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Validation of the Korean version Moorehead-Ardelt quality of life questionnaire II

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Purpose: To investigate the weight loss effects with higher sensitivity, disease specific quality of life (QoL) instruments were important. The Moorehead-Ardelt quality of life questionnaire II (MA-II) is widely used, because it was simple and validated the several languages. The aims of present study was performed the translation of MA-II Korean version and the validation compared with EuroQol-5 dimension (EQ-5D), obesity-related problems scale (OP-scale), and impact of weight quality of life-lite (IWQoL-Lite).

Methods: The study design was a multicenter, cross-sectional survey and this study was included the postoperative patients. The validation procedure is translation-back translation procedure, pilot study, and field study. The instruments of measuring QoL included the MA-II, EQ-5D, OP-scale, and IWQoL-lite. The reliability was checked through internal consistency using Cronbach alpha coefficients. The construct validity was assessed the Spearman rank correlation between 6 domains of MA-II and EQ-5D, OP-scale, and 5 domains of IWQoL-Lite.

Results: The Cronbach alpha of MA-II was 0.763, so the internal consistency was confirmed. The total score of MA-II was significantly correlated with all other instruments; EQ-5D, OP-scale, and IWQoL-Lite. IWQoL-lite ($\rho = 0.623$, $P < 0.001$) was showed the strongest correlation compared with MA-II, followed by OP-scale ($\rho = 0.588$, $P < 0.001$) and EQ-5D ($\rho = 0.378$, $P < 0.01$).

Conclusion: The Korean version MA-II was valid instrument of measuring the obesity-specific QoL. Through the present study, the MA-II was confirmed to have good reliability and validity and it was also answered simple for investigating. Thus, MA-II could be estimated sensitive and exact QoL in obesity patients.

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Key Words: QOL, MA-II, BAROS, Bariatric surgery, Validation

INTRODUCTION

Obesity causes health problems ranging from asymptomatic chronic diseases to severe cardiovascular events [1]. Bariatric surgery is recommended for morbidly obese patients because the surgery is superior in maintaining weight loss and preventing obesity-related disease [1,2].

Apart from physical health problems, obesity is related to various social distresses and mental illness [3]. When we assess either morbidity of obesity or effects of weight loss treatment, it is very important to evaluate all aspects of physical, mental, and social health [4]. Health related quality of life (QoL) is one of

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the most important parameters for assessing multidimensional morbidity of obesity and the effects of treatment [5-7].

The use of bariatric surgery is increasing steadily in South Korea as prevalence of morbid obesity has risen during the last decade [8]. To evaluate the results of bariatric surgery, we need a disease-specific QoL instrument in Korean that is reliable and valid. The obesity-related problems scale (OP-scale), and impact of weight quality of life-lite (IWQoL-Lite) was disease-specific instruments for patients with obesity. However, they were not the instruments for measuring QoL of patients underwent bariatric surgery. We estimated the QoL of patient with obesity using EuroQol-5 dimension (EQ-5D), it was general instrument used in any patient or healthy person. Thus, it was difficult to measure improvement of QoL caused by bariatric surgery.

The Bariatric analysis and reporting outcomes system (BAROS) is a comprehensive instrument, covering amount of weight loss, remission of comorbidities, complications related to surgery and QoL after bariatric surgery [9]. The BAROS is used internationally for evaluating the efficacy of bariatric surgery. The QoL dimension of BAROS was estimated by Moorehead-Ardelt quality of life questionnaire II (MA-II) [10,11]. To evaluate the efficacy of bariatric surgery in Korea and compare the results to other international researchers, the MA-II self-reporting questionnaire needs to be translated and validated for Korean patients. Therefore, the purpose of this study was translating MA-II and validating it.

METHODS

Study design and patients

The study design was a multicenter, cross-sectional survey and the period of survey was from 1 July to 31 October 2011. The study included the postoperative patients and the types of surgery included laparoscopic adjustable gastric banding (LAGB), laparoscopic Roux-en-Y gastric bypass (LRYGB), and laparoscopic sleeve gastrectomy (LSG). The bariatric surgery was performed for severely obese patients defined as body mass index (BMI) of ≥30 kg/m^2 following Asia clinical practice guidelines [1,2]. Patients less than 18 years old or less than 3 months after surgery were excluded.

Validation process

The validation follows a translation-back-translation procedure, pilot study, and field study.

