RESEARCH ARTICLE/ARAŞTIRMA MAKALESİ

KARYA JOURNAL OF HEALTH SCIENCE

journal homepage: www.dergipark.org.tr/kjhs

TRANSLATION, CULTURAL ADAPTATION, RELIABILITY, AND VALIDITY OF THE TURKISH VERSION OF THE HEADACHE IMPACT QUESTIONNAIRE

BAŞ AĞRISI ETKİ ANKETİ'NİN TÜRKÇE VERSİYONUNUN ÇEVİRİSİ, KÜLTÜREL UYUMU, GÜVENİLİRLİĞİ VE GEÇERLİLİĞİ

Halime Arıkan*

Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Tokat Gaziosmanpaşa University, Tokat, Türkiye

ABSTRACT

Objective: To prove the reliability and validity of the Turkish version of the Headache Impact Questionnaire (HImQ) for evaluating individuals with headaches.

Method: 102 individuals (31.12±12.39 years) with headaches participated in the study. Test-retest and internal consistency analyses were used to assess the reliability of the HImQ, and Exploratory (EFA) and Confirmatory Factor Analysis (CFA), and correlation analysis was used to determine its validity. For correlation analysis, the total scores of the HImQ, Headache Impact Test-6 (HIT-6), and Migraine Disability Assessment Scale (MIDAS) were calculated.

Results: The Turkish version of the HImQ demonstrated high reliability with an Intraclass Correlation Coefficient of 0.846 and a Cronbach's α of 0.769. Structural validity through EFA indicated a three-factor structure, supported by KMO (0.759) and Bartlett's sphericity test values (780.133; p<0.001). CFA confirmed this structure with good fit indices. Convergent validity was supported by good correlations between the HImQ and HIT-6 (r=0.429; p=0.000), and MIDAS (r=0.487; p=0.000). No floor or ceiling effects were detected.

Conclusion: This study established the Turkish HImQ as a reliable and valid measure for evaluating the impact of headaches on daily functioning. With strong internal consistency, test-retest reliability, and supported validity, the scale proved effective for clinical and research use in the Turkish-speaking people. It provides a solid framework for assessing headache-related disability in daily life.

Key Words: Headache, Migraine, Questionnaire, Psychometrics

ÖZ

Amaç: Baş ağrısı olan bireylerin değerlendirilmesinde Baş Ağrısı Etki Anketi'nin (BEA) Türkçe versiyonunun güvenilirliğini ve geçerliliğini kanıtlamaktı.

Yöntem: Çalışmaya baş ağrısı yaşayan 102 birey (31,12±12,39 yıl) katıldı. BEA'nın güvenilirliğini değerlendirmek için test-tekrar test ve iç tutarlılık analizleri, geçerliliğini belirlemek için ise Açımlayıcı Faktör Analizi (AFA), Doğrulayıcı Faktör Analizi (DFA) ve korelasyon analizi kullanıldı. Korelasyon analizinde, BEA, Baş Ağrısı Etki Testi-6 (BET-6) ve Migren Engellilik Değerlendirme Ölçeği (MEDÖ) toplam puanları hesaplandı.

Bulgular: BEA'nın Türkçe versiyonu, 0.846'lık bir iç tutarlılık katsayısı ve 0.769'luk bir Cronbach's α ile yüksek güvenilirlik gösterdi. AFA ile yapılan yapısal geçerlilik, Kaiser-Meyer-Olkin test (0.759) ve Bartlett'in sphericity testi değerleri (780,133; p<0,001) ile desteklenen üç faktörlü bir yapı ortaya koydu. DFA bu yapıyı iyi uyum indeksleri ile doğruladı. BEA ile BET-6 (r=0,429; p=0,000) ve MEDÖ (r=0,487; p=0,000) arasındaki iyi korelasyonlar, yakınsak geçerliliği destekledi. Taban ve tavan etkileri tespit edilmedi.

Sonuç: Bu çalışma, baş ağrılarının günlük işlevsellik üzerindeki etkisini değerlendirmek için güvenilir ve geçerli bir ölçüt olarak Türkçe BEA'yı ortaya koydu. Güçlü iç tutarlılık, test-tekrar test güvenilirliği ve desteklenen geçerlilikle, ölçek Türkçe konuşan bireylerde klinik ve araştırma kullanımı için etkili olduğunu kanıtladı. Günlük yaşamda baş ağrısıyla ilişkili engelliliği değerlendirmek için sağlam bir çerçeve sağlar.

