Original Research

Validation and Clinical Application of the Turkish Version of the RhinoQOL Questionnaire in the Setting of Chronic Rhinosinusitis with Nasal Polyp Patients

 Nihal Seden Boyoglu, Enes Yigit, Ozlem Onerci Celebi, Tolga Kirgezen, Efe Can, Ozgur Yigit

Department of Otorhinolaryngology - Head & Neck Surgery, University of Health Sciences Türkiye, Istanbul Training and Research Hospital, Istanbul, Türkiye

Abstract

Objectives: Validation of the translations of questionnaires from foreign languages is important. Failure to validate surveys can lead to misapplication.

Methods: A total of 64 patients who presented with nasal obstruction due to chronic rhinosinusitis with nasal polyps and 64 control subjects were included in this prospective instrument validation study. Translation and back-translation method was used to adapt the Rhinosinusitis quality of life (RhinoQOL) into Turkish. The test and retest reliability, internal consistency, reproducibility, construct validity, and sensitivity to change were assessed.

Results: The mean±SD test and retest scores were similar in the control group. Cronbach correlation coefficients were 0.872, 0.873, and 0.959 for the test and were 0.799, 0.725, and 0.885 for the retest scores for the frequency, bothersomeness, and impact domains. Post-operative scores were significantly higher than pre-operative scores obtained for each domain of the RhinoQOL questionnaire in the patient group (p<0.001). Pre-operative scores for frequency, bothersomeness, and impact domains were significantly lower than the corresponding average test and retest scores for each domain in the control group (p<0.001), whereas other than significantly higher bothersomeness scores in patient versus controls (p=0.018), no significant difference was noted between post-operative scores and average test and retest scores.

Conclusion: These results demonstrated that the Turkish translation is equivalent to the English version of RhinoQOL in terms of internal consistency, test and retest reliability, and construct validity, with good responsiveness to change and thus potential utility in the assessment of post-operative outcome.

Keywords: Chronic rhinosinusitis, Quality of life, RhinoQOL questionnaire, Turkish, Validation

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Chronic rhinosinusitis with nasal polyps, an inflammatory disease, adversely affects the personal and social functioning, and it can dramatically decrease the quality of quality of life (QOL) of patients.[1–3]

Hence, several disease-specific instruments have been developed to evaluate the effect of rhinosinusitis through the assessment of symptoms and health-related QOL as well as to observe the response to treatment, while the severity of nasal symptoms or findings has also been considered not to correlate with QoL scales in every patient.[1,4-7]

The rhinosinusitis QOL (RhinoQOL) questionnaire is considered as a short and straightforward and simple to use rhinosinusitis disease specific questionnaire. It has been validated in acute and chronic rhinosinusitis patients treated both medically and surgically.[8,9] The RhinoQOL is a 17-item questionnaire with three subunits searching for symptom frequency (five questions), bothersomeness (three questions), and impact (nine questions).[7-9]

Being one of the most prevalent symptoms encountered in routine otorhinolaryngology practice, nasal obstruction is considered as challenging complaint in terms of the assessment of treatment response.[10-13]

This study performed the Turkish validation of the RhinoQOL questionnaire based on its equivalence to the original (English) version in terms of internal consistency, reliability, reproducibility and validity, and to assess clinical applications in the management of Turkish-speaking chronic rhinosinusitis patients.

Methods

Study Population

A total of 64 patients who presented with nasal obstruction due to CRSwNP and 64 control subjects who presented with non-rhinologic complaints to our otolaryngology department were included in this prospective instrument validation study conducted between July 2020 and February 2021. The presentation with nasal obstruction lasting for more than 3 months despite medical treatment(s) being diagnosed with chronic rhinosinusitis as defined by EPOS, being able to speak and read Turkish, having no prior rhinologic surgery, and receiving no topical or systemic corticosteroids for any reason within the past 4 weeks were the inclusion criteria in the patient group. Patients aged <18 years or above 65 years and patients with a history of sinonasal tumor or previous radiotherapy were excluded from the study. The control subjects were those older than age 18, presented with non-rhinologic complaints, able to speak and read Turkish, had no history or current nasal sinus disease, no nasal symptoms and no positive findings on endoscopic examination after decongestion, and had not received topical or systemic corticosteroids for any reason within the past 4 weeks.