First, translation was processed by the standards outlined of the Reports of the International Society for Pharmacoeconomics and Outcomes Research Task Force for Translation and Cultural Adaptation [12]. The MA-II was translated by two Korean native speakers who are fluent in both Korean and English. The translation was led by a coordinator (Y.J.L.), and disagreements were resolved with discussion. The resulting Korean version was back-translated by independent two native English speakers who are fluent in Korean. This was reviewed by a coordinator and compared with the original version to ensuring identical concepts.

Second, the pilot study was conducted. The Korean version of the MA-II was tested on a sample of 20 morbid obese patients who were expected to get bariatric operation or who had already undergone bariatric operation at the obesity center of Inha University Hospital. This process was performed to detect and remedy potential problems in understanding or confusion with questions.

After administration of the translated Korean questionnaire, a structured interview was conducted with each patient individually. To ensure that questions were answered properly, the structured interview was applied to each item separately concerning its precise meaning and its difficulty with regard to answering and understanding. We recorded and summarized all procedures of the pilot study for yielding a final translation version in Korean. This report including final Korean version of MA-II was sent to the authors of the original questionnaire for review and approval of the questionnaire.

Lastly, the field study was approved by the Ethics Committee at five hospitals (Soonchunhyang University Hospiral, Inha University Hospital, Catholic University Seoul Hospital, Chung-Ang University Hospital, Seoul National University Bundang Hospital) and National Evidence-based Collaborating Agency (NECA). All patients received an explanation about the study and signed an informed consent. A face-to-face interview by well-trained investigators was conducted. Interviewers were trained in the study purpose, critical contents, and practical methods. The patients answered the questionnaire by self-reported methods in the presence of an interviewer. The interviewer was observed and explained odd answer or patient's question based on the questionnaire guideline. After the pretest was carried out, the main survey was performed using the revised version.

Questionnaires

The questionnaires consisted of two parts of general or disease-specific instruments and demographic characteristics. The first part included the MA-II, EQ-5D, OP-scale, and Impact of IWQoL-Lite. All instruments measuring QoL used validated versions. The other part is composed of general characteristics: weight and BMI at initial and most recent visit, follow-up periods, and type of surgery.

Moorehead-Ardelt quality of life questionnaire II

BAROS is comprised of weight change, improvement in comorbidities related to obesity, and QoL [13]. The QoL of BAROS was assessed with the MA-II. MA II consists of six items: general self-esteem, physical activity, social contacts,

satisfaction concerning work, pleasure related to sexuality, and focus on eating behavior [9]. Each item used 10 level Likert scales (−0.5 to 0.5) and had same weights. The total scores range from very good (2.1 to 3), good (1.1 to 2), fair (−1 to 1), poor (−2 to −1.1), and very poor (−3 to −2.1). The Korean version MA-II was shown in Supplementary material 1.

EuroQol-5 dimension

EQ-5D includes general instruments (i.e., not limited to a specific disease) and is made up of five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression [14]. The index scores range from 0 (death) to 1 (perfect health) and Lee et al. [15] tariff was used. The EQ-5D has been validated in many countries and standardized internationally, and is in general use in cost-utility analysis and clinical outcomes [16].

Obesity-related problems scale

OP-scale was developed by the Swedish Obese Subjects study groups for estimating social and psychological functions [17]. The OP-scale included eight items and was answered as degree of bother caused by obesity in specific situations. Each item was a 4-point scale, transformed from 0 to 100. The higher score indicated abnormal psychosocial function [18].

Impact of weight quality of life-lite

IWQoL-Lite was an abridged edition of IWQoL and first developed for the obesity patients. The shorten version had 31 questions, unlike the original version that had 74 questions. IWQoL-Lite was a sensitive measure of psychological and clinical outcomes [19]. The questionnaire is organized into five dimensions and each dimension was a 5-point scale. The scores ranged from 0 to 100 and the score of 100 indicated the highest QoL [20].

Statistical analysis

The demographic characteristics of all study subjects were analyzed. The percent of weight loss was calculated as [(first weight − last weight) / first weight] × 100. Excess body mass index loss (EBMIL) was estimated as [(first excess BMI − last excess BMI) / first excess BMI] × 100.

