underwent laparoscopic gastric bypass.

SF-36 general instrument

Physical and mental components median summations before surgery were 43 points (IQR = 36-50) and 53.3 points (IQR = 42.1-57.7), respectively. There were no differences between BMI strata or between genders in the pre-surgical SF-36 score. The SF-36 score increase was observed from three to 12 months after BS; there was no significant score increase after month 12 post-surgery. Differences were observed in the physical and mental components when compared before and after surgery (Table 2). Significant changes were observed in the general health and vitality areas after BS.

Table 1. General characteristics of the population with severe obesity

Parameter	Value (n = 230)	
	Median	IQR
Age (years)	45	37-50
Initial weight (kg)	126	113-140
BMI (kg/m ²)	48	44-53
Pre-surgical weight (kg)	110	106-125
EWL % at 12 months	59	54-72
EWL % at 4 years	84	77-88
	n	%
Women	146	81
Type 2 diabetes mellitus	56	25
Prediabetes	93	42
High blood pressure	112	49
Obstructive sleep apnea	59	26
Dyslipidemia	76	34
Osteoarthritis	40	18
Deep venous thrombosis	12	5
Peripheral venous insufficiency	37	17
Hypothyroidism	52	24
Psychiatric disorder	50	26
Non-alcoholic fatty liver disease	25	12
Hyperuricemia	24	12
Gastroesophageal reflux disease	8	4
Vertical gastrectomy	3	2
Roux-en-Y gastric bypass	57	39
Gastric bypass from anastomosis	86	59

IQR = interquartile range; EWL % = excess weight lost percentage.

Each SF-36 domain of the physical, psychological and social components and total score of patients who underwent BS, classified by baseline BMI strata, were compared with the QoL results in the general healthy population published by Zúñiga et al.,¹² in all components, the score was observed to be low even after BC (Tables 3 and 4).

BAROS specific instrument

In 98.5 % of the patients, good, very good and excellent results were obtained after surgery, which is maintained

Table 2. SF-36 questionnaire results before and after bariatric surgery

Variable	Pre-surgical score (n = 98)	Post-surgical score (n = 132)	p*
	Median (IQR)	Median (IQR)	
Physical function	52.9 (36.2-75)	57 (52-57.1)	0.778
Physical role	56.2 (32-100)	56.2 (56.2-56.2)	0.228
Bodily pain	51.6 (37-62.7)	51.6 (46.5-62.7)	0.605
General health	46.6 (39.5-62)	57.9 (50.2-62.6)	< 0.001
Vitality	53.8 (44.3-65.6)	60.9 (53.8-65.6)	0.001
Social role	57.1 (46.3-87.5)	57.1 (46.3-57.1)	0.001
Emotional role	55.3 (55.3-100)	55.3 (55.3-55.3)	< 0.001
Mental health	59.7 (50-76)	56.1 (48.2-61.8)	0.014
Physical component	43 (36-50.0)	54.2 (48.2-61.8)	< 0.001
Mental component	53.3 (42.1-57.7)	56.6 (50.8-60.8)	0.002

*p < 0.005, Mann-Whitney's U-test.

for up to five years after surgery. In the BAROS questionnaire, QoL results were fair in 14 patients (10 %), good in 23 (18 %) and very good in 94 (72 %) (Fig. 1).

Regarding the assessment of comorbidities with the BAROS questionnaire, improvement was identified in eight patients (6 %), there were no changes in 13 (10 %), one major comorbidity was resolved and others improved in 18 patients (14 %) and all major comorbidities were resolved and others improved in 92 patients (70 %). Excess weight lost ranged from good to excellent and was correlated with the BAROS questionnaire score ($r = 0.421$; $p < 0.001$). In the quality of life section, there was improvement in all components, except for the sexual component.

