

The Validation of the Moorehead-Ardelt Quality of Life Questionnaire II

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Background: The Moorehead-Ardelt Quality of Life Questionnaire was originally developed as a disease-specific instrument to measure postoperative outcomes of self-perceived quality of life (QoL) in obese patients. 5 key areas were examined: self-esteem, physical well-being, social relationships, work, and sexuality. Each of these questions offered 5 possible answers, which were given + or - points according to a scoring key. The questionnaire was used independently or incorporated into the Bariatric Analysis and Reporting System (BAROS). The instrument is simple, unbiased, user-friendly and can be completed in <1 minute. It has been found useful, reliable and reproducible in numerous clinical trials in different countries. Further research and feedback from some of its users prompted refinements, now included in the Moorehead-Ardelt Quality of Life Questionnaire II (M-A QoLQII). This study tested the validity of the improved instrument.

Methods: The wording of the questions was changed, to make them less suggestive and allow for the use of the survey before and after medical intervention, and with control groups. A 6th question, analyzing eating behavior, was added. The ± 1 point given to the evaluation of self-esteem was split with this new question, thus maintaining the consistency of the scores. The drawings were simplified. Finally, the scoring key was changed to a 10-point Likert scale, to improve response-differentiation. To validate the M-A QoLQII, we examined its concordance with other health and well-being indicators, specifically the MOS 36-Item Short-Form Health Survey (SF-36), the Beck Depression Inventory-II (BDI-II) and the Stunkard and Messick Eating Inventory. The study population included 110 morbidly obese patients (20 males, 90

females, mean BMI=50), participants of gastric bypass support groups. Reliability of the M-A QoLQII was determined using Cronbach's alpha coefficient. Construct validity was measured by conducting a series of Spearman rank correlations.

Results: A Cronbach's alpha coefficient of 0.84 indicated satisfactory internal consistency. The M-A QoLQII was found to be significantly correlated ($P<0.01$) to 7 of the 8 SF-36 scales: Physical Role ($r=0.357$), Bodily Pain ($r=-0.486$), General Health ($r=0.413$), Vitality ($r=0.588$), Social Functioning ($r=0.517$), Emotional Role ($r=0.480$), and Mental Health ($r=0.489$). The questionnaire also significantly correlated ($P<0.01$) to the Beck Depression Inventory-II ($r=-0.317$), as well as to the 'Disinhibition' ($r=-0.307$) and 'Hunger' ($r=-0.254$) factors of the Stunkard and Messick Eating Inventory.

Conclusions: The M-A QoLQII correlates well with other widely used health and well-being indicators such as the SF-36, Beck Depression Inventory II and the Stunkard and Messick Eating Inventory. The study established the validity and reliability of this improved disease-specific instrument for QoL measurement in the obese population.

Key words: Quality of life, questionnaire, validation, SF-36, bariatric surgery, obesity, morbid obesity, outcome assessment, weight loss

Introduction

The original Moorehead-Ardelt Quality of Life Questionnaire (M-A QoLQ) was created to be part of the Bariatric Analysis and Reporting Outcome System (BAROS).¹ The BAROS was initially devel-

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oped by the senior author (HEO) in response to the 1991 National Institutes of Health (NIH) Consensus Conference Statement, which identified the lack of standards for comparison of outcomes in the surgical treatment of severe obesity as a key problem: "Better statistical reporting of surgical results is urgently needed for better assessment of outcomes". Furthermore, this panel stated, "Quality of life considerations in patients undergoing surgical treatment of obesity must be addressed . . .".²

The BAROS, shown in Figure 1, consists of a scoring table that includes three columns for the main areas of analysis: Weight Loss, Improvement of Medical Conditions and Quality of Life. Points are added or subtracted according to changes in these domains. A maximum of three points is given to each domain to evaluate changes after medical or surgical intervention. Points are deducted for complications or reoperations. The total number of points defines five outcome groups from 'failure' to 'excellent'. The original M-A QoLQ, seen in Figure 2, was designed on a single page, using simple drawings to offer answer options in each of five important quality of life (QoL) domains: self-esteem, physical activity, social life, work condi-

**MOOREHEAD-ARDELT: Quality of Life Questionnaire
Self Esteem and Activities Levels**

Please print form: Make a check to show how your life has changed after your weight loss.

