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SHORT COMMUNICATION

Reliability and Validity of the Greek Migraine Disability Assessment (MIDAS) Questionnaire

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Abstract

Background The Migraine Disability Assessment (MIDAS) Questionnaire is a reliable and valid instrument for migraine-related disability. Such a tool is needed to quantify migraine-related disability in the Greek population.
Objective This validation study aims to assess the test–retest reliability, internal consistency, item discriminant and convergent validity of the Greek translation of the MIDAS.
Methods Adults diagnosed with migraine completed the MIDAS Questionnaire on two occasions 3 weeks apart to assess reliability, and completed the RAND-36 to assess validity.
Results Participants ($n = 152$) had a median MIDAS score of 24 and mostly severe disability (58% were grade IV). The test–retest reliability analysis ($N = 59$) revealed excellent reliability for the total score. Internal consistency was $\alpha = 0.71$ for initial and $\alpha = 0.82$ for retest completion. For item discriminant validity, the correlations between each question and the total score were significant, with high correlations for

questions 2–5 (range $0.67 \leq r \leq 0.79$; $p < 0.01$). For convergent validity, there was significant negative correlation between the total score and all RAND-36 subscales except for 'emotional wellbeing'. The negative correlation indicates that patients with a lower degree of disability according to their MIDAS score tended to have better wellbeing. Psychometric properties are comparable with those of other published validation studies of the MIDAS and the original. Findings on question 1 show that missing work/school days may be closely related with increased affect issues.
Conclusion The Greek version of the MIDAS Questionnaire has good reliability and validity. This study allowed for cross-cultural comparability of research findings.

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Key Points for Decision Makers

The Greek version of the Migraine Disability Assessment (MIDAS) Questionnaire has good internal consistency, item-discriminant and convergent validity and test–retest reliability.

It can be used in research as well as for stratified migraine care in clinical settings. Findings show that missing work or school days may be more closely related with increased affect issues compared with physical limitations imposed by migraine.

1 Introduction

Migraine is a primary headache disorder with an estimated global prevalence of around 14.7% [1]. It ranks seventh highest among specific causes of disability globally and

holds a high score of years lived with disability, an important indicator of disability according to the World Health Organization [1]. A valid, reliable tool is needed to quantify migraine-related disability in the Greek population. Such an instrument could be used for clinical purposes (e.g. stratified migraine care) and would allow for internationally comparable research to be carried out with Greek language speakers. The aim of this study was to develop the Greek version of the Migraine Disability Assessment (MIDAS) Questionnaire (Fig. 1) and to assess its psychometric properties. We hypothesized that the validity and reliability of the Greek version would be comparable to the original version and other validation studies of the MIDAS.

2 Methods

This was a validation study to explore the psychometric properties of the MIDAS scale in a sample of Greek migraine outpatients. The MIDAS is a self-administered tool designed by Stewart et al. [2] to retrospectively assess migraine-related disability in different life domains over the previous 3 months (Appendix). The questionnaire comprises seven questions in total. Three questions assess the number of missed days due to headache in the domains of school/work, housework, and family/leisure activities (items MIDAS 1, 3 and 5). Two questions assess the number of additional days with limited productivity due to headache at school/work and housework (items MIDAS 2 and 4). The total MIDAS score is the sum of the days given as response to these five questions (MIDAS 1 to MIDAS 5). The total score ranges from 0 to 90 and is used to categorize patients in disability grades I to IV. A higher score means more severe disability, placing the patient in a higher disability grade. For example, a total score ≥ 21 would categorize a patient as disability grade IV. Two additional questions (MIDAS A and B) measure headache frequency and average pain intensity. Frequency is noted as the number of days in the previous 3 months on which the patient experienced migraine. Intensity is noted as the average pain intensity of these episodes on a scale of 1–10, where ten signifies the most intense pain possible. These two items are not taken into account when estimating the total MIDAS score. The MIDAS Questionnaire has been validated in many languages, and the total score correlates strongly with clinical judgment regarding the need for treatment [3–11].

