

# Quality of Life after the Swedish Adjustable Gastric Band Procedure

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## ABSTRACT

*The term »quality of life« usually describes factors that have an impact on living conditions within the society or on an individual. Generally, the term quality of life refers to the level of the welfare of individuals or group of people. Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health and as such is one of the most common pathological conditions of modern society. Almost 10–25% of adult population in Europe, 1/3 population in the USA and 20% of population in Croatia are affected by obesity<sup>5,6</sup>. In this prospective study we included 30 patients who underwent Swedish adjustable gastric band procedure (SAGB) (Johnson & Johnson) procedures without complications during the first year of the postoperative period. Body mass index (BMI) was in female patients 40,52174 kg/m<sup>2</sup> and in male patients 46,71429 kg/m<sup>2</sup>. Prior to the surgical procedures 13 patients (43.33%) experienced worse health conditions. Health conditions were equal in 17 patients. The treatment was ineffective in 5 patients (16.67%). In 5 patients health conditions were equal. 6 patients (20%) had good quality of life, 11 patients (36.67%) very good and only 3 patients (10%) had excellent quality of life after the procedure. We noticed body weight reduction in all patients. The quality of life was improved in all patients, except for one 28 years old woman. Body weight loss and quality of life after the procedure are in positive correlation which means that significant body weight loss leads to improved quality of life. Our conclusion is that SAGB is a quality method in obesity treatment which improves quality of life.*

**Key words:** life quality, obesity, bariatric surgery, Swedish adjustable gastric band procedure

## Introduction

The term »quality of life« usually describes factors that have an impact on the living conditions for the society or an individual. Generally, the term quality of life refers to the level of the welfare of individuals or group of people. The concept of quality of life refers to the overall well-being within the society, and it is aimed at enabling every member of the society to achieve their goals. This means that the quality of life is measured by various economic, but also non-economic indicators. The principle of quality of life relies not only on the indicators of material living standards (indicators of income inequality, real income, poverty rates), but also on various subjective factors that affect human life (e.g. social relations, security, mental health, quality of environment, leisure, cultural resources etc.)<sup>1–5</sup>. There is a general opinion that quality

of life related to health in the fullest sense comprises of four areas that describe patient's experience of health and disease: physical health and symptoms, functional status and activities of daily life, mental well-being (including existential and spiritual aspects of life), social health, including the performance of social roles and social support. The deteriorated condition and the course of the disease can lead to mild or dramatic changes in some or all the determinants of quality of life, with complex interactions between disease and treatment, and individual patient responses to the social environment. In the last twenty years the trend of measuring quality of life has ranged from using non-standardized interviews and ad-hoc scales that included concise definitions of quality of life, to current standardized, multidimensional

and specific to a particular disease tests. Different models were applied in order to measure the quality of life of direct observation – interviews, telephone interviews and questionnaires made for patients. The preferred method is certainly using the questionnaires for patients with a subjective assessment of their physical, mental and social functioning. The main advantage of the questionnaires is a minimal financial input and the simplicity of its application. A number of experts do not support this argument claiming that questionnaires provide valid results and the evaluation of the patient perspective quality of life caused by the experience of their health. Knowing the experience of health and welfare of the medical team caring for patients allows a better understanding of patients and their needs, which may focus medical intervention to the specific needs of an individual. Complete treatment of the patient, understanding the issues, educating patients, families and relatives enhance the satisfaction of the patients and the multidisciplinary team, which ultimately results in improved quality of treatment, the experience of health and welfare of patients in the care. Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health and is one of the most common pathological conditions of modern society. Almost 10–25% of adult population in Europe, 1/3 population in the USA and 20% of population in Croatia is affected by obesity<sup>6–9</sup>. There is no simple definition of obesity. In literature, moderately adipose person weights up to 20% over ideal body weight, significantly adipose person 20–40% and obese person more than 40% over the ideal body weight<sup>10</sup>.

The body mass index (BMI), or Quetelet index, is a heuristic proxy for human body fat based on an individual's weight and height. BMI does not actually measure the percentage of body fat. It was devised between 1830 and 1850 by the Belgian polymath Adolphe Quetelet during the course of developing »social physics«. Body mass index is defined as the individual's body mass divided by the square of his or her height. The formulae universally used in medicine produce a unit of measure of  $\text{kg/m}^2$ :  $\text{BMI} = \text{Weight/kg} / \text{height/m}^2$  (Table 1).

