

ORIGINAL ARTICLE

The improvement of quality of life in patients treated with bariatric surgery in Korea

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Purpose: Bariatric surgery is considered an efficient treatment for severe obesity, but postoperative complications and psychosocial problems may impact quality of life (QoL). Although QoL is an important aspect of bariatric surgery, few studies have evaluated the changes in QoL. We examined whether severely obese patients who had undergone bariatric surgery had better QoL compared with severely obese adults who had not undergone bariatric surgery in Korea. **Methods:** Data were obtained from 78 participants in two groups; bariatric surgery group (n = 53) and nonsurgery group (n = 25). EuroQoL-5D (EQ-5D), the impact of weight on quality of life-lite (IWQoL-lite) and the obesity-related psychosocial problem scale (OP-scale) were used to assess the improvement of QoL. **Results:** A total of 78 patients completed the QoL forms as part of their surgical consultation. In the EQ-5D, the changes of EQ-5D 3 level and EQ-5D visual analogue scale in the surgery group was 0.174 and 24.6 versus 0.017 and 17.8 in the nonsurgery group (P = 0.197 and P = 0.179). The changes of IWQoL-lite and OP-scale were significantly improved after bariatric surgery. In the IWQoL-lite, the mean changes in the surgery group was 33.4 versus 14.3 points in the nonsurgery group (P = 0.000). In the OP-scale, the mean changes in the surgery group patients scored 39.3 versus 9.0 points in the nonsurgery group (P = 0.000). **Conclusion:** We demonstrated significant improvement of QoL observed after bariatric surgery compared to nonsurgical procedure. The results of this comparative study favor bariatric surgery for the treatment of severe obesity.

Key Words: Bariatric surgery, Obesity, Quality of life

INTRODUCTION

Obesity has emerged as one of the most serious threats to public health worldwide. According to a 2012 report

published by World Health Organization, the population with obesity in the world is increasing more than double to over 300 million compared to a 1,980 report, and the increase in the prevalence of obesity is expected to accelerate

Received August 20, 2012, Revised November 22, 2012, Accepted December 7, 2012

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in the future [1].

Data from Report on National Health and Nutrition shows the prevalence of obesity in Korea is also on the rise: adult population in Korea with a body mass index (BMI) over 25 has increased from 26% in 1998 to 31.3% in 2009 [2], and severely obese patients who are candidates for bariatric surgery has increased from 2.4% to 4.7% in the same period [3]. An increase in obese population is followed by increases in the incidence of hypertension, diabetes, hypercholesterolemia, metabolic disorder, cardiovascular disorder, and cerebrovascular disorder, regardless of race, gender, and age. This increase in the prevalence of accompanying diseases of obesity has resulted in increases in public health costs and mortality. It makes obesity not just an individual health issue, but also a threat to public health [4].

Obesity is also considered to be a direct or indirect variable determining a socio-mental well-being and quality of life, which play important roles in both the development and management of obesity. A rise of interests in the effect of socio-psychological aspects of obese individuals, such as low self-esteem and depressed mood, on their quality of life has led to extensive researches on quality of life for the obese population [5-7]. Although various approaches to the treatment of obesity including diet therapy, behavior therapy, and exercise therapy have been tried, they have resulted in unsatisfactory outcomes so far and have not been proven to be effective in the treatment of complications of diabetes. Successful treatment of obesity is defined as achieving the ideal body weight and maintaining it for at least 5 years thereafter. When considering this, the success rate of treatment for obesity remains at only 10% with the success rate for the treatment of serious obesity much less than that. This warrants a more aggressive approach to the treatment of obesity [8].

In 1991, National Institutes of Health (NIH) held a conference on the surgical treatment of obesity as one of the more aggressive ways of treatment, where a consensus was reached that a surgical approach was indicated for the treatment of severely obese patients [9]. The indications of surgical treatment for obesity are 1) for the patients with a BMI over 40 or 2) for patients with a BMI over 35 and with comorbidities such as hypertension, type 2 diabetes, ob-

structive sleep apnea, and so on. Meanwhile, lower BMI by 3 (BMI 37 and BMI 32) is applied for Korean patients as the indication, which was proposed by Asia-Pacific Bariatric Surgery Group in 2005 [10]. The suggested surgical techniques included gastroplasty, gastric bypass, laparoscopic adjustable gastric banding (LAGB), biliopancreatic diversion with or without duodenal switch, and sleeve gastrectomy. These various surgical techniques are reported to be effective in reducing weight by more than 50% of excess weight and maintaining it for over 5 years in up to 70% of patients [11-13]. Along with such weight loss, they proved to reduce obesity-related metabolic disorder and diabetes, which highlights the effectiveness of bariatric surgery for treating comorbidities of obesity by altering the anatomical structure of intestine [14,15].

