Original Article

Reliability and Validity Study of the Migraine Interictal Burden Scale-4 in Turkish

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Abstract

Objective: The objective of this study was to assess the reliability and validity of the Turkish version of the Migraine Interictal Burden Scale-4 (MIBS-4) in patients with migraine. MIBS-4 measures migraine-related interictal burden in four domains related to difficulty in planning at work or school, family and social life, and emotional/affective and cognitive stress. **Materials and Methods:** A total of 178 patients with migraine were enrolled in this multicenter, prospective study in two consecutive interviews with 4-week intervals. The comprehensibility, patient–physician reliability, internal consistency, test–retest reliability, and validity of the Turkish translation of MIBS-4 were analyzed. **Results:** In terms of comprehensibility of all MIBS-4 questions, a statistically significant agreement was obtained between the patient and the physician (intraclass correlation coefficient [ICC] = 0.713; $P < 0.001$, ICC = 0.851; $P < 0.001$, ICC = 0.637; and $P < 0.001$, ICC = 0.760; $P < 0.001$). No statistically significant difference was found between the comprehensibility of the first, second, third, and fourth questions of MIBS-4 according to the patient self-test and the physician interviews ($P = 0.167$, $P = 0.068$, $P = 0.121$, and $P = 0.225$, respectively). A significant high consistency was obtained between the first and second interview values (ICC = 0.891; $P < 0.001$). Cronbach's alpha coefficient was obtained between 0.818 and 0.845, and the scale was obtained with high reliability. A statistically significant positive correlation was obtained between the first and second interview MIBS values and Headache Impact Test-6, and the correlation coefficients were obtained as 0.158 and 0.330, respectively ($P = 0.036$ and $P < 0.001$, respectively). **Conclusion:** These results demonstrated that the Turkish translation of MIBS-4 is equivalent to the English version in terms of internal consistency, and it has high test–retest reliability and validity. The Turkish version of MIBS-4 can serve as a reliable, useful, and valid tool for assessing the burden on patients between migraine attacks, as well as aiding health-care professionals in enhancing migraine treatment strategies in Türkiye.

Keywords: *Interictal burden, migraine, reliability*

Submitted: 04-Nov-2023
Revised: 10-Jul-2024
Accepted: 17-Jul-2024
Published: 30-Sep-2024

Introduction

Migraine is recognized as a leading cause of disability worldwide.[1,2] Extensive research has demonstrated that migraine significantly impacts a person's functioning and quality of life, both during and between attacks.[3,4] Individuals with migraine typically

Access this article online

Quick Response Code:

Website: www.nsnjournal.org

DOI: 10.4103/nsn.nsn_159_23

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How to cite this article: Karaci R, Sünbül EA, Dikmen PY, Aydinlar EI, Bilgiç F, Öksüz N, *et al.* Reliability and validity study of the Migraine Interictal Burden Scale-4 in Turkish. Neurol Sci Neurophysiol 2024;41:153-61.

experience a decline in health-related quality of life even during pain-free periods compared with those without migraine.[5]

The Migraine Disability Assessment (MIDAS) questionnaire and the Headache Impact Test-6 (HIT-6) assess the burden of migraine during attacks and because the burden between attacks can be partially anticipated, it should be inquired by health-care professionals to develop an optimal treatment plan.[6]

The interictal burden is as important as ictal periods. The Migraine Interictal Burden Scale-4 (MIBS-4) is a self-administered 4-item questionnaire designed to measure the interictal burden related to migraine. It covers areas such as work or school, family and social life, difficulty in planning or committing, and emotional/affective and cognitive stress[7] [Figures 1 and 2]. Buse *et al*. reported that MIBS-4 could show variations among ethnic and racial subgroups.[8] There is currently no Turkish validity and reliability study available for this scale.

The aim of this study was to assess the comprehensibility, internal consistency, patient–physician reliability, test–retest reliability, and validity of the Turkish version of MIBS-4 in patients with migraine.