Anahtar Kelimeler: Baş Ağrısı, Migren, Anket, Psikometri

INTRODUCTION

Headaches are probably the most common reason for referral to neurologists in the 21st century [1]. Headaches are classified as primary or secondary headaches. Primary headaches include migraine, tension-type, and trigeminal autonomic cephalgias that are not related to an underlying medical condition. Secondary headaches occur with association with a certain disorder known to cause headaches. Headaches associated with trauma or head and/or neck injury are examples [2]. Migraine and tension-type headaches are the most common primary headaches, while cervicogenic headache is the most common secondary headache [3,4].

Headache is one of the most common health problems associated with various medical costs, socioeconomic status, and reduced quality of life [5-7]. Headache disorders are among the main causes of disability worldwide; however, most individuals are unfortunately not professionally diagnosed. Instead, individuals turn to over-the-counter medication to self-manage symptoms [8]. Information about any headache attack is not sufficient to characterize the overall severity of the disease. Accordingly, the Headache Impact Questionnaire (HImQ) was developed to evaluate the headache experience over a period rather

than any headache. Because physicians and patients often cannot communicate effectively about headache severity, it was thought that a simple self-administered questionnaire measuring the impact of headaches could improve doctor-patient communication and facilitate treatment decisions. Such a questionnaire can also provide a screening tool to identify individuals in need of care and an outcome measure for clinical practice, clinical trials, and epidemiological studies. HImQ, which was developed to measure the impact and quality of life of individuals suffering from headaches, evaluates the frequency and duration of headaches, the degree of pain severity, daily living activities, disruptions in work or school life, the influence of leisure activities of the individual, and other symptoms that may occur [9].

Primary care providers will constantly encounter headache as a clinical problem. Appropriate treatment after early and accurate diagnosis will help reduce pain, suffering and economic burden. However, before all of this, it is important to evaluate the headache and its effects correctly and to deal with it from many perspectives. While there are established headache-specific measures, it was aimed to address unique aspects of headache assessment that the HImQ offers, which are particularly relevant for the Turkish population. The HImQ provides a comprehensive evaluation across multiple dimensions of headache impact, including frequency, duration, pain intensity, disruptions to daily living activities, and other symptoms related to headaches. Furthermore, the HImQ's development process, rooted in previous population-based headache studies, underscores its strength as a validated tool across diverse headache types and impacts, making it an ideal candidate for thorough psychometric analysis in a Turkish context. Therefore, the aim of this study was to adapt, and analyze the validity and reliability of the Turkish version of the self-administered HImQ, which was developed to evaluate the headache experience for a certain period rather than any headache.

METHOD

Study Design and Participants

This study was designed as a methodological research to evaluate the validity and reliability of the Turkish version of the HImQ.

The sample of the study consisted of at least 99 individuals over the age of 18 with headache complaints. Based on the original study of HImQ developed by Stewart et al. [9] the expected reliability level, minimal acceptable reliability level, α, and β was taken as $\rho 1=0.85$, $\rho 0=0.75$ [10], 0.05, and 0.20, respectively. The sample size was determined as 99.

The study sample comprised individuals aged 18 and older who had headache complaints and were residents of Tokat, Turkey. The participants of the study were Tokat Gaziosmanpaşa University students, employees and individuals residing in Tokat. Potential participants were approached and verbally invited to join the study, with detailed information provided about the research objectives and procedures. Those who expressed interest and gave their consent were subsequently enrolled in the study. The questionnaires were filled out face to face by individuals at Tokat Gaziosmanpaşa University Faculty of Health Sciences. Additionally, individuals who received any headache diagnosis from a neurologist at any point in their lives were recorded. However, having a specific headache diagnosis was not a prerequisite for participation; simply having a complaint of headache was sufficient for inclusion in the study.

Inclusion Criteria: Individuals meeting the following conditions were included in the study:

- Had a headache complaint for at least 3 months,
- Had a diagnosis of headache at any time in their life (a formal diagnosis was not required; having a complaint was sufficient),
- Could speak, read, and write in Turkish,
- Were over 18 years of age,
- Volunteered to participate in the study.

Exclusion Criteria: Individuals were excluded if they:

- Could not speak, read, or write in Turkish,
- Had any neurological, psychiatric, or cognitive impairments.

Translation

The steps for translation and cultural adaptation, based on the Beaton guidelines, were as follows [11]: 1) The original version of the HImQ was translated into Turkish separately by two native Turkish speakers (proficient in the English language); 2) Then the translations were combined by these two translators to form a single translation; 3) The final Turkish version of the HImQ was translated back into English by two translators who were unaware of the study; 4) Later, the translations were combined by these two translators to create a suitable and single translation; and 5) Back translation and cultural adaptation were conducted by an expert committee consisting of a physiotherapist, an English linguist, and two translators, and the final form of the scale was created.