The principles of the Declaration of Helsinki were followed during the study. Written informed consent was obtained from each subject following a detailed explanation of the objectives and protocol of the study, and approved by the Local Hospital Ethics Committee (Date: June 3, 2020 Number: 2211).

Forward and Back Translations of RhinoQOL

Translation and back-translation method was used to adapt the RhinoQOL into Turkish. The RhinoQOL questionnaire was derived from the original article by Atlas et al.[9] The questionnaire was first translated into Turkish by two independent native Turkish translators who spoke English fluently. Then, the wo versions were compared and discussed by otolaryngologists and the final version was accepted by specialists. This version was later translated back into English by a native speaker, who had not seen the original English version. The back-translated English version was compared and reviewed with the original RhinoQOL in English by the authors of this paper to produce the final draft of the Turkish version of RhinoQOL (see appendix).

Questionnaire Application

Test and retest was performed to determine control group scores and reliability, with an interval of 2 weeks.

Patients who were scheduled for sinonasal surgery due to a diagnosis of chronic rhinosinusitis with polyps were asked to fill out the questionnaire the day before surgery and 4 weeks after the surgery. All the patients who were scheduled for surgery were prescribed oral prednisolone initiated 3 weeks before surgery with an initial dose of 1mg/kg and the dose was reduced gradually until the day of operation.

The results for each sub-scale score ranges were normalized to report a range of values from 0 to 100, with higher scores indicating better health status.[9,14]

Reliability Assessment

Reliability was assessed on the basis of test and retest reliability, internal consistency (Cronbach's alpha values for test and retest scores), and reproducibility.

Construct Validity

Construct validity was assessed with the Spearman correlation test. The frequency, bothersomeness, and impact scores were compared with each other.

Sensitivity to Change

Sensitivity to change was assessed based on the comparison of post-operative versus Pre-operative scores for each domain of the RhinoQOL questionnaire in the patient group and comparison of both post-operative and pre-operative scores with the average test and retest scores for each domain in the control group.

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, version 17.0 (IBM Corp., Armonk, NY). Pearson Chi-square test was used for the comparison of categori-

cal data, while numerical data were analyzed using Mann–Whitney U test for non-normally distributed variables. Pre-operative versus Post-operative and test versus retest comparisons were performed through the Wilcoxon test. The correlations between study parameters to determine test and retest reliability and validity analysis were defined by the Pearson correlation method and given as the Pearson correlation coefficient (R). The internal consistency of the scores was evaluated using Cronbach's α, with values >0.7 and 0.8 were noted to indicate acceptable and excellent internal consistency, respectively. P<0.05 was considered to be statistically significant.

Results

Demographic Characteristics and Smoking Status

The differences between the patient and control groups in terms of gender, smoking, and age of the patients were not significant (Table 1).

Test and retest Reliability

The mean±SD (median) test and retest scores for frequency (R=0.653, p<0.001), bothersomeness (R=0.776, p<0.001), and impact (R=0.733, p<0.001) domains in the control group showed an acceptable test and retest reliability (Table 2).

Reproducibility

The mean±SD (median) test and retest scores for frequency, bothersomeness, and impact domains were similar in the control group (Table 2).

Internal consistency

Cronbach correlation coefficients were 0.872, 0.873, and 0.959 for the test and were 0.799, 0.725, and 0.885 for the retest scores for the frequency, bothersomeness, and impact domains of the RhinoQOL, indicating an acceptable to excellent internal consistency (Table 2).