Materials and Methods

Study population

This study is a multicenter, prospective, and a methodologic study of scale adaptation validity and reliability, conducted between March 2023 and May 2023 at six headache centers in different regions of Türkiye. The study included 178 adult patients diagnosed as having episodic or chronic migraine according to the International Classification of Headache Disorders, 3rd edition (ICHD-3) by headache specialists (RK, PYD, EIA, NÖ, EUÖ, AÇA, EET, DU, AÖ, and FMD).[9]

The total number of patients was determined considering the tendency in scale development studies to have a sample size between 5 and 10 times the number of items in the scale. Patients were interviewed twice. A 4-week interval was set between the first and second interviews, long enough for patients not to recall their initial responses during the first interview, but not long enough to create any significant changes in disease severity.[10]

Please answer each of the following statements about the effect of your headaches in the past 4 weeks on days when you are not having an attack. **(X one box for each statement)**

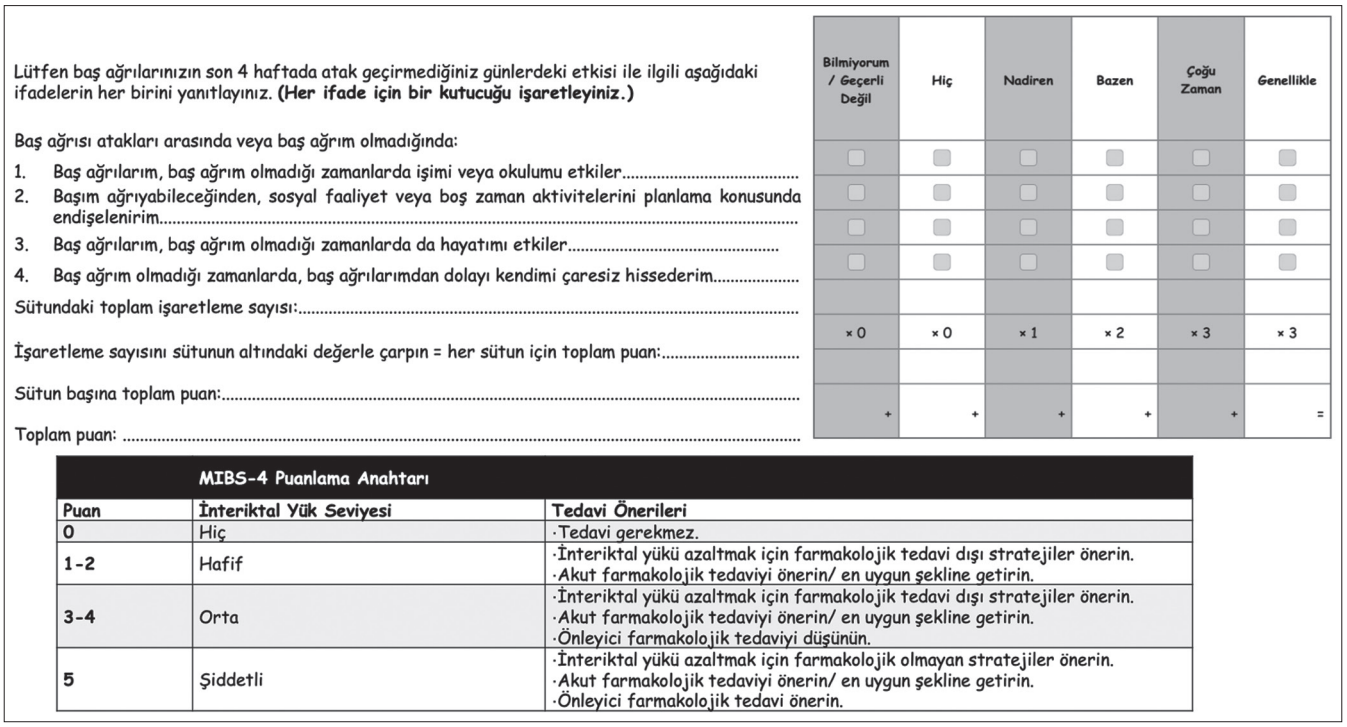
Between headache attacks or at times when I do not have a headache

	Don't know/NA	Never	Rarely	Some of the time	Much of the time	Most or all of the time
1. My headaches affect my work or school at times when I do not have a headache	☐	☐	☐	☐	☐	☐
2. I worry about planning social or leisure activities because I might have a headache	☐	☐	☐	☐	☐	☐
3. My headaches impact my life at times when I do not have a headache	☐	☐	☐	☐	☐	☐
4. At times when I do not have a headache, I feel helpless because of my headaches	☐	☐	☐	☐	☐	☐
Total number of checks in column						
Multiply number of checks by value = total score per column	×0	×0	×1	×2	×3	×3
Total score per column						
Total score		+	+	+	+	+ =

MIBS-4 scoring key

Score	Level of interictal burden	Treatment recommendations
0	None	• No action needed
1-2	Mild	• Offer non-pharmacological strategies for reducing interictal burden • Offer/optimize acute pharmacological treatment
3-4	Moderate	• Offer non-pharmacological strategies for reducing interictal burden • Offer/optimize acute pharmacological treatment • Consider preventive pharmacological treatment
5+	Severe	• Offer non-pharmacological strategies for reducing interictal burden • Offer/optimize acute pharmacological treatment • Offer preventive pharmacological treatment

