



Evaluation of the relationship between patient expectation, patient expectation coverage rates and patient satisfaction in open primary septorhinoplasty surgery: a prospective randomized study

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Abstract

Purpose The aim of this study was to evaluate the relationship between preoperative patient expectation and postoperative patient expectation coverage rates and patient satisfaction.

Methods 183 patients who underwent SRP for various reasons were divided into 6 groups according to surgical indication and the postoperative Rhinoplasty Outcome Evaluation Scale (ROE). The groups were evaluated in terms of preoperative expectation levels and postoperative expectation coverage rate.

Results When the patients were evaluated in terms of preoperative expectation levels, a significant difference was determined between the patients who underwent surgery for cosmetic reasons (86.15 ± 8.61) and those with functional reasons (79.24 ± 6.62) ($p < 0.001$). Similarly, the lowest patient expectation coverage rates were in the patient group with cosmetic reasons for the operation. When patients were grouped according to the ROE scores in the postoperative period and surgical indication, expectation was higher in the groups that were not satisfied with the results (Groups 2, 4 and 6). The highest expectation levels among the groups were seen in the dissatisfied patients who had undergone surgery for cosmetic reasons (92.17 ± 4.96). A strong positive correlation was found between expectation coverage rates and patient satisfaction ($r 0.907$, $p < 0.001$).

Conclusion Determination and rationalization of the expectations of patients in the preoperative period is one of the factors that will increase the satisfaction of the patients about the surgical procedure.

Keywords Septorhinoplasty · Outcome evaluation questionnaire · Patient satisfaction

Introduction

The main purpose of septorhinoplasty (SRP) surgery, which is one of the most frequent aesthetic operations worldwide, is to achieve a functional and clear nose, which is compatible with facial features, while providing the functional opening of the nasal airway [1, 2]. The success of the SRP procedure may have different meanings for the surgeon and the patient. An operation in which surgical functional results are obtained may not be sufficient for patient satisfaction [3].

Therefore, it is important for the surgeon to understand the patient's expectations from the operation and to individualize the treatment by considering the conditions, such as race, gender and regional ethnic preferences. Even if all these situations are taken into consideration, the desired results may not be obtained for the patient [4, 5].

Although factors affecting patient satisfaction have been evaluated in the literature [6–9], with objective data such as nasal airway resistance and/or tomographic examinations [2], or with various subjective quality of life assessment scales [6–10], the prediction of patient satisfaction in the preoperative period remains one of the mysteries of aesthetic surgery [11, 12].

In studies conducted on patient expectation, it has been reported that especially body dysmorphic syndrome (BDS) is associated with high expectations, unnecessary surgery requests and low satisfaction levels with surgical results [11–14].

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The aim of this study was to evaluate the relationship between preoperative high patient expectation and postoperative expectation coverage rates and patient satisfaction.

Patients and methods

Approval for the study was granted by the Clinical Researches Ethics Committee (decision no: 109, dated: 04.09.2018). Primary septorhinoplasty was performed for functional, cosmetic or functional + cosmetic reasons for 198 patients over the age of 18 years by a single surgeon between 01.03.2019 and 30.11.2019 in the ENT department of a university hospital. All patients were subjected to psychiatric evaluation in the preoperative period, and patients with psychosomatic problems such as body dysmorphic syndrome and whose surgical request was inappropriate were not operated on. After excluding 11 patients who refused to participate in the study and 4 patients who did not attend follow-up rhinomanometric examination, this prospective study included 183 patients. All the procedures were applied in accordance with the principles of the Helsinki Declaration. Written informed consent was obtained from all patients prior to the procedure. While rhinomanometric examination was used to evaluate objective functional results before and after the operation, the subjective functional state of the nose was evaluated with the Nasal Obstruction Symptoms Evaluation (NOSE) scale [9] and the subjective aesthetic condition with the Rhinoplasty Outcome Assessment (ROE) scale [7]. The criteria for inclusion and exclusion are stated below.

The patients included were aged > 18 years, participated voluntarily, had no psychiatric problems, were determined with or without functional nasal obstruction (e.g. concha hypertrophy), with symptomatic septal deviation and were undergoing primary surgery.

Patients were excluded from the study if they were aged < 18 years, were not willing to participate in the study, had a traumatic facial bone fracture, congenital facial anomaly, psychiatric disorder, the presence of nasal obstruction such as choanal atresia, tumors (e.g. polyp), or were undergoing revision surgery.

Septorhinoplasty with the open technique was applied to all the patients included in the study. The patients were divided into three groups according to surgical indication (functional (Group F, $n = 58$), cosmetic (Group C, $n = 64$) and functional + cosmetic (Group F + C, $n = 61$) for homogenization of the results. Then, according to the postoperative ROE values, these three groups were sub-divided into six groups with a total of ROE < 12 or ROE \geq 12 according to the preoperative ROE value to evaluate patient satisfaction.

Groups:

Group 1 [Functional Satisfied Group, ROE \geq 12 ($n = 47$)],

Group 2 [Functional Dissatisfied Group, ROE < 12 ($n = 11$)],

Group 3 [Cosmetic Satisfied Group, ROE \geq 12 ($n = 36$)],

Group 4 [Cosmetic Dissatisfied Group, ROE < 12 ($n = 28$)],

Group 5 [Functional + cosmetic Satisfied Group, ROE \geq 12 ($n = 46$)],

Group 6 [Functional + cosmetic Dissatisfied Group, ROE < 12 ($n = 15$)].