Face validity simply refers to whether an instrument measures what it is intended to and whether it serves as a reasonable method for the intended purpose. Generally, testing on 15-30 individuals is sufficient. Face validity of the prefinal Turkish version of HImQ was tested on 30 individuals with headaches [12]. Since no negative or incomprehensible feedback was received from these individuals, the prefinal version was accepted as the final version. Seven days later, 70 subjects who were contacted again were included in the test-retest analysis. A sample size of 70 participants for the retest analysis is considered adequate and exceeds common standards for reliability testing. Specifically, reliability is typically rated positively when the Intraclass Correlation Coefficient (ICC) or weighted Kappa reaches a threshold of 0.70 or higher, with a minimum sample size of 50 patients being sufficient for robust statistical analysis [13]. Thus, having 70 individuals in the retest group not only meets but also enhances the reliability assessment's statistical power, providing confidence in the consistency of the results.

Outcome Measures

Sociodemographic Form: Sociodemographic information on individuals' age, weight, height, body mass index, complaint duration, gender, presence of migraine, smoking, and alcohol use were recorded.

The Headache Impact Questionnaire (HImQ): HImQ is a self-administered questionnaire designed to measure the frequency and duration of headaches, the degree of pain intensity, the disruptions in activities of daily living, work or school life, the impact of the individual's leisure activities, and other symptoms that may occur in individuals with headache complaints. The scale consists of 16 items. Early in the development of HImQ, the first draft questionnaire was created based on questions used in previous population-based migraine headache studies. When calculating the total score of the HImQ, not all items are included. The total score is calculated as follows:

item 4+[item 14*(item 1-item 13)]+[item 12*(item 1-item 11)]+[item 10*(item 1-item 9)].

The test-retest correlations of the items were found to be between 0.64-0.86. It has been reported that HImQ is at an acceptable level in terms of intended psychometric properties [9].

The Headache Impact Test-6 (HIT-6): HIT-6 evaluates conditions such as pain, psychological stress, and social and cognitive functions in individuals with headaches. It consists of 6 items and each question contains a 5-point Likert-type answer. The total score ranges from 36-78. An increased score indicates greater exposure to headaches [14]. Its Turkish validity and reliability were performed [15].

The Migraine Disability Assessment Scale (MIDAS): MIDAS is a 5-item scale developed in 1999 to measure the effect of headaches on the quality of life in patients diagnosed with migraine [16]. It has

widespread use. It was used in this study because it evaluated the quality of life. Turkish validity and reliability were established [17].

Ethical Approval

All participants were informed about the assessments before the study, volunteered for the study in compliance with the Helsinki Declaration, and signed the Informed Consent Form. The necessary permission and approval were obtained from the Tokat Gaziosmanpaşa University Ethics Committee of Clinical Investigations for the study (date: 25.08.2022, approval number: 2022/14) and the study was registered in ClinicalTrials.gov (NCT04765501).

Statistical Analysis

Statistical Package for Social Sciences (SPSS) version 22.0 software was used for statistical analyses. Analyses are expressed as mean±standard deviation and as a percentage.

Internal consistency and test-retest analyses were used to determine the reliability of the HImQ. Internal consistency analysis was calculated by Cronbach's α, and test-retest values were calculated by Intraclass Correlation Coefficient (ICC). A Cronbach α value of ≥0.70 was considered acceptable [13]. ICC values ≤0.5, 0.50-0.75, 0.75-0.90, and >0.90 represented weak, moderate, good, and excellent reliability, respectively [18]. To evaluate the agreement and systematic variation between test and retest scores, a t-test was conducted, and Bland-Altman plots with 95% agreement limits were used [12]. Reproducibility was assessed using the standard error of measurement (SEM) and minimal detectable change (MDC). The SEM and MDC were calculated using the following formulas [18]:

SEM95: $SD/\sqrt{(1-ICC)}$; where SD is the standard deviation of participants and ICC is the reliability coefficient

MDC95: $z*SEM*\sqrt{2}$; where z=1.96 (based on 95% confidence) and SEM is the standard error of measurement