Construct Validity: Interscore Correlation Coefficients

The values of interscore correlation coefficients obtained in the pre-operative and post-operative period revealed a high-intensity relationship (p<0.001 for each) between the frequency and bothersomeness scores (r=0.655 and r=0.793, respectively), the bothersomeness and impact scores (r=0.793 and r=0.845, respectively) and the frequency and impact scores (r=0.769 and r=0.813, respectively) (Table 3).

The correlation between items and scores of domains was significant for each domain, regardless of the timing of the questionnaire (pre-operative/post-operative or test/retest) (Table 4).

Sensitivity to Change

Post-operative scores were significantly higher than pre-operative scores obtained for each domain of the RhinoQOL questionnaire in the patient group (p<0.001 for each) (Table 5).

Pre-operative scores for frequency, bothersomeness, and impact domains were significantly lower than the corresponding average test and retest scores for each domain in the control group (p<0.001 for each), whereas other than significantly higher bothersomeness scores in patient versus controls (88.2±13.71 vs. 74.9±25.3, p=0.018), no significant difference was noted between post-operative scores and average test and retest scores (Table 5).

Table 1. Demographic characteristics and smoking status in patient and control groups

	Patient group	Control group	p
Age (year), mean±SD (median)	41.6±12.5 (43.0)	37.9±9.64 (38.0)	0.065[1]
Gender, n (%)			
Male	39 (60.9)	29 (45.3)	0.077[2]
Female	25 (39.1)	35 (54.7)	
Smoking status, n (%)			
Non-smoker	22 (34.4)	31 (48.4)	0.106[2]
Active smoker	42 (65.6)	33 (51.6)	

[1]Mann–Whitney U test; [2]Chi-square test.

Table 2. Reliability: Test-retest reliability, internal consistency, and reproducibility in the control population

	Test	Re-test	p[1]	Test-retest reliability (Correlation between scores)		Internal consistency (Cronbach-alpha coefficient)	
				R	p[2]	Test	Re-test
RhinoQOL scores, mean±SD (median)							
Frequency	79.5±23.5 (90.0)	81.0±17.9 (85.0)	0.692	0.653	<0.001	0.872	0.799
Bothersomeness	75.3±30.4 (88.3)	74.5±23.3 (73.3)	0.859	0.776	<0.001	0.873	0.725
Impact	86.9±22.2 (100.0)	85.8±16.6(94.4)	0.293	0.733	<0.001	0.959	0.885

R: Pearson correlation coefficient. [1]Wilcoxon test; [2]Pearson correlation analysis.

Table 3. Construct validity: Interscore correlation coefficients

	Pre-operative		Post-operative		Test		Retest	
	R	p	R	p	R	p	R	p
RhinoQOL domains								
Frequency – Bothersomeness	0.655	<0.001	0.923	<0.001	0.898	<0.001	0.932	<0.001
Bothersomeness – Impact	0.793	<0.001	0.845	<0.001	0.796	<0.001	0.876	<0.001
Impact – Frequency	0.769	<0.001	0.813	<0.001	0.862	<0.001	0.898	<0.001

Pearson correlation analysis; R: Pearson correlation coefficient.