Figure 1: Four-item clinic version of Migraine Interictal Burden Scale-4 in the original version (public domain referenced in https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2676125/pdf/mayoclinproc_84_5_007.pdf). MIBS-4: Migraine Interictal Burden Scale-4



Lütfen baş ağrılarınızın son 4 haftada atak geçirmediğiniz günlerdeki etkisi ile ilgili aşağıdaki ifadelerin her birini yanıtlayınız. **(Her ifade için bir kutucuğu işaretleyiniz.)**

	Bilmiyorum / Geçerli Değil	Hiç	Nadiren	Bazen	Çoğu Zaman	Genellikle
Baş ağrısı atakları arasında veya baş ağrım olmadığında:						
1. Baş ağrılarım, baş ağrım olmadığı zamanlarda işimi veya okulumu etkiler	☐	☐	☐	☐	☐	☐
2. Başım ağrıyabileceğinden, sosyal faaliyet veya boş zaman aktivitelerini planlama konusunda endişelenirim	☐	☐	☐	☐	☐	☐
3. Baş ağrılarım, baş ağrım olmadığı zamanlarda da hayatımı etkiler	☐	☐	☐	☐	☐	☐
4. Baş ağrım olmadığı zamanlarda, baş ağrılarımdan dolayı kendimi çaresiz hissederim	☐	☐	☐	☐	☐	☐
Sütundaki toplam işaretleme sayısı:						
İşaretleme sayısını sütunun altındaki değerle çarpın = her sütun için toplam puan:	× 0	× 0	× 1	× 2	× 3	× 3
Sütun başına toplam puan:						
Toplam puan:	+	+	+	+	+	=

MIBS-4 Puanlama Anahtarı

Puan	İnteriktal Yük Seviyesi	Tedavi Önerileri
0	Hiç	·Tedavi gerekmez.
1-2	Hafif	·İnteriktal yükü azaltmak için farmakolojik tedavi dışı stratejiler önerin. ·Akut farmakolojik tedaviyi önerin/ en uygun şekline getirin.
3-4	Orta	·İnteriktal yükü azaltmak için farmakolojik tedavi dışı stratejiler önerin. ·Akut farmakolojik tedaviyi önerin/ en uygun şekline getirin. ·Önleyici farmakolojik tedaviyi düşünün.
5	Şiddetli	·İnteriktal yükü azaltmak için farmakolojik olmayan stratejiler önerin. ·Akut farmakolojik tedaviyi önerin/ en uygun şekline getirin. ·Önleyici farmakolojik tedavi önerin.

Figure 2: Migraine Interictal Burden Scale-4 Turkish version (given as supplementary material for public domain). MIBS-4: Migraine Interictal Burden Scale-4

Patients who met the inclusion criteria were informed about the purpose of the research. After providing detailed information about the study, written voluntary participation forms were signed by patients who were willing to participate in the study. Inclusion criteria for the research were as follows: being aged >18 years and literate, signing the written informed consent form, having a diagnosis of either episodic or chronic migraine according to the ICHD-3 criteria for at least 1 year, and if prophylactic medication was initiated before enrollment, being under at least 3 months of treatment. Patients with a history of psychiatric illness, cognitive impairment or dementia syndromes, or mental retardation; presence of any other cause of pain and/or types of headaches other than migraine or accompanying migraine headache; failure or unwillingness to attend the second interview; and noncompletion of the scales used in the study or failure to complete the headache diary were excluded from the study.

Ethical approval was obtained from the Ethical Committee of University of Health Sciences, Erenköy Psychiatry and Neurological Diseases Training and Research Hospital (2023-13).

Study design

In this multicenter, prospective, and a methodologic study, we planned two interviews held 4 weeks apart sequentially. Patients who presented to the outpatient clinic and met the study criteria were randomly assigned to Groups A and B, respectively.

First interview

Performed at baseline after being given a written explanation on how to complete the MIBS-4 and the comprehensibility assessment form (CAF), both groups of patients answered the questions by themselves. To evaluate the patient–physician reliability and the consistency of the questionnaire, the MIBS-4 form and CAF were administered once again by a headache specialist physician in Group A (n = 90).

Sociodemographic information data, duration of migraine disease, history of prophylactic treatment, duration of migraine attack, headache severity scores using a Likert scale, headache intensity using a Visual Analog Scale (VAS), migraine-related disability according to MIDAS, and quality of life with HIT-6 scores were recorded for all patients. All the patients were asked to keep a headache diary until the second interview [Figure 3].

