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Vestibular Rehabilitation Benefit Questionnaire: Turkish Validity and Reliability

Vestibüler Rehabilitasyon Fayda Anket: Türkçe Geçerlik ve Güvenirlik Çalışması

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ABSTRACT

Background: While clinical tools are useful for assessing certain aspects of treatment, they often fail to capture its overall effect on life satisfaction. The Vestibular Rehabilitation Benefit Questionnaire (VRBQ) serves as an effective instrument for evaluating how vestibular rehabilitation (VR) influences both quality of life and well-being.

Aim: The aim of the present study is examine the reliability and the validity of the Turkish Vestibular Rehabilitation Benefit Questionnaire.

Material – Methods: The VRBQ was initially translated into Turkish by the study authors, followed by a blind back-translation conducted by a native English speaker. The finalized version was administered to a sample of 220 individuals. To evaluate the questionnaire's psychometric properties, its internal consistency and construct validity were assessed.

Results: Following factor analysis, items 2, 6, and 17 were excluded from the questionnaire due to insufficient factor loadings. The Cronbach's alpha values for the two dimensions related to symptoms were 0.807 and 0.630, respectively, while the quality-of-life dimension yielded a coefficient of 0.834, indicating strong internal consistency. Evidence for the questionnaire's ability to detect change was provided by paired samples t-test findings, which identified significant improvements in most items from pre- to post-test, excluding items 17 and 19 ($p < 0.05$).

Conclusion: Findings from this study confirm that the VRBQ is a robust instrument for evaluating outcomes of vestibular rehabilitation.

Keywords: vertigo, vestibular hypofunction, vestibular rehabilitation, questionnaire, quality of life

ÖZET

Giriş: Klinik değerlendirme araçları tedavinin belirli yönlerini ölçmede faydalı olsa da, genellikle yaşam memnuniyeti üzerindeki genel etkisini yansıtmakta yetersiz kalırlar. Vestibüler Rehabilitasyon Fayda Ölçeği (VRBQ), vestibüler rehabilitasyonun (VR) yaşam kalitesi ve iyi oluş üzerindeki etkisini değerlendirmede etkili bir araçtır.

Amaç: Bu çalışmanın amacı, Vestibüler Rehabilitasyon Fayda Ölçeği'nin Türkçe versiyonunun geçerlik ve güvenirliğini değerlendirmektir.

Gereç ve Yöntem: VRBQ, çalışma yazarları tarafından Türkçeye çevrilmiş, ardından ana dili İngilizce olan bir kişi tarafından kör geri çeviri yapılmıştır. Nihai versiyon, 220 kişilik bir örneklem grubuna uygulanmıştır. Ölçeğin psikometrik özelliklerini değerlendirmek amacıyla iç tutarlılık ve yapı geçerliği analizleri yapılmıştır.

Bulgular: Faktör analizi sonucunda 2, 6 ve 17 numaralı maddeler düşük faktör yükü nedeniyle ölçekten çıkarılmıştır. Semptomlarla ilişkili iki boyut için Cronbach alfa değerleri sırasıyla 0.807 ve 0.630, yaşam kalitesi boyutu için ise 0.834 olarak bulunmuştur. Bu sonuçlar güçlü bir iç tutarlılığı göstermektedir. Ölçeğin değişime duyarlılığı, eşleştirilmiş örneklemler t-testi ile değerlendirilmiş ve 17 ve 19 numaralı maddeler hariç tüm maddelerde ön test ve son test sonuçları arasında istatistiksel olarak anlamlı iyileşmeler saptanmıştır ($p < 0.05$).

Sonuç: VRBQ'nun yüksek geçerlik ve güvenirlik değerleri, vestibüler rehabilitasyonun etkinliğini değerlendirmek için uygun bir araç olduğunu göstermektedir.

Anahtar Kelimeler: vertigo, vestibüler hipofonksiyon, vestibüler rehabilitasyon, ölçek, yaşam kalitesi

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Introduction

Addressing functional impairments resulting from vestibular disorders necessitates personalized treatment approaches tailored to individual needs and characteristics. Among the most prominent interventions is vestibular rehabilitation (VR), which comprises specific exercises and movement strategies designed to alleviate vestibular symptoms and their impact on daily functioning. The primary objectives of VR include enhancing gaze and postural stability, minimizing symptom severity and fall risk, reducing anxiety and panic, and supporting functional independence (1, 2).