Among 20 most important health risks, obesity is on the 10th place. The most frequent causes of death in the world are starvation, unsafe sex, high blood pressure, smoking, alcohol, water pollution, insanitary conditions, lack of iron, interior pollution, high level of cholesterol and obesity. Obesity is also an esthetic defect. Obese peo-

ple face many problems in everyday activities. Obesity is one of the risk factors in development of heart diseases, hypertension, stroke, diabetes, gallstones, arthropathy, some malignancies (breast cancer), bronchial asthma. According to the WHO, the overweight of 20% increases the risk of death by 25%, and overweight of 30% increases the risk of death by 42%. Hypocaloric diet, drugs, fitness and wellness programs are used to reduce body weight, in 90% of cases without results<sup>11–13</sup>. Some surgical procedures are developed to reduce body weight and have significant results. Highly motivated patients with BMI of more than 40 are ideal candidates to undergo some of bariatric procedures. It is recommended to try to reduce body weight using non-surgical methods a year before they undergo surgical procedures. They have to be under a supervision of endocrinologist, psychiatrist and anesthesiologist and before the surgical procedure is made, gastroscopy must be conducted with a healthy stomach mucosa. All bariatric surgery procedures can be divided into two groups: restrictive and malabsorption procedures. While restrictive procedures decrease food uptake, malabsorption procedures are based on reduced food absorption. Some procedures combine both surgical principles<sup>14</sup>. In the last few years about 50 surgical procedures have been used in bariatric surgery. The most effective surgical procedures are adjustable gastric banding, gastric bypass, sleeve resection and biliopancreatic diversion with duodenal switch. In the USA, 100 000 people per year undergo some of these procedures.

Adjustable gastric banding is a restrictive bariatric surgery method. Adjustable gastric band is endoscopically set up around the stomach, below the cardia and the stomach looks like an hourglass or an arch. Imported food fills a new, reduced stomach which leads to sooner satiety transmission to the brain. The size of the ring is controlled by the balloon filled with air or a solution. If it is necessary, the ring can be removed. With this method, 90% of patients will reduce their body weight by 55–70% compared to conservative methods of only 3% reduction. Few days after procedures patients consume only liquid food. Under the circumstances, adjustable gastric banding is a relatively safe method with good results. The complication rate is very low. Body weight loss is slow with permanent result after 2-year period. Patients are content with their body weight loss. The advantages of this method are high percent of body weight loss, reduced operative time and relatively safe procedure.

## Patients and Methods

Obesity is associated with heart diseases, diabetes, gallstones, arthropathy, malignancies and emotional disorders. Obesity reduces quality of life. To determinate quality of life in obese people BAROS (Bariatric Analysis and Reporting Outcome System) questionnaire is often used<sup>15</sup>. This questionnaire has been used as a standard since 1997 in patients who underwent some of bariatric surgery procedures. The questionnaire has five categories which describe patient's health condition (worse,

TABLE 1  
CLASSIFICATION OF OBESITY (WHO)

BMI	25–29.9	Overweight
BMI	30–34.9	Obesity I. stage
BMI	35–39.9	Obesity II. stage
BMI	>40	Obesity III. stage – pathological obesity
BMI	>50	Obesity IV. stage – super obesity

WHO – World Health Organization; BMI – Body mass index

equal, better, significantly better, excellent) related to body weight loss and quality of life. Questions are simple and estimation is made before a surgical procedure as well as one year, two years and etc. after the procedure. In our study we added some variables to standard BAROS questionnaire: blood pressure, blood glucose level, cholesterol, LDL and HDL. The estimation was made preoperative and one year after the SAGB procedure. We included 30 patients in this prospective study who underwent SAGB (Johnson & Johnson)<sup>16</sup> procedures without complications in 1 year postoperative period. After the preoperative preparation (gastroscopy, ultrasound of abdomen, endocrinologist examination, consultation with psychiatrist) all patients completed modified BAROS questionnaire. A year after the procedures they completed the same questionnaire and they were undertaken to body weight and cholesterol measurement. All the data were analysed with Student t-test.