Table 4. The correlation between items and scores of domains

	Pre-operative domain score		Post-operative domain score		Test domain score		Retest domain score	
	R	p	R	p	R	p	R	p
Frequency items								
1	−0.642	<0.001	−0.540	<0.001	−0.743	<0.001	−0.651	<0.001
2	−0.583	<0.001	−0.714	<0.001	−0.909	<0.001	−0.893	<0.001
3	−0.442	0.004	−0.743	<0.001	−0.876	<0.001	−0.837	<0.001
4	−0.497	0.001	−0.175	0.280	−0.675	<0.001	−0.553	<0.001
5	−0.188	0.246	−0.763	<0.001	−0.811	<0.001	−0.742	<0.001
Bothersomeness items								
1	−0.718	<0.001	−0.614	0.020	−0.814	0.001	−0.642	<0.001
2	−0.788	<0.001	−0.767	<0.001	−0.938	<0.001	−0.886	<0.001
3	−0.536	<0.001	−0.705	<0.001	−0.887	0.001	−0.868	<0.001
Impact items								
1	−0.663	<0.001	−0.713	<0.001	−0.861	<0.001	−0.752	<0.001
2	−0.624	<0.001	−0.859	<0.001	−0.854	<0.001	−0.802	<0.001
3	−0.464	0.003	−0.581	<0.001	−0.881	<0.001	−0.714	<0.001
4	−0.618	<0.001	−0.581	<0.001	−0.891	<0.001	−0.719	<0.001
5	−0.792	<0.001	0.519	<0.001	−0.689	<0.001	−0.603	<0.001
6	−0.599	<0.001	−0.554	<0.001	−0.800	<0.001	−0.710	<0.001
7	−0.476	0.002	−0.661	<0.001	−0.880	<0.001	−0.809	<0.001
8	−0.411	0.008	−0.530	<0.001	−0.700	<0.001	−0.536	<0.001
9	−0.533	<0.001	−0.767	<0.001	−0.856	<0.001	−0.789	<0.001

Pearson correlation analysis; R: Pearson correlation coefficient.

Table 5. Sensitivity to change: RhinoQOL scores in patient and control groups

	Patient group			Control group		
	Pre-operative	Post-operative	p	Test and retest average	p	
					versus. Pre-operative	versus. Post-operative
RhinoQOL scores, mean±SD (median)						
Frequency	45.8±11.58(45.0)	84.6±12.22(85.0)	<0.001	80.3±18.8 (85.0)	<0.001	0.571
Bothersomeness	38.8±18.64(40.0)	88.2±13.71(90.0)	<0.001	74.9±25.3(80.0)	<0.001	0.018
Impact	58.2±14.66(62.5)	91.6±9.69(94.4)	<0.001	86.4±18.1(96.5)	<0.001	0.750

Mann–Whitney U test.

Discussion

Our findings on the Turkish validation of RhinoQOL questionnaire in the setting of chronic rhinosinusitis with polyps revealed an acceptable to excellent internal consistency, acceptable test and rest reliability, and good construct validity of the questionnaire.

The test and retest Cronbach α values for the frequency (0.872 and 0.799), bothersomeness (0.873 and 0.725), and impact (0.959 and 0.885) domains of the RhinoQOL in the present study support the data on coefficient α values for frequency, bothersomeness, and impact scores from the English (0.68, 0.57, and 0.89, respectively),[8,9] French (0.57, 0.67, and 0.83, respectively),[13] Portuguese (0.77, 0.56, and 0.88, respectively),[7] and Moroccan (0.80, 0.75, and 0.94, respectively)[14] versions of the RhinoQOL questionnaire.

Item-item correlations and correlations between each item in the Turkish version of the questionnaire indicated a stronger relationship for the postoperative (R ranged from 0.813 to 0.923) than pre-operative (R ranged from 0.655 to 0.793) scores and particularly between frequency and bothersomeness domains (0.923). This seems consistent with the previously reported interscore correlation coefficients of the questionnaire in the nasal obstruction setting.[13]

RhinoQOL is considered to be a practical tool in the evaluation of endoscopic sinus surgery results.[7] Likewise, in the present study, post-operative scores were significantly higher than pre-operative scores obtained for each domain of the RhinoQOL questionnaire in the patient group, while other than significantly higher bothersomeness scores in patient versus controls, no significant difference was noted between postoperative scores of patients and average test and retest scores of controls.