Given the high prevalence of vestibular disorders as well as their substantial impact on quality of life, assessing the effectiveness of available rehabilitation strategies is essential. This can be achieved through both objective assessments and patient-reported outcomes. While generic health-related quality of life instruments offer an overview of a patient's condition, more targeted tools have been developed to specifically assess balance disturbances and post-treatment improvements (3, 4). Several English-language questionnaires are widely utilized for this purpose in the literature(5-7). The Vestibular Rehabilitation Benefit Questionnaire (VRBQ), created by Morris, Lutman, and Yardley, is a purpose-built instrument for evaluating the benefits of vestibular rehabilitation (4). This study focuses on validating the Turkish version of the VRBQ and examining its psychometric robustness.

Material and Methods

Ethical approval for the study was secured from the Human Research Ethics Committee of Ankara University (No: 14/230, 2019). All subjects signed an informed-consent. All procedures in this study followed the ethical guidelines established by the Declaration of Helsinki.

Vestibular Rehabilitation Benefit Questionnaire

The VRBQ evaluates the extent of an individual's current vestibular complaints and quality of life in comparison to their baseline or typical state. It is structured to measure outcomes both before and after vestibular rehabilitation, providing insight into symptom severity and quality of life changes. The questionnaire consists of two primary sections: Section A (items 1–11) assesses the severity and frequency of vertigo and motion-induced dizziness, whereas Section B (items 12–22) evaluates changes in quality of life associated with vestibular dysfunction. The total score is expressed as a percentage from 0 to 100, with any value above zero indicating the presence of symptoms, functional limitations, or diminished quality of life. Scoring is performed using a standardized scoring template, by summing the responses within each subscale and adjusting the raw scores in proportion to the amount of missing data. In cases where the calculated quality of life subscale yields a negative value, it is rounded up to zero (4).

Translation Procedure

Initially, two bilingual academicians with expertise in Audiology independently translated the questionnaire from English to Turkish. Following this, cultural and linguistic adaptations were carefully reviewed to ensure conceptual equivalence, and the most contextually appropriate expressions were selected. Back-translation process performed by a native English speaker. A comparative analysis between the original version and the back-translation was conducted, and necessary refinements were made to finalize the Turkish adaptation.

Subjects

The study sample comprised 220 individuals aged between 18 and 65 years who had been diagnosed with vestibular hypofunction and enrolled in a vestibular rehabilitation program. Participants were recruited using a convenience sampling approach. All individuals who met the inclusion criteria and were referred to the vestibular rehabilitation program during the data collection period were invited to participate. This non-probabilistic sampling strategy was considered appropriate given the study's clinical setting and the need to include enough participants undergoing similar rehabilitation procedures. Inclusion criteria required participants to be within the specified age range, of either sex, and to have experienced

Table.1. Factor Analysis Results for Symptoms

Dimension	Item	Factor Load	Explained Variance Rate	Cronbach's Alpha
Dimension 1	11	.805	34.021	.807
	10	.759		
	8	.746		
	9	.705		
	7	.663		
	3	.518		
Dimension 2	4	.660	17.413	.630
	1	.627		
	5	.616		
Symptoms Total			51.434	.826

dizziness and/or vertigo persisting for more than one month. Participants were excluded if they had significant visual or auditory impairments, orthopedic limitations that hindered engagement in vestibular rehabilitation, or if their dizziness/vertigo stemmed from neurological or cardiovascular causes.

Statistical Analysis and Validity Assessment

Statistical procedures were carried out with IBM SPSS Statistics 26.0 and structural equation modeling was performed using IBM AMOS. Descriptive statistics presented continuous variables as means, standard deviations, while categorical variables were described using frequency distributions.

Construct validity was investigated through an Exploratory Factor Analysis (EFA). The fitness of the data for factor analysis was first confirmed using the Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO). A KMO value of ≥0.50 and a statistically significant Bartlett's test result showed that the data were fitted for factor analysis.

The latent structure of the scale was explored by analyzing eigenvalues with a Scree Plot. If multiple components emerged, items were allocated to their respective factors using the varimax rotation technique, which assumes orthogonal factors. Item loadings on these factors were critically examined to determine item retention or elimination from the scale.

Reliability Analysis

Reliability assessment included internal consistency and test-retest evaluations. Internal consistency was quantified using Cronbach's alpha, which measures how closely related items are within a scale; values closer to 1 denote stronger internal reliability.

Results

Data from 220 individuals diagnosed with balance impairments were included in the analysis.

Section A: Factor Analysis and Reliability

For Section A, the KMO measure of sampling adequacy was 0.830 (threshold: >0.500), indicating suitability for factor analysis. Bartlett's Test of Sphericity, with a chi-square value of 634.981 ($p < 0.05$), further supported the correlation matrix's suitability for factor extraction. EFA revealed a three-factor structure (see Table 1). Items 2 and 6 were excluded due to substantial cross-loadings.