The study took place in two private clinics in Athens, Greece between July 2015 and February 2016. Approval was obtained from the Institutional Review Board of the Mediterraneo Hospital (Glyfada, Greece). Permission was acquired from the corresponding author. The questionnaire

was translated using standard forward–backward methodology by two bilingual speakers at each stage. A pilot administration ($N = 7$) was performed, in which one of the researchers (TO) asked participants to complete the questionnaire. After completion, participants were asked a series of questions, including whether they found the questionnaire easy to understand, whether they had any difficulties in completing it, whether they found the time required for completion to be acceptable, and whether they had any suggestions to improve the questionnaire. Respondents' comments were positive, and no suggestions for improvement were offered, indicating that the Greek MIDAS is easy to understand.

The inclusion criteria were migraine diagnosis with or without aura (1.1 and 1.2) by a neurologist specialized in headache medicine (one of the authors, MV) based on the 2013 International Headache Society criteria (3rd edition, beta version) [12]. Adults with a good understanding of the Greek language were eligible. Patients undergoing changes in treatment between the two questionnaire completion points were excluded. Eligible patients who came to clinic during the recruitment period were informed about the study and signed an informed consent form if they agreed to participate. We collected data to assess the test–retest reliability, internal consistency, item discriminant and convergent validity of the Greek MIDAS.

2.1 Validity and Reliability

Sociodemographic and migraine data were collected at baseline. Questions regarding headache frequency, duration, and employment status were completed again at retest to ensure migraine severity and employment status had not changed. Change in employment (gainfully employed/full-time student, or unemployed) could affect answers to MIDAS questions 1 and 2.

2.1.1 Validity

Item discriminant validity was assessed by analysing the correlations between each MIDAS question and the total score. Convergent validity was assessed using the RAND-36 questionnaire, a 36-item, self-administered questionnaire assessing mental and physical wellbeing. RAND-36 is based on the 36-item short-form health survey (SF-36) [13]. Physical health is assessed through four dimensions (physical functioning, role limitations due to physical health, pain, general health). Mental health is also assessed through four dimensions (energy/fatigue, social functioning, role limitations due to emotional health, emotional wellbeing). Higher scores denote better quality of life. RAND-36 has been validated in Greek [14]. Given that higher RAND-36 scores represent better wellbeing,

Ερωτηματολόγιο Για την Αξιολόγηση της Ανικανότητας λόγω Ημικρανίας (MIDAS)

Το ερωτηματολόγιο MIDAS (Αξιολόγηση της Ανικανότητας λόγω Ημικρανίας) δημιουργήθηκε για να σας βοηθήσει να αξιολογήσετε την επίπτωση που έχουν οι πονοκέφαλοι στη καθημερινή ζωή σας. Οι πληροφορίες σε αυτό το ερωτηματολόγιο θα είναι επίσης χρήσιμες στον γιατρό σας ώστε να κατανοήσει το επίπεδο πόνου κι ανικανότητας που προκαλείται από τους πονοκεφάλους σας, και να βρει την τη καλύτερη θεραπεία για εσάς.

ΟΔΗΓΙΕΣ

Παρακαλώ απαντήστε στις ακόλουθες ερωτήσεις για όλους τους πονοκεφάλους που είχατε κατά τη διάρκεια των τελευταίων 3 μηνών. Σημειώστε την απάντηση σας στο κενό που βρίσκεται δίπλα σε κάθε ερώτηση. Σημειώστε μηδέν εάν αυτό που περιγράφει η ερώτηση δε συνέβη μέσα στους τελευταίους 3 μήνες.

_____ 1. Στο διάστημα των τελευταίων 3 μηνών, πόσες μέρες απουσιάσατε από την εργασία σας ή από το σχολείο λόγω των πονοκεφάλων σας;

_____ 2. Στο διάστημα των τελευταίων 3 μηνών, πόσες μέρες ήταν η παραγωγικότητα σας στην εργασία ή στο σχολείο μειωμένη κατά το ήμισυ ή και περισσότερο, λόγω των πονοκεφάλων σας; (Μη συμπεριλάβετε τις ημέρες που υπολογίσατε ήδη στην ερώτηση 1, που απουσιάσατε από την εργασία ή το σχολείο.)

