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Health-related quality of life in morbid obesity: the impact of laparoscopic sleeve gastrectomy

Research Article

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Abstract: Our aim in this prospective study was to determine the impact of laparoscopic sleeve gastrectomy on the quality of life of patients with morbid obesity in comparison with population standards. The study evaluated 76 morbidly obese patients who underwent laparoscopic sleeve gastrectomy. The short version of the World Health Organization Quality of Life questionnaire (WHOQOL-BREF) was used to evaluate quality of life in the following four areas: physical health, mental health, social relations, and environment. Patients completed the questionnaire before their planned operation and again 3 and 6 months after surgery. Compared with the population standard, patients with morbid obesity had significantly lower quality of life scores in the physical and mental health domains, including on independent questions related to of overall health and quality of life ($p<0.001$). Women scored lower on indicators of mental health than men. Three and 6 months following surgery a significant trend of body mass index (BMI) reduction was seen, as well as increased quality of life in all indicated areas ($p<0.001$). Laparoscopic sleeve gastrectomy treatment in morbidly obese patients reduced BMI on a long-term basis, a change seen as early as 3 months after surgery. By 6 months after surgery, patients had the same quality of life scores as the reference population.

Keywords: *Quality of life • Laparoscopic sleeve gastrectomy • Morbid obesity*

1. Introduction

The prevalence of obesity worldwide is increasing at an alarming rate. In developed countries obesity has reached epidemic proportions [1]. Obesity (BMI>30) prevalence in Europe ranges between 10% and 20% in males and is as high as 25% in females. Half of the European population is overweight or obese (BMI ≥ 25) [2]. According to obesity research conducted in 2008 in the Czech Republic, 34% of the adult population was overweight and 23% was obese [3]. Obesity increases the risk of developing several diseases, including diabetes, cardiovascular disease, and certain tumours, and it increases mortality. In addition to the adverse health effects, obesity worsens the quality of life (QOL) of patients while limiting their involvement in productive work. These limitations impose increased demands on the funding required for the treatment of obese patients [4]. Increasing obesity prevalence results not only in health problems, but in social and economic problems, as well.

Research in patients suffering from long-term health problems has shown that poor health negatively influences QOL in all areas [5]. Several studies have

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reported a correlation between increasing obesity levels and lower health QOL [3,6–8]. Other studies have found a correlation between higher BMI and decreased QOL [9–11].

Non-surgical treatment of obesity can decrease body weight by 5–20%, but such methods are not usually effective in the long term [9,12]. Kaukua [13] investigated the quality of life of 100 obese patients during treatment with a very low-energy diet and behaviour modification and 2 years after treatment. He reported an average weight loss of 12% at the completion of treatment, which had decreased to 6% 1 year later, and to 2% 2 years after the completion of treatment. Only one-third of patients maintained weight loss ≥ 5% of their body weight. Improved QOL in the domains of mental and physical health was seen with a weight loss of 10%. Increased weight 1 and 2 years after completion of treatment resulted in decreased QOL in these areas.

Bariatric surgery is currently considered the most effective method of obesity treatment [14]. Long-term studies have shown that bariatric intervention substantially reduces weight and mortality, and decreases the risk of developing new obesity-associated diseases [15]. According to mandatory European interdisciplinary recommendations for the surgical treatment of obesity, bariatric surgical interventions that limit food consumption by gastric capacity reduction (restrictive methods) include: vertical banded gastroplasty (VBG), laparoscopic sleeve gastrectomy (LSG), adjustable gastric bandage (AGB), and gastric bypass (GBP). A laparoscopic approach is considered the first choice among bariatric interventions [14], as is the case in other difficult gastric surgeries [16]. In connection with QOL, Stefaniak [17] found that patients had a more positive self-perception and body image following laparoscopic surgery than after conventional surgery.

The surgical treatment of obesity can help patients not only with long-term weight reduction, but it can also improve their QOL [10,12,18]. Studies have shown that QOL can improve as soon as 3 months after surgery [19–20]. Helmio [21] evaluated patients following laparoscopic AGB and found significant increases in QOL 1 year after surgery. Brunault [20] compared QOL in patients following laparoscopic AGB and LSG and reported increased QOL in both groups as early as 6 months after surgery. Some studies have shown an association between social and economic factors such as marital status, income, education, and employment, and QOL in obese patients [22].

2. Aims

In this prospective study we aimed to evaluate the impact of laparoscopic sleeve gastrectomy on subjective perception of QOL in connection with health condition in obese patients. Patients completed quality of life assessments 3 and 6 months following surgery. We compared the QOL of obese patients with population standards in the Czech Republic.