The flow diagram of patient inclusion, exclusion and group formations is shown in Fig. 1.

Surgical technique

The surgical procedure was performed under general anaesthesia for all the patients. In the study, specific conditions such as the presence of posterior septal deformity, the severity of external deformity, presence of posterior septal deformity, and the need for graft or tip plasty were taken into consideration in the selection of surgical method in the preoperative period. Intervention was not made to any patient for experimental purposes. Although septorhinoplasty is also performed with the closed technique or modified methods in our clinic, only patients operated on with the open technique were evaluated in this study. This was primarily to keep the number of variables that can affect patient satisfaction constantly. Therefore, despite the surgical team in our clinic, the operations of all the patients in this study were performed by a single surgeon (MA). The surgical method applied was similar to that described by Başer et al. [2].

Due to the ethnic characteristics of the patients, a humpectomy was applied to more than half of the patients ($n = 114$, 62.3%) because of an aquiline nose structure. Tip plasty was applied to only 22 (12.0%) patients.

Objective functional analysis with rhinomanometry

The measurements were made with an SRE2100 device (Rhinometrics A/S, Lyngø, Denmark), which produces an acoustic signal in the form of intermittent pulses, in accordance with the criteria set and recommended by the Acoustic Rhinometry Standardization Committee [15]. The cross-sectional areas, distances and volume measurements of the nasal cavity obtained from the measurement curves were determined with the 2.6 version of Rhinoscan program (Rhinometrics A/S, Lyngø, Denmark). The value of the average curve obtained from these three curves was

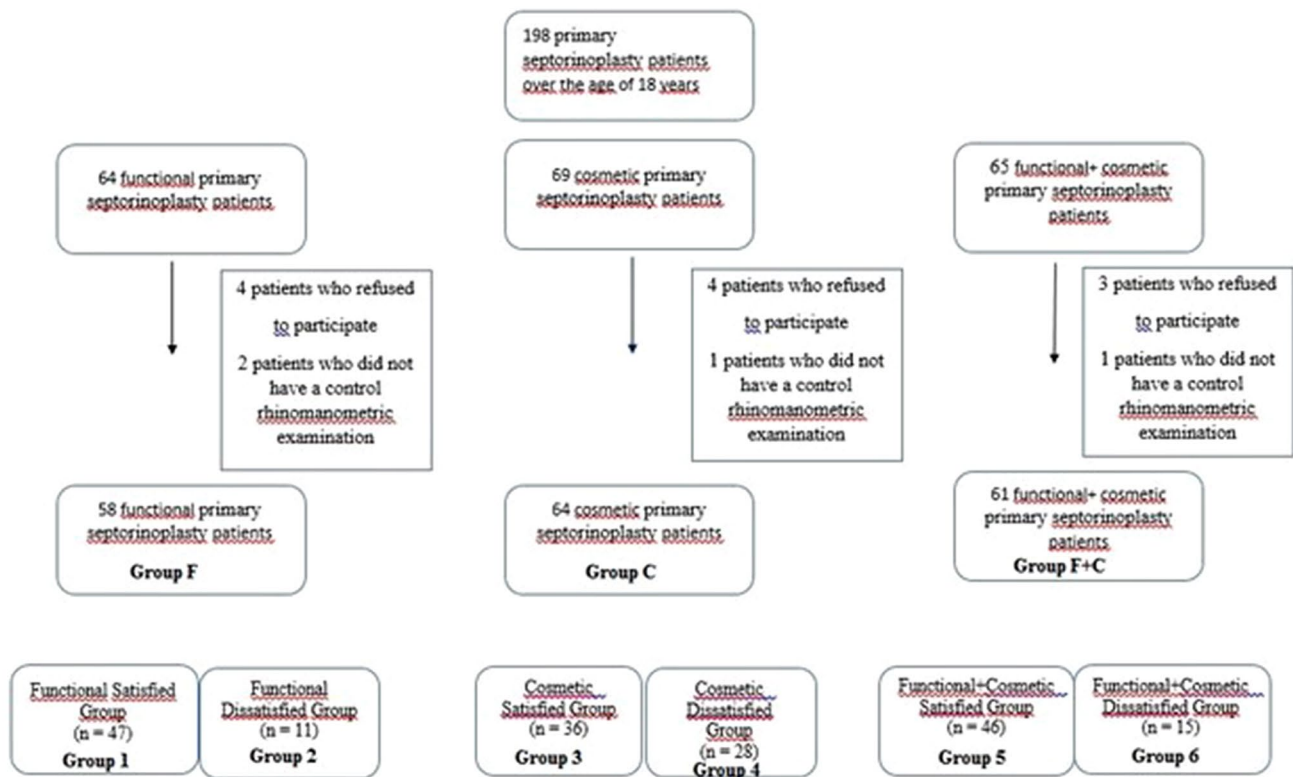


Fig. 1 Patient groups and flow chart

recorded for each patient. The transnasal pressure values (P) and nasal airflow values (V) of the patients were determined and recorded. From the data obtained, total nasal resistance values were calculated according to the formula given below:

$$\text{Nasal Resistance (RN)} = \text{Tansasal pressure (P)/Nasal airflow (V)}, \text{RTotal} = (\text{RLeft} \times \text{RRight})/(\text{RLeft} + \text{RRight})$$

The measurements were repeated on the same machines and by the same technician 12 months after surgery.