Questionnaires can be used to evaluate patient satisfaction and treatment effectiveness.[15,16] Overall, Turkish version of the RhinoQOL questionnaire could detect differences between patients with chronic rhinosinusitis and control subjects, and the scores improved significantly after surgery indicating a good responsiveness. Hence, our findings support the that the RhinoQOL meets the criteria for discriminant validity and responsiveness in the setting of nasal obstruction due to chronic sinusitis or morphological syndromes such as septal deviation.[7-9,13]

In conclusion, these results demonstrated that the Turkish translation is equivalent to the English version of RhinoQOL. The Turkish RhinoQOL questionnaire appears culturally appropriate and psychometrically valid with good responsiveness to change and thus potential utility in assessment of post-operative outcome.

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Appendix: The Turkish version of RhioQOL questionnaire

RİNOSİNÜZİT – HAYAT KALİTESİ ANKETİ

❖ Rinosinüzit – Hayat Kalitesi Anketi, yakın zamanda yaşamış olduğunuz burun ile ilgili şikayetlerinizin hayat kaliteniz üzerine olan etkisini belirlemek amacıyla oluşturulmuş bir ankettir.

❖ Cevaplarınızı soruların solunda bulunan kutuları işaretleyerek cevaplayınız

❖ Bazı soruları atlamanız istenecektir. Bu olduğunda yan tarafta hangi soruyu cevaplamanız gerektiğini gösteren bir ok ve açıklama göreceksiniz. Örneğin;

☐ Evet -> Evet ise soru 1'e geçin

☐ Hayır

❖ Sayısal değerlendirmenizi yapabilmeniz adına 0'ın "hiç rahatsız olmadım", 10'un "çok rahatsız oldum" anlamına geldiğini bilmenizi isteriz.

Ad – Soyad:
Cinsiyet:
Yaş:

_____

A. Semptom Sıklığı ve Oluşturduğu Rahatsızlık Ölçütleri

1. Son 7 gün içerisinde kaç kere **sinüs baş ağrısı, yüz ağrısı ya da yüzde basınç hissi** yaşadınız?

☐ Hiçbir zaman   ->Eğer **HİÇ** ise soru 2'ye geçiniz.
☐ Birkaç kez
☐ Bazen
☐ Çoğunlukla
☐ Her zaman

1a. 0'dan 10'a kadar olan tabloyu kullanarak sinüs baş ağrısı, yüz ağrısı ya da yüzde basınç hissinin sizi ne kadar rahatsız ettiğini belirtiniz. 0 : Hiç rahatsız etmedi 10: Çok rahatsız etti

0☐	1☐	2☐	3☐	4☐	5☐	6☐	7☐	8☐	9☐	10☐

Hiç Rahatsız etmedi   Çok Rahatsız etti

2. Son 7 gün içerisinde ne sıklıkla **burun tıkanıklığı** yaşadınız veya **burnunuzda doluluk** hissettiniz?

☐ Hiçbir zaman   ->Eğer **HİÇ** ise soru 3'ye geçiniz.
☐ Birkaç kez
☐ Bazen
☐ Çoğunlukla
☐ Her zaman

2a. 0'dan 10'a kadar olan tabloyu kullanarak **burun tıkanıklığı veya burunda doluluk hissinin** sizi ne kadar rahatsız ettiğini belirtiniz. 0 : Hiç rahatsız etmedi 10: Çok rahatsız etti

0☐	1☐	2☐	3☐	4☐	5☐	6☐	7☐	8☐	9☐	10☐

Hiç Rahatsız Etmedi   Çok Rahatsız Etti

3. Son 7 gün içerisinde ne sıklıkla **geniz akıntısı** yaşadınız?

   ☐ Hiçbir zaman ->Eğer **HİÇ** ise soru 4'ye geçiniz.

