FACULDADE DE MEDICINA

UNIVERSIDADE Ð

COIMBRA

MESTRADO INTEGRADO EM MEDICINA – TRABALHO FINAL

PAULO FILIPE STEVENSON DE OLIVA TELES

Quality of life post bariatric surgery

ARTIGO CIENTÍFICO ORIGINAL

ÁREA CIENTÍFICA DE CIRURGIA GERAL

Trabalho realizado sob a orientação de:

DR. ANDRÉ LÁZARO

PROFESSOR DOUTOR JOSÉ GUILHERME TRALHÃO

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TABLES

ABBREVIATIONS

A   Anxiety/depression

BAROS   Bariatric Analysis and Reporting Outcome System

BMI   Body Mass Index

BPD   Biliopancreatic diversion

CHUC   Centro Hospitalar Universitário de Coimbra

CI   Confidence intervals

CES/EHC   Comissão de ética para a saúde/Ethics Health Committee

DS   Duodenal switch

IQR   Interquartile range

LAGB   Laparoscopic adjustable gastric banding

Kg/m^2 Kilogram per square metre

M   Mobility

QoL   Quality of Life

P   Pain/discomfort

Ref   Reference

RYGB   Roux-en-Y gastric bypass

S   Self-care

SD   Standard deviation

SG   Sleeve gastrectomy

V   Value of quality of life

U   Usual activities

WHO   World Health Organization

I. Abstract

Introduction Obesity is a condition presenting with a body mass index (BMI) ≥ 30 kg/m^2. When BMI reaches a value of 40 kg/m^2 (or 35 kg/m^2 with comorbidities) the patient is eligible to undergo bariatric surgery. The aim of this paper is to find whether the weight loss expected for surgical patients will represent an increase in quality of life (QoL).

Material and Methods This study comprised a total of 31 selected patients. The authors collected data using the EQ-5D questionnaire, validated in Portugal. All patients were above 18 years old and had undergone bariatric surgery. Data was analysed using IBM SPSS® Statistics version 26.0 and descriptive statistics in order to find mean, median, standard deviation and interquartile range was performed. Normality tests and a non-parametric test were used.

Results Significant increase in QoL from a median of 51,6% before to 84,8% after surgery was obtained. Excess weight loss percentage (EWL%) and total weight loss percentage (TWL%) 6 months after surgery were 58,89% and 23,63%, respectively.

Discussion Significant differences were found between BMI at surgery (median of 42,00 kg/m^2) and 6 months later (median of 31,62 kg/m^2). On average, undergoing bariatric surgery was successful since EWL% was greater than 50%. In view of the EWL% and TWL%, there is some indication of a better outcome in patients subjected to Roux-en-Y gastric bypass, when compared to the sleeve gastrectomy.

Conclusion Although the QoL in this study increased significantly, more tests are required with elimination of some biasing variables such as medical comorbidities. Larger studies are needed in order to quantify differences between different types of bariatric surgery.

Keywords

Quality of Life; Bariatric Surgery; Obesity; EQ-5D.

II. Introduction

Obesity is a condition that mostly affects developed countries and is characterized as presenting with a body mass index (BMI) of ≥ 30 kg/m^2. The Portuguese population comprised 16,4% in this category (1). Some of these patients will be so obese that they are strongly recommended for surgical intervention such as bariatric surgery.

This type of intervention is defined as a surgical operation that results in loss of weight due to: 1- restriction in intake through laparoscopic adjustable gastric banding (LAGB) or sleeve gastrectomy (SG); 2- malabsorption of the intake through biliopancreatic diversion (BPD) or duodenal switch (DS); 3- a combination of both factors typically effected by a Roux-en-Y gastric bypass (RYGB). In order to be eligible for bariatric surgery the patient must have a BMI of ≥ 40 kg/m^2 or a BMI ≥ 35 kg/m^2 with medical comorbidities. Additionally, the patient must be psychiatrically stable and is expected to have tried and failed a medically supervised diet (2).

