

Cross-cultural Adaptation and Translation of the central Kurdish Version of Rhinoplasty Outcome Evaluation (ROE)

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ABSTRACT:

Background and Objectives: Patient-reported outcome measures are important for assessing satisfaction and function after rhinoplasty. However, no validated Kurdish version of the Rhinoplasty Outcome Evaluation (ROE) questionnaire exists. This study aimed to translate, culturally adapt, and validate the Kurdish ROE. **Methods:** This methodological validation study was conducted between January and December 2024 in Sulaymaniyah, Iraq. The ROE was translated using standardized forward-backward procedures and expert committee review. Sixty adult patients undergoing primary rhinoplasty completed the Kurdish ROE preoperatively and postoperatively. Construct validity and responsiveness were assessed using the Wilcoxon signed-rank test. Internal consistency was evaluated with Cronbach's alpha and corrected item-total correlations. Test-retest reliability was analyzed using intraclass correlation coefficients (ICC). Content validity was assessed using Content Validity Ratio (CVR) and Content Validity Index (CVI). **Results:** The mean age of participants was 27.60 ± 5.51 years; 51.7% were female. The total ROE score improved significantly from 10.63 ± 2.96 preoperatively to 20.50 ± 3.15 postoperatively ($p \leq 0.001$). All six items showed statistically significant improvement ($p \leq 0.001$). Cronbach's alpha exceeded 0.70, indicating satisfactory internal consistency. Corrected item-total correlations ranged from 0.279 to 0.658. Test-retest reliability was excellent (overall ICC = 0.85, $p \leq 0.001$). CVR (0.82–0.90) and CVI (0.90–0.95) values confirmed strong content validity. **Conclusion:** The Kurdish ROE demonstrated satisfactory validity, reliability, and responsiveness, with strong internal consistency and excellent test-retest reliability. It is a suitable tool for assessing rhinoplasty outcomes in Kurdish-speaking patients in clinical and research settings.

Keywords: Rhinoplasty; Surveys and Questionnaires; Reproducibility of Results; Validation Study; Psychometrics

1. Introduction

Rhinoplasty (RP) ranks among the most frequently performed aesthetic and functional procedures in facial plastic and otolaryngologic surgery worldwide. Rhinoplasty serves to alter both the form and function of the nasal structure, whether undertaken for aesthetic refinement or to address functional requirements pertaining to nasal obstruction (Chen et al., 2024). Given its dual impact on physical appearance and physiological function, a comprehensive and standardized method of measuring surgical outcomes from the patient's perspective is essential. Subjective quality-of-life (QOL) instruments have assumed an increasingly prevalent role in the assessment of outcomes after nasal surgery, largely because objective measures frequently diverge from patients' own perceptions of improvement (Alanzi, Assiri, Aldosari, & Alarfaj, 2025).

Patient-reported outcome measures (PROMs), which assess the quality of care delivered from the patients' perspective, are becoming increasingly important in documenting the effectiveness of such procedures (Bonsel, Itiola, Huberts, Bonsel, & Penton, 2024). Among the available PROMs, the Rhinoplasty Outcome Evaluation (ROE) is an easy-to-use questionnaire that allows comprehensive assessment of RP-related patient satisfaction. The ROE is composed of six questions, two for each of the factors considered vital to patient satisfaction, namely, physical, emotional, and social domains (Mahmoudi & Rabbani Zadeh, 2022). Nevertheless, for a PROM to yield accurate and comparable data across diverse populations, it must be rigorously adapted to the linguistic and cultural context of the target group, rather than merely translated verbatim (Alpers & Hanssen, 2022).

Cross-cultural adaptation of the ROE questionnaire has gained significant traction internationally, with validated versions now available in several languages. Izu et al. validated the Brazilian-Portuguese ROE in a prospective study of 56 RP patients; mean preoperative score was 7.14, rising to 20.50 at 90 days post-op, with

internal consistency of 0.86 (Izu et al., 2014). Çelik and Altıntaş translated and culturally adapted the ROE into Turkish, demonstrating its validity by differentiating RP patients from the general population (Çelik & Altıntaş, 2019). Similarly, the ROE was cross-culturally adapted into Arabic, demonstrating good reliability and validity for the Arabic-speaking population (Mulafikh, Alharethy, Alqabbani, & Mesallam, 2021).