Second interview

In the second interview, performed 4 weeks after the first interview, all patients answered the MIBS-4 and CAF scales by themselves, without dividing the patients into subgroups. The pain diary was reviewed to determine the number of days with pain and characteristics of

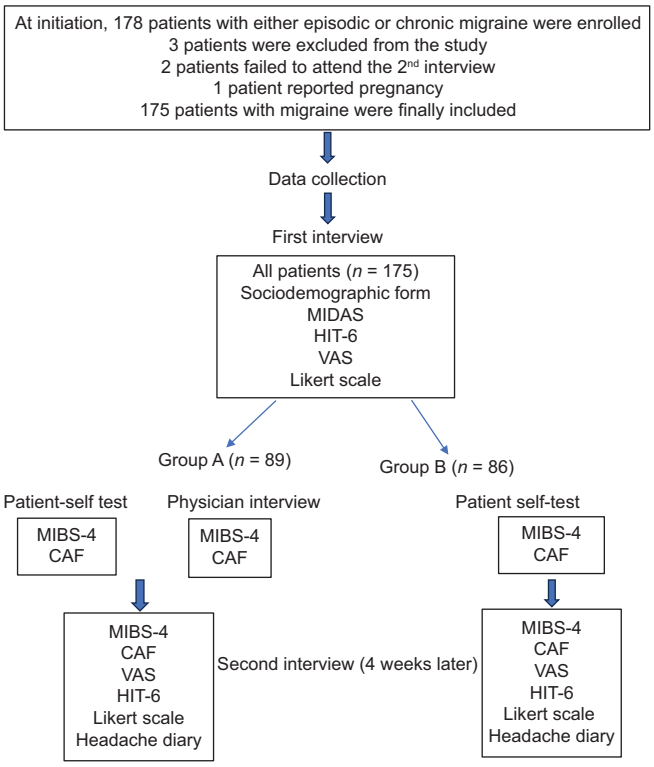


Figure 3: Study flow chart. MIBS-4: Migraine Interictal Burden Scale-4, HIT-6: Headache Impact Test, VAS: Visual Analog Scale, CAF: Comprehensibility Assessment Form, MIDAS: Migraine Disability Assessment

headache. The Likert scale, VAS, and HIT-6 were also administered to all patients who attended the second interview [Figure 3].

Questionnaires

The sociodemographic data form were a semi-structured questionnaire prepared by the researchers to identify characteristics such as age, sex, marital status, occupation, medical history in both patient and control groups, and information related to migraine for the patients included in the study.

MIBS-4 measures the burden of headaches between migraine attacks in four areas: the impact of headaches on work or school life, difficulty in planning social life or leisure activities, the effect of headaches on the patient's life, and emotional/affective impact. MIBS-4 is a 4-item self-administered scale used for clinical purposes or screening.[11] The minimum score that can be obtained from the scale is 0, scores of 1–2 indicate mild burden, scores of 3–4 indicate moderate burden, and scores above 5 indicate severe interictal burden [Figure 1].

Written consent was obtained from the developer of the scale. The translation of the MIBS-4 scales from English to Turkish, that was used in this study, was conducted by neurology specialists proficient in both languages. After this translation was reviewed and understood, it was translated back to English by another neurology specialist proficient in both languages. This translation was then reviewed by a bilingual translator proficient in Turkish and English as their native languages. After the final Turkish back translation of MIBS-4 was matched with the original English version by the authors (RK and FMD), the final form was accepted as the Turkish version of MIBS-4 [Figure 2].

CAF is a Likert-type scale used to assess the understandability of the questions asked in the scale. It consists of four items, including "Fully understandable," "Partially understandable," "Difficult to understand," and "Not understandable at all." In the study, all patients answered the CAF for each question of the MIBS-4 both in the first and second interviews. In Group A, any existence of a correlation between the CAF scores of the patient self-test and physician interview for each question of MIBS-4 was also analyzed.

The VAS pain scale is a measurement tool used to assess pain intensity, which is effective, easy to administer, and repeatable. It is a one-dimensional scale commonly used for measuring pain intensity. The VAS validity and reliability study has been conducted in Türkiye. VAS consists of a 10-cm long line, either horizontally or vertically drawn, starting with "No pain" and ending with "Very severe." The patient is asked to mark a point on this line that corresponds to the intensity of their pain. The distance from the lowest VAS level to the patient's mark is then measured using a ruler, and the numerical index of the patient's pain intensity is obtained in centimeters or millimeters.