Subjective nasal-specific quality of life analysis using the NOSE scale

The Nasal Obstruction Symptom Evaluation (NOSE) scale was developed by Stewart et al. as part of a multicenter study and includes the assessment of five parameters for symptoms [9]. Each item is rated on a 5-point Likert scale, with the total raw value ranging from 0 to 20. To determine the total score, the scores of the individual answers are added and multiplied by 5, so the results are evaluated over 100 points.

Subjective aesthetic analysis using the ROE scales

The Rhinoplasty Outcome Evaluation Scale is a scoring system that evaluates the appearance of the nose, function, self-esteem and requests for personal change related to the

nose, and in this way, patient satisfaction is evaluated. A score of ≥ 12 points indicates that the patient is satisfied with his nose functionally and aesthetically, and a score of < 12 points indicates dissatisfaction [7].

Evaluation of patient expectations

The expectations of the patient from the surgical procedure were evaluated preoperatively with a modified method of the Preoperative Expectation Questionnaire in the studies by Morselli et al. [11] in brief, the method involves instructing the patient to mark the level of their expectations of the surgery on a 10 cm line where 0 = minimum and 10 = maximum, and the evaluation is made by multiplying the points obtained by 10 to give a value from a maximum of 100.

Then the results were evaluated according to a 5-point Likert scale as 0–20 points = very low level of expectation, 21–40 points = low expectation, 41–60 points = undecided, 61–80 points = high expectation and 81–100 points = very high expectation.

Evaluation of patient expectation coverage rate

At the 12-month follow-up, patient expectation coverage rate was evaluated. These were performed in the same way as the preoperative evaluation. The total from 100 was then evaluated according to a 5-point Likert scale as 0–20 points = expectations were not met at all, 21–40 points = expectations were not met, 41–60 points = undecided, 61–80 points = expectations were mostly met and 81–100 points = expectations were fully met.

Statistical analysis

The effect size and power of the study were calculated using G*Power 3.1.9.2 (University of Dusseldorf, Germany). At the beginning of the study, 5 disease pilot studies were performed from all groups, considering the postoperative patient expectation level, and the minimum number of patients per group was determined as 9 in the power analysis with $\alpha=0.05$ and 80% impact power. Data obtained in the study were analysed statistically using SPSS vn. 17.0 software (IBM statistics for Windows version 17, IBM Corporation, Armonk, New York, USA). The conformity of

continuous data to normal distribution was tested with the Kolmogorov–Smirnov test. Quantitative data were expressed in the tables as mean \pm standard deviation (SD) and median range (maximum–minimum) values. Categorical data were expressed as number (n) and percentage (%). Repeated measurements were evaluated using the Repeated measure ANOVA followed by the Bonferroni test, and the data were compared both in time within the groups and as the difference between the groups. When the Mauchly test was significant, normality and variance equality was not neglected in the groups and Sera–Geisser adjustment was made to determine the statistical significance of the factors. In the evaluation of factors related to patient expectation and patient expectation coverage rate, Pearson and Spearman correlation analyses were used. Then, the variables that were found to be correlated with patient satisfaction were used to evaluate the contribution of multiple common variables to dissatisfaction with binary logistic regression analysis. Data were assessed at the 95% confidence interval. A value of $p < 0.05$ was accepted as statistically significant.

Results

The patients comprised 135 (73.7%) females and 48 (26.3%) males with a mean age of 34.66 ± 9.01 years (18–61 years). Table 1 shows the demographic data and expectation levels of patients grouped by reason for surgery. Patients with the highest preoperative expectation levels were operated on for

Table 1 Demographic variables of the patients participating in the study

| Variables | Functional (n=58) | Cosmetic (n=64) | Functional+cosmetic (n=61) | p |
|---|----------------------|--------------------|-------------------------------|---------|
| Age, mean \pm SD, y | 37.77 \pm 7.74 | 32.76 \pm 7.13 | 31.19 \pm 7.95 | < 0.001 |
| Women, no. (%) | 37 (63.8%) | 57 (89.1%) | 41 (67.2%) | 0.002 |
| Patient expectation % | 79.24 \pm 6.62 | 86.15 \pm 8.61 | 83.73 \pm 8.27 | < 0.001 |
| Expectation level (according to Likert scale) | | | | < 0.001 |
| High expectation (61–80 points) (n) | 37 (63.8%) | 16 (25.0%) | 28 (45.9%) | |
| Very high expectation (81–100 points) (n) | 21 (36.2%) | 48 (75.0%) | 33 (54.1%) | |
| Patient expectation coverage rate (%) | 77.72 \pm 22.91 | 64.42 \pm 28.34 | 72.91 \pm 25.63 | 0.017 |
| Patient expectation coverage rate (according to Likert scale) | | | | 0.257 |
| Not met at all (0–20 points) | 2 (3.4%) | 6 (9.4%) | 5 (8.2%) | |
| Not met (21–40 points) | 7 (12.1%) | 17 (26.5%) | 8 (13.1%) | |
| Undecided (41–60 points) | 2 (3.4%) | 4 (6.1%) | 2 (3.3%) | |
| Mostly met (61–80 points) | 9 (15.5%) | 9 (14.2%) | 11 (18.0%) | |
| Fully met (81–100 points) | 38 (65.6%) | 28 (43.8%) | 35 (57.4%) | |
| Education status no. (%) | | | | 0.195 |
| University | 35 (60.4%) | 47 (73.4%) | 34 (55.7%) | |
| High school | 19 (32.7%) | 14 (21.9%) | 19 (60.3%) | |
| Elementary school | 4 (6.9%) | 3 (4.7%) | 8 (60.3%) | |