The structural validity of HImQ was evaluated with Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The following metrics were examined: Kaiser-Meyer-Olkin (KMO) test, Bartlett's test of sphericity (BTS), as well as the percentage of variance explained, eigenvalues, and factor loadings. A KMO value of 0.50 or higher is considered acceptable for assessing the adequacy of performing EFA on a variable set [19]. BTS values with a p-value below 0.05 suggest that the covariance matrix is appropriate for factor analysis [20]. An acceptable percentage of variance explained is 50% or greater [21]. Factors with eigenvalues greater than 1 were considered [19], and loadings above 0.40 were deemed significant and thus included in the analysis [12]. For CFA, the fit of each factor structure was assessed using several criteria: chi-square/degrees of freedom (CMIN/DF), Goodness of Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Squared Residual (SRMR). Acceptable thresholds for these indices include a CMIN/DF less than 3, a GFI greater than 0.90, an RMSEA below 0.10, and an SRMR less than 0.10 [22]. Terwee et al. recommend a minimum sample size of 100 individuals for CFA [13]. The convergent validity of the questionnaire was calculated by correlating the total score of the HImQ with the total scores of the HIT-6, and MIDAS. Pearson's and Spearman's correlations were used for this analysis, and it was interpreted as excellent (r=0.81-1.00), very good (r=0.61-0.80), well (r=0.41-0.60), poor (r=0.21-0.40), and bad correlation (r=0-0.20) [23].

The percentage of the lowest (0 point) and highest (37810 points) questionnaire score was calculated to determine the floor and ceiling effect of the Turkish version of the HImQ [13].

All values were considered significant at p<0.05.

RESULTS

The initial test group consisted of 102 individuals with a mean age of 31.12±12.39 years (81 women and 21 men), while the retest group consisted of 70 individuals with a mean age of 32.73±12.87 years (52 women and 18 men). The duration of headache complaints for the initial group was 65.26±64.61 months, whereas for the retest group, it was 66.20±71.98 months. Additionally, in the first group, 47 individuals (46.1%) were diagnosed with migraine, compared to 27 individuals (38.6%) in the second group. Detailed information about the individuals is presented in Table 1.

Table 1. Characteristics of individuals

		Test group (n=102) Mean±SD	Retest group (n=70) Mean±SD
Age (years)		31.12±12.39	32.73±12.87
Weight (kg)		68.18±14.60	70.93±14.53
Height (m)		1.67±0.08	1.68±0.09
BMI (kg/m²)		24.46±4.76	25.13±5.08
Complaint duration		65.26±64.61	66.20±71.98
Pain intensity		68.86±18.16	68.30±19.44
HImQ		1554.67±1604.37	1267.57±1047.32
HDQ		44.01±14.31	42.06±13.43
HIT-6		61.92±6.43	61.07±6.75
MIDAS		36.90±33.82	38.49±34.62
		n (%)	n (%)
Gender			
	Female	81 (79.4)	52 (74.3)
	Male	21 (20.6)	18 (25.7)
Presence of migraine			
	Yes	47 (46.1)	27 (38.6)
	No	55 (53.9)	43 (61.4)
Smoking			
	Yes	33 (32.4)	22 (31.4)
	No	69 (67.6)	48 (68.6)
Alcohol use			
	Yes	9 (8.8)	6 (8.6)
	No	93 (91.2)	64 (91.4)

SD: Standard deviation; kg: Kilogram; m: Meter; BMI: Body mass index; kg/m²: Kilogram/Meter²; HImQ: Headache Impact Questionnaire; HIT-6: Headache Impact Test-6; MIDAS: Migraine Disability Assessment.

Table 2. Item properties for the HImQ (n=102)

Item	Mean	SD	Corrected item-total correlation	Cronbach's α if item deleted
1. HAFREQ	16.74	11.87	0.343	0.759
2. LASTHA	6.78	7.50	-0.136	0.781
3. DURATION	3.73	3.18	0.267	0.769
4. PAININT	6.92	1.78	0.616	0.767
5. PAINSEV%	62.94	19.58	0.537	0.739
6. LIEDOWN%	64.41	23.78	0.593	0.732
7. LIEDOWNF	11.43	11.35	0.404	0.756
8. MISWORK%	26.57	26.31	0.385	0.763
9. MISWORKF	2.29	2.95	0.380	0.767
10. WORKEFF%	45.00	27.85	0.427	0.760
11. MISCHOREF	8.19	10.09	0.289	0.763
12. CHOREFF%	54.71	21.70	0.698	0.719
13. MISNWORKF	7.57	7.90	0.416	0.759
14. NWORKEFF%	54.90	22.10	0.729	0.714
15. NAUSEA	1.22	0.95	0.404	0.770
16. SENSITIVITY	2.32	0.86	0.432	0.771

Cronbach's α: 0.917; Intraclass Correlation Coefficient (ICC): 0.846; Standard Error Measurement (SEM): 387.3824; Minimal Detectable Change (MDC): 1073.769; HAFREQ: Number of days with headache; LASTHA: The latest headache; DURATION: Headache duration; PAININT: Headache intensity; PAINSEV%: Percentage of severe headaches; LIEDOWN%: Percentage of rest in headache; LIEDOWNF: Number of rests more than 1 hour due to headache; MISWORK%: Missing work or school due to headaches; MISWORKF: Number of days missing work or school due to headache; WORKEFF%: Percentage of decreased ability to work or school due to headache; MISCHOREF: Inability to do housework or chores due to headache; CHOREFF%: Percentage of not being able to do housework or chores; MISNWORKF: Number of days spent away from non-work activities due to headaches; NWORKEFF%: Percentage of not being able to do non-work activities; NAUSEA: Frequency of nausea; SENSITIVITY: Frequency of light or sound sensitivity.