### Results

30 patients completed the modified BAROS questionnaire, 23 female and 7 male patients, aged between 26 and 55 years, average age of 37.5 years (Figure 1). Body mass index (BMI) was in female patients 40,52174 kg/m<sup>2</sup>

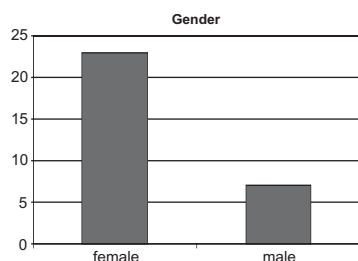


Fig. 1. Gender of the patients.

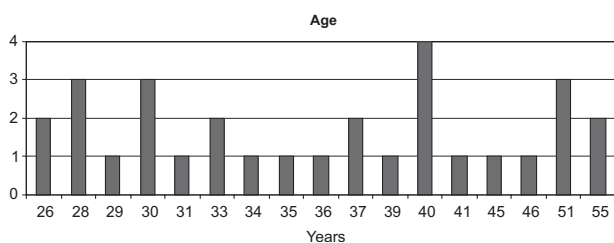


Fig. 2. Age of the patients.

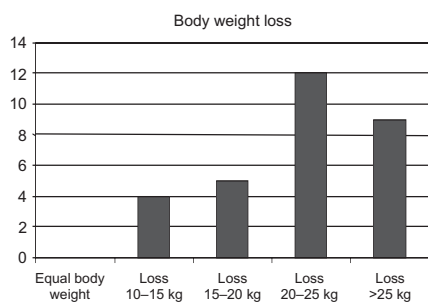


Fig. 3. Body weight loss.

and in male patients 46,71429 kg/m<sup>2</sup>, 13 patients (43.33%) had worse health conditions before the surgery. In 17 patients health conditions were equal. The treatment was ineffective in 5 patients (16.67%). In 5 patients health condition was equal, 6 patients (20%) had good quality of life, 11 patients (36.67%) very good and only 3 patients (10%) had excellent quality of life after the procedures

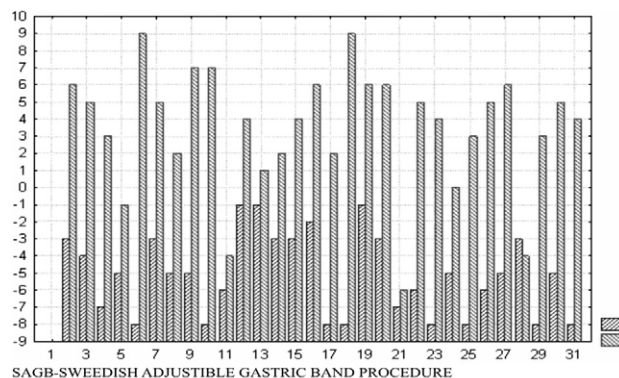


Fig. 4. Quality of life before and after SAGB procedure. Blue – before SAGB procedure; red – after SAGB procedure (SAGB – Swedish adjustable gastric band procedure).

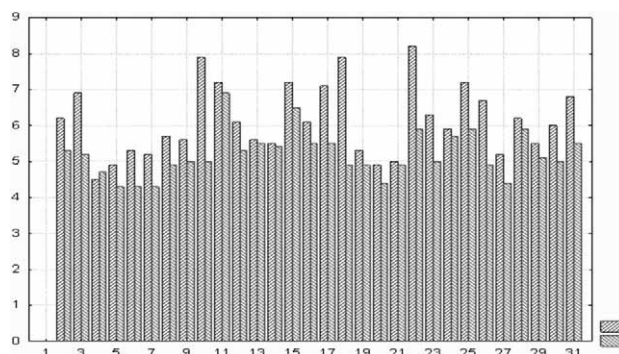


Fig. 5. Cholesterol blood level before and after SAGB procedure. Blue – before SAGB procedure; red – after SAGB procedure.