Data are expressed as the mean \pm SD or n (%), unless otherwise noted. One-Way ANOVA (with Tukey HSD) or Pearson Chi-Square test

cosmetic reasons (Group C) (86.15 ± 8.61), and the difference between this group and those operated for functional reasons (Group F) was statistically significant (79.24 ± 6.62) ($p < 0.001$). The patients operated on for cosmetic reasons had the lowest patient expectation coverage rate. The highest expectation levels (92.17 ± 4.96) were seen in patients who were operated for cosmetic reasons and were dissatisfied postoperatively (Group 4). Compared to the other two dissatisfied groups, no statistically significant difference was determined ($p = 0.609$, $p = 0.994$, respectively). When the groups that were not satisfied with the surgical results were evaluated with the other groups in terms of expectation levels according to the Likert scale, it was seen that all the patients in the dissatisfied groups had a very high expectation level. (Table 2). In Fig. 2, the expectation levels and postoperative satisfaction rates are shown, and the p values with special features are presented in the figure.

The changes in ROE scores from preoperative to postoperative period were determined to be statistically

significant [$F(5, 177) = 93.05$ $p < 0.001$ $\eta^2 = 0.724$]. In the subgroup analysis, the difference was seen to be due to the satisfied groups (Group 1, Group 3, Group 5) (all $p < 0.001$). In the preoperative period, nasal resistance values in group 1 decreased from 2.31 ± 1.18 to 0.71 ± 0.41 ($p < 0.001$), while the decrease in values was not significant in the group operated for functional reasons (group 2) (2.21 ± 1.01 vs 2.16 ± 0.97) ($p = 0.893$). The temporal change in the mean nasal resistance values of the patients in the groups was statistically significant [$F(5, 177) = 21.01$ $p < 0.001$ $\eta^2 = 0.3373$]. In the subgroup analysis, the significance was seen to be due to Group 1 ($p < 0.001$), Group 3 ($p = 0.019$) and Group 5 ($p < 0.001$) (Fig. 3).

In the evaluation of the factors related to the level of patient expectations, negative correlation was found between patient expectation and satisfaction ($r = -0.789$, $p < 0.001$). A positive correlation was determined between expectation coverage rate and patient satisfaction ($r = 0.907$,

Table 2 Comparisons between the groups of demographic data

| Variables | Functional | | Cosmetic | | Functional + cosmetic | | <i>p</i> |
|---|-------------------------------------|--|-------------------------------------|--|-------------------------------------|--|----------|
| | Satisfied group (<i>n</i> = 47) | Dissatisfied group (<i>n</i> = 11) | Satisfied group (<i>n</i> = 36) | Dissatisfied group (<i>n</i> = 28) | Satisfied group (<i>n</i> = 46) | Dissatisfied group (<i>n</i> = 15) | |
| Age, mean \pm SD, y | 40.65 \pm 6.78 | 24.45 \pm 4.27 | 37.69 \pm 3.23 | 26.42 \pm 5.59 | 32.80 \pm 8.11 | 26.26 \pm 5.02 | < 0.001 |
| Women, no. (%) | 28 (59.6%) | 9 (81.8%) | 31 (86.1%) | 26 (92.8%) | 28 (60.8%) | 13 (86.6%) | 0.002 |
| Patient expectation | 77.46 \pm 5.62 | 86.81 \pm 5.07 | 81.47 \pm 7.92 | 92.17 \pm 4.96 | 81.80 \pm 8.21 | 89.66 \pm 5.16 | < 0.001 |
| Expectation level (according to Likert scale) | | | | | | | < 0.001 |
| High expectation (61–80 points) (<i>n</i>) | 15 (31.9%) | 0 (0%) | 16 (44.4%) | 0 (0%) | 17 (36.9%) | 0 (0%) | |
| Very high expectation (81–100 points) (<i>n</i>) | 32 (68.1%) | 11 (100%) | 20 (55.6%) | 28 (100%) | 29 (63.1%) | 15 (100%) | |
| Patient expectation coverage rate (%) | 88.21 \pm 6.09 | 32.90 \pm 9.81 | 88.05 \pm 6.89 | 34.03 \pm 10.51 | 86.95 \pm 5.52 | 29.86 \pm 9.22 | < 0.001 |
| Patient expectation coverage rate (according to Likert scale) | | | | | | | < 0.001 |
| Not met at all (0–20 points) | 0 (0%) | 2 (18.2%) | 0 (0%) | 6 (21.4%) | 0 (0%) | 5 (33.3%) | |
| Not met (21–40 points) | 0 (0%) | 7 (63.6%) | 0 (0%) | 17 (60.7%) | 0 (0%) | 8 (53.4%) | |
| Undecided (41–60 points) | 0 (0%) | 2 (18.2%) | 0 (0%) | 4 (17.9%) | 0 (0%) | 2 (13.3%) | |
| Mostly met (61–80 points) | 9 (19.1%) | 0 (0%) | 9 (25.0%) | 0 (0%) | 11 (23.9%) | 0 (0%) | |
| Fully met (81–100 points) | 38 (80.9%) | 0 (0%) | 27 (75.0%) | 0 (0%) | 35 (76.1%) | 0 (0%) | |
| Education status, no. (%) | | | | | | | 0.006 |
| University | 26 (55.3%) | 9 (81.8%) | 23 (63.9%) | 24 (89.3%) | 22 (47.8%) | 12 (80%) | |
| High school | 17 (36.2%) | 2 (18.2%) | 10 (27.8%) | 4 (10.7%) | 16 (32.6%) | 3 (20%) | |
| Elementary school | 4 (8.5%) | 0 (0%) | 3 (8.3%) | 0 (0%) | 8 (19.6%) | 0 (0%) | |