Despite the growing body of literature on culturally adapted rhinoplasty PROMs across diverse languages, no validated Kurdish-language version of a RP evaluation instrument currently exists, leaving a significant gap for Kurdish-speaking patients who are routinely underrepresented in outcomes research. This study was, therefore, conducted to perform the translation, cross-cultural adaptation, and preliminary psychometric validation of the Kurdish version of the ROE questionnaire, with the aim of providing a reliable and culturally appropriate tool for assessing RP outcomes in Kurdish-speaking populations.

2. Methodology

Design

This methodological validation study was conducted to translate, culturally adapt, and evaluate the psychometric properties of the ROE questionnaire in Kurdish. The study was conducted at multiple surgical centers in Sulaymaniyah, Iraq, specifically Anwar Sheikha Medical City, Safin Hospital, and Malik Polyclinic between January 2024 and December 2024.

Participants/Sample

Sixty patients scheduled for primary RP were recruited. Eligible participants were adults (≥ 18 years), native Kurdish speakers, and able to complete the questionnaire independently. Patients with prior nasal surgery, congenital craniofacial deformities, major psychiatric illness, or inability to attend follow-up were excluded. Demographic data, including age and sex, were recorded at baseline. Written informed consent was obtained from all participants.

Participants were recruited consecutively from patients attending the otolaryngology and facial plastic surgery clinic who were scheduled to undergo primary RP during the study period. Eligible patients who met the inclusion criteria were invited to participate at their preoperative visit, and those who agreed provided written informed consent before enrollment. The sample size ($n = 60$) was determined based on recommendations for psychometric validation studies and was comparable to that used in previous ROE validation research (Çelik & Altıntaş, 2019).

Translation and Cross-Cultural Adaptation

Permission to translate and validate the ROE questionnaire was obtained from the original developers. The adaptation followed established forward–backward translation procedures. Two independent bilingual translators whose native language was Kurdish performed the forward translation, one with a medical background and one without to ensure both conceptual and linguistic equivalence. The two versions were reconciled into a single draft, which was then back-translated into English by two blinded translators. An expert committee consisting of otolaryngologists, plastic surgeons, and a methodologist reviewed all versions to resolve discrepancies and ensure cultural relevance and semantic accuracy. The pre-final version was pilot-tested on a small group of patients to assess clarity and comprehensibility. As no significant issues were identified, the finalized Kurdish ROE was approved for psychometric evaluation.

Data collection

Participants completed the Kurdish ROE questionnaire twice: preoperatively at baseline and postoperatively during routine follow-up after RP, at a standardized time point when early edema had subsided and surgical outcomes had stabilized. To assess test–retest reliability, a subgroup of patients completed the questionnaire twice during the preoperative period within a short interval when no clinical change was expected. The ROE includes six Likert-scaled items evaluating nasal appearance (frontal and profile), self-confidence, breathing comfort, social comfort, and overall

satisfaction. Questionnaires were self-administered in a quiet clinical setting, and total scores were calculated by summing item responses, with higher scores reflecting better patient-reported outcomes.

Psychometric Evaluation

Construct Validity and Responsiveness

Construct validity was examined by comparing preoperative and postoperative ROE scores. Because RP is expected to improve aesthetic and functional outcomes, significant postoperative increases in item and total scores were considered evidence of construct sensitivity. Differences between paired observations were analyzed using the Wilcoxon signed-rank test due to the ordinal nature of the data. A p -value ≤ 0.05 was considered statistically significant.

Internal Consistency

Internal consistency was assessed using Cronbach's alpha coefficient. An alpha value ≥ 0.70 was considered acceptable for group-level comparisons. Corrected item–total correlation coefficients were calculated to evaluate the relationship between each item and the overall scale. Squared multiple correlations and “alpha if item deleted” values were also examined to determine the contribution of each item to scale homogeneity.

