# Outcomes research in rhinoplasty: Body image and quality of life

Cemal Cingi, M.D.,[1] Murat Songu, M.D.,[2] and Cengiz Bal, M.D.[3]

## ABSTRACT

**Background:** *Although hundreds of quality-of-life (QOL) studies are available in the literature, very few were designed that include both a global and a procedure-specific evaluation of QOL and an inventory for the assessment of body image. The purpose of this study was to use condition-specific and global measures as well as psychological evaluations in a case series of rhinoplasties for a more comprehensive assessment of patient-reported outcomes.*

**Methods:** *Records of 225 patients aged 18–57 years who underwent rhinoplasty were prospectively included in the study. Study participants completed both a baseline questionnaire before the rhinoplasty operation and a postsurgical patient questionnaire 12 months after the operation, including the European QOL Questionnaire (EQ), Rhinoplasty Outcomes Evaluation Questionnaire (ROE), and the Multidimensional Body–Self Relations Questionnaire (MBSRQ).*

**Results:** *Mean values corresponding to the EQ VAS results except for discomfort and anxiety domains increased after treatment compared with baseline. Both male and female patients experienced significant improvement in ROE scores, with larger differences between pre- and postoperative ROE scores in male patients compared with female patients. The analyses of variance in the MBSRQ results revealed significant postsurgical improvements on the appearance orientation subscale.*

**Conclusion:** *The development, standardization, and use of validated procedure-specific QOL tools are essential components for accurately measuring patient-reported outcomes of facial plastic surgery procedures. To measure patient satisfaction in a more objective and standardized manner, specific questionnaires or instruments should be used that can determine the QOL changes associated with each procedure of interest.*

The assessment of outcomes in esthetic surgery is especially pertinent because patient satisfaction is the predominant factor in determining success. However, the majority of results are subjective based on the patient or the surgeon's own personal assessment of outcome. For this reason, quantifying and measuring these results is of particular importance.

An increased awareness exists about the impact of health and health care on the quality of human life. Positive themes of happiness and social and emotional well-being need to be measured because these variables are particularly relevant to esthetic surgery. Various health-related QOL (HRQOL) instruments, as well as generic and disease-specific, have been applied to various studies.[1] A recommendation was made by Guyatt *et al.* to include both a generic and a disease-specific instrument in the evaluation of medical interventions.[2] Furthermore, the psychological or psychiatric assessment of a patient is a traditional outcome measurement and should be a part of outcome research. In fact, the majority of outcome measures that have been used in cosmetic surgery are psychological in nature.

Although hundreds of quality of life (QOL) studies are available in the literature, very few were designed that include both a global and a procedure-specific evaluation of QOL and an inventory for the assessment of body image. Global surveys assess general states of well-being and provide a subjective measure of treatment efficacy. They have high comparative value for unrelated diseases and are generalizable between studies. These help establish the relative priority of a procedure, especially when determining cost-effectiveness in an era of limited resources. Procedure-specific surveys focus on elements associated with particular disease processes and treatment effects. This increases the sensitivity to trends and outcomes of the condition being studied. The survey questions are geared toward expected trends in the study of a particular condition and are more focused in their scope than global instruments. In the study of QOL issues, the use of a combination of global and procedure-specific instruments has been advocated.

There are presently very few means of evaluating patient outcome postrhinoplasty by using a combination of global and procedure-specific evaluations of QOL and psychological assessment of a patient. This particular investigation uses a large sample size and standardized outcome measures in an effort to achieve this goal. Here, we used procedure-specific and global measures, as well as psychological evaluations, in a case series of rhinoplasties for a more comprehensive assessment of patient-reported outcomes.

## METHODS

### Study Design

A case series with planned data collection of 225 procedures was analyzed. Approval from the local ethical committee was obtained (approval no. 962008) and completion of the questionnaire was considered to imply an informed consent. The study was performed in accordance with the guidelines of the Helsinki Declaration of Human Studies. Rhinoplasty was applied to 268 adult patients between February 2006 and April 2009. Of these, 43 patients were lost to follow-up because they moved to other cities or did not answer the phone despite numerous attempts. A prospectively planned data collection of 225 patients who had a follow-up period longer than 12 months after rhinoplasty was evaluated in the study. All procedures were performed by the senior otorhinolaryngologist (C.C.). Study participants completed both a baseline questionnaire before the rhinoplasty operation and a postsurgical patient questionnaire 12 months after the operation, including the European QOL Questionnaire (EQ), the Rhinoplasty Outcomes Evaluation Questionnaire (ROE), and the Multidimensional Body–Self Relations Questionnaire (MBSRQ). Compared with global measures, the primary advantage of procedure-specific measures is that they are usually found to be more responsive to treatment-related change. Because of their greater responsiveness to change, procedure-specific instruments may be more likely to detect differences between treatment groups in clinical trials. An