_____ 3. Στο διάστημα των τελευταίων 3 μηνών, πόσες μέρες δεν ασχοληθήκατε με οικιακές εργασίες (όπως νοικοκυριό, επισκευές και συντήρηση του σπιτιού, ψώνια, φροντίδα παιδιών και συγγενών) λόγω των πονοκεφάλων σας;

_____ 4. Στο διάστημα των τελευταίων 3 μηνών, πόσες μέρες ήταν η παραγωγικότητα σας στις οικιακές εργασίες μειωμένη κατά το ήμισυ ή και περισσότερο, λόγω των πονοκεφάλων σας; (Μη συμπεριλάβετε τις ημέρες που υπολογίσατε ήδη στην ερώτηση 3, στις οποίες δεν ασχοληθήκατε με τις δουλειές του σπιτιού.)

_____ 5. Στο διάστημα των τελευταίων 3 μηνών, πόσες μέρες απουσιάσατε από οικογενειακές, κοινωνικές, ή ψυχαγωγικές δραστηριότητες λόγω των πονοκεφάλων σας;

_____ Σύνολο (Ερωτήσεις 1-5)

_____

_____ Α. Στο διάστημα των τελευταίων τριών μηνών, πόσες μέρες είχατε πονοκέφαλο; (Εάν ένας πονοκέφαλος κράτησε περισσότερο από μια (1) ημέρα, μετρήστε κάθε μέρα ξεχωριστά.)

_____ Β. Σε μια κλίμακα από το 0 εως το 10, κατά μέσο όρο, πόσο επώδυνοι ήταν αυτοί οι πονοκέφαλοι; (όπου 0 = καθόλου πόνος, και 10 = ο χειρότερος δυνατός πόνος.)

Βαθμολόγηση: *Αφού συμπληρώσετε το ερωτηματολόγιο, προσθέστε το συνολικό αριθμό των ημερών από τις ερωτήσεις 1-5 (αγνοήστε τα Α και Β).*

Βαθμίδα MIDAS	Ορισμός	Βαθμολογία MIDAS
I	Ελάχιστη ή καθόλου ανικανότητα	0-5
II	Μικρή ανικανότητα	6-10
III	Μέτρια ανικανότητα	11-20
IV	Σοβαρή ανικανότητα	21+

Παρακαλώ, επιστρέψτε το συμπληρωμένο ερωτηματολόγιο στον γιατρό σας.

Αυτό το ερωτηματολόγιο δημιουργήθηκε από τον Richard B. Lipton, MD, Professor of Neurology, Albert Einstein College of Medicine, New York, NY, και τον Walter F. Stewart, MPH, PhD, Associate Professor of Epidemiology, Johns Hopkins University, Baltimore, MD.

Fig. 1 The Greek version of the Migraine Disability Assessment Questionnaire

whereas higher MIDAS scores represent more severe disability, we hypothesized that the correlation between RAND-36 subscale scores and the total and individual MIDAS scores would be negative. We also assessed the correlation between MIDAS scores and the number of headache days (MIDAS A) and pain intensity (MIDAS B).

2.1.2 Test–Retest Reliability

Patients completed the questionnaire on two occasions, 3 weeks apart to avoid recall bias. The retest form was sent to the patients via email. We assessed test–retest reliability at the individual item and total score level by estimating the intraclass correlation coefficient (ICC).

2.2 Statistical Analysis

Missing demographic data were excluded pairwise. There were no missing data for the MIDAS Questionnaire. Student's t test and analysis of variance (ANOVA) were used for means comparisons. Internal consistency was assessed using Cronbach's alpha. An alpha of ≥ 0.7 and ≥ 0.8 was considered acceptable and to show good internal consistency, respectively [15]. The Spearman correlation coefficient (r) was used for convergent and item discriminant validity. We considered correlation coefficients <0.30 to be weak, coefficients between 0.3 and 0.5 to show moderate correlation, and coefficients >0.5 to be strong [16]. The ICC was estimated with a two-way mixed-effects single measure for test–retest reliability. We classified test–retest reliability as 'excellent' (ICC ≥ 0.81), 'good' (0.61–0.8), 'moderate' (0.41–0.60), and 'poor' (≤ 0.40) [17]. Independent t test, ANOVA and Spearman correlation coefficient were used to examine the interaction between demographic variables and MIDAS scores for the purpose of exploratory analyses. The level of significance was 0.05. We used SPSS software version 22 (SPSS Inc., Chicago, IL, USA).