Moreover, the surgical treatment of obesity is also reported to be effective in improving patients' quality of life (QoL) in terms of socio-mental well-being [16,17]. Psychiatric evaluation of all candidates for bariatric surgery is suggested for the following reasons; 1) obese patients with serious psychiatric issues may have problems with post-operative adjustment, 2) it may help to predict, in advance, which patients would have better outcomes following the surgery, and 3) it may even help to recognize and manage psychological issues experienced by patients after the surgery [18]. According to some reports, obese people have some degree of mental problem, but generally have lower QoL due to bad self-image and uncontrollable cravings for food. Such low QoL is shown to negatively affect the outcomes of treatment for obesity in either a direct or indirect manner [16,17]. It is reported that bariatric surgery is effective in improving QoL, however, there has been no study in Korea on the effect of bariatric surgery on changes in QoL. This study attempts to compare the QoL between patients who received only nonsurgical treatments such as exercise, diet, and pharmacological therapies and patients who underwent bariatric surgeries. This is the first comparative study on QoL of obese patients between surgery and nonsurgery groups, as well as being a multi-institute, study in Korea.

METHODS

Participants

A total of 78 severely obese adult patients who were 18 years old or more and had a BMI of ≥ 30 participated in this study. They were categorized as two groups. Surgery group consisted of 53 patients who underwent bariatric surgery such as LAGB, laparoscopic Roux-en-Y gastric bypass, and laparoscopic sleeve gastrectomy in the surgery department of 7 tertiary referral hospitals from January 2008 to February 2011. Nonsurgery group was comprised of 25 patients who had nonsurgery treatment such as weight control medication or lifestyle modification therapy in the family medicine department of 2 tertiary hospitals. The ethics review board of the National Evidence-Based Healthcare Collaborating Agency and of each hospital involved in this study approved the study protocol.

Procedures

QoL was self-reported under the instruction of well trained surveyors. QoL before and after treatment (i.e., surgery or nonsurgery treatment) was investigated when patients visited hospital five months after treatment from July 2011 to October 2011. Post-treatment patients were asked to answer a pretreatment QoL questionnaire. The pretreatment QoL questionnaire may have recall bias, which was investigated through the survey for QoL of patients who were waiting for bariatric surgery. Post-treatment QoL was evaluated five months after treatment. Weight change was also investigated for those patients through a retrospective chart review to see the relationship between weight change and QoL. Weight change was presented as change in weight (%) calculated by dividing weight change from baseline by baseline weight. QoL instruments for this study were EuroQoL-5D (EQ-5D 3 level, EQ-5D visual analogue scale [VAS]), impact of weight on quality of life-lite (IWQoL-lite), and obesity-related psychosocial problem scale (OP-scale).

Health-related QoL instruments

As general health questionnaire, EQ-5D 3 level and EQ-5D VAS were used. EQ-5D 3 level consists of 5 di-

mensions (i.e., mobility, self-care, usual activities, pain/discomfort, and anxiety/depression) having a three health status [19]. The value from 5 dimensions of EQ-5D 3 level can be generally converted into health utility score. Health utility score had a range of 0 (death) to 1 (perfect health). The Korean version of EQ-5D was used and Korean value set was used to convert QoL value into health utility score for this study [20]. In the EQ VAS, subjects recorded self-rated health on a visual analogue scale, where a value of 0 equals the 'worst imaginable health state' and a value of 100 represents the 'best imaginable health state'.