Data are expressed as the mean \pm SD or *n* (%), unless otherwise noted. One-Way ANOVA (with Tukey HSD) or Pearson Chi-Square test

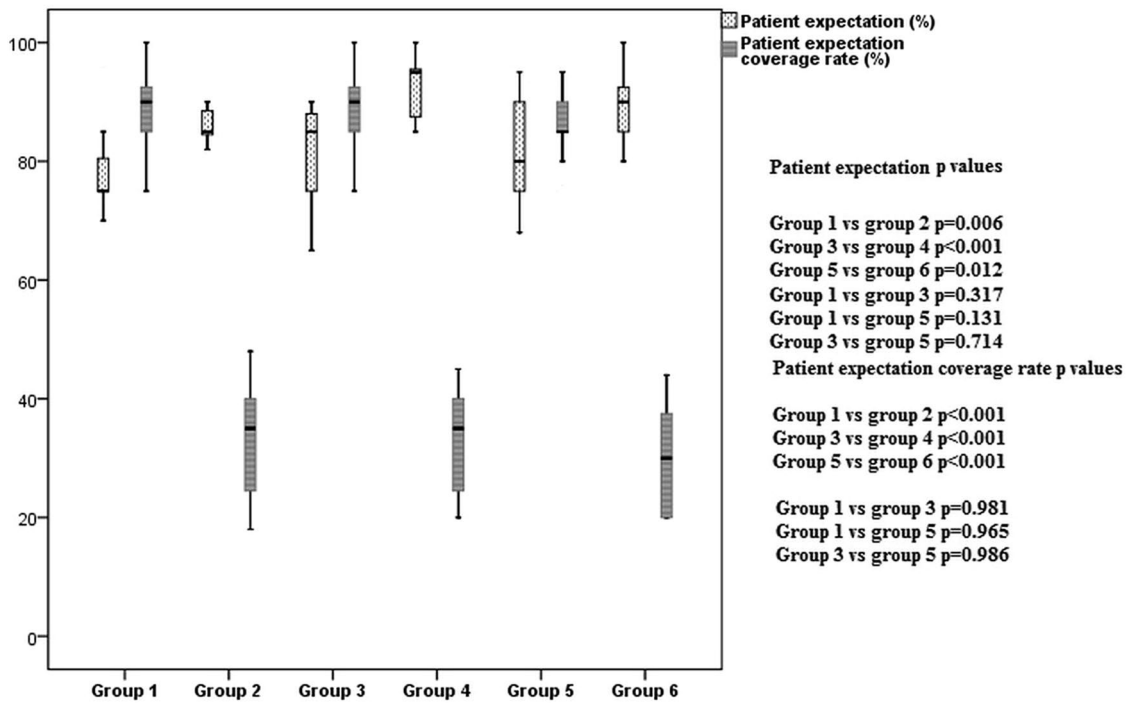


Fig. 2 Patient expectations and expectation coverage rates. Significant p values between groups was presented in the figure