The statistical analysis was performed as follows: first, MA-II scores were presented in the form of means and standard deviations, and the reliability was checked for internal consistency using Cronbach alpha coefficients. Correlation coefficients between each item score and total score were calculated. Missing values were not replaced; second, the construct validity was assessed using Spearman rank correlation among the six domains of MA-II and EQ-5D, OP-scale, and five domains of IWQoL-Lite. The level of significance was set at $P < 0.01$. Both convergent validity and discriminant validity were estimated. Because the OP-scale ran in the opposite direction to other instruments, the OP-scale score was inverted. For the criterion validity was studied, the association of the total score of MA-II and BMI were conducted; lastly, subgroup analysis was conducted to find the critical factors of the MA-II score. That was performed according to the baseline BMI and degree of weight or BMI changes.

The statistical software used was STATA release 11.0 (StataCorp LP., College Station, TX, USA).

RESULTS

Patients

Fifty-three patients at five general hospitals were included this survey. All patient signed an informed consent was

Table 1. General characteristics of the study population (n = 53)

Characteristic	Value
Age (yr)	37.8 ± 12.2
≤30	18 (34.0)
31−40	12 (22.6)
≥41	23 (48.4)
Sex	39.6 ± 6.9
Male	8 (15.1)
Female	45 (84.9)
BMI at initial visit to the clinic (kg/m^2)	30.1 ± 5.9
<35	13 (24.5)
35−39	21 (39.6)
≥40	19 (35.8)
BMI upon the time of questionnaire (kg/m^2)	13.8 ± 6.5
<25	10 (18.9)
≥25, <30	17 (32.1)
≥30	26 (49.1)
Follow-up times to the clinic (yr)	
≤1	4 (7.55)
>1, ≤2	25 (47.17)
>2	24 (45.28)
Type of obesity surgery	
Gastric banding	8 (15.1)
Gastric bypass	24 (45.3)
Sleeve gastrectomy	21 (39.6)
Percent of weight loss (%)	23.8 ± 9.0
<20	18 (34.0)
≥20, <30	26 (49.1)
≥30	9 (17.0)
Percent of EBMIL (%)	73.2 ± 33.9
<50	15 (28.3)
≥50, <100	28 (52.8)
≥100	10 (18.9)

Values are presented mean ± standard deviation or number (%).
BMI, body mass index; EBMIL, excess body mass index loss.

completed the questionnaire. The mean age of all subjects was 37.8 years and most was female (84.9%) (Table 1). The present mean BMI was 30.1 kg/m^2, while the mean BMI before surgery was 39.6 kg/m^2. The median follow-up period was 13.8 months; 92.5% were followed more than 12 months. The patients undergoing LRYGB comprised 45.3%. Following bariatric surgery the average percent weight loss was 23.8% and excess BMI loss (EBMIL) was 73.2%.

Reliability

The Cronbach alpha of MA-II was 0.7633, so the internal consistency was confirmed. The item-total coefficient ranged from 0.6458 to 0.8326 without the dimension of food (α=0.4323) (Table 2). Also, the alpha coefficients in cases of item deleted was between 0.6680 and 0.7290 except the food dimension (α=0.8484). Five dimensions were totally answered except only sexual activity dimension; it had missing value of 5.8%. Thus, we calculated the total MA-II score in 49 patients (94.2%).

Validity

The total MA-II score was significantly correlated with that of all other instruments: EQ-5D, OP-scale, and IWQoL-Lite (Table 3). IWQoL-Lite (ρ = 0.6225, P < 0.001) was most highly correlated with MA-II was, followed by OP-scale (ρ = 0.5878, P < 0.001) and EQ-5D (ρ = 0.3782, P < 0.01). The total MA-II score was also significantly correlated with the dimension score of IWQoL-Lite, except physical function.

The total EQ-5D score was significantly correlated with the dimension scores of self-esteem (ρ = 0.3866, P < 0.01) and physical activity (ρ = 0.3767, P < 0.01) of MA-II. The total OP-scale score and the five dimension of MA-II were significantly correlated except food dimension. The physical function, self-esteem, sexual life, and public distress of IWQoL-Lite were highly significantly correlated with physical activity (ρ = 0.3798, P < 0.01), self-esteem (ρ = 0.6332, P < 0.001), sexual activity (ρ = 0.6054, P < 0.001), and social life (ρ = 0.5325, P < 0.001) of MA-II, respectively. The food dimension scale of MA-II was not associated with the five dimensions of IWQoL-Lite except self-esteem (ρ = 0.2973, P < 0.01).