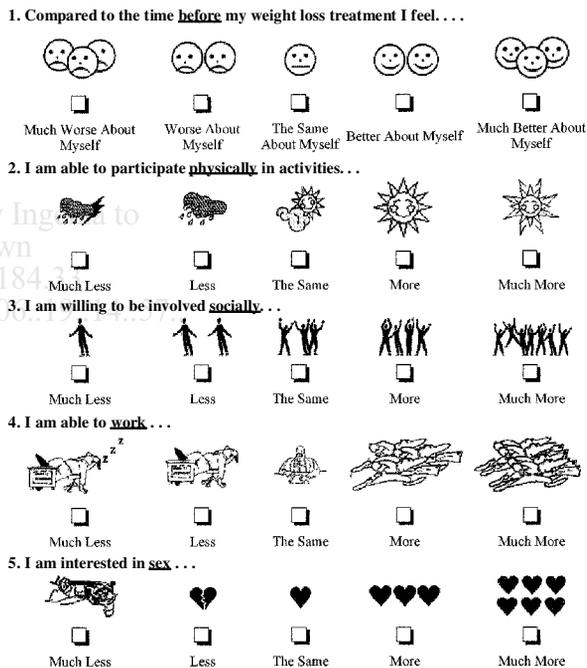


Figure 2. The original Moorehead-Ardelt Quality of Life Questionnaire.

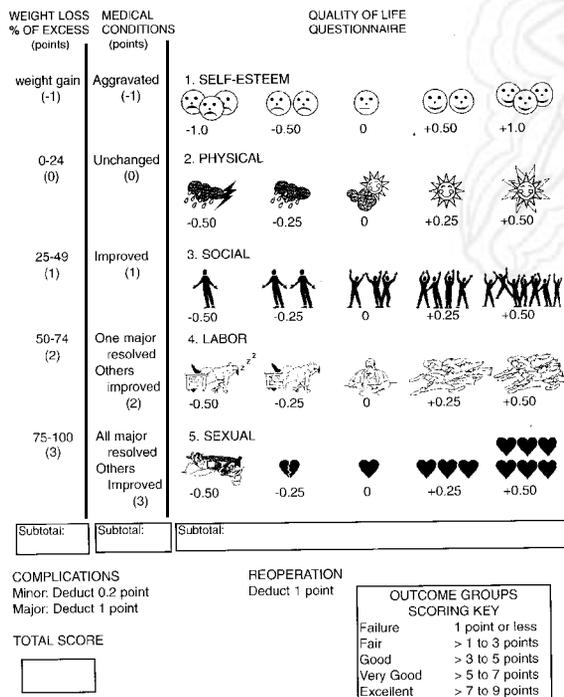


Figure 1. Bariatric Analysis and Reporting Outcome System (BAROS).¹

tions, and sexual activity. This questionnaire's scoring key is shown in Figure 3. Using a European-based study population, the questionnaire was found to be both valid and reliable.³

The BAROS has been used by surgeons in the U.S.A., as well as by many centers in Europe, Brazil, Canada, Mexico, and other countries. This outcome system has been adopted as a standard for reporting results in Austria, Germany and all German-speaking countries, as well as in Spain and Brazil. The BAROS has been found to be easy to use and effective in reporting standardized surgical outcomes.⁴⁻¹¹ Prestigious bariatric surgeons have recommended that the system be adopted as a standard for evaluation of outcomes in obesity surgery.¹²⁻¹⁴

In an attempt to remain open and responsive to suggestions made from members of the surgical community, the M-A QoLQ has been improved.¹⁵ The new questionnaire can now be used for pre, as well as for post-intervention assessment (see Appendix 1 at end, P. 691). It also allows for comparison with control groups. A question related to