For the Turkish version of the HImQ, the Intraclass Correlation Coefficient (ICC) was 0.846, and the Cronbach's α value was 0.769. The SEM and the MDC were found to be 387.38 and 1073.77, respectively. Table 2 shows the mean, standard deviation, corrected item-total correlation, and Cronbach's α if item deleted values for the questionnaire items. Additionally, Bland-Altman plots supported the reliability of the HImQ (Figure 1).
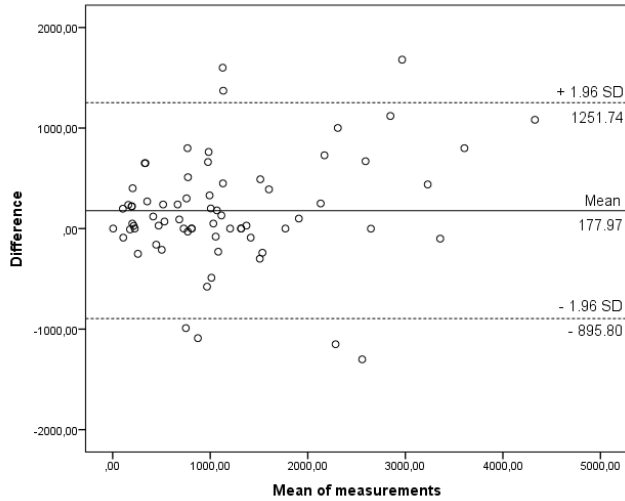

Figure 1. Bland–Altman's plots of the HImQ test–retest scores (n=70)

The structural validity assessed through EFA revealed a three-factor structure. The Kaiser-Meyer-Olkin (KMO) test value (0.759) and Bartlett's sphericity test value (780.133; p<0.001) supported the adequacy of the sample size for this analysis (Table 3 and Figure 2).

Table 3. Factor analysis results for the HımQ (n=102)

Items	Factor 1	Factor 2	Factor 3
3. DURATION	0.443		
4. PAININT	0.702		
5. PAINSEV%	0.680		
6. LIEDOWN%	0.671		
12. CHOREFF%	0.776		
14. NWORKEFF%	0.774		
15. NAUSEA	0.675		
16. SENSITIVITY	0.597		
1. HAFREQ		0.847	
2. LASTHA		-0.523	
7. LIEDOWNF		0.840	
11. MISCHOREF		0.854	
13. MISNWORKF		0.755	
8. MISWORK%			0.832
9. MISWORKF			0.811
10. WORKEFF%			0.767
Percent Variance (%)	24.457	45.704	58.994

Kaiser-Meyer-Olkin test: 0.759; Bartlett's test: 780.133 p<0.001; Minimum Discrepancy Function by Degrees of Freedom (CMIN/DF): 1.99; Root Mean Square Error of Approximation (RMSEA): 0.099; Standardized Root Mean Squared Residual (SRMR): 0.076; Goodness of Fit Index (GFI): 0.95; HAFREQ: Number of days with headache; LASTHA: The latest headache; DURATION: Headache duration; PAININT: Headache intensity; PAINSEV%: Percentage of severe headaches; LIEDOWN%: Percentage of rest in headache; LIEDOWNF: Number of rests more than 1 hour due to headache; MISWORK%: Missing work or school due to headaches; MISWORKF: Number of days missing work or school due to headaches; WORKEFF%: Percentage of decreased ability to work or school due to headache; MISCHOREF: Inability to do housework or chores due to headache; CHOREFF%: Percentage of not being able to do housework or chores; MISNWORKF: Number of days spent away from non-work activities due to headaches; NWORKEFF%: Percentage of not being able to do non-work activities; NAUSEA: Frequency of nausea; SENSITIVITY: Frequency of light or sound sensitivity.