According to the World Health Organization (WHO), quality of life (QoL) is defined "as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment." (3). It is expected that the patient's QoL will improve after bariatric surgery, specifically in terms of mobility and pain, which will represent a valuable change for their own daily self-care.

Aim of the paper

The aim of this paper was to analyse QoL before and after bariatric surgery in patients who have previously undergone bariatric surgery in the Centro Hospitalar Universitário de Coimbra (CHUC).

III. Materials and methods

This was a retrospective study, approved by the CHUC ethics committee (Ref nº 227/CES, CHUC-081-19), comprising a highly selected group of patients who attended a scheduled appointment with a surgeon in the bariatric surgery Service of the CHUC during the month of November 2019 (randomly chosen). For this study, only patients aged ≥ 18 years were considered. Patients who had not undergone the surgical procedure were excluded. The patients' selection flowchart is shown in Figure 1. The initial cohort included 88 patients with a scheduled appointment in bariatric surgery; of these 38 did not want to participate in the study. Nineteen of the remaining 50 patients had not undergone the surgery. A total of 31 patients qualified for the study, 4 males (12,9%) and 27 females (89,1%).
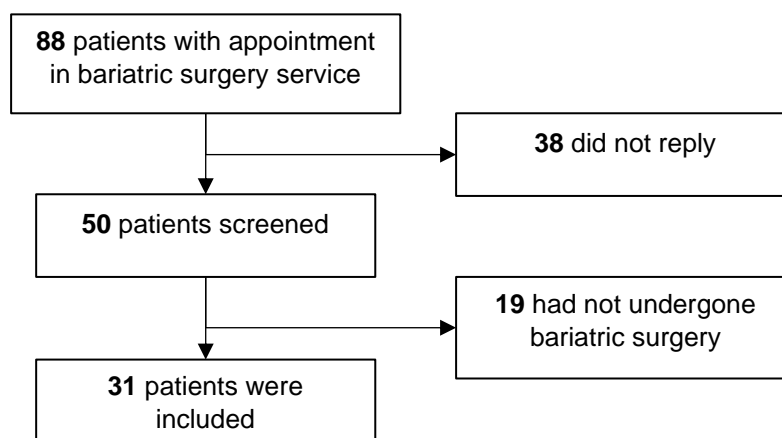

Figure 1 - Flowchart of patients' selection for the study

For this paper the authors used a standardized version of the EQ-5D questionnaire, as previously validated in Portugal, since it allows the measure of health-related QoL in cost-utility economic evaluations (4). This EQ-5D questionnaire consists of 5 dimensions, as illustrated in Table 1: mobility (M), self-care (S), usual activities (U), pain/discomfort (P) and anxiety/depression (A). Each of these dimensions has 3 possible answers corresponding to levels of satisfaction ranging from 1- no problems; 2- some problems; 3- major problems. This EQ-5D questionnaire was specifically applied in order to understand how the QoL of each individual had changed following the surgery and to assess the patients' complaints according to those dimensions. The questionnaire also allows the patient to give an estimation of what they perceive their health to be according to a numerical value (0 – 100, in which 0 corresponds to the worst possible health and 100 the best health imaginable).

Table 1 – EQ-5D QoL questionnaire: dimension, description and corresponding level

Dimension	Description	Level
Mobility	No problems walking about	1- No problems
	Some problems walking about	2- Some problems
	Confined to bed	3- Major problems
Self-care	No problems with self-care	1- No problems
	Some problems washing or dressing self	2- Some problems
	Unable to wash or dress self	3- Major problems
Usual activities	No problems with performing usual activities (e.g. work, study, housework, family or leisure activities)	1- No problems
	Some problems with performing usual activities	2- Some problems
	Unable to perform usual activities	3- Major problems
Pain/discomfort	No pain or discomfort	1- No problems
	Moderate pain or discomfort	2- Some problems
	Extreme pain or discomfort	3- Major problems
Anxiety/depression	Not anxious or depressed	1- No problems
	Moderately anxious or depressed	2- Some problems
	Extremely anxious or depressed	3- Major problems

Firstly we collected data from the 31 patients using Microsoft Excel® and transformed the levels of each dimension through an index rate (Table 2), according to Dolan *et.al.* (5) formula ($V = 1 - \alpha - M - S - U - P - A - N3$), so that we could compare QoL value (V) before and after undergoing bariatric surgery. In this equation, 1 represents perfect health, α is a constant value which represents the non-coincidence of the value of any dimension related to level 1 and N3 is another constant which represents the presence of level 3 in any dimension. Table 2 illustrates the descriptive system of the EQ-5D questionnaire, in which the value for each dimension changes according to the reported level of satisfaction.