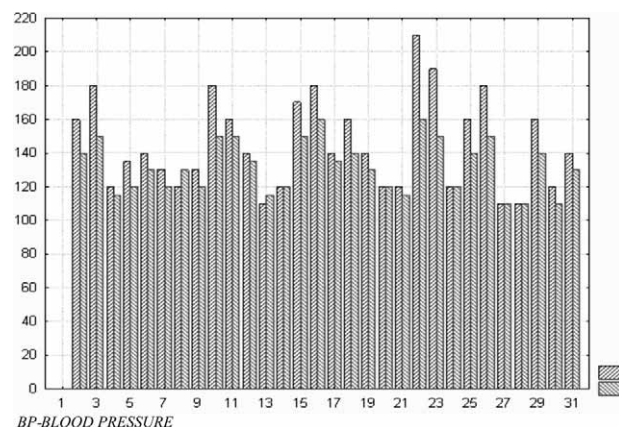


Fig. 6. Systolic BP before and after SAGB procedure. Blue – before SAGB procedure; red – after SAGB procedure (BP – blood pressure).



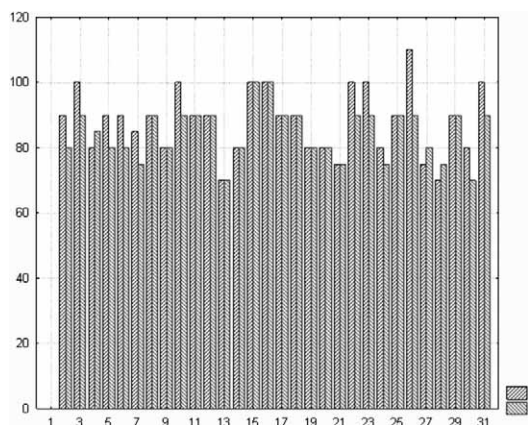


Fig. 7. Diastolic BP before and after SAGB procedure. Blue – before SAGB procedure; red – after SAGB procedure.

(Figure 2). We noticed body weight reduction in all patients. 4 patients lost 10–15 kg, 5 patients 15–20 kg, 12 patients 20–25 kg. 9 patients more than 25 kg (Figure 3, Figure 4). Quality of life was improved in all patients, except for 28 years old woman. The largest improvement was noticed in 40 years old woman (8 to 9) (Figure 5). Systolic blood pressure was lower in 23 patients, in 5 patients was equal and in 2 patients was higher (Figure 6). Diastolic blood pressure was lower in 12 patients after the surgical procedure, in 15 patients was equal and in 3 patients was higher (Figure 7, Table 2).

Table 2 shows that body weight loss and quality of life after the operation are in positive correlation (PCC 0.8521). More significant body weight loss leads to better quality of life after the operation. That correlation is significant and demonstrates high level of correlation. The correlation is statistically significant on the level of signi-

fication with a value of 1%. Negative correlation is between body weight loss and blood cholesterol level (PCC -0.3836). Greater weight loss leads to greater reduction in blood cholesterol level. The correlation is statistically significant on level of signification with a value of 5% (Table 3).

There is statistical signification between blood glucose level, cholesterol, LDL and systolic blood pressure before and after SAGB procedure with 5% level of signification.

### Discussion

Obesity is one of the most important health problems nowadays. The assumption is that about 60 000 people with BMI above 35 live in Croatia<sup>6</sup>. Obesity is associated with high blood pressure, diabetes, heart disease, bronchial asthma, malignancies, depression, metabolic syndrome and arthropathy<sup>9–11</sup>. The treatment of obesity is a complex one and involves a team of experts: endocrinologist, psychiatrist, nutritionist, psychologist etc<sup>12</sup>. In almost 90% of the cases the treatment is unsuccessful. For example, the treatment of drug and alcohol addictions shows better achievement. During the last 10 years intragastric ballons have been used in bariatric surgery to treat obesity having good short term results<sup>17</sup>. The main limitation of this method is its removal after 3 months. For the last 40 years surgery has had an important role in the obesity treatment. There are two principles in the surgical treatment of obesity: restrictive and malabsorptive. Restrictive principle is based on a reduction of food intake with satiety. Gastric bands (LAP BAND, SAGB) are based on idea of Kuzmaka, 1986. The main principles of this treatment is to form small fore-stomach, just after the oesophagogastric area using silicon band with a ballon and creating proximal stomach with the volume of

TABLE 2  
CORRELATION BETWEEN BODY WEIGHT LOSS QUALITY OF LIFE BLOOD GLUCOSE LEVEL CHOLESTEROL LEVEL AND BLOOD PRESSURE AFTER THE PROCEDURE

	Quality of life	Blood glucose level	Cholesterol	Systolic blood pressure	Dyastolic blood pressure	
Body weight loss	Pearsons corelation coefficient	0.8521	0.0689	-0.3836	0.30570	0.2074
	p-value	0.000	0.717	0.036	0.10	0.271