3. Materials and methods

3.1. Participants

The study included patients of the Gastroenterology Outpatient Department of the Surgical Clinic of the Teaching Hospital in Ostrava and of the Obesitology Outpatient Department of Surgery, Department of Gastroenterology of Vítkovice Hospital in Ostrava. Patients were selected for inclusion in the study using criteria determined in advance. Criteria included diagnosis of morbid obesity according to the guidelines of the International Federation for the Surgery of Obesity (IFSO) (i.e., individuals with a BMI > 40 kg/m^2 or BMI > 35 kg/m^2 with associated co-morbidities), age over 20 years, and signed consent to participate. Exclusion criteria included thyropathy, use of oral corticosteroids, severe renal dysfunction, treatment with dialysis, renal transplantation, and gastrointestinal diseases influencing intestinal absorption (gluten enteropathy, Crohn's disease, and rheumatoid arthritis).

To protect personal data, we assigned participants numerical identifiers by which they were identified in the database. Research was approved by the Ethical Committee of the Medical Faculty of Ostrava University and by the Ethical Committee of the Teaching Hospital in Ostrava. Laparoscopic sleeve gastrectomy surgeries were performed on participants beginning in May 2010. Patients completed the QOL questionnaire one month before the scheduled surgery and again during follow-up examinations 3 and 6 months after surgery. All participants provided written informed consent.

Nineteen of the enrolled participants were eventually excluded from the study for reasons including unwillingness to collaborate after surgery (absence at scheduled follow-ups), severe complications in the post-operative period, and re-operations. Seventy-six patients completed the questionnaire before surgery. Three months after surgery 73 patients completed the questionnaire during their follow-up examination, and 71 patients completed the questionnaire 6 months after surgery.

Questionnaire results of participants were compared with population standards. Population standards for the WHOQOL-BREF were established in 2006, using a multistage random sampling. The sex and age of participants were matched with population standards. For comparison with our study population, we used a population standard of 30–60-year-olds [5].

3.2. QOL questionnaire

The QOL questionnaire developed by the World Health Organization (WHOQOL-BREF) consists of 24 items covering four domains (physical, psychological, social, and environment) and two separate items evaluating overall QOL and health condition. The first domain (physical health) evaluates pain, dependence on medical care, fatigue, mobility, sleep, everyday activities, and work activities. The second domain (psychological health) assesses joy in life, sense of vitality, concentration, acceptance of physical appearance, satisfaction with self, and negative sensations. The third domain (social relations) asks about personal relations, sexual life, support of friends, and personal security. The fourth domain (environment) addresses the environment, financial situation, access to information, hobbies, neighbourhood, medical care availability, and transportation.

3.3. Statistical methods

Results of the WHOQOL-BREF questionnaire were evaluated based on a) domain scores representing mean scores calculated from particular items and converted to a scale from 4 to 20, and b) values of answers to individual questions q1 and q2, which evaluate overall QOL and overall health. The determination of rough domain scores and their conversion was performed according to Dragomírecká methodology [5]. The score range of individual questions was from 1–5, but the total score per domain was from 4–20, with higher scores indicating better QOL. Graphs 1–4 include individual items q1 and q2, converted to the 4–20 point scale for comparison.

To compare the results of participants to the reference population and results between individual examinations, the two sample t-test was applied. Trends between examinations and mean values of monitored parameters were evaluated with original data trend testing. All statistical tests were evaluated with a significance level of 5%. Statistical analyses were performed with the Stata program, v.10.

4. Results

4.1. Sociodemographic and clinical characteristic of the subjects

Seventy-six patients were included in the study, 62 women and 14 men. The average age of participants was 42.47 years (s=9.64), range 27–60 years. The mean BMI of patients before surgery was 42.79 (s=5.43; minimum, 32.5; maximum, 64.48). Before surgery the men had significantly higher (p=0.0145) mean BMI (45.05) than the women (42.29). Patients indicated that they had been overweight for an average of 19.69 years (s=13.17), ranging from 2 to 55 years. Men indicated that their weight problems began at an older age (average of 28.9 years) compared with women (average of 17.6 years); that difference was also statistically significant (p=0.0032). All patients had tried to lose weight, most often through diet, exercise, and medications. Thirty-six per cent of patients were smokers, smoking an average of 19.33 cigarettes per day (range, 3–40). Seventy-eight per cent of participants suffered from comorbidities, most commonly high blood pressure and back pain. Sociodemographic and clinical characteristics of participants are summarized in Table 1.