Table 2. Internal consistency of MA-II scale

Item description	No.	Final item score	Item-total correlation coefficient	Alpha if item deleted
Total	49	1.18 ± 0.92		
1. Usually I feel…	52	0.19 ± 0.23	0.780	0.685
2. I enjoy physical activities…	52	0.18 ± 0.20	0.833	0.668
3. I have satisfactory social contacts…	52	0.27 ± 0.21	0.646	0.729
4. I am able to work…	52	0.31 ± 0.16	0.733	0.714
5. The pleasure I get out of sex is…	49	0.12 ± 0.26	0.764	0.705
6. The way I approach food is…	52	0.08 ± 0.29	0.432	0.848

Values are presented mean ± standard deviation.
Standardized Cronbach's alpha of MA II=0.7633.
MA-II, Moorehead-Ardelt quality of life questionnaire II.

Table 3. MA-II correlations with EQ-5D, OP-scale, and IWQoL-lite domains

Domains	MA II						
	Total	Self-esteem	Physical activities	Social life	Working conditions	Sexual activity	Food
EQ-5D	0.378*	0.387*	0.377*	0.235	0.193	0.336	–0.061
OP-scale	0.588**	0.523**	0.489**	0.457**	0.465**	0.465**	0.318
IWQoL-lite							
Total	0.623**	0.543**	0.585**	0.569**	0.567**	0.581**	0.149
Physical function	0.351	0.363*	0.380*	0.334	0.365*	0.357	0.037
Self-esteem	0.698**	0.633**	0.631**	0.571**	0.495**	0.554**	0.297*
Sexual life	0.539**	0.432*	0.425*	0.424*	0.453*	0.605**	0.094
Public distress	0.482**	0.468**	0.483**	0.533**	0.453**	0.424*	0.223
Work	0.555**	0.395*	0.509**	0.500**	0.485**	0.554**	0.152

Values are presented as Spearman correlation coefficients.
MA-II, Moorehead-Ardelt quality of life questionnaire II; EQ-5D, EuroQol-5 dimension; OP-scale, obesity-related problems scale; IWQoL-lite, impact of weight quality of life-lite.
*P < 0.01. **P < 0.001.

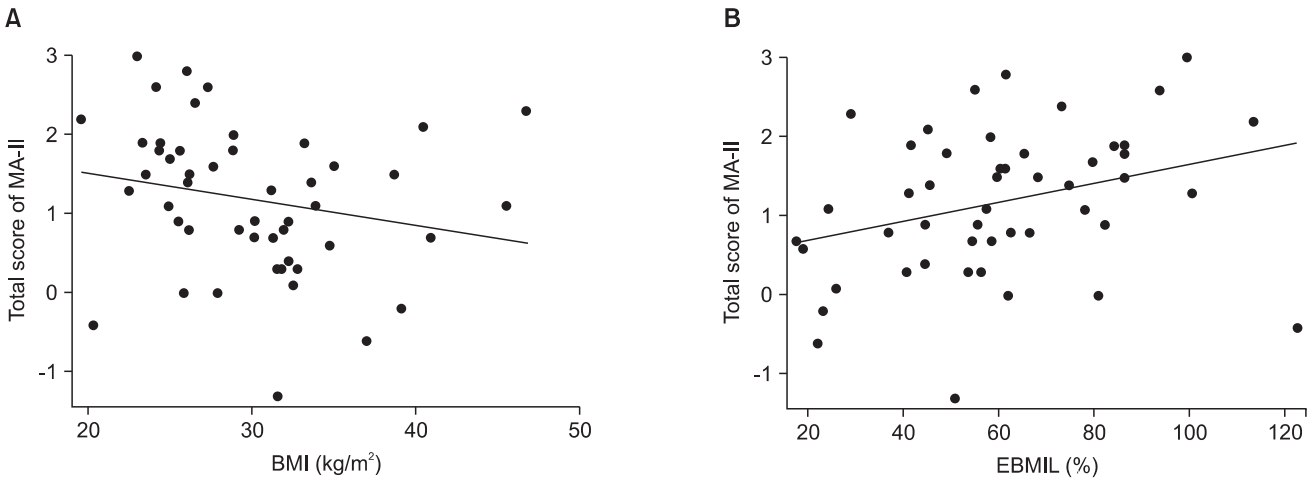

Fig. 1. Relationship between clinical outcomes and MA-II scale. (A) BMI and MA-II scale (r = −0.218, P = 0.023), (B) EBMIL and MA-II scale (r = 0.314, P = 0.009). MA-II, Moorehead-Ardelt quality of life questionnaire II; BMI, body mass index; EBMIL, excess body mass index loss.