Table 2 – Descriptive system of EQ-5D

Dimension	No problems	Some problems	Major problems
Mobility	0	0,069	0,314
Self-care	0	0,104	0,214
Daily activities	0	0,036	0,094
Pain/discomfort	0	0,123	0,386
Anxiety/depression	0	0,071	0,236
α	0,081		
N3	0,269		

α: constant which represents the non-coincidence of the value of any dimension related to level 1; N3: constant which represents the presence of level 3 in any dimension

Data was analysed using IBM SPSS® Statistics version 26.0 and descriptive statistics in order to find mean, median, standard deviation (SD) and interquartile range (IQR) was performed. Normality tests (Kolmogorov-Smirnov and Shapiro-Wilk) and a non-parametric test (Wilcoxon Rank Sum test for paired data) were used. A p value <0,05 was considered statistically significant for the hypothesis tests.

IV. Results

Table 3 assembles the demographic and anthropometric data of the 31 patients evaluated in this study. Most patients were female (87,1%).and only 12,9% were male. Collectively they presented with a mean age of 48,17 and a median Body mass index of 42,00 kg/m^2 at surgery, whereas currently they are on average 50.67 years old with a median BMI of 31,67 kg/m^2. Excess weight had a median of 46,05 kg, ranging from a minimum of 25,74 to a maximum of 112,07; the average excess weight loss percentage (EWL%) was 58,89% and the total weight loss percentage (TWL%) was of 23,63%.

Table 3 – Demographic and anthropometric data of all patients

Parameters	Statistics
Gender	
Female	27 (87,1%).
Male	4 (12,9%)
Age	
At surgery	
Mean ± SD	48,17 ± 8,78
Current	
Mean ± SD	50,67 ± 8,95
BMI at surgery	
Median	42,00
IQR	38,10 - 45,00
BMI 6 months after surgery	
Median	31,62
IQR	29,00 - 38,00
Excess Weight	
Minimum	25,74
Maximum	112,07
Median	46,05
IQR	35,77 - 52,03
EWL%	
Mean ± SD	58,89 ± 21,61
TWL%	
Mean ± SD	23,63 ± 8,04

SD: Standard Deviation; BMI: Body Mass Index; IQR: Interquartile Range; EWL%: Excess Weight loss percentage; TWL%: Total Weight Loss percentage at 6 months

As shown in Table 4, before the surgery most patients (48,4%) had no problems of mobility, although almost the same number of patients (45,2%) had some problems and 6,4% had major problems. A great majority of patients (67,7%) referred no problems of self-care, whereas 25,8% reported some problems and 6,5% had major problems. Most patients (54,8%) had some problems in their daily activity, 41,9% perceived no problems and 3,3% had major problems. Regarding pain/discomfort 32,3% did not mention problems, 45,2% referred some problems and 22,5% had major problems. In the dimension of Anxiety/depression 32,3% had no problems, 38,7% had some and 29,0% had major problems.

After surgery 83,9% had no mobility problems, 12,9% had some and 3,2% still had major problems. An expressive majority of patients (96,7%) reported no self-care problems and only 3,3% of patients still reported some problems. Regarding daily activities, a great number of patients (87,1%) had no problems and only 12,9% still reported some problems. In the dimension of pain/discomfort and anxiety/depression 64,5% had no problems, 29,0% had some problems, although 6,5% still had major problems.