*From the [1]Department of Otorhinolaryngology, Eskisehir Osmangazi University Medical Faculty, Eskisehir, [2]Department of Otorhinolaryngology, Izmir Ataturk Research and Training Hospital, Izmir, and [3]Department of Biostatistics, Eskisehir Osmangazi University Medical Faculty, Eskisehir, Turkey*
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*Address correspondence and reprint requests to Cemal Cingi, M.D., Department of Otorhinolaryngology, Eskisehir Osmangazi University Medical Faculty, Eskisehir, 26020, Turkey*
*E-mail address: ccingi@ogu.edu.tr*

## Table 1  EQ-5D (U.K. English version)—By placing a tick in one box in each group, please indicate which statements best describe your own health state today

1. Mobility
   I have no problems in walking about ☐
   I have some problems in walking about ☐
   I am confined to bed ☐
2. Self-Care
   I have no problems with self-care ☐
   I have some problems washing or dressing myself ☐
   I am unable to wash or dress myself ☐
3. Usual Activities (*e.g.*, work, study, housework, family, or leisure activities)
   I have no problems with performing my usual activities ☐
   I have some problems with performing my usual activities ☐
   I am unable to perform my usual activities ☐
4. Pain/Discomfort
   I have no pain or discomfort ☐
   I have moderate pain or discomfort ☐
   I have extreme pain or discomfort ☐
5. Anxiety/Depression
   I am not anxious or depressed ☐
   I am moderately anxious or depressed ☐
   I am extremely anxious or depressed ☐

*EQ-5D = European Quality-of-Life Questionnaire–Five Dimensions.*

advantage of global measures is that they can be used to compare among various populations, make comparisons with the general population, and estimate the relative impact of various medical conditions or treatments. Global measures also tend to correlate well with procedure-specific measures. Most importantly, global measures are distinct from procedure-specific measures in that they usually assess impact of disease and treatment on overall functioning or a broader range of health domains. Because generic and procedure-specific measures have different strengths and are conceptually distinct, it is often recommended to administer both types of instruments as part of a complete outcomes assessment in clinical trials. The psychological or psychiatric assessment of a patient is a traditional outcome measurement and also should be a part of outcome research. In fact, the majority of outcome measures that have been used in cosmetic surgery are psychological in nature. For a QOL instrument to be a valuable measure of what is intended, it must be reliable and valid. All instruments used in our study are validated reliable.

## European Quality-of-Life Questionnaire

The EQ-Five Dimensions (EQ-5D) is a simple and standardized measure of HRQOL, which consists of the EQ-5D descriptive system and the EQ visual analog scale (EQ-VAS).[3] The EQ-5D descriptive system comprises the following five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension has three levels: no problems, some problems, and severe problems. The respondent is asked to indicate his/her health state against the most appropriate statement in each of the five dimensions (Table 1). This decision results in a one-digit number expressing the level selected for that dimension. The digits for five dimensions can be combined in a five-digit number describing the respondent's health state. Note that the numerals 1–3 have no arithmetic properties and should not be used as a cardinal score. The EQ-VAS records the respondent's self-rated health on a vertical VAS, whereby the end points are labeled "best imaginable health state" and "worst imaginable health state." This information can be used as a quantitative measure of health outcome as judged by the individual respondents.

## Rhinoplasty Outcomes Evaluation Questionnaire

This instrument comprises a total of six questions regarding the physical, emotional, and social fields.[4,5] The ROE asks patients to assess the appearance and function of their nose, emotional confidence, and desire for change, as well as the manner in which their nasal appearance influences their personal, social, and professional life (Table 2). Each of the six items is scored on a 0–4 scale, with 0 representing the most negative response and 4 the most positive response. Dividing the total score for each instrument by 24 and multiplying by 100 yields the scaled instrument score. This range is 0–100, with 0 representing the least and 100 the most patient satisfaction.

## Multidimensional Body–Self Relations Questionnaire

MBSRQ is a well-validated self-report inventory for the assessment of body image.[6] Body image is conceived as one's attitudinal dispositions toward the physical self, which include evaluative, cognitive, and behavioral components. The physical self encompasses not only one's physical appearance but also the body's competence (or fitness) and its biological integrity (or health/illness). The MBSRQ is a 69-item self-reported inventory for assessing self-attitudinal aspects of the body image construct. Two forms of the MBSRQ are available, the full version and the MBSRQ-Appearance Scales.