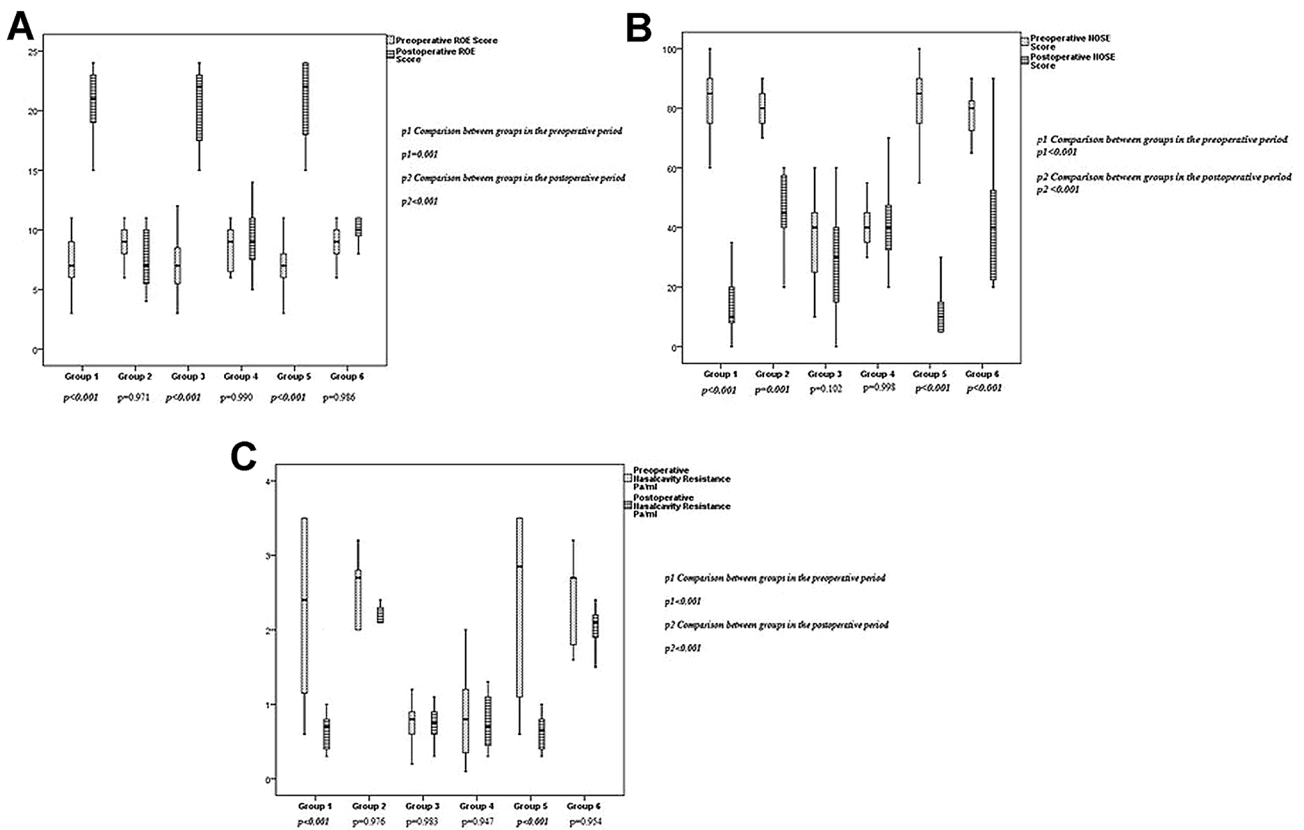


Fig. 3 Changes in preoperative and postoperative ROE (a), NOSE (b) and nasal cavity resistance values (c) in groups

Table 3 Factors associated with preoperative patient expectation

| | Preoperative Patient expectation | |
|--------------------------------------|----------------------------------|----------|
| | <i>r</i> | <i>p</i> |
| Age | 0.261** | 0.001 |
| Gender (female) | 0.171* | 0.018 |
| Educationstatus (high) | 0.227** | 0.005 |
| Preoperative NOSE score | 0.311** | <0.001 |
| Preoperative ROE score | −0.628** | <0.001 |
| Preoperative nasal cavity resistance | 0.571** | <0.001 |
| Patient satisfied | −0.789** | <0.001 |

NOSE Nasal Congestion Symptoms Evaluation, ROE the Rhinoplasty Outcome Evaluation

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

$p < 0.001$). (Table 3, Fig. 4). The parameters related to patient expectation coverage rates are shown in Table 4 and Fig. 5. The factors affecting patient satisfaction according to the logistic regression analysis results are shown in Table 5.

Discussion

One of the main indicators of the success of the operation in SRP surgery is the patient’s satisfaction with the operation [1, 2]. Although achieving excellent functional result is at the heart of success for the surgeon, this may not always result in the patient finding the operation successful. Therefore, the surgeon must talk to the patient in the preoperative period, and treatment should be planned considering conditions such as race, gender and regional ethnic preference. The purpose of this study was not to determine the factors affecting patient satisfaction, but to evaluate of the relationship between preoperative patient expectation and expectation coverage rates and patient satisfaction. Nevertheless, patient satisfaction in SRP surgery is complex and cannot be reduced to a single factor. Therefore, it is inevitable that other factors affecting patient satisfaction should be discussed.

When the results are evaluated in terms of demographic data, it has been reported in literature that age may be an important factor determining patient expectations [16, 17]. Litner et al. reported that younger patients had higher expectations of the cosmetic outcome [16]. When the current study was evaluated in terms of the relationship between patient age and patient expectation, it was found that younger patients had high expectations and low expectation coverage rates ($r - 0.261, p = 0.001$). However, the effect of this