Table 4 – Distribution of obtained answers of EQ-5D dimensions and perceived health in the 31 patients

Dimension	Before			After		
	No problems	Some problems	Major problems	No problems	Some problems	Major problems
Mobility	15 (48,4%)	14 (45,2%)	2 (6,4%)	26 (83,9%)	4 (12,9%)	1 (3,2%)
Self-care	21 (67,7%)	8 (25,8%)	2 (6,5%)	30 (96,7%)	1 (3,3%)	0 (0%)
Daily activities	13 (41,9%)	17 (54,8%)	1 (3,3%)	27 (87,1%)	4 (12,9%)	0 (0%)
Pain/discomfort	10 (32,3%)	14 (45,2%)	7 (22,5%)	20 (64,5%)	9 (29,0%)	2 (6,5%)
Anxiety/depression	10 (32,3%)	12 (38,7%)	9 (29,0%)	20 (64,5%)	9 (29,0%)	2 (6,5%)

From the values of Tables 2 and 4, Table 5 was constructed using descriptive statistics. This Table shows the median and IQR of each dimension, as well as the total value as expressed by the afore-mentioned formula. After performing the normality and non-parametric tests we rejected the hypotheses that this was a normal distribution and confirmed the hypothesis that there is a statistically significant increase of quality of life from a median of 51,6% to 84,8%.

Table 5 – Summary of results for the EQ-5D questionnaire

Dimension	Before		After		
	Median	IQR	Median	IQR	*p* value
Mobility	0,069	0 - 0,069	0	0 - 0	0,003
Self-care	0	0 - 0,104	0	0 - 0	<0,001
Daily activities	0,036	0 - 0,036	0	0 - 0	<0,001
Pain/discomfort	0,123	0 - 0,123	0	0 - 0,123	<0,001
Anxiety/depression	0,071	0 - 0,236	0	0 - 0,071	<0,001
V	0,516	0,088 - 0,848	0,848	0,76 - 1	<0.001

V: value of Quality of Life; IQR: Interquartile Range

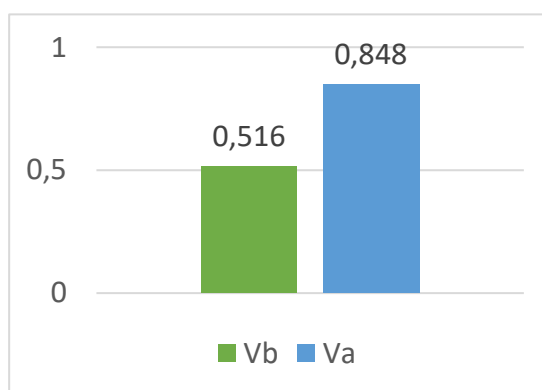A more graphic representation of Table 5 is shown in Figure 2.

Figure 2 – Analyses of changes in the median quality of life before (Vb)
and after (Va) bariatric surgery, as determined with EQ-5D questionnaire

Additionally, the self-assessment evaluation of QoL allowed us to conclude that most patients showed improvement as shown in Table 6 and Figure 3.

Table 6 – Patients' self-assessment evaluation
before and after surgery

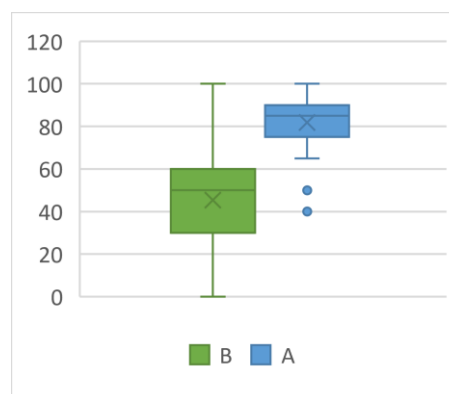|	Before	After
[0;25[	5 (16,1%)	0 (0,0%)
[25;50[	10 (32,3%)	1 (3,2%)
[50;75[	12 (38,7%)	4 (12,9%)
[75;100[	4 (12,9%)	26 (83,9%)

Figure 3 – Patients' perceived (self-assessment)
health before (B) and after (A) bariatric surgery

In order to find mean, standard deviation (SD), median and interquartile ranges of each parameter we performed normality tests (Shapiro-Wilk) for the value of QoL (V) before and after surgery, the excess weight loss percentage (6 months after surgery) and the total weight loss percentage (6 months after surgery) for each of the respective types of surgery (sleeve gastrectomy; Roux-en-Y gastric bypass; duodenal switch; laparoscopic adjustable gastric banding) as shown in Table 7.