4.2. Impact of treatment on patients´ quality of life

At the time of the first follow-up questionnaire, performed 3 months after surgery, patients had significantly lower BMIs and higher QOL scores in the physical and mental health domains, including on the questions concerning overall QOL and satisfaction with health (see Table 2). In these areas, QOL continued to improve 6 months after surgery. Three months after treatment, satisfaction with social relations was slightly worse than before surgery, but by 6 months it had improved, though not significantly. Regarding the domain of environment, QOL mean values after surgery increased, but the change did not reach statistical significance.

4.3. Quality of life of obese patients during bariatric treatment compared with population standards

Before surgery, patients had significantly lower QOL than the reference population in the domains of physical and mental health (p<0.001). As early as 3 months after surgery the patients' mental health scores were the same as the population standards, and 6 months after surgery scores in the physical health domain were

Table 1. Sociodemographic and clinical characteristic of morbidly obese patients

	man		women		total	
	n	%	n	%	N	%
Obesity start						
✓ <12 years	2	14.3	22	35.5	23	30.3
✓ 12-20 years	3	21.4	26	41.9	25	32.9
✓ >20 years	9	64.3	14	22.6	28	36.8
Effort to lose weight	14	100	62	100	76	100
✓ diet	13	92.9	59	94.7	72	94.7
✓ exercises	8	57.1	44	70.9	52	68.4
✓ course	0	0	18	29.0	18	23.7
✓ spa	0	0	6	9.7	6	7.9
✓ medicinal products	1	7,1	48	77.4	49	64.5
Current smoker	3	21,4	24	38.7	27	35.5
Sedentary lifestyle	4	28.6	26	42.6	30	39.5
Length of education						
✓ basic (<9 years)	0	0	5	8.1	5	6.6
✓ intermediate (9-12 years)	13	92.9	51	82.3	64	84.2
✓ higher (> 12 years)	1	7.1	6	9.6	7	9.2
Comorbidities	13	92.9	46	74.2	59	77.7
✓ hypertension	14	100	23	50.0	37	61.1
✓ diabetes	2	15.4	9	19.6	11	18.6
✓ hypothyreosis	1	7.7	10	21.7	11	18.6
✓ coronary heart disease	2	15.4	2	4.4	4	6.8
✓ arthrosis	0	0	12	26.1	12	20.3
✓ pain in spine	5	38.5	25	54.4	30	50.9
✓ osteoporosis	0	0	1	2.2	1	1.7
✓ gynecological problems	0	0	7	15.2	7	11.9
✓ allergy	2	15.4	18	39.1	20	33.9

Table 2. The comparison of BMI and WHOQOL-BREF score in morbidly obese patients before surgery and 3 - 6 months after surgery

Domains WHOQOL	Before surgery (n=76)	After surgery 3 months (n=73)	6 months (n=71)	
	mean (s.d.)	mean (s.d.)	mean (s.d.)	p
BMI	42.75 (5.28)	34.99 (5.92)	33.11 (4.49)	**0.000**
Dom 1 – physical health	13.64 (2.43)	15.09 (2.18)	15.78 (1.99)	**0.000**
Dom 2- mental health	13.61 (2.21)	15.01 (2.24)	16.13 (2.45)	**0.000**
Dom 3 – social relations	15.00 (2.73)	14.73 (2.89)	15.01 (2.53)	0.498
Dom 4- environment	14.15 (1.89)	14.01 (1.53)	14,28 (1.36)	0.896
Q1 – overall QOL	3.47 (0.68)	3.69 (0.71)	3.95 (0.74)	**0.018**
Q2 – overall health	2.68 (0.67)	3.48 (0.71)	3.84 (0.85)	**0.000**

s.d. – standard deviation

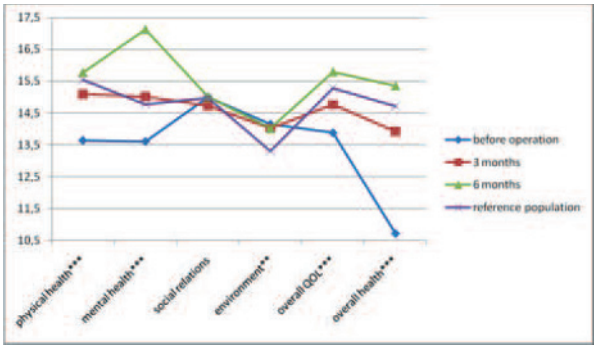
equivalent. Compared with the reference population, obese patients had statistically lower (p<0.001) QOL scores before surgery, including in the individual items of overall QOL and health. Three months after surgery QOL scores had increased and by 6 months after surgery scores were identical with the population standard (see Figure 1). QOL values in the domain of social relations were similar between morbidly obese patients and the reference population even before surgery. Obese patients evaluated the domain of environment as significantly better (p=0.0029) than did the reference population.