However, if the items forming the factors are more similar, naming is preferred. In the original version, a four-factor structure emerged and no naming was done. Therefore, it could not be done in this study. The construct validity of this three-factor structure was confirmed through

CFA (Figure 3). The CFA results showed a CMIN/DF value of 1.99, RMSEA value of 0.099, SRMR value of 0.076, and GFI value of 0.95. Convergent validity was examined by correlating the HImQ with the HIT-6, and MIDAS. This analysis also showed a good correlation between the HImQ with HIT-6 (r=0.429; p=0.000) and MIDAS (r=0.487; p=0.000).

No floor or ceiling effects were observed, with both percentages being 0% for each assessment.

DISCUSSION

The aim of this study was to investigate the validity and reliability of the Turkish version of the HImQ in individuals with headache complaints. The adaptation and statistical results show that the HImQ is an appropriate, valid, and reliable assessment tool for individuals with headache complaints in the Turkish population.

Clinical scales and patient-reported outcome measures (PROMs) for headache disorders include various instruments like the Headache Activities of Daily Living Index and the Headache Disability Questionnaire, many of which are specifically designed for migraine and have established validity and reliability [24]. While the HImQ was developed for migraine patients, its items also apply to individuals with headache complaints lacking a formal diagnosis. Therefore, it is essential to evaluate the validity and reliability of the Turkish version of the HImQ.
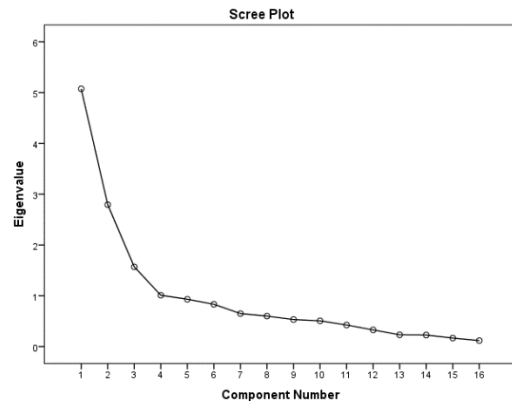

Figure 2. Scree plot of the HımQ (n= 102)

The internal consistency of the Turkish version of the HImQ was assessed using Cronbach's alpha coefficient, which was found to be 0.769. When compared with the original version of the HImQ [9], which had a Cronbach's alpha of 0.83, the Turkish version shows a similar, albeit slightly lower, internal consistency. This slight difference could be attributed to cultural and linguistic factors, which might influence how individuals interpret and respond to items on the scale. Nonetheless, the Cronbach's alpha value for the Turkish version still falls within the acceptable range, indicating comparable reliability to the original version.

Test-retest reliability was also evaluated in this study, which is a critical component for ensuring that the instrument produces stable and consistent results over time. According to the literature, there is no definitive time interval for test-retest analysis [25,26]. According to Marx et al., test-retest intervals of 2 days to 2 weeks are sufficient for evaluating the stability of responses over time [25]. In the original study by Stewart et al., the test-retest interval ranged from 33 to 55 days, and the reported Intraclass Correlation Coefficient (ICC) values were between 0.77 and 0.85 [9]. The current study employed a shorter, 2-week interval, aligning with commonly accepted practices in the literature for headache-related scales. The ICC value for the Turkish version was found to be 0.846, which is in line with the reliability of the original version. An ICC value above 0.75 generally indicates good reliability, further supporting the robustness of the Turkish version of the HImQ.
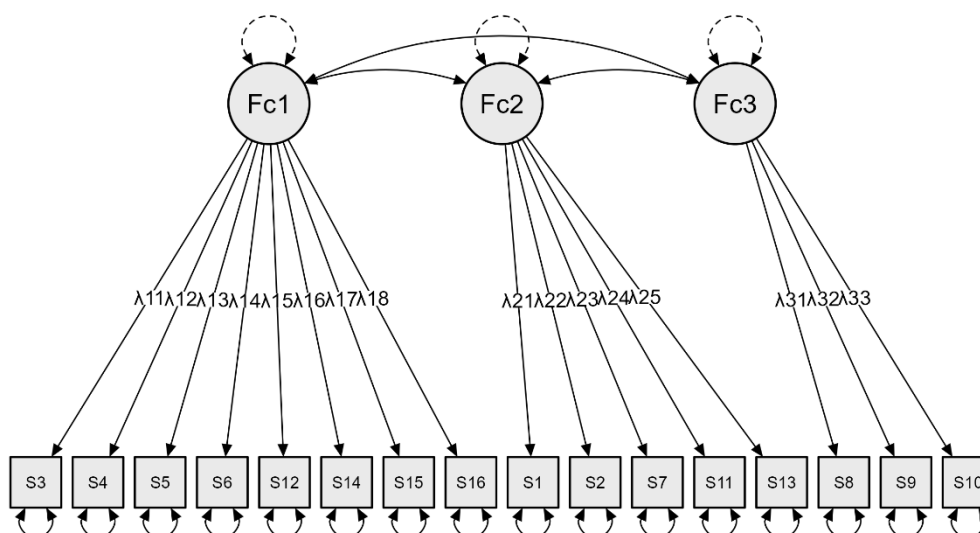
Figure 3. The CFA diagram shows the three-factor structure of the Turkish version of the HImQ (n=102)