As obesity specific questionnaires, IWQoL-lite questionnaire and OP-scale were used. We used Korean versions confirmed by the original authors for this study. IWQoL-lite was a sensitive questionnaire to measure psychological and clinical status in obese people. IWQoL-lite had good internal consistency (0.90–0.96) and greater test-retest reliability (reproducibility, 0.83–0.94) [21]. This QoL instrument has 5 dimensions: physical function, Self-esteem, Sexual life, public distress, and work. Each question had five points from 0 to 5. Total score and subtotal score for each dimension were calculated. The scores were then finally converted into a value of 0 to 100. Higher score had better health status. OP scale was developed modeling the Swedish obese study (SOS) [22] to measure psychosocial problems in obese people. OP scale consists of eight items to measure the impact of body weight that bothers them in given situations (i.e., private gatherings in my own, private gatherings in my friend or relative's home, going to a restaurant, going to community activities, courses etc., vacations away from home, trying on and buying cloths, bathing in public baths, intimate relations). The sum score of OP scale was also converted into a value of 0 to 100. Higher scores on OP scale indicate more psychosocial dysfunction.

Statistical analysis

Demographic and clinical characteristics were summarized by descriptive statistics for surgery and nonsurgery groups. Chi-square test for categorical variables and t-test for continuous variables were used to show the difference in baseline characteristics between the two groups. The mean difference scores between pretreatment and

post-treatment QoLs were presented, and they were compared using t-test to see the statistical difference between surgical and non-surgical group.

RESULTS

Profile of participants

Seventy-eight participants were enrolled in this study and consisted of 53 in surgery group and 25 in nonsurgery group. Table 1 shows the baseline characteristics and scores of baseline QoL. Some factors of baseline characteristics such as sex, BMI, prevalence of diabetes and hypertension, and current health status had significant difference between both groups. EQ-5D 3 level and EQ-5D VAS, which are the questionnaires of general health, did not show any difference, but, IWQoL-lite and OP-scale, which

are obesity-specific questionnaires, show significantly lower scores of QoL in surgery group.

Because pretreatment QoL may have the recall bias, we investigated the possibility of bias through the survey for QoL for the patients who were waiting for bariatric surgery during the same period. In the results of this survey, these patients expecting surgery had slightly better QoL than pretreatment surgery group and slightly lower than pretreatment nonsurgery group. That means the recall of the surgery group has the possibility that the patients of surgery group had slightly worse QoL than actual QoL. Nonetheless, pretreatment-QoL of surgery group is worse than that of nonsurgery group, as well.

Change of QoL before and after treatment

EQ-5D

The difference of EQ-5D 3 level and EQ-5D VAS be-

Table 1. Clinical characteristics of severe obesity

Characteristic	Surgery group		Nonsurgery group		P-value
	No.	Value	No.	Value	
Age (yr), mean \pm SD	53	37.8 \pm 12.2	25	44.0 \pm 14.9	0.056
Sex (M/F)	53	8/45	25	10/25	0.042
BMI (kg/m ²), mean \pm SD	53	39.6 \pm 6.9	25	34.3 \pm 3.8	<0.001
30 \leq BMI < 35 (%)	13	24.5	16	64.0	
BMI \geq 35 (%)	39	75.5	9	36.0	
Comorbidity (%)	53		25		
Diabetes	25	47.2	4	16.0	0.004
Hypertension	39	73.6	12	48.0	0.001
Dyslipidemia	15	28.3	11	44.0	0.081
Follow-up (median days)	53	208.6	25	302.8	

SD, standard deviation; BMI, body mass index.

Table 2. Quality of life (QoL) between surgery group and nonsurgery group using EQ-5D 3 level and EQ-5D VAS

	Surgery group				Nonsurgery group				P-value
	No.	Before treatment	After treatment	Mean difference ^{a)}	No.	Before treatment	After treatment	Mean difference ^{a)}	
EQ-5D 3 level	53	0.72 \pm 0.24	0.89 \pm 0.13	0.17	25	0.79 \pm 0.22	0.86 \pm 0.21	0.07	0.197
30 \leq BMI < 35 ^{b)}	13	0.77 \pm 0.23	0.87 \pm 0.17	0.10	16	0.79 \pm 0.26	0.85 \pm 0.26	0.06	0.561
BMI \geq 35 ^{b)}	40	0.70 \pm 0.24	0.90 \pm 0.11	0.20	9	0.80 \pm 0.17	0.89 \pm 0.08	0.09	0.181
EQ-5D VAS	53	44.8 \pm 19.8	69.4 \pm 15.1	24.6	24	50.1 \pm 18.2	68.8 \pm 15.5	17.8	0.179
30 \leq BMI < 35 ^{b)}	13	50.8 \pm 13.7	70.2 \pm 15.9	19.4	16	50.1 \pm 15.8	66.5 \pm 16.8	14.8	0.525
BMI \geq 35 ^{b)}	40	42.8 \pm 21.2	69.2 \pm 15.1	26.4	8	50.0 \pm 23.5	72.6 \pm 13.2	22.6	0.919

Values are presented as mean \pm standard deviation.