Table 4. Factors associated with the MA-II

Variable	MA-II	P-value	Less than fair quality of life (≤1)	More than good quality of life (>1)
BMI at initial visit to the clinic (kg/m^2)		0.094		
<35	1.77 ± 0.95		2 ± 16.7	10 ± 83.3
35−39	1.02 ± 0.67		11 ± 55.0	9 ± 45.0
≥40	0.96 ± 1.05		8 ± 47.1	9 ± 52.9
BMI upon the time of questionnaire (kg//m^2)		0.012*		
<25	1.69 ± 0.93		1 ± 10.0	9 ± 90.0
≥25, <30	1.47 ± 0.85		5 ± 33.3	10 ± 66.7
≥30	0.79 ± 0.83		15 ± 62.5	9 ± 37.5
Follow up times to the clinic (year)		0.198		
≤1	0.62 ± 1.10		2 ± 50.0	2 ± 50.0
>1, ≤ 2	1.06 ± 0.89		13 ± 54.2	11 ± 45.8
>2	1.42 ± 0.92		6 ± 28.6	15 ± 71.4
Type of obesity surgery		0.001*		
Gastric banding	0.28 ± 0.59		8 ± 100.0	-
Gastric bypass	1.43 ± 0.95		7 ± 30.4	16 ± 69.6
Sleeve gastrectomy	1.27 ± 0.81		6 ± 33.3	12 ± 66.7
Percent of weight loss (%)		0.257		
<20	0.99 ± 0.91		10 ± 58.8	7 ± 41.2
≥20, <30	1.29 ± 0.95		8 ± 34.8	15 ± 65.2
≥30	1.27 ± 0.97		3 ± 33.3	6 ± 66.7
Percent of EBMIL (%)		0.025*		
<50	0.84 ± 0.85		9 ± 64.3	5 ± 35.7
≥50, <100	1.17 ± 0.91		11 ± 44.0	14 ± 56.0
≥100	1.69 ± 0.93		1 ± 10.0	9 ± 90.0

Values are presented mean ± standard deviation.
The Fisher exact test was performed in cases of each cell was less than 5%.
MA-II, Moorehead-Ardelt quality of life questionnaire II; BMI, body mass index; EBMIL, excess body mass index loss.
*P < 0.05.

There was a significant negative relationship between total MA-II score and present BMI ($\rho = -0.2176$, $P = 0.0233$), and the EBMIL and MA-II scores were significantly positively correlated ($\rho = 0.3140$, $P = 0.0092$) (Fig. 1).

In the subgroup analysis, factors that significantly affected the MA-II score were present BMI, type of surgery, and EBWIL (Table 4). The high MA-II score was related to higher EBMIL and lower BMI after the surgery. The patients with LRYGB had the highest MA-II score (mean, 1.43), followed by LSG (mean, 1.27) and LAGB (mean, 0.28).

DISCUSSION

In this study, the Korean version of MA-II proved its reliability with a Cronbach alpha of 0.7633 and was validated by comparing with the valid Korean version of QoL instruments [21-24].

To validate the Korean version of MA-II, we used the Korean versions of EQ-5D, OP-scale, and IWQoL-Lite. Overall correlation coefficients of those instruments with MA-II were statistically significant ($P < 0.01$). The correlation coefficients of disease-specific instruments (i.e., $\alpha = 0.6225$ in IWQoL-Lite and $\alpha = 0.5878$ in OP-scale) were higher than that of general instruments (i.e., $\alpha = 0.3782$ in EQ-5D). It suggested that the obesity-specific instruments, such as OP-scale and IWQoL-Lite, are more sensitive to evaluating QoL of morbidly obese patients.

The Cronbach alpha ranges from 0 to 1, and a value of 0.6 or less generally indicates unsatisfactory internal consistency or reliability. The coefficient is considered useful at a level of 0.70, and the coefficient of more than 0.8 is statistically stronger [25]. Thus Cronbach alpha of translated Korean MA-II was 0.7633 and satisfied the standard of reliability. This result was similar to previous studies [9-11]. In English version of USA, Czech, German, Italian, and Spanish version of European countries, and Taiwan version of Asia, all Cronbach alpha of MA-II were more than 0.7.