Migraine Disability Assessment (MIDAS): To measure migraine disability, participants were assessed using the MIDAS scale. The scoring of the MIDAS scale is obtained by adding the scores of the first five questions. Scores between 0 and 5 represent Grade I (no or very little disability), scores between 6 and 10 represent Grade II (mild or infrequent disability), scores between 11 and 20 represent Grade III (moderate disability), and scores of 21 and above represent Grade IV (severe disability). The first, third, and fifth questions in the MIDAS scale assess the number of days lost due to headaches in the past 3 months in school or work, household chores, and leisure time, respectively. The second and fourth questions evaluate the number of additional days with decreased productivity (defined as at least a 50% decrease in productivity) at work and household chores in the past 3 months. Two additional questions (MIDAS A and B questions) assess headache frequency and intensity but are not added to the total MIDAS score.[12] The Turkish validity and reliability study of the MIDAS scale was proved in patients with migraine.[13]

HIT-6 is a 6-item self-report scale that assesses the impact of headaches in a broad context. It evaluates the problems caused by headaches. This scale provides quantitative information related to headaches, with a minimum score of 36 and a maximum score of 78. The scale is interpreted as follows: Scores ≤49 mean no impact (Grade I), scores between 50 and 55 indicates moderate impact (Grade II), scores between 56 and 59 mean substantial impact (Grade III), and scores ≥60 show severe impact (Grade IV). The Turkish validity and reliability study of the scale was developed by Kosinski *et al*. and was conducted by Dikmen *et al*.[14,15]

Likert Scale: While assessing the severity of patients' headaches, a Likert scale was used with 4-point scoring from (0) none, (1) mild, (2) moderate, and (3) severe pain.

Comprehensibility, reliability, and validity

To assess the level of intelligibility of MIBS-4, it was investigated whether there was a difference between the CAF scores between the first and the second interviews and any difference in the comprehensibility of the patients. In Group A, any existence of a correlation was also analyzed between the patient self-test and physician-interview CAF scores.

The correlation between the MIBS-4 forms completed by patients in Group A and the forms administered by the physician was examined to assess patient–physician reliability. To evaluate the test–retest reliability, the correlation between the MIBS-4 scores of each patient in the first and second interviews was examined. Internal consistency was analyzed by determining the correlation between the forms administered by all the patients in both the first and second interviews as well as the scores of the patient self-test and physician interview forms in Group A using Cronbach's alpha values.

To assess the validity of MIBS-4, the correlation between the scores obtained from the MIBS-4 scale and the type of migraine was investigated. The correlation between MIBS-4 and VAS scores, Likert scale scores, MIDAS, and HIT-6 scores were analyzed for both Groups A and B patients at the first interview. At the second interview, the correlation between MIBS-4 and VAS scores, Likert scale scores, and HIT-6 scores of all the patients was examined.

Statistical analysis

The data were analyzed using the IBM SPSS V23 software (IBM Corp. in 2012). The suitability of normal distribution was examined using the Kolmogorov–Smirnov test. For the comparison of nonnormally distributed data between paired groups, the Mann–Whitney *U*-test was used. For the comparison of nonnormally distributed quantitative data among paired dependent groups, the Wilcoxon test was used. The McNemar test was used for the comparison of categorical variables within paired dependent groups. To investigate the consistency between physicians and patients and for the test–retest reliability, the intraclass correlation coefficient (ICC) was used. Internal consistency was assessed using Cronbach's alpha coefficient. Cronbach's alpha values between 0.6 and 0.8 were approved as quite reliable and between 0.8 and 1.00 were approved as highly reliable for internal consistency. For the examination of relationships among nonnormally distributed data, the Spearman's rho correlation coefficient was used. The significance level was set at $P < 0.050$.

Results

At the initiation of the study, 178 patients were enrolled. Three patients dropped out; one patient failed to participate due to being pregnant, and two others were unwilling to attend the second interview. Of the included 175 patients, 87.43% were female, with an average age of 39.07 ± 10.16 years, and 12.57% were male, with an average age of 35.96 ± 11.29 years. Among the participants, 68% had a diagnosis of episodic migraine, 32% had chronic migraine, and 53.14% of the patients were receiving prophylactic treatment [Table 1].