EQ-5D, EuroQoL-5D; VAS, visual analogue scale; BMI, body mass index.

^{a)}Mean difference between before and after treatment. ^{b)}BMI at baseline before treatments.

tween pre- and post-treatment in both groups means that the treatment has a trend in improvement in QoL. The difference of surgery group was 0.174 in EQ-5D 3 level and 24.6 in EQ-5D VAS and that of nonsurgery group was 0.071 and 17.8 each. But the change of QoL between both groups did not show any statistically significant difference (Table 2).

IWQoL-lite

The questionnaire of IWQoL-lite was completed in 51 patients of surgery group and 23 patients of nonsurgery group. The difference in mean score of both groups between pre- and post-treatment was 33.4 in surgery group and 14.3 in nonsurgery group, which shows a statistically significant difference. Among 5 dimensions of IWQoL-

Table 3. Quality of life (QoL) between surgery group and nonsurgery group using IWQoL-lite

	Surgery group				Nonsurgery group				P-value ^{b)}
	No.	Before treatment	After treatment	Mean difference ^{a)}	No.	Before treatment	After treatment	Mean difference ^{a)}	
Total severely obese patients									
IWQoL-lite total score	51	43.9 ± 18.1	77.1 ± 16.6	33.4	24	59.1 ± 17.9	74.1 ± 21.8	14.3	<0.001
Physical function	53	44.3 ± 20.6	78.6 ± 16.2	34.6	25	60.4 ± 21.2	74.9 ± 23.1	15.6	0.001
Self-esteem	53	29.0 ± 24.6	71.8 ± 25.7	42.9	25	41.7 ± 27.7	59.5 ± 29.6	16.1	0.000
Sexual life	51	50.0 ± 29.9	70.3 ± 29.6	20.4	24	65.9 ± 28.7	78.8 ± 25.0	11.1	0.102
Public distress	53	52.1 ± 22.2	81.8 ± 17.5	29.8	25	64.8 ± 26.6	78.3 ± 24.7	13.0	0.000
Work	52	58.5 ± 26.3	82.3 ± 17.5	23.8	25	73.8 ± 23.2	87.8 ± 23.0	12.0	0.025
30 ≤ BMI (kg/m ²) < 35 ^{c)}									
IWQoL-lite total score	12	45.8 ± 18.0	82.1 ± 19.3	36.4	15	57.7 ± 18.3	72.1 ± 25.5	13.4	0.004
Physical function	13	47.2 ± 22.9	80.6 ± 20.6	33.4	16	65.3 ± 19.2	75.2 ± 27.4	10.9	0.032
Self-esteem	13	30.5 ± 31.7	81.9 ± 30.4	51.4	16	33.5 ± 23.7	51.8 ± 30.4	16.8	0.004
Sexual life	12	53.1 ± 32.6	71.9 ± 33.9	18.8	15	62.5 ± 32.2	80.4 ± 27.7	15.2	0.802
Public distress	13	59.2 ± 21.7	89.6 ± 13.9	30.4	16	64.4 ± 26.3	77.1 ± 28.6	12.1	0.002
Work	12	60.9 ± 19.1	91.7 ± 11.7	30.7	16	68.4 ± 26.3	84.8 ± 28.1	13.8	0.019
BMI (kg/m ²) ≥ 35 ^{c)}									
IWQoL-lite total score	39	43.3 ± 18.3	75.6 ± 15.7	32.5	9	61.6 ± 18.0	77.2 ± 15.2	15.7	0.010
Physical function	40	43.4 ± 20.0	78.0 ± 14.7	35.0	9	51.5 ± 22.8	74.5 ± 15.9	23.0	0.111
Self-esteem	40	28.6 ± 22.3	68.5 ± 23.5	40.1	9	56.3 ± 29.5	71.4 ± 25.3	15.1	0.004
Sexual life	39	49.0 ± 29.4	69.9 ± 28.7	20.9	9	71.5 ± 22.3	76.4 ± 21.4	4.9	0.001
Public distress	40	49.8 ± 22.1	79.3 ± 18.0	29.6	9	65.6 ± 28.8	80.0 ± 18.4	14.4	0.049
Work	40	57.8 ± 28.3	79.5 ± 18.1	21.6	9	83.3 ± 12.5	92.4 ± 11.6	9.0	0.021

Values are presented as mean ± standard deviation.