4.4. Quality of life evaluation in morbidly obese patients according to sex

Before surgery, physical health, overall QOL, and overall health were evaluated identically by men and women. They were then compared to reference populations. Women scored significantly lower in the domain of mental health than men (p=0.0483). In the domain of social relations men also expressed more satisfaction (see Figure 2).

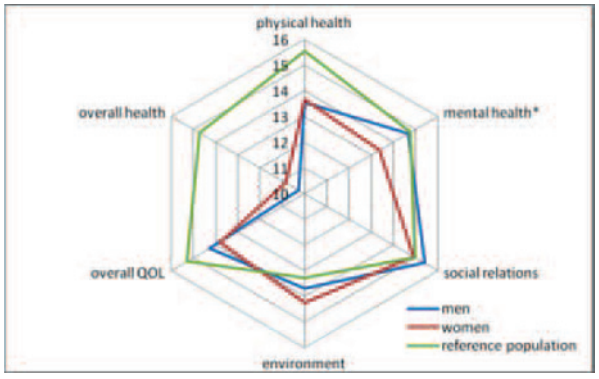
Three months after surgery, participating women evaluated the domain of physical health similarly to the reference population, while among participating men the values remained lower than those of the reference population, though not significantly. As to mental health, women indicated greater satisfaction at 3 months than before surgery, with mean QOL values already identical to those of the population standard. Men exhibited higher average values than women in the domains of mental health and social relations, and also in their overall assessment of QOL (see Figure 3).

Six months after surgery women were more satisfied in all four domains than man, as well as in overall QOL and health assessment. Average QOL scores among participating women were higher than those of the population standard, though the difference did not reach significance (see Figure 4).



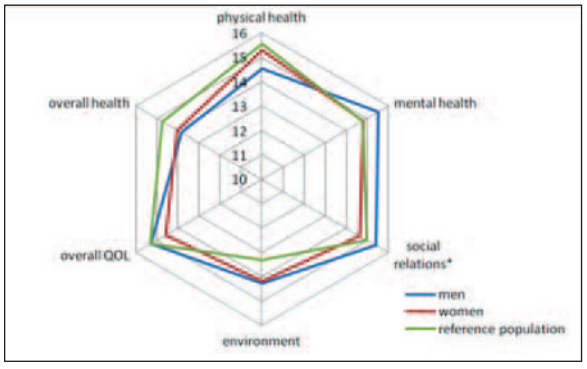
*Independent samples of t-test (between: morbidly obese patients before operation and population standards), ***p<0.001, **p<0.01, *p<0.05*

Figure 1. The comparison of WHOQOL-BREF score between obese patients during bariatric treatment and population standards



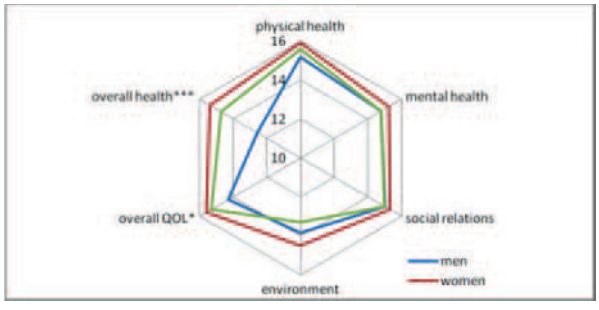
*Independent t-test samples (between man and women), ***p<0.001, **p<0.01, *p<0.05*

Figure 2. Comparison of score WHOQOL-BREF in morbidly obese patients before operation according to sex



*Independent samples t-test (between man and women), ***p<0.001, **p<0.01, *p<0.05*

Figure 3. Comparison of WHOQOL-BREF score in morbidly obese patients 3 months after the operation according to sex



*Independent samples t test (between man and women), ***p<0.001, **p<0.01, *p<0.05*

Figure 4. Comparison of WHOQOL-BREF score in morbidly obese patients 6 months following the operation according to sex

5. Discussion

The evaluation of health-related QOL in morbidly obese patients supplements objective assessments of health by describing the impact of disease and treatment on the everyday lives of patients, mediating their subjective views and evaluating the effects of treatment [5]. Interest in evaluating the QOL of morbidly obese patients in connection with treatment is increasing, as evidenced by a number of studies conducted on the topic in recent years. Several specific questionnaires have been developed specifically aimed at assessing QOL in morbidly obese patients, including the Laval Questionnaire [23], the Impact of Weight on Quality of Life Questionnaire (IWQOL) [24], and the Quality of Life, Obesity and Dietetics (QOLOD) survey [20]. The generic WHOQOL-BREF questionnaire evaluates general QOL in connection with health while expanding existing perceptions of QOL, which have been understood mainly as subjective evaluations of health and everyday activities. It investigates four main areas: physical health function, psychological function, social relations, and environment.