Migraine Interictal Burden Scale-4 test comprehensibility

Between the first and second interviews, there was no statistically significant difference in the comprehensibility of the first item of MIBS-4 ($P = 0.126$). The rate of full comprehension was 64.6% in the first interview and 78.4% in the second interview. Similarly, for the second item of MIBS-4, no statistically significant difference in the comprehensibility was found based on the interviews ($P = 0.081$). The rate of full comprehension was 75.4% in the first interview and 91.8% in the second interview. Similarly, for the third item of MIBS-4, no statistically significant difference in the comprehensibility was found based on the interviews ($P = 0.239$). The rate of full comprehension was 79.8% in the first interview and 86% in the second interview. However, there was a statistically significant difference in the comprehensibility for the fourth item

Table 1: Sociodemographic findings

	Female	Male
Sex, *n* (%)	153 (87.43)	22 (12.57)
Age (mean±SD)	39.07±10.16	35.96±11.29
Episodic migraine, *n* (%)	103 (86.55)	16 (13.45)
Chronic migraine, *n* (%)	50 (89.28)	6 (10.72)
Prophylactic treatment, *n* (%)	83 (89.24)	10 (10.76)

SD: Standard deviation

of MIBS-4 (P = 0.046). The rate of full comprehension was 82% in the first interview and 91.8% in the second interview [Table 2].

Patient–physician reliability

There was no statistically significant difference in the reliability for the first, second, third, and fourth items between patients and physicians (P = 0.167, P = 0.068, P = 0.121, and P = 0.225, respectively). In terms of comprehensibility of the second question, a statistically high reliability was achieved between the patient and the physician (ICC = 0.851; P < 0.001). The first, third, and fourth questions had statistically very good reliability between the patient and the physician (ICC = 0.713; P < 0.001, ICC = 0.637; and P < 0.001, ICC = 0.760; P < 0.001) [Table 3].

Migraine Interictal Burden Scale-4 test–retest reliability and internal consistency

Both in episodic migraine and chronic migraine types, a statistically significant and high level of consistency was achieved between the values of the first and second interviews (ICC = 0.883; P < 0.001, ICC = 0.889; P < 0.001). For each migraine group and without differentiation by group, the Cronbach's alpha coefficient for MIBS-4 was obtained in the range of 0.818–0.845, indicating a high reliability of the scale. Furthermore, a statistically significant and high level of consistency was achieved between patients and physicians (ICC = 0.963; P < 0.001). In Group A, the Cronbach's alpha coefficient for the first interview belonging to the patients was obtained as 0.784, indicating that the scale was quite reliable. In Group A, the Cronbach's alpha coefficient for the first interview belonging to the physicians was obtained as 0.695, indicating that the scale was found quite reliable [Table 4].

Validity of the Migraine Interictal Burden Scale-4

Both in the first and second interviews, there was a statistically significant positive relationship between MIBS-4 values and HIT-6, with correlation coefficients of 0.158 and 0.030, respectively (P = 0.036 and P < 0.001, respectively). In the first interview, a statistically significant positive relationship was obtained between MIBS-4 values and MIDAS, with a correlation coefficient of 0.287 (P < 0.001). In the second interview, a statistically significant positive relationship was obtained between MIBS-4 values and the Likert scale, with a correlation coefficient of 0.206 (P = 0.007). No statistically significant relationships were observed between MIBS-4 and other variables (P > 0.050) [Table 5].

A statistically significant difference was found between the median MIBS-4 values of the first interview according

Table 2: Comparison of the comprehensibility of Migraine Interictal Burden Scale-4 items between patients in the first and second interviews

	MIBS-4 self-administered scores							
All patients	**1st question (%)**		**2nd question (%)**		**3rd question (%)**		**4th question (%)**	
	First interview	**Second interview**	**First interview**	**Second interview**	**First interview**	**Second interview**	**First interview**	**Second interview**
Fully understandable	64.6	78.4	75.4	91.8	79.8	86	82	91.8
Partially understandable	26.3	15.8	18.3	5.8	13.5	9.9	12.4	6.4
Difficult to understand	8.6	5.8	6.3	2.3	5.6	4.1	5.6	1.8
Not understandable at all	0.6	0	0	0	1,1	0	0	0
P	0.126*		0.081*		0.239**		0.046*	

*McNemar-Bowker test, **Wilcoxon test. Frequency (%). MIBS: Migraine Interictal Burden Scale

Table 3: Comparison of comprehensibility of Migraine Interictal Burden Scale-4 items between patient and physician in the first interview