The full 69-item version consists of seven factor subscales: (1) appearance evaluation, (2) appearance orientation, (3) fitness evaluation, (4) fitness orientation, (5) health evaluation, (6) health orientation, and (7) illness orientation. Three multi-item subscales exist: (1) the body areas satisfaction scale, (2) the overweight preoccupation scales, and (3) the self-classified weight scale. In this study, a scoring of The Appearance Evaluation Subscale (AES) was performed. AES is a seven-item scale that measures feelings of physical attractiveness or unattractiveness and satisfaction or dissatisfaction with one's looks (Table 3). The other scales were not specifically evaluated because they had to do with health evaluation, illness orientation, and weight preoccupation. AES assesses satisfaction with the body as a whole, rather than on a part-by-part basis. Respondents rate their levels of agreement with the statements on a five-point Likert scale, ranging from definitely disagree (1) to definitely agree (5). Scores vary from 1 to 5, yielding a total score that ranges from 7 to 35. A high score indicates emphasis on one's looks, attention to one's appearance, and engaging in extensive grooming behaviors. A low score indicates apathy about one's appearance, that one's looks are not especially important and not expending much effort to "look good." Low scorers have a general unhappiness with their physical appearance whereas the high scorers feel mostly positive and satisfied with their appearance.

## Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences 17.0 for Windows (SPSS, Inc., Chicago, IL). The Shapiro-Wilk's test was used to test the normality assumption. Frequency tables, Wilcoxon $t$-test, and homogeneity test were used to analyze data. Pearson's $r$ value and the Spearman rank-correlation coefficients were analyzed. Values were expressed as means ($\pm$SD). Statistical significance was accepted for values of $p < 0.05$.

## RESULTS

Of the 268 patients included in this study, 225 (168 female and 57 male patients) answered the questionnaire (age range, 18–57 years; mean, 29.79 $\pm$ 9.46 years). Geographical concentration regarding location of residence of the group was 189 (84%) in urban and 36 (16%) in rural areas. The mean duration between the evaluation of satisfaction by questionnaires and rhinoplasty was 28 months (range, 12–48 months). The reason to undergo rhinoplasty was esthetic in

**Table 2** Rhinoplasty Outcomes Evaluation Questionnaire—Please circle the number that best characterizes your current opinion regarding the following questions

1. How well do you like the appearance of your nose?

| Not at all | Somewhat | Moderately | Very much | Completely |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

2. How well are you able to breathe through your nose?

| Not at all | Somewhat | Moderately | Very much | Completely |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

3. How much do you feel your friends and loved one like your nose?

| Not at all | Somewhat | Moderately | Very much | Completely |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

4. Do you think your current nasal appearance limits your social or professional activities?

| Not at all | Somewhat | Moderately | Very much | Completely |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

5. How confident are you that your nasal appearance is the best that it can be?

| Not at all | Somewhat | Moderately | Very much | Completely |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

6. Would you like to surgically alter the appearance or function of your nose?

| Not at all | Somewhat | Moderately | Very much | Completely |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

**Table 3** Multidimensional Body-Self Relations Questionnaire Appearance Scales—You are asked to indicate the extent to which each statement pertains to you personally. Read each statement carefully and decide how much it pertains to you personally. Using the scale below, indicate your answer by entering it to the left of the number of the statement

1: Definitely disagree
2: Mostly disagree
3: Neither agree nor disagree
4: Mostly agree
5: Definitely agree
__1. My body is sexually appealing.
__2. I like my looks just the way they are.
__3. Most people would consider me good-looking.
__4. I like the way I look without my clothes.
__5. I like the way my clothes fit me.
__6. I dislike my physique.
__7. I am physically unattractive.

15% and a combination of both esthetic and functional in 85% of patients. No differences were found in questionnaires by demographic characteristics: men and women reported the same preference-based score at baseline.

Mean values corresponding to the EQ-VAS score increased after treatment compared with baseline. Mean values corresponding to discomfort and anxiety domains showed a significant decrease after treatment (Table 4). Differences in mobility, self-care, and usual activities subscales did not reveal difference before and after the surgical procedure. Using the ROE questionnaire, a general and significant improvement of the mean ROE score by rhinoplasty increased from 19.71 to 75.33% (Table 5). Our average increase in patient satisfaction was 55.62%. Both male and female patients experienced improvement in ROE scores, with larger differences between pre- and postoperative ROE scores in male patients compared with female patients. The analyses of variance for the MBSRQ revealed postsurgical improvements on the Appearance Orientation Subscale (Table 6).