Table 7 – Statistical data organized by type of surgery (sleeve gastrectomy; gastric bypass; duodenal switch; gastric band) before and after surgery.

Types of surgery	Statistics	Types of surgery	Statistics
Sleeve gastrectomy	19 (61,3%)	**RYGB**	10 (32,3%)
V before surgery		V before surgery	
Median	0,62	*Mean ± SD*	0,31 ± 0,40
IQR	0,09 - 0,80		
V after surgery		V after surgery	
Median	0,85	*Median*	0,85
IQR	0,80 - 1,00	*IQR*	0,62 - 1,00
EWL%		EWL%	
Mean ± SD	58,63 ± 17,68	*Mean ± SD*	65,31 ± 25,65
TWL%		TWL%	
Mean ± SD	23,55 ± 8,25	*Mean ± SD*	25,22 ± 7,49
LAGB	1 (3,2%)	**Duodenal Switch**	1 (3,2%)
V before surgery	0,80	V before surgery	0,22
V after surgery	0,80	V after surgery	0,22
EWL%	17,22	EWL%	41,11
TWL%	10,11	TWL%	22,69

V: value of Quality of Life; IQR: Interquartile Range; SD: Standard Deviation; EWL%: Excess Weight loss percentage at 6 months; TWL%: Total Weight Loss percentage at 6 months; RYGB: Roux-en-Y gastric bypass; LAGB: Laparoscopic adjustable gastric banding

V. Discussion and Conclusion

In this study, the majority of patients were female (87,1%) and only 12,9% were male, which is in line with previous publications (6–8). As previously reported, it is possible that this may happen because males tend to seek this drastic option of treatment only when their quality of life is much more affected than for females, perhaps when they have exhausted all other weight loss options or even when they are afraid of death (9).

In Portugal, according to the 2017 official report from "Entidade Reguladora da Saúde", the registry of proportion of patients with obesity at a national level in the years 2014, 2015, 2016 and 2017 were 5,8%, 7,1%, 8,0% and 8,6% respectively (10). These figures show that obesity has been growing in Portugal thus making this a chronic disease that needs increased specialized clinical care. Bariatric surgery is an effective way of reducing weight, but it is generally the last resort for obese patients. Hence the importance of QoL studies for assessing the effect of this type of surgery in Portugal.

Most previously reported international studies use other types of questionnaires such as SF-36; Moorehead-Ardelt quality of life questionnaire or BAROS score (11–14). Few authors have used the EQ-5D questionnaire and when it was used it studied, for example, adjustable band surgery with type 2 diabetes (15), metabolic investigations (6) or the quality of life in patients with endometriosis (16).

According to our data (Table 3) significant differences were found between BMI at surgery (median of 42,00 kg/m^2) and 6 months later (median of 31,62 kg/m^2). We also found that the mean EWL% was 58,89%, highlighting the success of bariatric surgery, since the necessary minimum value for EWL percentage is greater than 50% (17). The TWL percentage was found to be 23,63%.

The analyses of all the data as illustrated in Table 5 allowed us to conclude that all the five dimensions in this study had an improvement of their median values with a statistically significant result. This resulted in a significant improvement of quality of life. The main limitation of this study could be the limited number of participants, with another limitation that should be considered being the lack of assessment of medical comorbidities that influence QoL.

In the self-assessment estimation, according to Table 6 and Figure 3, most patients (83,9%) reported that the surgical outcome was very satisfactory as had been expected by most patients who effectively accepted going through this invasive procedure to improve their quality of life. In the last decade some studies have reviewed controlled trials following bariatric surgery which concluded that the QoL improvements were more likely to occur within the first 2 years of surgery (17,18). These studies highlight the importance of systematic acquired

scientific knowledge regarding the outcomes of bariatric surgery and consequent effects on quality of life.