Group A	**1st question**		**2nd question**		**3rd question**		**4th question**	
	First patient-self interview	**First physician interview**	**First patient-self interview**	**First physician interview**	**First patient-self interview**	**First physician interview**	**First patient-self interview**	**First physician interview**
Fully understandable, *n* (%)	61 (68.5)	69 (77.5)	71 (79.8)	76 (85.4)	63 (70.8)	71 (79.8)	69 (77.5)	73 (82)
Partially understandable, *n* (%)	17 (19.1)	14 (15.7)	13 (14.6)	11 (12.4)	16 (18)	12 (13.5)	14 (15.7)	11 (12.4)
Difficult to understand, *n* (%)	11 (12.4)	6 (6.7)	5 (5.6)	2 (2.2)	9 (10.1)	5 (5.6)	5 (5.6)	5 (5.6)
Not understandable at all, *n* (%)	0	0	0	0	1 (1.1)	1 (1.1)	1 (1.1)	0
P	0.167*		0.068*		0.121*		0.225**	
ICC (95% CI)	0.713 (0.564–0.812)		0.851 (0.773–0.902)		0.637 (0.447–0.762)		0.76 (0.634–0.842)	
P	<0.001		<0.001		<0.001		<0.001	

*McNemar-Bowker test, **Wilcoxon test. Frequency (%). ICC: Intraclass correlation coefficient, CI: Confidence interval

Table 4: Examination of test–retest reliability and internal consistency of Migraine Interictal Burden Scale-4

Group	Mean±SD	Median	*P*	Patient–physician reliability		Reliability (internal consistency) (Cronbach-alpha)
				ICC (95% CI)	*P*	
Episodic migraine						
First interview	3.57±3.51	3.00	0.019	0.883 (0.83–0.919)	<0.001	0.829
Second interview	3.15±3.19	2.00				0.845
Chronic migraine						
First interview	5.09±4.30	5.00	0.266	0.889 (0.811–0.935)	<0.001	0.829
Second interview	4.77±3.81	5.00				0.818
All patients						
First interview	4.07±3.84	3.00	0.013	0.891 (0.853–0.919)	<0.001	0.829
Second interview	3.68±3.48	3.00				0.833
Group	**Mean±SD**	**Mean**	***P***	**Patient–physician reliability**		**Reliability (internal consistency) (Cronbach-alpha)**
				ICC (95% CI)	***P***	
Group A						
First interview patient self-test	4.15±3.82	4.00	0.016	0.963 (0.943–0.975)	<0.001	0.784
First interview physician	3.79±3.73	3.00				0.695

SD: Standard deviation, ICC: Intraclass correlation coefficient, CI: Confidence interval

Table 5: Examination of the validity of Migraine Interictal Burden Scale-4 and its relationship with Likert, Headache Impact Test-6, Visual Analog Scale, and migraine disability assessment

	First interview MIBS-4 1		Second interview MIBS 2	
	r	*P*	*r*	*P*
Likert 1	0.137	0.070	0.206	0.007
HIT-6	0.158	0.036	0.330	<0.001
VAS I	0.065	0.393	0.085	0.267
MIDAS I	0.287	<0.001	-	-

r: Spearman's rho correlation coefficient. MIBS-4: Migraine Interictal Burden Scale-4, HIT-6: Headache Impact Test, VAS: Visual Analog Scale, MIDAS: Migraine disability assessment

to migraine types (P = 0.039). The median for episodic migraine type was 3.00, whereas the median for chronic migraine was 5.00. A statistically significant difference was found between the median MIBS-4 values of the second interview according to migraine types (P = 0.008). The median for episodic migraine type was 2.00, and the median for chronic migraine was 5.00 [Table 4].

Discussion

Migraine is a disease that reduces an individual's quality of life and works productivity, with a high prevalence and incidence, and it poses a significant economic burden on society. In addition to the physical and psychological adverse effects on patients, the economic impact of migraine is increasing daily.[16] It is estimated that the annual cost related to headaches in the United States is $20 billion, and in Europe, it is $27 billion.[17] In the 2016 Global Burden of Migraine study, it was determined that there were 1.04 billion people with migraine worldwide, and it resulted in more disability than tension-type headache. The current study identified migraine disability at a rate of 0.434, indicating that compared with a healthy individual, migraine attacks cause a 43.4% loss of health in the patient.[18]

Numerous studies have shown that migraine-related headaches significantly contribute to work productivity loss.[19] According to the results of the "Global Burden of Migraine Study" published in 2010, 57% of patients experienced 5 days or more of school and work loss in 3-month periods. In addition, the weekly time loss due to migraine was found as 1.1 h.[20]

In the migraine cost report published in Türkiye in 2021, it was found that the annual average direct cost of patients with migraine in items such as outpatient clinics, laboratory tests, medication, and hospitalization was 3063.60 TL (515.75 USD). In addition, the average nonmedical direct costs per patient were 202 TL (34 USD). In addition to these, migraine also brings indirect costs in terms of lost productivity due to absenteeism and poor health outcomes. According to the Turkish Statistical Institute (TUİK) data from 2019, the indirect cost due to leave and medical reports related to migraines was found as 983.90 TL (165.63 USD). The total direct and indirect costs per patient were calculated as 4249 TL (715.31 USD).[16]