TABLE 3  
STATISTICAL SIGNIFICANCY BETWEEN BLOOD GLUCOSE LEVEL CHOLESTEROL LDL HDL AND BLOOD PRESSURE BEFORE AND AFTER PROCEDURE

	t-value	p-value
Blood glucose level (before) vs. Blood glucose level (after)	2.028517	0.047102
Cholesterol (before) vs. Cholesterol (after)	4.406513	0.000046
LDL (before) vs. LDL (after)	4.501917	0.000033
HDL (before) vs. HDL (after)	-1.154340	0.253096
Systolic blood pressure (before) vs. Systolic blood pressure (after)	2.267027	0.027133
Dyastolic blood pressure (before) vs. Dyastolic blood pressure (after)	1.562384	0.123638

about 30–50 ml. The silicon band is connected with a port which is inserted under the skin and is used to change stomach volume. The silicon band is placed laparoscopically. The indication for gastric band treatment is the BMI value above 40 or the BMI value above 35 with associated pathological condition<sup>18</sup>. Gastric band treatment is used in patients aged 18–55, with more than 5-year obesity monitoring and conservative treatment failure. Adjustable gastric band contraindications are hypersensitivity, hypothyroidism, Crohns disease, ulcerative colitis, oesophagitis, drugs or alcohol addiction, cardiovascular disease and emotional disorder. Patients after gastric band treatment lose 47.5% of body weight during the period of 3–3.5 years after the procedure. Body weight loss depends on patient's personality, their motivation and mobility<sup>19–21</sup>. The advantages of adjustable gastric band treatment are low mortality (1/2000 patients), the capability to remove adjustable gastric band, no stomach resection, short hospital stay, fast rehabilitation, the absence of malabsorption and simple balloon adjustment. Adjustable band treatment complications include ulceration, gastritis, erosion, band slippage, oesophageal dilatation, port complications and infections. Malabsorption procedures are based on reduction of gastrointestinal system functionality with resection of stomach (Sleeve resection, Roux-en-Y gastric bypass) or intestinal bypass (biliopancreatic diversion, duodenal switch)<sup>22</sup>. These methods are permanent. They have better efficiency but with more and severe complications. These methods are used in super obesity treatment and if there was no use of adjustable gastric band treatment<sup>23,24</sup>. Obesity has negative emotional impact on the obese which leads to reduced quality of life<sup>8,11–13</sup>. Quality of life includes physical conditions and symptoms, functional status and everyday activities, mental benefits, social health which includes social roles and support<sup>5,13</sup>. Reduced health state can lead to mild or severe disorders in these factors with complex interaction between disease and treatment and individual reaction of patients on social environment<sup>13</sup>. In our study 30 patients who underwent SAGB procedure without postoperative complications were included. All patients with postoperative complications were excluded. Except standard BAROS questionnaire blood pressure, blood glucose level, cholesterol, LDL and HDL were measured before procedure and one year after. According to the findings of surveys and researches health deterioration was recorded in 43.33% patients. The quality of life was reduced in all patients. A year after the implantation of the Swedish adjustable gastric band all the patients had obvious weight loss, 4 patients lost 10–15 kg. 5 patients lost 15–20 kg. Most respondents, 12 of them, lost 20–25 kg. 9 patients lost more than 25 kg. Significant weight loss in most patients, first year after the surgery, is explained by euphoria, increased commitment and adherence to the rules of nutrition, interpreted according to the literature<sup>14,25</sup>. Following the data from other studies, body mass in patients with SAGB falls after the second and third year after the operation and then stagnates. In our study, the loss of body weight is closely related to the quality of life<sup>24</sup>. As patients lose more