In addition to internal consistency and test-retest reliability, this study also introduced measurements of the SEM and MDC, which were not reported in the original study [9]. The SEM and MDC provide insights into the measurement precision of the scale and the smallest change that can be detected beyond measurement error, respectively. The SEM value of 387.38 and MDC value of 1073.77 suggest that the Turkish version of the HImQ has reasonable sensitivity for detecting changes in headache impact over time. However, it is important to note that these values may vary depending on the population and the context in which the scale is used. Therefore, further studies across different populations and headache types are necessary to provide more generalized conclusions regarding these psychometric properties.

The KMO and Bartlett's test results indicated that the sample size was both appropriate and sufficient for factor analysis, with the KMO value being greater than the acceptable threshold of 0.50, and Bartlett's test of sphericity confirming that the data were suitable for factor analysis (p<0.001). Structural validity, which examines how well the scale measures the theoretical construct it is intended to assess, was evaluated through both EFA and CFA. The EFA revealed that the Turkish version of the HImQ demonstrated a three-factor structure, which is slightly different from the four-factor structure found in the original version of the HımQ [9]. This discrepancy could be attributed to cultural differences in how headache-related symptoms are perceived and reported by Turkish-speaking individuals compared to those in the original study population. Despite the difference in factor structure, the CFA provided further support for the validity of the Turkish version of the HImQ. The CFA results showed that the values for key fit indices-CMIN/DF, RMSEA, SRMR, and GFI-all fell within the acceptable range, indicating a good fit between the hypothesized model and the observed data. Specifically, a CMIN/DF value less than 3, an RMSEA value below 0.10, an SRMR value below 0.08, and a GFI greater than 0.90 are all considered indicative of a well-fitting model. These findings suggest that the three-factor structure of the Turkish version of the HImQ is statistically sound and appropriate for use in this population. This study represents the first instance where CFA was applied to the HImQ, as the original validation study did not conduct CFA to confirm the factor structure identified in EFA. The fact that the current study was able to validate the structural validity of the Turkish version through CFA adds to the robustness of the scale's psychometric properties.

In addition to structural validity, convergent validity-a subtype of construct validity-was also examined in this study. Convergent validity assesses whether two measures that theoretically should be related are indeed correlated in practice. In this case, the total scores of the Turkish HImQ were compared with scores from two well-established headache-related scales, the HIT-6 and the MIDAS. The statistically significant correlations observed between the HImQ and both the HIT-6 (r=0.429, p =0.000) and MIDAS (r=0.487, p=0.000) indicate that the HImQ is appropriately measuring headache-related disability and impact, similarly to these widely recognized instruments. This further supports the convergent validity of the Turkish version of the HImQ, indicating that it is a valid tool for assessing the broader impact of headaches on individuals' lives.

Overall, the results of this study indicate that the Turkish version of the HImQ is a reliable tool for assessing the impact of headaches in a Turkish-speaking population. However, further research is needed to explore its applicability across various subgroups, as well as its potential use in longitudinal studies where sensitivity to change over time is critical. The results of the EFA, CFA, and convergent validity analyses confirm that the Turkish version of the HImQ is a valid instrument for assessing headache-related impact in a Turkish-speaking population. The introduction of CFA in this study adds a layer of rigor to the validation process, and the strong correlations with other headache assessment tools highlight the scale's practical relevance in both clinical and research settings.

Limitations

One limitation of this study is that the Turkish version of the HImQ was evaluated solely within individuals with headache complaints, which may restrict its generalizability to other headache diagnoses or populations. Further research involving various headache types is needed to explore the scale's applicability across different headache disorders. Additionally, sensitivity and specificity analyses for different headache diagnoses were not conducted, which limits our understanding of the scale's diagnostic precision. Another limitation is the lack of longitudinal data to assess the HImQ's ability to detect changes over time. Future studies should address these aspects to provide a more comprehensive evaluation of the HImQ's utility and effectiveness.