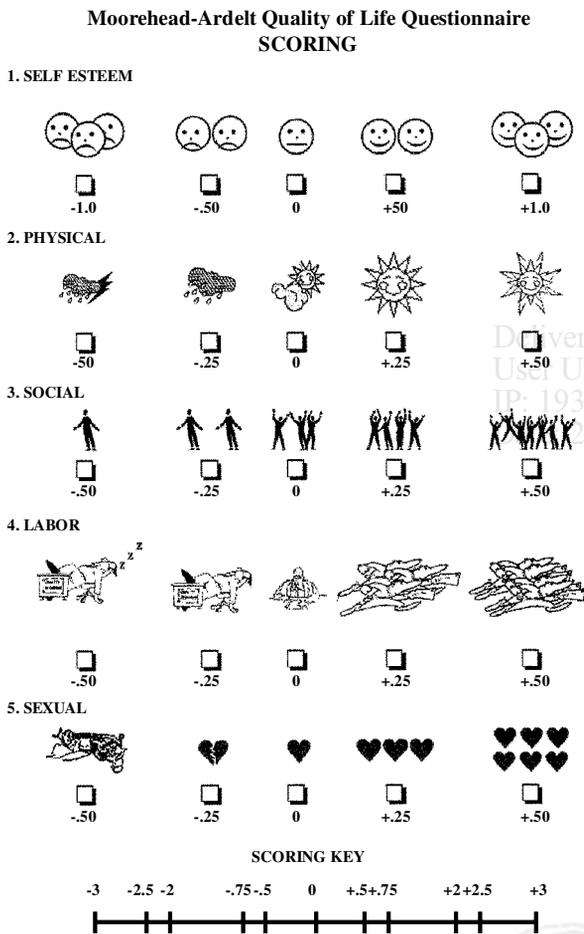


Figure 3. Scoring key for the original M-A QoLQ.

food perception was added. Hence, six items are now used for measuring a patient’s subjective impression of QoL in the areas of: 1) general self-esteem, 2) physical activity, 3) social contacts, 4) satisfaction concerning work, 5) pleasure related to sexuality, and 6) focus on eating behavior. The wording of the questions was also improved. This change was intended to make the questions less suggestive and reduce any tendency towards “socially desirable” responses. All the questions are now equally weighted and a 10-point Likert scale is used for scoring, as shown at end in Appendix 2, P. 692. This change makes the instrument more sensitive and improves response-differentiation. Lastly, some of the color-illustrated graphic symbols were changed to promote fewer “culture-sensitive” responses, minimizing the cross-cultural and linguistic factors that can influence the reliability of any instrument. The M-A QoLQII, like the original,

can be completed in less than 1 minute, a fact that contributes to a high response rate. Furthermore, it does not require a structured interview or any assisting or coaching. These points are particularly important, because one of the most serious problems in the field of bariatric surgery research is poor long-term follow-up data, even in the simple reporting of weight loss.¹⁶

To validate the M-A QoLQII, we examined its concordance with other widely-used health and well-being indicators, specifically the SF-36, the Beck Depression Inventory-II, and the Stunkard and Messick Eating Inventory.¹⁷⁻¹⁹ The study was undertaken to establish the construct validity of the new questionnaire. This means the degree to which an instrument measures the concepts that it purports to measure, and that the correlation with other tests which measure the same construct is high.

Methods

Study Population

The validation study was conducted in patients participating in gastric bypass support groups from two surgical practices in Fort Lauderdale, FL, USA. A total of 110 patients were included. All participants were either preparing for or were interested in bariatric surgery. The tests were administered on a monthly basis for a 6-month period following regularly scheduled support group meetings, as well as in the privacy of their surgeons’ offices, during office appointments. Demographics of the study participants are shown in Table 1.

Reliability

The reliability of the new instrument was determined by calculating the Cronbach’s alpha coefficient. This coefficient is considered useful at a level 0.70, but a coefficient of 0.80 is statistically stronger. The correlations are attenuated very little by measurement errors beyond this level. Comprehensive test-retest reliability studies were conducted in Austria by two of the authors (EA-G and HL). In these trials, the M-A QoLQII also demonstrated satisfactory reliability.

Table 1. Demographic data of the 110 patients, 20 males and 90 females

Variable	Mean	Range
Age (yrs)	42	19 to 65
Weight (kg)	139	95-328
BMI (kg/m ²)	50	32-92

Protocol

The research subjects were highly motivated to participate in the study. All respondents were guaranteed anonymity, and the participants were provided with the following explanation:

THANK YOU for participating in our International study helping to advance knowledge in the field of Bariatric Surgery Psychology. By honestly and openly answering the following questions, you will help us learn more about the life-threatening disease of morbid/super obesity. This new information will help us to better provide sensitive services to our patients and recommendations to their surgeons. We ask that you answer each and every question as it reflects your thoughts or feelings RIGHT NOW. Thank you for helping us give a voice to those who suffer from this debilitating disease. The more the people of the world understand about this medical condition, the less suffering others will have to endure.

Questionnaires Utilized

1) *The M-A QoLQII*. This questionnaire is a one-dimension-structure instrument that evaluates a patient's self-perception of QoL in six key areas. The tool was specifically designed for use with overweight, morbidly obese and super obese patient populations that are seeking medical or surgical intervention. As previously mentioned, the questionnaire is easy to understand and can be completed in less than 1 minute. It is user-friendly, easy to complete and score, cross-cultural and, like the original, has the added value of generating a high response rate.