3 Results

Of the total sample ($n = 152$), 119 (82%) agreed to receive the retest questionnaire, and 59 (38.8%) returned the form. Sample characteristics are presented in Table 1. Participants had an average age of 40.7 years (range 20–64) and were mostly female (83.6%) and gainfully employed or fulltime students (76.7%). Most had migraine without aura (63.8%) and severe disability (58.3% for grade IV) (Table 1). There was no significant difference for employment status, headache frequency and duration between initial and retest completion ($p > 0.05$). Median

Table 1 Sample demographic characteristics and baseline measurements

Characteristics	Total sample (N = 152)
Sociodemographic variables	
Sex	
Female	127 (83.6)
Male	25 (16.4)
Age	40.73 ± 10.14
Education	
Primary	1 (0.7)
Secondary	41 (27.2)
Tertiary	101 (72.2)
Employment	
Employed or fulltime student	115 (76.7)
Unemployed	35 (23.3)
Marital status	
Married	101 (66.9)
Unmarried	50 (33.1)
Illness characteristics	
Median time since diagnosis (mean ± SD)	14 (14.29 ± 10.43)
Migraine with aura	54 (36.2)
Frequency	
<1 episode/week	38 (25.7)
1 episode/week	44 (29.7)
>1 episode/week	51 (34.5)
Daily	15 (10.1)
Duration	
<3 h	17 (11.3)
3–24 h	42 (28)
1–2 days	47 (31.3)
3 days	36 (24)
>3 days	8 (5.3)
MIDAS disability grade	
Grade I	12 (7.9)
Grade II	14 (9.3)
Grade III	37 (24.5)
Grade IV	88 (58.3)

Data are presented as N (%) or mean ± SD unless otherwise specified

MIDAS Migraine Disability Assessment Questionnaire, *SD* standard deviation

time elapsed between the two completions was 21 days (mean 26.1 ± standard deviation 12.5, range 15–66).

Regarding MIDAS scores across demographic variables, there was a significant, low correlation between age and item MIDAS 4 ($p < 0.01$, $r = 0.24$). A significant difference was found for MIDAS 4 and 5 by sex, with females scoring higher ($p < 0.05$ for MIDAS 4, $p < 0.01$ for MIDAS 5). MIDAS 5 and MIDAS B differ significantly by

Table 2 Migraine Disability Assessment (MIDAS) questionnaire scores at initial and retest completion, with test–retest reliability

	Initial completion ($n = 152$)			Retest completion ($n = 59$)			
	Median	Mean ± SD	Min–max value	Median	Mean ± SD	Min–max value	ICC
MIDAS 1	0	2.37 ± 4.73	0–27	0	3.71 ± 12.31	0–90	0.41*
MIDAS 2	5	8.94 ± 12.62	0–90	5	7.97 ± 8.79	0–45	0.78*
MIDAS 3	6	9.89 ± 13.12	0–90	5	8.46 ± 9.12	0–60	0.78*
MIDAS 4	5	8.49 ± 11.24	0–70	5	6.95 ± 7.00	0–33	0.57*
MIDAS 5	4	6.85 ± 10.35	0–75	3	6.00 ± 9.06	0–60	0.44*
Total score	24	36.01 ± 35.45	0–225	26	33.14 ± 36.20	0–246	0.81*
MIDAS A	15	23.22 ± 19.70	2–90	16.5	23.07 ± 17.97	2–90	0.71*
MIDAS B	8	7.49 ± 1.51	3–10	7	6.98 ± 1.44	2–10	0.52*

ICC intraclass correlation coefficient for reliability, *SD* standard deviation

* $p < 0.001$

Table 3 Correlations between Migraine Disability Assessment (MIDAS) Questionnaire questions 1–5 and total score at initial completion

Question	Total MIDAS score (Rho[a])
MIDAS1	0.19*
MIDAS2	0.67**
MIDAS3	0.79**
MIDAS4	0.69**
MIDAS5	0.67**

* $p < 0.05$, ** $p < 0.01$

[a] Spearman correlation coefficient

employment status, with unemployed participants scoring higher ($p < 0.05$ for MIDAS 5, $p < 0.05$ for MIDAS B).