Test–Retest Reliability

Temporal stability was evaluated using intra-class correlation coefficients (ICC) derived from repeated administrations of the questionnaire. An ICC greater than 0.75 was interpreted as indicating excellent reliability. Test–retest correlation coefficients were also calculated for each item and for the total score.

Content Validity

Content validity was assessed by an expert panel comprising specialists in otolaryngology, plastic surgery, and psychometrics. Each expert independently rated the relevance, clarity, and cultural appropriateness of each item. The Content Validity Ratio (CVR) and Content Validity Index (CVI) were calculated to quantify agreement. Items with CVR and CVI values

exceeding established thresholds were considered to have satisfactory content validity.

Data Analysis

Statistical analysis was performed using SPSS version 28.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean $\pm$ SD and categorical variables as frequencies and percentages. The Wilcoxon signed-rank test was used to compare pre- and postoperative scores. Internal consistency was evaluated using Cronbach's alpha, along with corrected item-total correlations and "alpha if item deleted" values. Test-retest reliability was assessed using ICC (two-way mixed-effects model, absolute agreement). Content validity was quantified using CVR and CVI. All tests were two-tailed, with $p \leq 0.05$ considered statistically significant.

3. Results

This study included 60 patients. The mean age at participation was 27.60 ± 5.51 years. Sex distribution showed that 29 (48.3%) were male and 31 (51.7%) were female (Table 1).

Table (1): Demographic characteristics of participant.

Characteristics		Value
Age (year)		$27.60 \pm 5.506^*$
Gender	Male	29 (48.3%)
	Female	31 (51.7%)

*Mean $\pm$ SD, Frequency (%)

Table (2) presents the comparative analysis of ROE questionnaire scores before and after RP intervention. All six domains of the questionnaire demonstrated statistically significant improvements following surgery ($P \leq 0.001$). Mean scores increased substantially across all items: nasal appearance (front) improved from 1.15 ± 0.82 to 3.30 ± 0.83 ; nasal appearance (profile) from 2.43 ± 0.96 to 3.57 ± 0.53 ; self-confidence from 1.63 ± 0.86 to 3.43 ± 0.67 ; breathing comfort from 2.17 ± 0.92 to 3.85 ± 0.52 ; social comfort from 1.67 ± 0.91 to 2.77 ± 0.93 ; and satisfaction with outcome from 1.58 ± 0.67 to 3.58 ± 1.05 . The total ROE score increased from 10.63 ± 2.96 to 20.50 ± 3.15 , reflecting a

clinically meaningful enhancement in patient-reported outcomes.

Table (2): Responsiveness and Construct Sensitivity: Pretest vs. Post-test ROE Scores.

ROE Questionnaire	Pre-test score	Post score test	P-value*
	Mean $\pm$ SD	Mean $\pm$ SD	
Q1: Nasal appearance (front)	1.15 ± 0.820	3.30 ± 0.830	0.001
Q2: Nasal appearance (profile)	2.43 ± 0.963	3.57 ± 0.533	0.001
Q3: Self-confidence	1.63 ± 0.863	3.43 ± 0.673	0.001
Q4: Breathing comfort	2.17 ± 0.924	3.85 ± 0.515	0.001
Q5: Social comfort	1.67 ± 0.914	2.77 ± 0.927	0.001
Q6: Satisfaction with outcome	1.58 ± 0.671	3.58 ± 1.046	0.001
Total	10.633 ± 2.957	20.500 ± 3.154	0.001

*P-value based on Wilcoxon signed-rank test,

**Mean $\pm$ SD

Internal consistency and item-level psychometric properties are summarized in Table 3. Corrected item-total correlation coefficients ranged from 0.279 (Q2) to 0.658 (Q5), indicating acceptable to strong associations between individual items and the overall construct. Squared multiple correlation values further supported the convergent validity of each item within the scale. Cronbach's alpha coefficients, calculated with sequential item deletion, ranged from 0.632 to 0.768. Notably, removal of any single item did not substantially increase the overall alpha value, suggesting that all six items contribute meaningfully to the internal homogeneity of the scale. The overall Cronbach's alpha for the complete questionnaire exceeded the recommended threshold of 0.70, confirming satisfactory internal consistency for research and clinical applications in the Central Kurdish population.