## DISCUSSION

Although interest has been increasing in QOL outcomes in medicine, outcomes research activity in facial plastic surgery has been minimal in recent years.[7,8] This lack of research is because of fact that outcomes are often based on subjective impressions of the patient, which can span multiple psychosocial and physical domains, making patient-reported outcome measures especially relevant.

Over the past 10 years, multidimensional HRQOL scales, which can be either disease specific or more global, have become the gold standard for outcome measure. Disease-specific tools are typically more sensitive to the impact of treatment on health status and will allow meaningful comparisons between patients and treatments. However, disease-specific tools do not allow comparisons across disease states, which can be important if the overall impact of a particular procedure is the question under study. Therefore, use of both procedure-specific and global evaluation tools can be useful in some cases to take advantage of the benefits of both types of tools.[9]

The advantage of using a global scale is the ability to compare the burden of disease or condition using some type of quantitative measure. The EQ-5D is a reliable, widely used, and appropriately validated global QOL tool that has been used to assess a sample of cosmetic surgery patients.[10] The EQ-5D is a standardized measure of health status developed to provide a simple measure of HRQOL.[3] Applicable to a wide range of health conditions and treatments, it provides a simple descriptive profile and a single index value for health status that can be used in the clinical evaluation of health care as well as in population health surveys. It is cognitively undemanding, taking only a few minutes to complete. Ching et al. reviewed the literature to identify the appropriate tools to assess outcomes in esthetic surgery based on a critical evaluation of the feasibility, validity, reliability, and sensitivity to change of these measures.[10] The authors identified QOL measures to be of the greatest value in determining esthetic surgery outcomes, recommending the use of the Derriford Scale, the Health Utilities Index, or the EQ-5D in assessing QOL measures.[10] In our study, the EQ-VAS score increased significantly after treatment compared with baseline. Mean values corresponding to discomfort and anxiety domains showed a statistically significant decrease whereas subscales of mobility, self-care, and usual activities did not reveal a significant difference before and after the surgery.

The advantage of using a condition-specific scale relates to its potential sensitivity, precision, and responsiveness to clinical intervention. To measure disease-specific outcomes, one must first identify the main features that comprise satisfaction for the treatment modality of interest and affect the patient's QOL. Acceptance by friends and family, the manner in which the individual's appearance affects his/her social or

**Table 4   EQ-5D**

| | Preoperative (mean ± SD) (95% CI for mean) | Postoperative (mean ± SD) (95% CI for mean) | p Value |
|---|---|---|---|
| VAS | 4.82 ± 0.81 (4.71–4.93) | 8.04 ± 1.13 (7.89–8.19) | <0.01* |
| Mobility | 1.00 ± (–) | 1.00 ± (–) | 1.000 |
| Self-care | 1.28 ± 0.44 (1.22–1.34) | 1.20 ± 0.39 (1.14–1.25) | 0.99 |
| Usual activities | 1.14 ± 0.34 (1.09–1.18) | 1.00 ± 0.00 | 0.995 |
| Pain/discomfort | 2.34 ± 0.49 (2.28–2.41) | 1.40 ± 0.59 (1.32–1.48) | <0.01* |
| Anxiety/depression | 2.64 ± 0.48 (2.58–2.70) | 1.33 ± 0.70 (1.24–1.43) | <0.01* |

*Statistically significant.*
*EQ-5D = European Quality of Life Questionnaire–Five Dimensions; VAS = visual analogue scale.*

**Table 5   Rhinoplasty Outcomes Evaluation Questionnaire**

| | Preoperative (mean ± SD) (95% CI for mean) | Postoperative (mean ± SD) (95% CI for mean) | p Value |
|---|---|---|---|
| Appearance | 0.38 ± 0.50 (0.31–0.44) | 3.19 ± 0.91 (3.07–3.31) | <0.01* |
| Function | 1.62 ± 0.93 (1.49–1.74) | 3.22 ± 0.77 (3.12–3.32) | <0.01* |
| Personal life | 0.46 ± 0.51 (0.40–0.53) | 3.17 ± 0.84 (3.05–3.28) | <0.01* |
| Social and professional life | 1.47 ± 0.64 (1.38–1.55) | 2.55 ± 0.92 (2.43–2.68) | <0.01* |
| Emotional confidence | 0.59 ± 0.54 (0.52–0.66) | 3.17 ± 0.88 (3.06–3.29) | <0.01* |
| Desire for change | 0.21 ± 0.40 (0.15–0.26) | 2.78 ± 1.22 (2.62–2.94) | <0.01* |