2) *The Stunkard and Messick Eating Inventory* is an instrument used to help recognize and treat eating disorders. It assesses three dimensions of eating behavior: cognitive control of eating, disinhibition, and hunger. The Inventory consists of 51 questions and is designed to take approximately 15 minutes to administer.

3) *The Beck Depression Inventory-II (BDI-II)* con-

sists of 21 items and is the most widely used instrument for identifying depression. It uses depression criteria in line with the *Diagnostic and Statistical Manual of Mental Health Disorders - Fourth Edition (DSM-IV)*.²⁰

4) *The MOS 36-Item Short-Form Health Survey (SF-36)* was designed for use in clinical practice and research, health policy evaluations, and general population surveys. It is a multi-item scale that assesses eight health concepts: limitations in physical activities because of health problems, limitations in social activities because of physical or emotional problems, limitations in usual role activities because of physical health problems, bodily pain, general mental health (psychological distress and well-being), vitality (energy and fatigue) and general health perception. It has been widely-used for decades and is often considered in the U.S. to be the gold-standard to evaluate QoL by the medical community.²¹⁻²⁴

Statistical Analysis

Construct validity was measured by conducting a series of Spearman rank correlations, comparing the new questionnaire to the above-mentioned health and QoL instruments. Correlations between the test instruments were considered significant at $P < 0.01$.

Results

A Cronbach's alpha coefficient of 0.84 indicated satisfactory internal consistency and demonstrated the instrument's reliability. The intra-class correlations were between 0.54 and 0.69, a satisfactory level. Table 2 displays the concordance of the M-A QoLQII scores with the eight health concepts of the SF-36. Scores were highly and significantly ($P < 0.01$) correlated with seven of the eight health scales of the SF-36: limitations in social activities because of physical or emotional problems, limitations in usual role activities because of physical health problems, bodily pain, general mental health (psychological distress and well-being), vitality (energy and fatigue) and general health perception. No significant correlation was found, however, with the physical functioning scale of the SF-36.

The concordance of the questionnaire with other

Table 2. Correlation of the Moorehead-Ardelt Quality of Life Questionnaire II and the Short Form 36

SF-36 Scales	Spearman <i>r</i>
Social Function	0.517*
Emotional Role	0.480*
Mental Health	0.489*
Physical Functioning	0.023
Physical Role	0.357*
Bodily Pain	-0.486*
General Health	0.413*
Vitality	0.588*

**P*<0.01

health and QoL indicators, the Stunkard and Messick's Eating Inventory and the BDI-II, is reported in Table 3. The Eating Inventory demonstrated significant (*P*<0.01) negative correlations on two of the three factor scales, 'Disinhibition' and 'Hunger.' A non-significant correlation was found on the 'Cognitive Restraint' factor of the Eating Inventory. There was a significant negative correlation between the M-A QoLQII and the BDI-II, indicating that the greater the depression, the lower the individual's perceived QoL.

Discussion

The high Cronbach's alpha coefficient obtained in these tests proved the internal consistency and reliability of the questionnaire. The results of this study also showed construct validity between our instrument and the SF-36. This was demonstrated by significant correlations with seven of the eight SF-36

Table 3. Correlation of the MA QoLQII with the Stunkard and Messick Eating Inventory and the Beck Depression Inventory-II

Scale	Spearman <i>r</i>
Stunkard & Messick 'Disinhibition'	-0.307*
Stunkard & Messick 'Hunger'	-0.254*
Stunkard & Messick 'Cognitive Restraint'	0.173
Beck Depression Inventory-II	-0.317*

**P*<.01

scales. The 'physical functioning' concept was the only scale of the SF-36 that failed to correlate significantly. This failure may be explained by the difficulty in measuring physical functioning by paper and pencil testing. Furthermore, the M-A QoLQII is designed to measure the delight experienced when engaged in physical functions rather than the actual ability to function.

The SF-36 is a lengthy and generic health-related QoL measurement. Similar drawbacks exist with other surveys, such as the 112-item Gothenburg Quality of Life Scale.²⁵ Researchers have developed disease-specific instruments to better study particular pathologies or populations.²⁶⁻³⁰ One of these, the Impact of Weight on Quality of Life Questionnaire (IWQoL), is dedicated to the obese.³¹ However, this questionnaire includes many questions in different areas and is time-consuming. The M-A QoLQII, on the other hand, is a specially developed disease-specific instrument to study the obese population, independently or in conjunction with the BAROS. It is simple, concise, easy to understand and answer, and requires minimal time, human and material resources to complete. These benefits increase the response rate. The evaluation and scoring is simple, objective and short, reducing interviewer dependence and eliminating evaluator's bias. Therefore, the instrument is very cost-effective. Furthermore, the use of colored illustrations to assess the patient's perceived QoL in the six principal domains, makes the questionnaire user-friendly, fun to complete, and not culture-influenced. These are some of the reasons the questionnaire was rapidly accepted in different countries and cultures.