3.1 Reliability

Means and medians are presented in Table 2. In the test–retest reliability analysis ($N = 59$), excellent reliability was found for the total score (ICC 0.81), and good reliability for items MIDAS 2, MIDAS 3 (ICC 0.78 for both), and MIDAS A (ICC 0.71). Reliability was moderate (ICC

range 0.41–0.57) for all other items (MIDAS 1, MIDAS 4, MIDAS 5, and MIDAS B) (Table 2). Internal consistency for initial and retest completion was $\alpha = 0.71$ and $\alpha = 0.82$, respectively (data not shown).

3.2 Validity

All questions showed significant correlation with the total score ($p < 0.05$). Correlation was high for questions 2–5 ($r > 0.6$) and low for question 1 ($r = 0.19$) (Table 3). Correlations between RAND-36 and MIDAS were negative (Table 4). None of the MIDAS scores correlated significantly with 'Emotional wellbeing'. MIDAS 2 had the fewest significant correlations with RAND-36 subscales. Regarding MIDAS A and B, episode duration and frequency, MIDAS 1 showed significant, low correlation with MIDAS B ($p < 0.05$, $r = 0.19$), MIDAS 2 showed significant, moderate correlation with MIDAS A ($p < 0.01$, $r = 0.37$), and MIDAS 3, 4 and 5 showed significant, moderate correlations with MIDAS A and episode frequency ($p < 0.01$). Total score showed significant, moderate to high correlation with episode frequency and MIDAS A ($p < 0.01$, $r = 0.35$ and $r = 0.59$ respectively),

Table 4 Correlations (r) between Migraine Disability Assessment (MIDAS) Questionnaire scores and RAND-36

MIDAS scores	RAND-36 subscales							
	Physical functioning	Role physical	Pain	General health	Role emotional	Energy/fatigue	Social functioning	Emotional wellbeing
MIDAS1	−0.17*	−0.04	−0.21**	−0.22*	−0.17*	−0.06	−0.15	−0.04
MIDAS2	−0.11	−0.17*	−0.24*	−0.14	−0.09	−0.13	−0.11	−0.02
MIDAS3	−0.26**	−0.30**	−0.23**	−0.26**	−0.12	−0.22**	−0.24**	−0.10
MIDAS4	−0.19*	−0.24**	−0.17*	−0.15	−0.13	−0.15	−0.21**	−0.10
MIDAS5	−0.26**	−0.25**	−0.27*	−0.27**	−0.11	−0.25**	−0.43**	−0.12
Total	−0.35**	−0.32**	−0.36**	−0.34**	−0.19*	−0.29**	−0.37**	−0.15

* $p < 0.05$, ** $p < 0.01$

Table 5 Correlations (*r*) between Migraine Disability Assessment (MIDAS) Questionnaire scores and self-reported episode frequency, duration, MIDAS A and B

MIDAS scores	Duration	Frequency	MIDAS A	MIDAS B
MIDAS1	0.14	0.01	0.02	0.19*
MIDAS2	0.15	0.10	0.37**	−0.06
MIDAS3	0.15	0.27**	0.44**	0.15
MIDAS4	0.00	0.23**	0.46**	−0.06
MIDAS5	0.16	0.28**	0.36**	0.05
Total score	0.18*	0.35**	0.59**	0.06

* $p < 0.05$, * $p < 0.01$

and significant, low correlation with episode duration ($p < 0.05$, $r = 0.18$) (Table 5). Higher scores in the RAND-36 represent better wellbeing, contrary to the MIDAS, where higher scores represent more severe disability. Therefore, the negative correlation indicates that patients with a lower MIDAS score (and therefore a low degree of disability) may also have a higher RAND-36 score (and therefore better wellbeing).

4 Discussion

The MIDAS is a retrospective assessment tool for migraine-related disability across life domains. In this study, we assessed the psychometric properties of the Greek MIDAS. We hypothesized that validity and reliability would be comparable to the original version and other validation studies.