Patients experience a burden both during migraine attacks and between attacks, characterized by anxiety, difficulties in planning, and emotional problems. It is known that due to migraine or headache-related fear (cephalalgiaphobia), individuals engage in phobic avoidance of activities, contributing to the interictal burden of migraines. In a study by Peres *et al*., it was suggested that this avoidance behavior might lower the pain threshold and lead to medication overuse.[21]

To examine migraine interictal burden, Buse *et al*. developed a scale called MIBS-4 consisting of four questions.[6] They found moderate positive correlations between MIBS-4 and measures of ictal disability (MIDAS, HIT-6) and various psychological disorders in 1391 patients with migraine who met the ICHD II criteria.[11] Furthermore, Buse *et al*. documented that Hispanic patients reported higher moderate/severe interictal burden (MIBS-4) compared with non-Hispanic individuals (64% vs. 52%, Standart mean deviation (SMD) = 0.26).[8] In a population-based study called OVERCOME, Matsumori *et al*. studied 17,071 patients, and a moderate-to-severe interictal load was detected in 41.5% of patients with migraine. The interictal load was significantly different according to the frequency of headache ($P < 0.001$).[22]

In our study, the interictal load was found statistically higher in patients with chronic migraine than in those with episodic migraine according to median MIBS-4 scores in both interviews ($P = 0.039$ and $P = 0.008$). A similar result was also obtained in a Japanese information technology company without calculating the emotional and social burden, and the results were found to be similar.[23]

In a study conducted in Sweden, patients with migraine's well-being condition between attacks were compared with an age- and sex-matched control group. One hundred forty-five patients were questioned using three psychological health questionnaires, 138 were found to have greater symptom perception, greater emotional distress, and disturbance in satisfaction, vitality, and sleep compared with control subjects.[24] A cross-sectional study with 1000 adults in the United Kingdom found that the higher severity and frequency of headaches caused more frequent headache occurrences, anxiety, and sleep problems.[25]

Despite the convincing evidence of the burden of migraine, health-care professionals often underestimate the extent of functional impairment it causes, resulting in missed opportunities for effective acute and preventive treatments.[26] Besides, migraineurs may not mention the burden or seek suitable medical advice, rendering the physician unable to accurately diagnose the patient's condition.[27]

Before conducting studies aimed at a more comprehensive evaluation of the interictal burden of migraine in Türkiye, we also accomplished the Turkish translation of the MIBS-4 scale, whose validation was previously performed by Buse *et al*.[7,11] Then, we proceeded with a validity and reliability study comparing it with the original version. In both the first and second interviews, we found a significant positive relationship between the Turkish version of MIBS-4 and HIT-6 values, which had been validated previously. The correlation coefficients were calculated as 0.158 in the first interview ($P = 0.036$) and 0.330 in the second interview ($P < 0.001$). Furthermore, the study revealed positive correlation values only between the MIDAS scores obtained in the first interview, with a coefficient of 0.287 ($P < 0.001$). Based on these findings, the Turkish version of MIBS-4 demonstrates validity.

Furthermore, in Groups A and B, which had varying numbers of days with pain, the test–retest reliability yielded Cronbach's alpha coefficients ranging from 0.818 to 0.845, indicating the scale was highly reliable. For Group A, the Cronbach's alpha coefficients for both patient and physician interviews were obtained as 0.784 and 0.695, respectively, affirming that the scale was reliable. Fianlly, it was observed that there was a high level of agreement between patients and physicians regarding the comprehensibility of questions 1, 3, and 4. Moreover, Question 2 demonstrated a high level of agreement in terms of comprehensibility. This suggests that the scale can be used as a self-test due to its high level of compatibility between patients and physicians in terms of comprehensibility.

Conclusion

Understanding the burden of migraine between attacks can help predict the impact during attacks, emphasizing the importance for health-care professionals to inquire about interictal headache burden while developing treatment plans.

The findings of this study demonstrate that the Turkish translation of MIBS-4 is equivalent to its English version in terms of comprehensibility, internal consistency, test–retest reliability, and validity. Furthermore, it has been shown that MIBS-4 can be used by patients themselves due to the patient–physician consistency. Therefore, the Turkish version of MIBS-4 can serve as a reliable, useful, and valid tool for assessing the burden on patients between migraine attacks, as well as aiding health-care professionals in enhancing migraine treatment strategies in Türkiye.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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