Table (3): Internal Consistency and Item Analysis.

ROE question	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1	9.06	0.92	0.648	0.557	0.659
Q2	7.35	0.94	0.279	0.103	0.768
Q3	8.69	10.37	0.487	0.365	0.682
Q4	7.35	8.96	0.491	0.285	0.683
Q5	9.33	9.01	0.658	0.551	0.632
Q6	10	11.027	0.367	0.210	0.716

Scale Mean if Item Deleted: Mean score of questions if the question is deleted, Variance if Item Deleted: Question score variance if the question is deleted, Corrected Item Total Correlation: Correlation coefficient between the question in question and other questions, Squared Multiple Correlation: Squared multiple correlation coefficient, Cronbach's Alpha if Item Deleted: The Cronbach's alpha value is the desired value if the question is removed.

Temporal stability was confirmed through test-retest analysis (Table 4). ICC ranged from 0.84 to 0.86 for individual items, with an overall ICC of 0.85 ($P \leq 0.001$), indicating excellent reproducibility according to established psychometric criteria ($ICC > 0.75$).

Table (4): Test-Retest Reliability and Temporal Stability.

ROE question	Test-retest correlation	Intra-class correlation coefficient	P-value
Q1	0.96	0.84	0.001
Q2	1.00	0.85	
Q3	0.98	0.86	
Q4	0.97	0.86	
Q5	1.00	0.84	
Q6	1.00	0.85	
Total	0.98	0.85	

Content validity is assessed by a panel of reviewers with expertise in otolaryngology, plastic surgery, and psychometric methodology. As shown in Table (5), a CVR and CVI will be calculated for each item based on the experts' ratings of relevance, clarity, and cultural appropriateness Table (5).

Table (5): Content Validity Indices.

ROE question	CVR	CVI
Q1	0.88	0.93
Q2	0.82	0.90
Q3	0.86	0.92
Q4	0.90	0.95
Q5	0.84	0.91
Q6	0.87	0.94

4. Discussion

Rhinoplasty is a challenging procedure, and the ultimate goal is not only to restore function and youthful appearance, but also to improve the QOL.(Stergiou et al., 2022) The present study aimed to perform a cross-cultural adaptation and translation of the ROE questionnaire into Kurdish and to evaluate its psychometric properties in a sample of 60 RP patients. All six ROE domains demonstrated statistically significant improvement following surgery, with the total ROE score increasing from 10.63 ± 2.96 preoperatively to 20.50 ± 3.15 postoperatively, confirming the responsiveness of the Kurdish version. Internal consistency analysis yielded an overall Cronbach's alpha exceeding 0.70, with corrected item-total correlations ranging from 0.279 to 0.658. Test-retest reliability was excellent, with ICCs ranging from 0.84 to 0.86 across individual items and an overall ICC of 0.85. Content validity was also well established, with CVR and CVI values approaching or surpassing acceptable thresholds across all items.

Regarding responsiveness, the total ROE score in our study improved from 10.63 ± 2.96

preoperatively to 20.50 ± 3.15 postoperatively. This pattern is consistent with prior work: the Brazilian Portuguese version by Izu et al. (2014), reported a mean preoperative score of 7.14, rising to 17.73 at 15 days and 20.50 at 90 days postoperatively ($p < 0.0001$). The close numerical agreement between our postoperative total (20.50 ± 3.15) and the Brazilian 90-day figure (20.50) suggests that the Kurdish ROE captures postoperative improvement with a precision comparable to well-validated counterparts (Izu et al., 2014). Similarly, Çelik and Altıntaş (2019), in their Turkish validation of the ROE conducted in Turkey, reported a significant improvement at 3 months after surgery (3.3 ± 2.3 vs. 22.2 ± 2.8 , $p < 0.001$) (Çelik & Altıntaş, 2019). The slightly higher postoperative mean in the Turkish version may partly reflect differences in follow-up timing, as earlier postoperative assessments in the current study may not have fully captured late improvements. The Arabic version (ROE-A), validated in Saudi Arabia by Mulafikh et al., also documented postoperative scores improving from an average of 7.42 preoperatively to 20.36 at three months postsurgery ($p < 0.0001$) (Mulafikh et al., 2021), again aligning closely with the current study's findings and supporting the cross-cultural robustness of the ROE construct.