   ☐ Birkaç kez

   ☐ Bazen

   ☐ Çoğunlukla

   ☐ Her zaman

3a. 0'dan 10'a kadar olan tabloyu kullanarak **geniz akıntısının** sizi ne kadar rahatsız ettiğini belirtiniz? 0 : Hiç rahatsız etmedi 10: Çok rahatsız etti

0☐	1☐	2☐	3☐	4☐	5☐	6☐	7☐	8☐	9☐	10☐

Hiç Rahatsız Etmedi   Çok Rahatsız Etti

4. Son 7 gün içerisinde ne sıklıkla **koyu kıvamlı burun akıntısı** yaşadınız?

   ☐ Hiçbir zaman

   ☐ Birkaç kez

   ☐ Bazen

   ☐ Çoğunlukla

   ☐ Her zaman

5. Son 7 gün içerisinde ne sıklıkla **burun akıntısı** yaşadınız?

   ☐ Hiçbir zaman

   ☐ Birkaç kez

   ☐ Bazen

   ☐ Çoğunlukla

   ☐ Her zaman

Sıradaki sorular için yakın zamanda yaşamış olduğunuz burun ile ilgili tüm şikayetlerinizi düşünerek yanıtlayınız

6. Son 7 gün içerisinde burun şikayetleri nedeniyle ne sıklıkla **yorgun veya halsiz** hissettiniz?

   ☐ Hiçbir zaman

   ☐ Birkaç kez

   ☐ Bazen

   ☐ Çoğunlukla

   ☐ Her zaman

7. Son 7 gün içerisinde <u>burun şikayetleri nedeniyle</u> ne sıklıkla **uyumakta güçlük çektiniz?**

   ☐ Hiçbir zaman
   ☐ Birkaç kez
   ☐ Bazen
   ☐ Çoğunlukla
   ☐ Her zaman

8. Son 7 gün içerisinde <u>burun şikayetleri nedeniyle</u> ne sıklıkla **konsantrasyon güçlüğü** yaşadınız**?**

   ☐ Hiçbir zaman
   ☐ Birkaç kez
   ☐ Bazen
   ☐ Çoğunlukla
   ☐ Her zaman

9. Son 7 gün içerisinde <u>burun şikayetleri nedeniyle</u> ne sıklıkla **normalde yaptığınız şeyler yapmakta zorluk yaşadınız?**

   ☐ Hiçbir zaman
   ☐ Birkaç kez
   ☐ Bazen
   ☐ Çoğunlukla
   ☐ Her zaman

10. Son 7 gün içerisinde <u>burun şikayetleri nedeniyle</u> ne sıklıkla **utanmış hissettiniz?**

   ☐ Hiçbir zaman
   ☐ Birkaç kez
   ☐ Bazen
   ☐ Çoğunlukla
   ☐ Her zaman

11. Son 7 gün içerisinde <u>burun şikayetleri nedeniyle</u> ne sıklıkla **siniri bozulmuş hissettiniz?**

    ☐ Hiçbir zaman
    ☐ Birkaç kez
    ☐ Bazen
    ☐ Çoğunlukla
    ☐ Her zaman

12. Son 7 gün içerisinde <u>burun şikayetleri nedeniyle</u> ne sıklıkla **asabi hissettiniz?**

    ☐ Hiçbir zaman
    ☐ Birkaç kez
    ☐ Bazen
    ☐ Çoğunlukla
    ☐ Her zaman

13. Son 7 gün içerisinde <u>burun şikayetleri nedeniyle</u> ne sıklıkla **üzgün veya kederli hissettiniz**

    ☐ Hiçbir zaman
    ☐ Birkaç kez
    ☐ Bazen
    ☐ Çoğunlukla
    ☐ Her zaman

14. Son 7 gün içerisinde <u>burun şikayetlerinizi</u> ne sıklıkla **düşündünüz?**

    ☐ Hiçbir zaman
    ☐ Birkaç kez
    ☐ Bazen
    ☐ Çoğunlukla
    ☐ Her zaman

ZAMAN AYIRIP ANKETİ DOLDURDUĞUNUZ İÇİN TEŞEKKÜR EDERİZ!