In reviewing the validation process of other studies, general QoL instruments were commonly used for validating MA-II. The English version of MA-II was compared with 36-Item Short-Form Health Survey (SF-36) of generic QoL instrument and Beck Depression Inventory (BDI-II) of depression diagnostic tool [10]. The correlation coefficient between MA-II and 7 of the 8 SF-36 were significant ($P < 0.01$) and the relationship between MA-II and BDI-II was statistically significant ($\rho = -0.317$, $P < 0.01$). In a survey of four European countries, MA-II were significantly correlated with EQ-5D ($r = 0.662$, $P < 0.01$) and Short Form-6 dimension ($r = 0.734$, $P < 0.01$) of generic instruments [11]. The Taiwan version of MA-II was significantly correlated with two major components of SF-36 ($\rho = 0.34-0.69$, $P < 0.01$) and all four domains of World Health Organization quality of life (WHOQoL)-BREF (WHOQoL-BREF, simplified version of WHOQoL) ($\rho = 0.44-0.64$, $P < 0.01$) [10].

Furthermore, we checked the correlations of subordinate dimensions. The MA-II was composed of 6 dimensions and IWQoL-Lite had five dimensions similar to those in Table 3. The MA-II total score significantly correlated with 4 dimensions of IWQoL-Lite except physical function. The physical function, self-esteem, sexual life, and public distress of IWQoL-Lite were highly correlated with physical activity ($\rho = 0.3798$, $P < 0.01$), self-esteem ($\rho = 0.6332$, $P < 0.001$), sexual activity ($\rho = 0.6054$, $P < 0.001$), and social life ($\rho = 0.5325$, $P < 0.001$) of MA-II. These results were showed that convergent validity of MA-II was proved. Because the discriminant validity was contrary concept of convergent validity, the discriminant validity was able to satisfy.

Contrary to other subordinate dimensions of MA-II, the Food dimension gave apparently contradictory results. The Cronbach alpha when the food dimension item was deleted was 0.8484, higher than the overall the standardized Cronbach alpha of Korean MA-II ($\alpha = 0.7633$). That means the MA-II Korean version has higher internal consistency when it is used without the item of food dimension in morbidly obese Korean. In addition, the food dimension score was not significantly correlated with total scores of EQ-5D, OP-scale, and IWQoL-Lite as shown in Table 3.

In practice, most of morbidly obese Korean patients suffered from severe public distress and did not prefer eating in public [26]. They even tend to report very small amount of food intake or humiliation about eating behavior. The item expression 'I live to eat' might provoke negative feeling to distressed patients. These attitudes might come from excessive social pressure to be lean, and obesity discrimination in Korea [27]. The question about food (Supplementary material, Q6) was added to the MA-II from modifying MA-I. Thus, if BAROS or MA-II were applied to morbidly obese Korean, the Q6 needs careful consideration. Further research about how MA-II would be modified for Koreans and how food attitudes differ by culture might be required.

Lastly, this study identified critical factors influencing the total scores of MA-II by subgroup analysis. The groups of lower BMI on questionnaire, higher EBMIL, and the surgery type with higher weight loss significantly increased MA-II scores. The BMI before surgery and follow-up time does not significantly correlate with the MA-II scores at present.

This study has several limitations. First, the survey was limited to the patients who underwent bariatric surgery. The MA-II was instrument of estimating QoL as part of BAROS, which is a comprehensive instrument, covering amount of weight loss, remission of comorbidities, complications related to surgery and QoL after bariatric surgery. The target population for MA-II might be patients who have already undergone or

awaiting bariatric surgery, but we did not test it for highly morbidly obese patients expecting surgery. Second, the eligible population was small in number (53 patients). In Korea, the number of morbidly obese patients was very few as 4% in total population and most of them were unwilling to reveal their obesity-related problems [28].

However, in spite of small sample size, this study was enough to reveal the QoL of bariatric patients and factors affecting their QoL. We could identify that final BMI was an important factor affecting QoL in bariatric patients. Except for the BMI on initial visit point, change of BMI and postoperative period were significant factors for QoL of bariatric patients. The patients who had a longer period after surgery and a higher change of BMI reported better QoL.

In conclusion, through the present study, we found that the Korean MA-II was a valid instrument for measuring the obesity-specific QoL in bariatric patients.

CONFLICTS OF INTEREST

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

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SUPPLEMENTARY MATERIAL

Supplementary material can be found via http://thesurgery.or.kr/src/sm/astr-87-256-s001.pdf. Supplementary material. Moorehead-Ardelt quality of life questionnaire II self esteem and activity levels _ Korean.

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