*Statistically significant.*

**Table 6   Multidimensional Body–Self Relations Questionnaire Appearance Evaluation Subscale**

| | Preoperative (mean ± SD) (95% CI for mean) | Postoperative (mean ± SD) (95% CI for mean) | p Value |
|---|---|---|---|
| My body is sexually appealing | 1.52 ± 0.55 (1.45–1.59) | 4.19 ± 0.76 (4.09–4.29) | <0.01* |
| I like my looks | 2.39 ± 0.97 (2.26–2.52) | 4.10 ± 0.88 (3.99–4.21) | <0.01* |
| People consider me good-looking | 1.52 ± 0.55 (1.45–1.59) | 4.13 ± 0.89 (4.01–4.25) | <0.01* |
| I like the way I look without my clothes | 2.88 ± 0.86 (2.77–2.99) | 4.17 ± 0.75 (4.07–4.27) | <0.01* |
| I like the way my clothes fit me | 1.57 ± 0.53 (1.50–1.64) | 4.11 ± 0.82 (4.00–4.22) | <0.01* |
| I dislike my physique | 2.55 ± 0.64 (2.47–2.63) | 3.53 ± 0.91 (3.41–3.65) | <0.01* |
| I am physically unattractive | 1.71 ± 0.55 (1.64–1.78) | 4.11 ± 0.86 (4.00–4.22) | <0.01* |

*Statistically significant.*

professional life, and common emotional qualities are important components of the patient's QOL, exceeding the satisfaction with the procedure. In addition, very specific physical factors exist that contribute to the assessment of each individual treatment outcome, such as nasal airway functioning. An assessment of patient-related QOL should include all of these components of physical, emotional, and social functioning and reflect the satisfaction of the individual subject.[4,11,12] Alsarraf *et al.* developed and validated a questionnaire for the quantitative outcome measurement of rhinoplasty—the ROE.[7,13] The ROE was found to have excellent test–retest reliability and internal consistency scores, as well as the responsiveness to accurately measure change after surgical interventions. The test–retest reliability coefficient was 0.83, generally recommended for adequate instrument reliability and internal consistency in QOL evaluation.[4] This sort of reliability and validity testing is essential before the use of any such outcomes evaluation in a prospective clinical trial. In a case series of 26 patients, Alsarraf *et al.* found an average increase in patient satisfaction after surgery of 44.5, from a mean preoperative score of 38.8 to a postoperative score of 83.3.[13] Our average preoperative score was significantly lower (19.71), whereas our average increase in patient satisfaction was higher (55.62). The difference with regard to our preoperative scores is explained by our number of patients with associated functional requests. The case series of Alsarraf *et al.* seems to have included mainly purely cosmetic patients.[13] The difference

with regard to the average increase in patient satisfaction probably can be explained by the experience curve of the senior author, which exceeds 20 years for rhinoplasty.

The psychological or psychiatric assessment of a patient is a traditional outcome measure and should be a part of the outcomes research. In fact, the majority of outcomes measures that have been used in cosmetic surgery are psychological in nature. A change in body image, whether positive or negative, is a critical outcome measurement after rhinoplasty. Body image was measured using the AES of the MBSRQ, which was normalized for both men and women. In our understanding of psychological responses to esthetic surgery procedures, for patients to expect positive postoperative changes in body image is reasonable. We also believe, however, that expecting consistent postoperative changes in general psychological functioning may be setting surgical expectations too high, although we currently do not have the data to document this contention. We believe that in the future, evaluating body image and other changes prospectively in patients undergoing cosmetic and reconstructive surgery procedures will also be important.

This study has certain limitations. The power of our study is limited by the age group (18–57 years old). Another limitation is that the outcomes were evaluated only by means of subjective parameters. Objective assessments were arbitrarily assigned to instruments that could directly quantify the physical changes resulting from cosmetic surgery. Mishima

*et al.* used computer-assisted, three-dimensional anthropometric measurements to analyze the nasal form.[14] Validity of these measurements revealed that although they are specific and accurate because of their objective nature, whether these measurements are correlated with beneficial patient outcomes was not confirmed. Also, the reliability of the outcome assessments in this category is controversial.

## CONCLUSIONS

In summary, we believe that outcomes research can play an important role in both the present and the future of facial plastic and reconstructive surgery. The development, standardization, and use of validated procedure-specific QOL instruments are essential components of the accurate measurement of patient-related outcomes of facial plastic surgery procedures. To measure patient satisfaction in a more objective and standardized manner, specific questionnaires or tools should be used that can extract the QOL changes associated with each procedure of interest. Because generic and procedure-specific measures have different strengths and are conceptually distinct, we recommended administering both types of instruments as part of a complete outcomes assessment in clinical trials. Furthermore, the psychological assessment of a patient also should be a part of outcome research.

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