CONCLUSION

This study confirms that the Turkish version of the HImQ is a valid and reliable tool for assessing the impact of headache complaints on daily functioning. The scale demonstrates strong internal consistency and test-retest reliability, with a well-supported factor structure and good convergent validity. The findings suggest that the HImQ can be effectively used to evaluate headache-related disability in the Turkish population, providing valuable insights for both clinical assessment and research. Overall, the Turkish HImQ offers a robust tool for understanding and addressing the daily impact of headaches in clinical settings.

REFERENCES

1. Steiner TJ, Stovner LJ, Katsarava Z, et al. The impact of headache in Europe: principal results of the Eurolight project. J Headache Pain. 2014;15:1-11.
2. Arnold M. Headache classification committee of the international headache society (IHS) the international classification of headache disorders. Cephalalgia. 2018;38:1-211.
3. Ferrante T, Manzoni GC, Russo M, et al. Prevalence of tension-type headache in adult general population: the PACE study and review of the literature. Neurol Sci. 2013;34:137-8.
4. Burch R, Rizzoli P, Loder E. The prevalence and impact of migraine and severe headache in the United States: figures and trends from government health studies. Headache J Head Face Pain. 2018;58:496-505.
5. Crystal SC, Robbins MS. Epidemiology of tension-type headache. Curr Pain Headache Rep. 2010;14:449-54.
6. Stovner LJ, Hagen K, Jensen R, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia. 2007;27:193-210.
7. Torelli P, Lambru G, Manzoni GC. Psychiatric comorbidity and headache: clinical and therapeutical aspects. Neurol Sci. 2006;27:s73-6.
8. Stovner LJ, Nichols E, Steiner TJ, et al. Global, regional, and national burden of migraine and tension-type headache, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet Neurol. 2018;17:954-76.
9. Stewart WF, Lipton RB, Simon D, Von Korff M, Liberman J. Reliability of an illness severity measure for headache in a population sample of migraine sufferers. Cephalalgia. 1998;18:44-51.
10. Andresen EM. Criteria for assessing the tools of disability outcomes research. Arch Phys Med Rehabil. 2000;81:S15-20.
11. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures. Spine (Phila Pa 1976). 2000;25:3186-3191.
12. Portney LG. Foundations of clinical research: applications to evidence-based practice. 4th ed. Philadelphia: FA Davis; 2020.
13. Terwee CB, Bot SDM, de Boer MR, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007;60:34-42.
14. Kosinski M, Bayliss MS, Bjorner JB, et al. A six-item short-form survey for measuring headache impact: The HIT-6TM. Qual life Res. 2003;12:963-74.
15. Dikmen PY, Bozdağ M, Güneş M, et al. Reliability and validity of Turkish version of Headache Impact Test (HIT-6) in patients with migraine. Arch Neuropsychiatry. 2021;58:300-307.
16. Stewart WF, Lipton RB, Kolodner K, Liberman J, Sawyer J. Reliability of the migraine disability assessment score in a population-based sample of headache sufferers. Cephalalgia. 1999;19:107-114.
17. Ertaş M, Siva A, Dalkara T, et al. Validity and reliability of the Turkish Migraine Disability Assessment (MIDAS) questionnaire. Headache J Head Face Pain. 2004;44:786-93.
18. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med. 2016;15:155-63.
19. Black WC, Babin BJ, Anderson RE. Multivariate data analysis: A global perspective. 7th ed. New York: Pearson; 2010.
20. Tabachnick BG, Fidell LS, Ullman JB. Using multivariate statistics. Pearson Boston, MA; 2013.
21. Beavers AS, Lounsbury JW, Richards JK, Huck SW, Skolits GJ, Esquivel SL. Practical considerations for using exploratory factor analysis in educational research. Pract Assessment, Res Eval. 2019;18:6.
22. Erkorkmaz Ü, Etikan İ, Demir O, Özdamar K, Sanisoğlu SY. Doğrulayıcı faktör analizi ve uyum indeksleri. Turkiye Klin J Med Sci. 2013;33:210-23.
23. Feise RJ, Menke JM. Functional rating index: a new valid and reliable instrument to measure the magnitude of clinical change in spinal conditions. Spine (Phila Pa 1976). 2001;26:78-87.
24. Dikmen PY, Ozge A, Martelletti P. The use of clinical scales and PROMs in headache disorders and migraine, summarizing their dissemination and operationalization. Heliyon. 2023;9(5):e16187.
25. Marx RG, Menezes A, Horovitz L, Jones EC, Warren RF. A comparison of two time intervals for test-retest reliability of health status instruments. J Clin Epidemiol. 2003;56:730-5.
26. Allen MJ, Yen WM. Introduction to measurement theory. 11th ed. Long Grove, Illinois: Waveland Press; 2001.