Fig. 4 Patient expectation was negatively correlated with patient satisfaction

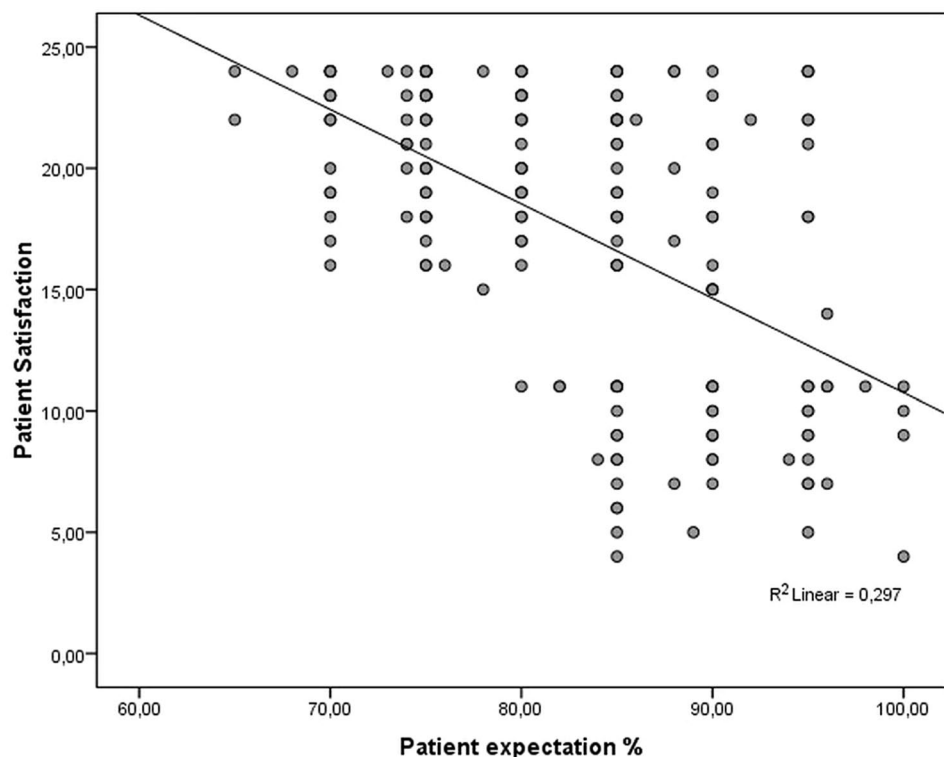


Table 4 Factors associated with patient expectation coverage rate

| | Patient expectation coverage rate (%) | |
|---------------------------------------|---------------------------------------|----------|
| | <i>r</i> | <i>p</i> |
| Age | 0.593** | <0.001 |
| Gender (female) | −0.211** | 0.004 |
| Educationstatus (high) | −0.226** | 0.002 |
| Postoperative NOSE score | −0.581** | <0.001 |
| Postoperative nasal cavity resistance | −0.531** | <0.001 |
| Preoperative patient expectation | −0.555** | <0.001 |
| Patient satisfaction | 0.932** | <0.001 |

NOSE Nasal Congestion Symptoms Evaluation

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

situation on patient satisfaction was not shown with logistic regression analysis.

Studies in literature evaluating the success of SRP surgery have used some objective and subjective evaluation methods [9, 10]. The NOSE scoring system is a widely used and validated method for this purpose [9], for which there are reports in literature of a relationship between high NOSE scores and patient dissatisfaction [1, 9]. However, the effects of these parameters on patient expectation have not been previously evaluated. This is the first study to have evaluated the relationship between the NOSE and ROE scale points

and rhinometric results and patient expectations. Patients who underwent surgery for cosmetic reasons were seen to have lower NOSE scores. Although patients who were not satisfied with the surgery had higher NOSE values, with the exception of Group 4, a difference was determined between preoperative and postoperative NOSE values in all the groups. In the correlation analysis, it was observed that there was a relationship between high NOSE scores in the preoperative period and patient expectation ($r\ 0.311$, $p < 0.001$). The results showed that high NOSE scores and nasal resistance values were effective factors on patient expectation. The current study results also showed that postoperative high NOSE values and nasal cavity resistance values were associated with a fivefold increase in patient dissatisfaction. In the patient group operated on for cosmetic reasons and dissatisfied with the surgical result (Group 4), postoperative normal nasal cavity resistance values and relatively high NOSE scores were observed (Table 3). The NOSE scale is known to be a subjective indicator, suggesting that the psychological status of the patients and their dissatisfaction with the result may lead to an increase in the score. However, this situation could not be observed in other groups and further interpretation cannot be made due to the limited number of patients in the group. There is a need for further studies on this subject.

The ROE scale is used in SRP surgery in the preoperative period to determine the appropriate patients for treatment and in the postoperative period for the evaluation of

Fig. 5 Positive correlation between patient expectation coverage rate and patient satisfaction