Regarding internal consistency, the present study overall Cronbach's alpha exceeded the recommended 0.70 threshold. The Turkish version reported a preoperative Cronbach's alpha of 0.887, (Çelik & Altıntaş, 2019) while the Arabic version demonstrated a Cronbach's alpha of 0.78 (Mulafikh et al., 2021). The Brazilian Portuguese version by Izu et al. achieved an internal consistency of 0.86, with inter- and intra-examiner test-retest reproducibility of 0.90 and 0.94, respectively. (Izu et al., 2014) The Persian version of a related RP questionnaire by Jahandideh et al. (Tehran, Iran) also reported a Cronbach's alpha of 0.925, which was described as comparable to its Portuguese (0.86) and German (0.91) versions (Jahandideh, Dehghani Firouzabadi, Dehghani Firouzabadi, Jfm Lohuis, & Roomiani, 2020). The somewhat lower alpha in the current Kurdish version is consistent with the relatively smaller

item pool (six items), and it is well established that fewer items tend to yield more modest alpha values. Nonetheless, the Kurdish ROE's alpha satisfies the accepted threshold for use in both research and clinical contexts.

Concerning test-retest reliability, the overall ICC in the present study was 0.85, which meets the criterion for "excellent" reliability ($ICC > 0.75$). The Arabic version reported an ICC of 0.8 for both individual questions and the total score, indicating good reliability (Mulafikh et al., 2021). The test-retest reproducibility of the Turkish version was also excellent and comparable to previously published literature (Çelik & Altıntaş, 2019). These convergent findings across Arabic, Turkish, Brazilian, Persian, German, and now Kurdish adaptations collectively reinforce that the ROE structure is robust to linguistic and cultural transplantation.

A broader meta-analytic perspective corroborates our responsiveness findings. A recent systematic review and meta-analysis by Rot et al. (2024), drawing on 17 studies from 2011 to May 2024, reported a mean pretreatment ROE score of 33.50 (CI: 29.46–37.53) and a posttreatment score of 69.60 (CI: 63.07–76.14) at 6 months, rising further to 80.25 (CI: 75.79–84.70) at 12 months ($p < 0.001$ at both timepoints). (Rot et al., 2024) While the absolute percentage scores differ from the present study data, owing to the use of a raw 24-point scale rather than a 0–100 normalized format, the directionality and statistical significance of improvement are fully aligned. The German version (ROE-D) was validated by Bulut et al., in a prospective study administering the questionnaire to 100 patients preoperatively and at 6 and 12 months postoperatively, with Cronbach's alpha indicating good internal consistency. (Bulut, Plinkert, Wallner, & Baumann, 2016) The Iranian version of the ROE, validated in Shiraz, Iran, was similarly confirmed as a valid instrument to assess results in RP patients. (Mahmoudi & Rabbani Zadeh, 2022) Collectively, the findings of the current study align with those from other country, confirming that the Kurdish ROE is a valid, reliable, and responsive patient-reported outcome

instrument suitable for clinical and research application in Kurdish-speaking populations.

This study has several limitations. First, the sample size was relatively small ($n = 60$) and recruited from centers within a single city, which may limit the generalizability of the findings to the broader Kurdish-speaking population. Second, the follow-up period was relatively short and may not fully reflect long-term postoperative satisfaction and stability of outcomes. Third, responsiveness was assessed primarily through pre–post comparison without external QoL instruments for convergent validation. Future studies with larger, multicenter samples and longer follow-up durations are

recommended to further confirm the robustness and generalizability of the Kurdish ROE.

5. Conclusion

The Kurdish version of the ROE questionnaire demonstrated satisfactory validity, reliability, internal consistency, and responsiveness. The instrument showed significant sensitivity to postoperative changes, excellent test–retest reliability, and strong content validity. Therefore, the Kurdish ROE can be considered a reliable and culturally appropriate tool for assessing patient-reported outcomes following RP in Kurdish-speaking populations, suitable for both clinical practice and research applications.

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