weight, they rate higher the quality of life and the positive correlation was statistically significant 1%. Similar results were shown by other studies<sup>26</sup>, but some<sup>27,28</sup>, especially those over the extended periods of time and with a large number of respondents, bring different results, especially three years after the surgery, which can be explained by emotional factors, depression etc<sup>29</sup>. A negative correlation occurs between weight loss and cholesterol blood level (correlation coefficient –0.3836) which means that significant body weight loss leads to significant reduction of cholesterol blood level. This correlation is statistically significant on the level of significance with value of 5%. The explanation is simple – reduced intake of cholesterol decreases cholesterol blood level. In our study statistically significant was glucose and cholesterol blood level before and after the procedure. The results of a t- test show statistically significant difference in glucose blood level, cholesterol blood level, LDL and blood pressure before and after SAGB procedure with a likelihood ratio of 5%<sup>30,31</sup>. In our study, two important pathological conditions associated with obesity were not included<sup>29</sup>; arthropathy and depression. We did not notice any arthropathy in our group and the reason probably was the average age of patients (37.5). According to the literature<sup>26</sup>, the quality of life is significantly improved after the procedure in patients with arthropathy<sup>30</sup>. The explanation is in reduced body weight. Most of the patients suffered a mild depression. The correlation between obesity and depression is not distinct<sup>29,32</sup>. There is no adequate explanation. One of the possible reasons can be discrimination and psychosocial stress<sup>28,29,33</sup>. Also depression in juvenile population can lead to obesity through inactivity and introverted behaviour<sup>34</sup>.

## Conclusion

The quality of life in obese patients is significantly reduced. Obesity is associated with high blood pressure, increased blood level of cholesterol and glucose. Body weight loss and quality of life after the procedure are in positive correlation which means that significant body weight loss leads to improved quality of life. The correlation is statistically significant on the level of significance with a value of 1%. Negative correlation has been detected between body weight loss and cholesterol blood level which means that significant body weight loss leads to significant reduce of cholesterol blood level. The correlation is statistically significant on the level of significance with a value of 5%. The results of t- test show statistically significant difference in glucose blood level, cholesterol blood level, LDL and blood pressure before and after the SAGB procedure with a likelihood ratio of 5%. Our conclusion is that SAGB is a quality method in obesity treatment which improves quality of life.

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## KVALITETA ŽIVOTA NAKON POSTAVLJANJA ŠVEDSKE PODESIVE ŽELUČANE VRPCE (SAGB)

## SAŽETAK

Pojmom »kvaliteta života« obično se opisuju čimbenici koji imaju utjecaj na životne uvjete društva ili pojedinaca. Općenito se pod pojmom kvaliteta života misli na stupanj blagostanja pojedinačne osobe ili grupe ljudi. Debljina (pretilost; gojaznost; povećana tjelesna težina; lat obesitas) jedna je od najčešćih bolesti moderne civilizacije koja uglavnom nastaje radi prekomjernog unosa hrane i smanjene tjelesne aktivnosti. Gotovo 10 do 25% odrasle populacije u Europi, a čak jedna trećina u SAD-u, 20% u Hrvatskoj pati od pretilosti. U naše prospektivno istraživanje uključeno je 30 pacijenata kojima je laparoskopskom tehnikom ugrađena Švedska podesiva vrpca (SAGB, Johnson & Johnson), a koji nakon godinu dana nisu imali nikakve komplikacije. Indeks tjelesne mase (BMI) je kod žena 40,52174 kg/m<sup>2</sup> dok je kod muškaraca nešto viši i iznosi 46,71429 kg/m<sup>2</sup>. Prije liječenja pogoršano zdravstveno stanje je bilo kod 13 pacijenata ili 43,33%. Ostalih 17 pacijenata (56,67%) su imali nepromijenjeno zdravstveno stanje. Ishod liječenja je bio neuspješan kod 5 pacijenata ili 16,67% ispitanika, tj. kvaliteta života se nije bitno promijenila. Kod 5 pacijenata stanje je ostalo nepromijenjeno. Kvaliteta života je ocjenjena dobrom kod 20% pacijenata, tj. kod njih 6. Vrlo dobru kvalitetu života sada ima 11 pacijenata ili 36,67%, a odličnu samo njih 3 ili 10% ispitanika. Kod svih pacijenata tjelesna težina se smanjila. Kvaliteta života je poboljšana kod svih pacijenata osim kod jednog, 28-godišnje žene. Gubitak tjelesne težine i kvaliteta života nakon operacije su pozitivno korelirane, tj. što je veći gubitak tjelesne težine nakon operacije, to je većom ocjenom ocjenjena kvaliteta života nakon operacije. Naše istraživanje je pokazalo da je podvezivanje želuca Švedskom podesivom vrpcom dobra metoda u liječenju pretilosti i poboljšanju kvalitete života.