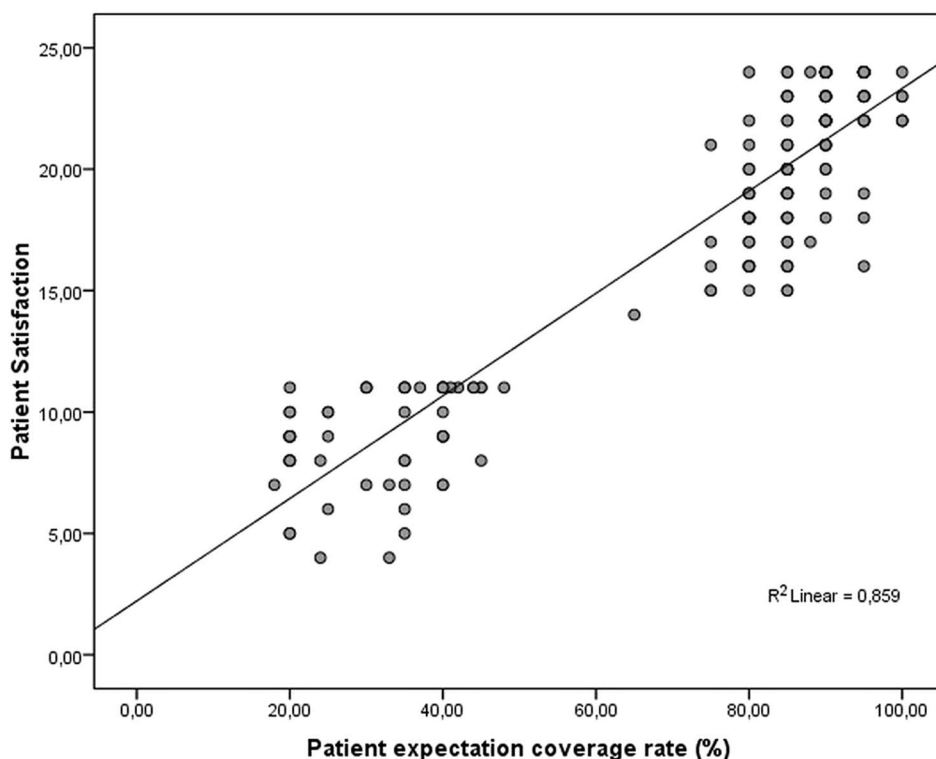


Table 5 Results of binary logistic regression analysis of factors associated with dissatisfaction

| Variable | OR (95% CI) | <i>p</i> |
|---------------------------------------|----------------------|----------|
| Age | 1.065 (0.824–1.283) | 0.319 |
| Sex (female) | 0.968 (0.744–1.245) | 0.120 |
| Education status (high) | 3.328 (1.155–15.521) | 0.034 |
| Postoperative NOSE score | 5.527 (1.087–22.289) | 0.009 |
| Postoperative nasal cavity resistance | 5.249 (1.098–20.107) | 0.005 |
| Patient expectation coverage rate | 8.272 (1.487–40.030) | 0.001 |

Adjusted $R^2 = 0.615/p$ value of the model's ANOVA < 0.001

CI Confidence interval, NOSE Nasal Congestion Symptoms Evaluation, OR Odds ratio

patient satisfaction [2, 6, 7, 18, 19]. Alsarraf et al. reported that ROE scores (44.5) were low in the group with low patient satisfaction in the postoperative period [7]. In the current study, patients with high preoperative ROE values were found to have high surgical expectation levels. It is known that high ROE values show that patients are satisfied with their functional and cosmetic status. Although this situation seemed irrational at first glance, when patient data were re-examined, it was seen that the ROE values in all groups were ≤ 11 points, but significantly higher in dissatisfied patients compared to patients who were satisfied with the surgical results. When one-to-one interviews were conducted with the patients, the common point they stated was “they do not find their noses very bad, but they aimed to reach more perfection”. This situation was also reflected in the correlation analysis, and a negative relationship was found between patient expectation and ROE values in the preoperative period ($r = -0.628$, $p < 0.001$). In addition, the results of the study clearly showed that there was a strong relationship between high expectation levels and patient satisfaction ($r = -0.789$, $p < 0.001$). A few studies in the literature have emphasized that patients in the young age group had high expectations due to environmental pressure in the preoperative period and therefore, their satisfaction levels from the surgical results were low [11, 17, 20]. However, preoperative patient expectation was not measured in those studies. In the current study, patient expectation was found to be related to higher education level and female gender, especially in young patients. In this respect, it was concluded that the current study results were compatible with the data highlighted in the literature. Although it has not been previously studied in the literature, the points that can be considered interesting are that patients with high preoperative ROE values had higher expectations from surgery, and the most important result of this study was the strong negative relationship between high expectation level and patient satisfaction. Therefore, it is important to

inform the patients about expectations, surgical results and possible complications before the SRP operation. In addition, despite the large differences in patient expectations between the satisfied and dissatisfied groups, relatively similar proportions in standard deviations may indicate that it is necessary not only to rationalize patient expectations, but also that surgeons should be aware of what they can and cannot accomplish. Although primary aim in this study was not to evaluate BDS, the experience we gained as a result of the study is that it is useful to evaluate psychiatrically in terms of BDS, especially in patients who cannot find a serious cosmetic or functional cause in the preoperative period. Our observations in BDS patients are that it is very difficult for patients to be satisfied with the results, no matter how good the functional and cosmetic results are. It has been reported in the literature that the incidence of BDS among patients who will undergo rhinoplasty varies between 12.2 and 27.5%, and if this condition cannot be detected in the preoperative period, patients are not satisfied with the surgical results, as well as requesting other surgeries that create problems for the surgeon and themselves [12, 13]. We observed that this rate is around 30% in the preoperative psychiatric evaluation, especially in patients who are scheduled for surgery for aesthetic reasons, both in the current study and in another study that is still being carried out by us.

Limitations

Perhaps the most important limitation of this study was that long-term results were not evaluated. However, the second evaluation at 12 months was considered to be sufficient.

Conclusion

The results of this study clearly showed that patient satisfaction is affected by many factors in SRP surgery. As well as the functional state of the nose, meeting the expectations of the patients in the preoperative period are among the factors affecting patient satisfaction. Therefore, the expectations of the patient regarding the surgical procedure should be determined in detail and rationalized according to the racial characteristics of the patient. Nevertheless, surgeons should also be aware of what they can and cannot achieve, and they should discuss this clearly with the patient.

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Compliance with ethical standards

Conflict of interest The authors have no conflict of interests to declare.

Ethics committee approval The study was conducted in accordance with the principles stated in the Declaration of Helsinki.

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