IWQoL-lite, impact of weight on quality of life-lite; BMI, body mass index.

^{a)}Mean difference between before and after treatment. ^{b)}BMI at baseline before treatments. ^{c)}P-value indicates the statistical significance between mean difference of surgery group and nonsurgery group.

Table 4. Quality of life between surgery group and nonsurgery group using OP-scale

	Surgery group				Nonsurgery group				P-value
	No.	Before treatment	After treatment	Mean difference ^{a)}	No.	Before treatment	After treatment	Mean difference ^{a)}	
OP-scale	53.0	73.3 ± 20.8	34.0 ± 25.7	39.3	25.0	56.8 ± 27.7	46.9 ± 32.7	9.0	0.000
30 ≤ BMI (kg/m ²) < 35 ^{b)}	13.0	73.7 ± 17.8	21.2 ± 26.8	52.6	16.0	62.5 ± 24.8	53.1 ± 33.9	8.3	0.000
BMI (kg/m ²) ≥ 35 ^{b)}	40.0	73.1 ± 19.4	38.1 ± 24.2	34.9	9.0	46.8 ± 31.2	36.6 ± 29.4	10.2	0.000

Values are presented as mean ± standard deviation.

OP-scale, obesity-related psychosocial problem scale; BMI, body mass index.

^{a)}Mean difference between before and after treatment. ^{b)}BMI at baseline before treatments.

lite, the score of 4 dimensions, except sex life, was more increased in surgery group than in nonsurgery group. We got the same results when we sub-divided groups with BMIs over 35 and BMIs less than 35 (Table 3).

OP-scale

OP-scale is another obesity specific QoL questionnaire. The difference of mean score between pre- and post-treatment was 39.3 in surgery group and 9.0 in nonsurgery group, which shows a statistically significant difference. Even if we investigated the subgroups of BMI over 35 and BMI less than 35, QoL of surgery group was more improved than that of nonsurgery group (Table 4).

The change of body weight and change of QoL

Average changes of both body weight and BMI were 26.1 kg (standard deviation [SD], 14.4) and 9.5 kg/m² (SD,

4.5) in surgery group and 9.3 kg (SD, 6.7) and 3.3 kg/m² (SD, 2.2) in nonsurgery group. Fig. 1 shows the relationship between % weight change and the score change of each QoL questionnaire. The degree of improvement after treatment has a trend of positive relationship with % weight loss for all QoL questionnaires, but statistical significance was shown only in the surgery group using IWQoL-lite. That means the more weight loss, the greater QoL is improved irrespective of treatment method. So, QoL improved more in surgery group because surgical treatment achieved more weight loss than nonsurgical treatment.