Significant correlations were also demonstrated with two of the three scales of the Stunkard and Messick's Eating Inventory, i.e. 'Disinhibition' and 'Hunger'. There was, however, no significant correlation between the QoL instrument and the 'Cognitive Restraint' factor of this inventory. QoL is an emotional variable and may have little to do with cognitive control. This lack of correlation with the 'Cognitive Restraint' item may be because of the fact that the M-A QoLQII is an instrument that measures "affect", or what one feels, rather than "cognition", or what one thinks. Further, this lack of correlation may also suggest that the 'Disinhibition' and 'Hunger' factors are the driving forces that promote inability to control eating behavior, thereby

lowering QoL. These findings may explain, in part, why non-surgical weight-loss programs based on behavioral modifications (i.e. cognitive control) are doomed to fail in the morbidly obese.

The Beck Depression Inventory-II demonstrated a very significant negative correlation to the M-A QoLQII. This statistically significant negative correlation helps explain what we already know in clinical work, that as a person loses control over their QoL, depression scores go up. We know from many studies presented at the American Society for Bariatric Surgery, that 90% or more of our morbidly obese patient population interested in bariatric surgery, present with depression. It would be useful to have a standardized tool for bariatric patients that measures the increase or decrease in QoL as depression scores rise or fall in preparation for or following medical/surgical interventions.

Conclusions

The results of this clinical investigation indicate that the M-A QoLQII correlates well with a longtime and widely-used QoL assessment instrument, the SF-36, and other health indicators such as the Beck Depression Inventory-II and the Stunkard and Messick Eating Inventory. We have established the internal consistency and reliability of the improved questionnaire and completed the validation process initiated in previous European research. While conducting this study, the simplicity, ease-of-use and cost-effectiveness of this disease-specific instrument for the evaluation of QoL outcomes in the obese population was again noticed. Finally, these results reasserted the wisdom of having incorporated the M-A QoLQ into the Bariatric Analysis and Reporting Outcome System (BAROS), the unique instrument for the objective and complete evaluation of outcomes in bariatric surgery.

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Appendix 1.

Moorehead-Ardelt Quality of Life Questionnaire II
Self Esteem and Activity Levels

Please make a check in the box provided to show your answer.

1. Usually I Feel...



Very Badly About
Myself

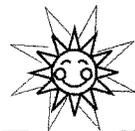


Very Good About
Myself

2. I Enjoy Physical Activities...



Not At All



Very Much

3. I Have Satisfactory Social Contacts...



None



Very Many

4. I Am Able to Work...



Not At All



Very Much

5. The Pleasure I get Out Of Sex Is...



Not At All



Very Much

6. The Way I Approach Food Is...



I Live to Eat



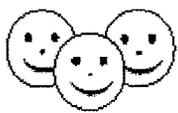
I Eat to Live

Appendix 2. The M-A QoLQII scoring key.

**Self Esteem and Activity Levels
SCORING KEY**

1. Usually I feel . . .

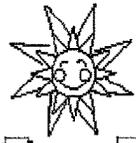




-0.50 -0.40 -0.30 -0.20 -0.10 +0.10 +0.20 +0.30 +0.40 +0.50

2. I Enjoy Physical Activities . . .





-0.50 -0.40 -0.30 -0.20 -0.10 +0.10 +0.20 +0.30 +0.40 +0.50

3. I Have Satisfactory Social Contacts . . .





-0.50 -0.40 -0.30 -0.20 -0.10 +0.10 +0.20 +0.30 +0.40 +0.50

4. I Am Able to Work . . .





-0.50 -0.40 -0.30 -0.20 -0.10 +0.10 +0.20 +0.30 +0.40 +0.50

5. The Pleasure I get Out of Sex Is . . .





-0.50 -0.40 -0.30 -0.20 -0.10 +0.10 +0.20 +0.30 +0.40 +0.50

6. The Way I Approach Food Is . . .





-0.50 -0.40 -0.30 -0.20 -0.10 +0.10 +0.20 +0.30 +0.40 +0.50

-3 to -2.1	-2 to -1.1	-1	0	1	1.1 to 2	2.1 to 3
Very Poor	Poor	Fair		Good		Very Good

Quality of Life