The collected data for the 4 types of surgery allowed us to make a comparison between sleeve gastrectomy and Roux-en-Y gastric bypass only (there was only one case of laparoscopic adjustable gastric banding and duodenal switch for each type of surgery in our cohort), as can be seen in Table 7. Thus, it may be observed that the potential outcome of EWL% of RYGB (65,31%) is slightly higher than that of SG (58,63%), as recently reported by a Dutch group (7). This excess weight loss percentage is reinforced by the total weight loss of RYGB being higher than that of SG. No significant difference between SG and RYGB was observed in relation to the calculated quality of life after bariatric surgery. However, due to the limited number of patients the comparison between the two techniques does not allow us to firmly conclude that RYGB has a better outcome, requiring more and larger studies to confirm or exclude this finding.

This study is innovative because no other authors have presented results with this questionnaire in Portugal, therefore making it difficult to find suitable data for comparison.

In conclusion, there was a significant increase in median Quality of Life in our paper. The EQ-5D questionnaire proved to be a suitable tool, easily applied to the study population, for assessing QoL in patients who have undergone bariatric surgery. Larger retrospective studies and long-term longitudinal studies would certainly provide gains in health due to the insight that suitably treated statistics data collected every two or five years, at a national level, might bring to the scientific community and general population.

EQ-5D

AVALIAÇÃO DE GANHOS EM SAÚDE
QUESTIONÁRIO EQ-5D

Assinale com uma cruz (assim ☒), um quadrado de cada um dos seguintes grupos, indicando qual das afirmações melhor descreve o seu estado de saúde hoje.

▶ **Mobilidade**

Não tenho problemas em andar .... ☐₁
Tenho alguns problemas em andar... ☐₂
Tenho de estar na cama .... ☐₃

▶ **Cuidados Pessoais**

Não tenho problemas com os meus cuidados pessoais .... ☐₁
Tenho alguns problemas em lavar-me ou vestir-me... ☐₂
Sou incapaz de me lavar ou vestir sozinho/a .... ☐₃

▶ **Actividades Habituais** *(ex. trabalho, estudos, actividades domésticas, actividades em família ou de lazer)*

Não tenho problemas em desempenhar as minhas atividades habituais..................... ☐₁
Tenho alguns problemas em desempenhar as minhas atividades habituais .... ☐₂
Sou incapaz de desempenhar as minhas atividades habituais .... ☐₃

▶ **Dor / Mal-estar**

Não tenho dores ou mal-estar... ☐₁
Tenho dores ou mal-estar moderados .... ☐₂
Tenho dores ou mal-estar extremos .... ☐₃

▶ **Ansiedade / Depressão**

Não estou ansioso/a ou deprimido/a .... ☐₁
Estou moderadamente ansioso/a ou deprimido/a .... ☐₂
Estou extremamente ansioso/a ou deprimido/a .... ☐₃

▶ Gostaríamos de saber o quanto a sua saúde está boa ou má HOJE

- A escala está numerada de 0 a 100.

- 100 significa a melhor saúde que possa imaginar.
  O significa a pior saúde que possa imaginar.

- Coloque um X na escala de forma a demonstrar como a sua saúde se encontra HOJE.

- Agora, por favor, escreva o número que assinalou na escala no quadrado abaixo.

A SUA SAÚDE HOJE = ☐

A melhor saúde que possa imaginar

```
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
```
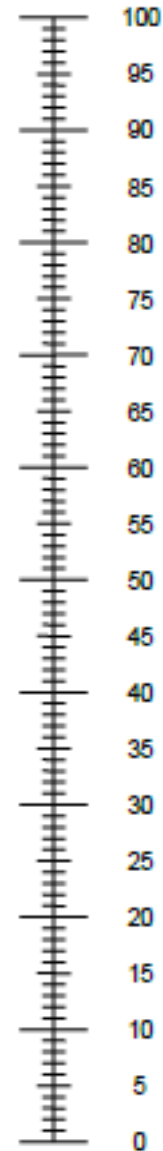
A pior saúde que possa imaginar

Muito obrigado por ter preenchido este questionário.

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