DISCUSSION

This study compared the change in QoL for severely

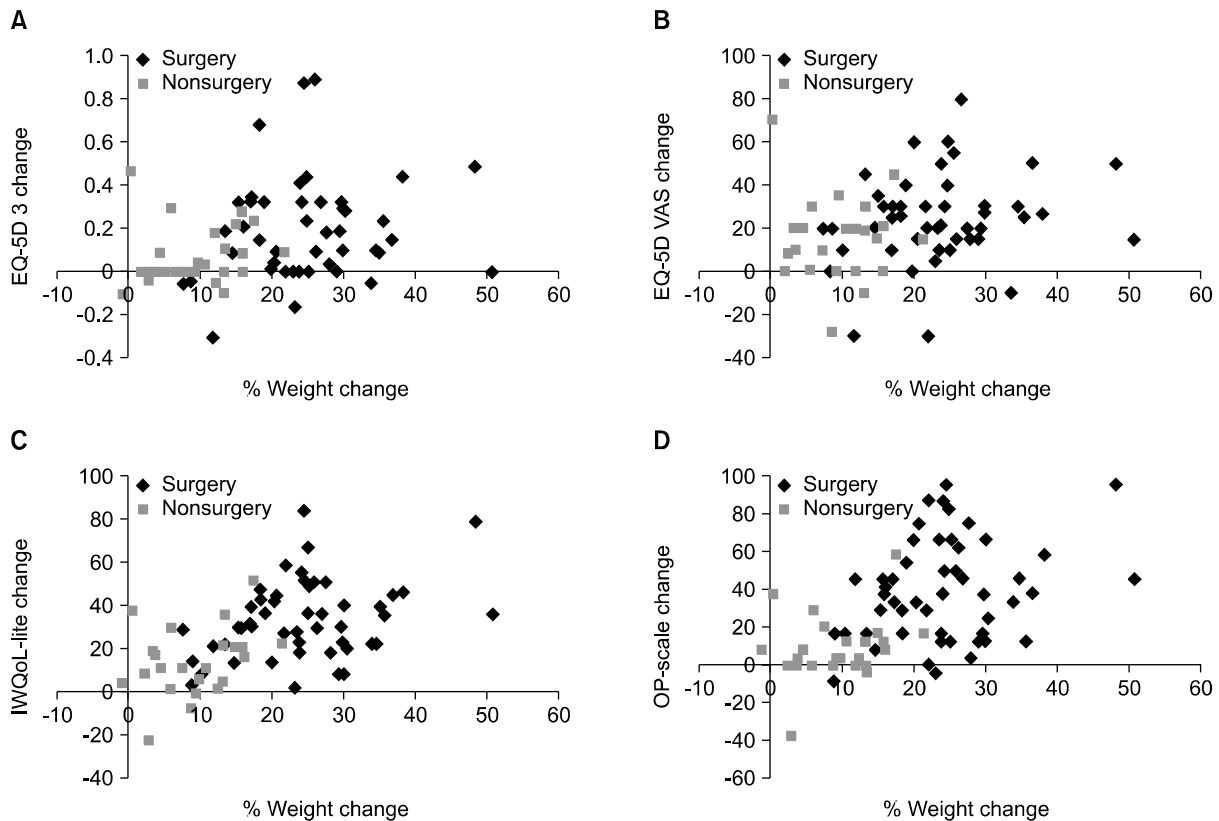


Fig. 1. Relationship between % weight change and the score change of each quality of life (QoL) questionnaire. Correlation P-value (A) 0.115 in surgery group, 0.097 in nonsurgery group. (B) 0.156 in surgery group, 0.543 in nonsurgery group. (C) 0.025 in surgery group, 0.102 in nonsurgery group. (D) 0.090 in surgery group, 0.188 in nonsurgery group. EQ-5D 3, EuroQoL-5D 3 level; EQ-5D VAS, EQ-5D visual analogue scale; IWQoL-lite, impact of weight on quality of life-lite; OP-scale, obesity-related psychosocial problem scale.

obese patients with a BMI over 30 who underwent treatment including surgery (surgery group) with the change in QoL for those treated without surgery (nonsurgery group). It is shown that surgery has significantly increased the QoL for severely obese patients. Comparison for QoL between the two groups using IWQoL-lite, an assessment tool designed specifically for obesity, shows a statistically significant improvement in QoL for the surgery group (33.4) over nonsurgery group (14.3). The same conclusion can be reached when measuring pre- and post-treatment QoL using OP-scale, with 39.3 for surgery group and 9.0 for nonsurgery group.

Cases of bariatric surgery have been increasing since its introduction in 1950 owing to an increase in the incidence of obesity and introduction of laparoscopic surgery.