Demographics (age and sex) were similar to other MIDAS validations and consistent with the literature, which reports higher migraine prevalence in females and the highest prevalence between the ages of 35 and 45 years [18, 19]. Approximately 64% of participants had migraine without aura, which is lower than expected yet comparable with other validations [6]. Overall, participants reported more reduced productivity than missed days for work/school, but more missed than reduced productivity days for housework. Missed housework days held the highest scores among the five questions. The low score for question 1 (missed work/school days) is consistent with keeping one's job, as over 70% of our sample were gainfully employed or full-time students. The total disability score was 24 (mean 36). Most participants had severe (58%) or moderate disability (24.5%). Patients reported a median of 15 episodes for MIDAS A and high pain intensity (median 8). These scores are comparable to some MIDAS validation studies [5, 6, 8] and higher than others [4, 7, 9, 10]. Compared with the studies that found

lower scores, our participants reported more episodes and greater pain intensity, which may explain the discrepancy. They are also consistent with the high episode frequency and duration of our patients.

Differences between demographic subgroups were examined in exploratory analyses. There was a significant, low correlation between age and decreased housework productivity (MIDAS 4, $p < 0.01$, $r = 0.24$). Decreased housework productivity or desire to engage with housework could be an outcome of the physical decline that comes with aging. MIDAS 4 and 5 also differ by sex, with females reporting more decreased housework productivity and missed social/leisure activity days ($p < 0.05$). Traditionally, females are considered responsible for housework in Greece; therefore, the impact of migraine on this score may be more pronounced. Lastly, there was marginally significant difference between employed and unemployed patients for MIDAS 5 and MIDAS B, with unemployed participants reporting higher scores ($p = 0.044$ and $p = 0.049$, respectively). Unemployment has significant psychological impact, which could exacerbate pain perception and participation in social/leisure activities [20]. In agreement with previous MIDAS studies, the correlation between sex or employment status and total score was non-significant [21]. The only mistake in questionnaire completion was reporting a range instead of one number to one of the five questions or MIDAS A.

The validity of the Greek MIDAS is satisfactory and comparable to the Iranian validation study [5]. The correlations between each question and the total score were higher for questions 2–5 (range $0.67 \leq r \leq 0.79$; $p < 0.01$) and low for MIDAS 1 ($r = 0.19$; $p < 0.05$). Zandifar et al. [5] also found the lowest item-total correlation to be for MIDAS 1, which is consistent with attempts to keep one's job irrespective of the burden of migraine [8]. Regarding convergent validity, all correlations between MIDAS and RAND-36 were negative, and all MIDAS scores correlated significantly with the 'Pain' subscale. The total score correlated significantly with all subscales except for 'Emotional wellbeing'. There were higher correlations with physical wellbeing subscales than with mental wellbeing subscales. In a previous study, the mental component of SF-36 was found to be more closely related to MIDAS scores than the physical component [5]. Low correlations can be expected, as the MIDAS is a migraine-specific tool and RAND-36 measures generic wellbeing. Unlike the other questions, MIDAS 1 did not correlate significantly with 'Physical role' limitations but correlated significantly with 'Emotional role' limitations. As the correlation between total score and MIDAS 1 was also low, these

findings may mean that missing work/school days is more closely related with increased affect issues than with disability. It is possible that absence from work/school occurs when patients also have mental health difficulties, which have been shown to be comorbid with migraine.

In the original version, validity was assessed by comparing MIDAS item and total scores with 90-day diary measures [4]. The MIDAS items for missed work/school days, missed household work days, and missed leisure days (MIDAS 1, MIDAS 3, and MIDAS 5) were similar to the diary estimates. MIDAS items 2 and 4 (reduced work and household work productivity) significantly overestimated the corresponding diary estimation. The total MIDAS score was not significantly different form the diary-based estimate: correlation 0.63. Overestimation compared with the diary-based measure may be caused by recall bias. Reduced productivity is a more subjective measure than missed days of work/household work and therefore may be more vulnerable to recall bias. We did not use a diary measure in our study. MIDAS items 2 and 4 seem to have low but significant correlation with the 'Pain' and 'Role physical' dimension of RAND-36, potentially demonstrating convergent validity. MIDAS 2 score did not correlate with self-reported episode frequency, unlike MIDAS 4.