Discussion

This is one of the first studies to evaluate QoL in Mexican patients on a BS program or who have already undergone surgery, using the SF-36 and BAROS questionnaires. In our study, we observed that there was an improvement in QoL, predominantly in the physical component, which is consistent with the results of other investigations.^{13,14} This change might be related to an improvement in obesity-associated comorbidities and a significant weight loss. We observed a decrease in the score of the mental health domain, which could be influenced by non-evaluated factors, such as personality,

Table 3. SF-36 questionnaire results comparison before bariatric surgery at different degrees of obesity vs. those of the healthy general population

Health component	Domain	General population (n = 12)	BMI 40-50 (n = 123)	BMI 50-60 (n = 70)	BMI > 60 (n = 22)
Physical	Physical function	94.6 ± 8.6	54 ± 18 [†]	49 ± 11 [†]	53 ± 15.6 [†]
	Physical role	94.5 ± 15.4	54.2 ± 23 [†]	57.4 ± 17 [†]	52 ± 26 [†]
	Bodily pain	88.6 ± 15.4	52 ± 17 [†]	53.5 ± 14 [†]	50.2 ± 13 [†]
	General health	72.9 ± 15.5	52.9 ± 13 [†]	54.5 ± 11 [†]	53.7 ± 12 [†]
	Vitality	81 ± 11.6	54.7 ± 13 [†]	58.9 ± 11 [†]	55.3 ± 16 [†]
Psychological	Emotional role	83.4 ± 25.1	54.5 ± 22 [†]	56.4 ± 20 [†]	64 ± 25 [†]
	Mental health	79.6 ± 13.9	55.8 ± 13 [†]	56.9 ± 15 [†]	58 ± 15 [†]
Social	Social function	86.9 ± 15.6	54.5 ± 16 [†]	56.2 ± 17 [†]	59.3 ± 15 [†]

Values are presented as means ± standard deviation.

Obelisks indicate the significance of comparing each result with the general population: [†]p < 0.001, [‡]p < 0.05, Student's t-test.

Table 4. Comparison of SF-36 questionnaire results after bariatric surgery vs. those of the healthy general population

Health component	Domain	General population (n = 12)	Post-operated	p [†]
Physical	Physical function	94.6 ± 8.6	53.9 ± 8.4	< 0.001
	Physical role	94.5 ± 15.4	53.5 ± 8.8	< 0.001
	Bodily pain	88.6 ± 15.4	52.6 ± 10.3	< 0.001
	General health	72.9 ± 15.5	55.7 ± 8.4	< 0.001
	Vitality	81 ± 11.6	58.5 ± 9.4	< 0.001
Psychological	Emotional role	83.4 ± 25.1	51.9 ± 10	< 0.001
	Mental health	79.6 ± 13.9	54.2 ± 10.2	< 0.001
Social	Social function	86.9 ± 15.6	52.4 ± 9.9	< 0.001

Values are presented as means ± standard deviation.

p < 0.05, Student's t-test.

eating disorders, depression, anxiety, personality disorders, aspects related to the social environment, self-esteem parameters and different expectations placed on bariatric surgery, among others.¹⁶

QoL physical and mental components have been observed to decrease as BMI increases, given that obesity causes or exacerbates different health conditions, which range from cardiovascular diseases to musculoskeletal pathologies, in addition to decreasing life expectancy in general.⁴ However, when the QoL of patients after

surgery was compared with that of the healthy population, we observed low scores despite the BMI reduction, which suggests that obese patients continue to perceive that their physical and mental health is not adequate. It is possible that this perception is due to the fact that after the surgical procedure they continue on periodic follow-up with the doctor (which can be perceived as still being ill or being a “chronic” patient), or to the psychological stress caused by lifestyle changes, perception of the milieu, self-esteem, body image acceptance, or presence of skin flaccidity, among other factors.^{16,17} This lack of improvement to the levels reported in the general population has been observed in diseases with a chronic behavior such as diabetes, end-stage kidney disease, rheumatoid arthritis, and cancer.¹⁸ This is an important outcome to support long-term follow-up after surgery by a multidisciplinary team.