NIH describes bariatric surgery as the only effective treatment method for comorbidity and complications of obesity [9], and the Korean Society for the Study of Obesity guidelines for the treatment of obesity states that bariatric surgery is the only effective treatment for severely obese patients [10]. In the current medical practice, however, bariatric surgery is not considered as a treatment option as often as it should be. It is generally offered to patients who fail to achieve treatment outcomes despite other non-surgical treatment modalities such as diet restriction, exercise, behavioral modification, and pharmacological therapy [8]. Previous studies have shown that bariatric surgery is effective in improving QoL as well as in treating obesity and its comorbidities [23-25]. Based on such results, it is recommended that assessment of treatment outcomes after bariatric surgery include not only the physical aspects of patients such as weight loss and improvement in comorbidity, but also other aspects such as social and mental functioning of patients. It can be further connected to the importance of the accurate measurement of pre- and post-operative QoL. Dziurawicz-Kozłowska et al. [23] studied the QoL for patients 3 and 6 months after bariatric surgery, and found improvements in both physical and socio-functional QoL in such a short term. A study by Folope confirmed an improvement in QoL 5 years after the Vertical Banded Gastroplasty [24]. This result supports the conclusion of a study by Mika, which showed an improvement in disease-specific and general health-related QoL

after laparoscopic gastric banding [25].

The relationship between the rate of weight loss after bariatric surgery and the difference in pre- and post-operative QoL shows patients with more weight loss after the surgery had a much larger difference in QoL before and after the surgery than that of nonsurgery group (Fig. 1). This conclusion is also supported by an SOS study that reviewed the effect of weight loss on the health-related QoL in severely obese patients for 10 years following bariatric surgery. This study confirmed that 1) high correlation between the rate of weight loss and the degree of improvement in QoL, 2) surgery group was more successful than the nonsurgery group in maintaining weight 10 years after the surgery, and thus 3) the surgery group exhibited a better long-term QoL in general. Based on these findings, the SOS study concluded that surgery is more effective than nonsurgical treatments in achieving and maintaining weight loss in severely obese patients, and advocated a more aggressive approach to improving QoL for these patients including bariatric surgery [26].

Although this study bears significance in that it proved the surgery group had better treatment outcomes than nonsurgery group in terms of weight loss, comorbidity, and QoL, it also has a few limitations. Since the QoL before the treatment for surgery and nonsurgery groups was accessed solely based on patients' recall, bias against QoL before the treatment may have influences on the results, especially for the surgery group. Selection bias may also have occurred because the surgeries were performed by different surgeons at 7 institutes. The fact that surgery group had more participants than nonsurgery group may have been translated into the more favorable outcome for the surgery group in terms of QoL. Since such variables as age, gender, and BMI were not adjusted due to small sample size, the proportion of female participants was higher in surgery group, and also, the results were presented by patient-stratified BMI level; $30 \leq \text{BMI} < 35$ and $\text{BMI} \geq 35$. Finally, 18 months of follow up after surgery may not be long enough to accurately evaluate the long-term changes in QoL. A long-term study with continuous evaluation of QoL is necessitated.

In this study, variables of QoL that do not have direct effects on health (such as income and freedom) were ex-

cluded, and only those variables that are directly related to health were evaluated. Among the assessment tools used in this study, EuroQoL-5D is a tool for measuring a general physical state of a patient with 5 different categories: exercise performance, self-management, daily activity, pain/discomfort, and anxiety/depression [19,20]. IWQoL-lite, which is proven to be valid for measuring obesity-specific QoL, offers an easy way of assessing the outcomes of treatment on obesity, as well as a sensitive tool for evaluating psychological and clinical states of a patient [21]. IWQoL-lite also has a high reproducibility for repeated examination, and can be used for a detailed measurement of obesity-related changes in QoL by analyzing 5 different categories: physical functioning, self-esteem, sex life, social and/or peer pressure, and work. OP-scale evaluates psychological and social malfunctions by measuring 8 different categories that are related to the degree of self-consciousness of obese patients in specific situations including various social activities [22,27]. This study is meaningful in that it evaluated the effectiveness of surgical treatment for severely obese patients, which is now considered one of the most effective approaches to the treatment for severely obese patients at this stage in Korea where obesity is on the rise and over 30% of total population is now considered as obese. So far, studies on the outcomes of bariatric surgery in severely obese patients in Korea attempted to evaluate only changes in physical states such as weight loss and comorbidity. This study is the first to evaluate QoL after bariatric surgery in Korea in that it included the assessment of socio-mental and psychological changes using obesity-specific tools such as IWQoL-lite and OP-scale as well as the first multi-institute study on QoL in Korea.

In conclusion, this study compares an overall effectiveness of surgical and nonsurgical treatments for severely obese patients by measuring QoL in terms of physical, social, and psychological functions. It can be concluded that the surgical treatment is significantly superior to non-surgical treatment for severely obese patients.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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