Results of research in the Czech Republic show that the fact that an individual suffers from chronic health problems does not necessarily determine their QOL (domain of environment) [25–26]. In our research, morbidly obese patients scored significantly higher in the domain of environment than did the reference population, both before and after surgery. Compared with population standards, the QOL of patients was significantly lower in the domains of physical and mental health. Additionally, participants had a significantly lower perception of their overall QOL and significantly lower satisfaction with their health. Lower satisfaction with health was also associated with a higher incidence of comorbidities. The majority of patients (61%) in this study had comorbidities, most frequently back pain (51%) and diabetes (20%). In the reference population, 20% of individuals suffered from hypertension and 7–8% from diabetes [3]. Comorbidities and impaired mobility objectively and subjectively worsen the health of morbidly obese patients [9,20]. Studies have found a high prevalence of anxiety and depression among obese patients [27]. In our study only women exhibited significantly lower QOL in the mental health domain before surgery compared with the reference population. There is greater tolerance for excessive weight in men than in women. Matoulek [3] reported that 78% of overweight men do not consider their weight a problem. Chang et al. [9] evaluated the QOL of obese patients before planned bariatric surgery. Patients had lower scores on individual items assessing overall health and QOL, as well as in all domains, except for environment. As in our research, men scored higher in the psychological domain than women, mainly in indices of self-esteem, body image, and appearance. Significantly lower QOL scores among obese women compared with men was also reported by Mannucci [8]. Lund [22] pointed out that lower QOL in obese patients is connected with unemployment. Compared with employed obese patients, unemployed obese patients had significantly lower QOL scores, mainly in the subareas of role-physical and role-emotional.

Social relations were evaluated similarly by patients in our study and the reference population, and patients showed satisfaction with their social support. Mean values dropped slightly 3 months after surgery and increased again by 6 months after surgery.

All patients had tried to lose weight in the past, most frequently by diet, exercise, and medications. Greater weight loss effort was observed in women. While 29% of the women had sought out a weight loss course, none of the men had. Weight loss medications were used by 7% of men compared with 77% of women. Despite the fact that obesity is more risky in men, women reported twice as many attempts at weight loss and had also more frequently sought professional consulting [3]. Among our participants planning bariatric surgery were more women than men.

At the 3-month re-assessment, patients' QOL scores had increased in the domains of physical and mental health. Dragomírecká and Bartoňová [5] found similar results when comparing domain scores in patients before and after surgical treatment of obesity. They reported increased subjective evaluation of physical and mental health in patients after surgery. Chang et al. [9] surveyed 102 patients after surgical treatment of obesity and found that Roux-en-Y gastric bypass (RYGB) significantly increased QOL in the domains of physical and mental health, both 3 and 6 months after surgery. Brunault [20] reported a significant increase in QOL in the domains of physical and mental health as early as 3 months after LAGB surgery and continued slight improvement 6 months after surgery. Fezzi [28] assessed 78 patients before bariatric LSG surgery and 1 year post-operatively. He discovered a significant increase in QOL in all domains on the SF-36 questionnaire; before surgery, patients scored at the lowest levels on emotional state and vitality. Dadan [29] evaluated QOL in patients 6 months after surgical treatment of obesity by LAGB and RYGB. In both groups, QOL improved in 97% of patients. Our results strongly confirm those of previously-conducted studies.

6. Conclusion

Obesity is associated with a high prevalence of comorbidities, which contribute to both objective and subjective worsening of patient health. Morbid obesity significantly decreases QOL in patients in the domains of physical and mental health, including health satisfaction. Mental health is affected mainly in obese women, while both men and women report low QOL equally in regards to physical health. Laparoscopic sleeve gastrectomy is a safe surgical method of treating morbidly obese patients that decreases BMI on a long-term basis and increases quality of life in the domains of physical and mental health within 3 months after surgery. Six months after surgery patients had the same QOL scores as the reference population. Future research should evaluate QOL and BMI values at 12 and 24 months after surgery.

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Conflict of interest statement

Authors state no conflict of interest.

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