The BAROS questionnaire indicated excellent results in most cases. The authors consider that this is associated with physical improvement related to excess weight loss. On the other hand, the social, mental and sexual aspects addressed in the questionnaire do not have this improvement, which is consistent with other studies.^{10,15} As observed with our results, treatment of this chronic condition should be comprehensive before and after BC, addressing not only the physical and metabolic health condition, but also psychological aspects, which can influence on reincorporation to society, work and family life. As for the occupational aspect, most patients in our study were economically active young people. Kantarovich K. et al.¹⁹ observed that an increase in QoL two years after BS predicts an improvement in productivity and reduces work disability,

Figure 1. Results of the Bariatric Assessment Reporting Outcomes System (BAROS) Questionnaire. Results after surgery at different time points, from 3 months to 4 years, are shown.

so that all interventions aimed at supporting and maintaining QoL, especially those related to mental health in the postoperative period, will increase the improvement of work-related functioning.

In our study, 26 % of the population had a preexisting psychiatric disorder, which may influence the results. Müller et al. observed that, four years after surgery, mental disorders were related to weight gain after it,²⁰ similar to what we have previously found in our population.²¹ We consider that, even when in this study the percentage of excess weight lost within the first year was adequate (a decrease of more than 50 %), there is a lack of prospective studies evaluating the impact of depression, anxiety and quality of life in the long term, as well as their effects on weight regain, since these factors can influence on behavioral modifications, such as the need to perform physical activity, and adherence to the nutritional plan in the postoperative period.²²

In the postoperative period, there are neuroendocrine changes (hypothalamic-pituitary axis), which are involved in the onset of emotional alterations; for example, reduction in the levels of neuropeptides from the gastrointestinal tract that regulate neuropeptide Y central action, which are associated with the onset of depression and addictions and with an increase in the hedonic drive for food.²³ There is still a lack of studies that combine sociological and psychological approaches with objective measures of food choices after BS.²⁴

This study allowed us to evaluate BS results in terms of weight reduction, comorbidity improvement and QoL,

which were similar to those reported in other international centers. In Mexico, obesity is a public health problem and access to BS is limited, given that few sites have a multidisciplinary team. Creation of new obesity clinics throughout the country is necessary, considering the benefits in terms of comorbidity remission, quality of life improvement in the physical and mental components, as well as mortality reduction in patients at productive age. These clinics should have a follow-up after BS, considering, in addition to improvements in clinical or biochemical parameters, QoL improvement, since information on the factors that determine QoL in Mexican patients is scarce.

One of the main limitations of the study is that, being a cross-sectional study, the populations are not being longitudinally compared against their own baseline results. However, so far, no other prospective study has evaluated QoL in Mexican patients. Nevertheless, baseline characteristics of the patients who underwent surgery are similar to those of patients before surgery, which suggests the possibility for the results to be applicable to all patients on similar conditions. The use of the BAROS questionnaire, designed only to evaluate the results after surgery and which does not require baseline assessment, also helps to assess whether postoperative quality of life results are concordant.

We should consider that the purposes of the questionnaires are not equivalent. The SF-36 questionnaire addresses quality of life from the patient physical and mental point of view, which can vary in a population or

according to the disease, while BAROS gives significant weight to bariatric surgery technical results. Both are subject to adequate standardization, translation and application for their interpretation and we can observe how BAROS yielded good or excellent results for most patients in the short term, which are maintained at high ranges even in patients evaluated years after surgery, while SF-36 indicated that patients had a poor quality of life in all aspects prior to surgery, but that after the procedure they perceived an improvement in the physical, but not in the mental aspect.

Although carrying out a cohort study with these patients is necessary, with baseline and postsurgical questionnaires being applied, the number of patients required to achieve a significant sample for the follow-up time evaluated in this study would probably imply a significant investment of resources. This is one of the reasons why there are not many publications of this type in world literature.

Conclusions

Scores in the SF-36 and BAROS quality of life instruments in patients with severe obesity improved after bariatric surgery. However, despite the quick and persistent benefits of surgery, patients who underwent bariatric surgery had a poor quality of life, similar to what occurs in other chronic diseases.

Conflict of interests

The authors declare that they have no conflicts of interest.

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Ethical disclosures

Protection of human and animal subjects. The authors declare that the procedures that were followed adhered to the ethical standards of the responsible committee for experimentation on human beings and were in agreement with the World Medical Association and the Declaration of Helsinki.

Confidentiality of data. The authors declare that they followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors obtained informed consent from the patients or subjects referred to in the article. This document is in the possession of the corresponding author.

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