The correlations found between MIDAS scores and episode duration and frequency illustrate the significance of episode frequency and are in agreement with other validation studies [5, 6, 21]. Our findings also imply that missing work/school days is related to experiencing severe pain but not to the number of episodes. Other studies found pain intensity to be significantly associated with the total MIDAS score [5, 21]. In our study, MIDAS B had a high median, and ratings were skewed towards higher values, which may have concealed the correlation with the total score.

The ICC for test–retest revealed excellent reliability for the total score, good reliability for items MIDAS 2, MIDAS 3, and MIDAS A, and moderate reliability for all other items (ICC range 0.41–0.81). Previous validation studies have estimated the Spearman correlation coefficient for reliability. In the original version, Spearman correlations of individual items ranged from 0.46 to 0.78 [3]. Our findings also seem comparable to the Spearman correlation ranges reported in other validation studies (0.54–0.71 in the Iranian validation study and 0.49–0.77 for the Italian validation) [5–7]. Internal consistency for initial and retest completion was $\alpha = 0.71$ and $\alpha = 0.82$, respectively, comparable to the US and other validation studies [2, 5, 6, 9, 10].

Regarding study limitations, the questionnaire return rate for retest was lower than in other validation studies. Participants were recruited from headache clinics, which could pose a selection bias. However, Greek patients mostly visit headache clinics through self-referral and not through referral by physicians. Therefore, clinic population is not necessarily as heavily affected as in other countries. Moreover, using a clinic population confirms that the MIDAS can be used in clinical practice and is comparable to other MIDAS validations.

This study allows for the cross-cultural comparability of research findings. It contributes to the precise quantification of migraine-related disability in the Greek population and can be used for stratified care. Stratified migraine care with the use of MIDAS can lead to better outcomes than step care strategies [22]. Moreover, we examined the differences in score across demographics, which have not been presented in other validation studies.

In conclusion, the Greek MIDAS Questionnaire is a valid and reliable scale for both research and clinical settings.

Compliance with Ethical Standards

Conflict of interest Theodora Oikonomidi, Michail Vikelis, Artemios Artemiadis, Christina Darviri, and George P. Chrousos have no conflicts of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed consent Informed consent was obtained from all individual participants included in the study.

Appendix

The Migraine Disability Assessment Test

The MIDAS (Migraine Disability Assessment) questionnaire was put together to help you measure the impact your headaches have on your life. The information on this questionnaire is also helpful for your primary care provider to determine the level of pain and disability caused by your headaches and to find the best treatment for you.

Instructions

Please answer the following questions about ALL of the headaches you have had over the last 3 months. Select your answer in the box next to each question. Select zero if you did not have the activity in the last 3 months. Please take the completed form to your healthcare professional.

Scoring: After you have filled out this questionnaire, add the total number of days from questions 1–5 (ignore A and B).

MIDAS Grade	Definition	MIDAS Score
I	Little or No Disability	0–5
II	Mild Disability	6–10
III	Moderate Disability	11–20
IV	Severe Disability	21+

If Your MIDAS Score is 6 or more, please discuss this with your doctor.

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_____ 1. On how many days in the last 3 months did you miss work or school because of your headaches?

_____ 2. How many days in the last 3 months was your productivity at work or school reduced by half or more because of your headaches? (Do not include days you counted in question 1 where you missed work or school.)

_____ 3. On how many days in the last 3 months did you not do household work (such as housework, home repairs and maintenance, shopping, caring for children and relatives) because of your headaches?

_____ 4. How many days in the last 3 months was your productivity in household work reduced by half of more because of your headaches? (Do not include days you counted in question 3 where you did not do household work.)

_____ 5. On how many days in the last 3 months did you miss family, social or leisure activities because of your headaches?

_____ Total (Questions 1-5)

What your Physician will need to know about your headache:

_____ A. On how many days in the last 3 months did you have a headache? (If a headache lasted more than 1 day, count each day.)

_____ B. On a scale of 0 - 10, on average how painful were these headaches? (where 0=no pain at all, and 10= pain as bad as it can be.)

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