The first factor, comprising six items, exhibited loadings from 0.518 to 0.805 and accounted for 34.021% of the total variance. Its internal consistency was high (α=0.807). The second factor included three items with loadings between 0.616 and 0.660, explaining 17.413% of the variance, and showed acceptable reliability (α=0.630).

Section B: Factor Analysis and Reliability

In Section B, which assesses quality of life, the KMO value was 0.903, and Bartlett's test yielded a chi-

Table.2. Factor Analysis Results for Quality of Life

Dimension	Item	Factor Load	Explained Variance Rate	Cronbach's Alpha
Quality of Life	18	.763	44.312	.834
	15	.749		
	12	.745		
	13	.731		
	14	.666		
	22	.654		
	20	.652		
	16	.631		
	21	.566		
	19	.430		

square of 689.283 ($p < 0.05$), confirming data adequacy for factor analysis. The EFA identified a single-factor model with 10 items, where factor loadings ranged from 0.430 to 0.763. Item 17 was excluded due to a low loading. This factor explained 44.312% of the total variance and demonstrated strong internal consistency (α=0.834).

Confirmatory Factor Analysis (CFA) findings for the symptom dimension showed acceptable model fit. The chi-square/degrees of freedom ratio ($\chi 2$/df) was 2.271 (acceptable range: 2–5). The Root Mean Square Error of Approximation (RMSEA) was 0.076 (95% CI within acceptable limits: 0.05<RMSEA≤0.08). The Comparative Fit Index (CFI) was 0.953, exceeding the 0.95 threshold for acceptable fit. Furthermore, the Weighted Root Mean Square Residual (WRMR) value was 0.068, well below the 1.00 cut-off. Collectively, these fit indices support the questionnaire's construct validity (See Table 2).

Discussion

The objective of this study was to adapt the VRBQ into Turkish and to examine its validity and reliability. Findings support that the Turkish version is a psychometrically sound instrument for evaluating the effectiveness of vestibular rehabilitation.

In numerous vestibular rehabilitation studies, self-reported questionnaires have been commonly utilized to monitor patient progress (8-11). Such tools are particularly effective in capturing patients' subjective perceptions of improvements (8). The VRBQ is among these self-administered scales, designed specifically to assess the status and treatment response of individuals undergoing vestibular rehabilitation. Comprising 22 items, the VRBQ focuses on evaluating improvements in quality of life, dizziness, anxiety, and motion-provoked symptoms. The questionnaire has proven to be sensitive even to subtle clinical changes and has shown greater sensitivity in detecting treatment outcomes compared to other widely used instruments (4).

In the original development study by Morris (2009) (4), test-retest reliability demonstrated high interclass correlation coefficients: 0.92 for the total score, 0.99 for dizziness, 0.99 for anxiety, 0.98 for movement-induced dizziness, and 0.94 for the quality of life subscale. Overall internal consistency, as measured by Cronbach's alpha, was 0.68, with the highest value observed in the quality of life domain and the lowest in the total score. These results suggest strong coherence among questionnaire items. Similarly, Morris et al. (4), reported alpha coefficients of 0.73 for the overall scale, and between 0.74 and 0.92 across subscales, indicating solid internal reliability.

In the current study, the symptoms subscale explained 51.434% of the total variance, with a Cronbach's alpha of 0.826. The quality of life domain accounted for 44.312% of the variance and had an alpha coefficient of 0.834. Exploratory factor analysis supported a three-factor solution, although items 2, 6, and 17 were removed due to overlapping factor loadings. Overall, these results support the high psychometric

quality of the Turkish VRBQ version, consistent with previous cross-cultural adaptation studies (12-14).

Additionally, a significant difference was observed in pre- and post-intervention scores on the VRBQ, with the exception of items 17 and 19 ($p < 0.05$). This indicates that the questionnaire is also suitable for tracking patient progress throughout the course of vestibular rehabilitation.

This study has several limitations that should be acknowledged. First, the use of a convenience sampling method and recruitment from a single rehabilitation program may limit the generalizability of the findings to broader vestibular patient populations. Second, the sample consisted primarily of individuals with vestibular hypofunction; therefore, the results may not be fully applicable to patients with other vestibular disorders. Finally, self-reported measures such as the VRBQ may be subject to response bias despite the rigorous translation and validation procedures applied. Future studies with larger and more diverse samples, including multiple clinical settings, are recommended to further confirm the psychometric robustness of the Turkish VRBQ.

Conclusion

Based on the advantages of the VRBQ, its current version will be available to Turkish clinicians and will be a reliable tool for monitoring the vestibular rehabilitation process and determining its effectiveness in vertigo/dizziness patients.

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Patient consent: Informed consent was obtained from the patients.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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