

Validation of the Spanish version of Migraine Disability Assessment questionnaire (MIDAS) in migraine university students.

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Abstract

Background. The Migraine Disability Assessment (MIDAS) questionnaire is widely used for determining headache-related disability. However, to the best of our knowledge, there is no validated Spanish version of the questionnaire. It is composed of seven items; the first five items constitute the main scale, while the sixth and seventh items refer respectively to the frequency and intensity of headache. The present study is aimed at analyzing the clinimetric properties of the Spanish version of the MIDAS questionnaire in a population of university students.

Methods. We performed a cross-sectional study of validation of measuring instruments. One hundred fifty-three subjects participated in the study. We analyzed construct validity by factor analysis, test-retest reliability by the Intraclass Correlation Coefficient (ICC), internal consistency, and concurrent validity with respect to the 12-Item Short Form Health Survey (SF-12).

Results. Factor analysis showed a two factors structure composed. The questionnaire presented good reliability for the MIDAS-main scale score ([ICC = 0.81; 95% CI: 0.63 – 0.90]), excellent reliability for headache frequency (ICC = 0.90; 95% CI: [0.79 – 0.95]), and moderate reliability for headache intensity (ICC = 0.63; 95% CI: [0.34 – 0.80]). The analysis also showed good internal consistency results (α Cronbach = 0.797) and a moderate correlation between MIDAS-main scale and physical summary component of SF-12 (Rho = -0.326; $p < 0.001$).

Conclusions. The Spanish version of the MIDAS questionnaire is a valid and reliable tool to measure headache-related disability in university subjects. The two additional items provide information that could help clinicians in making decisions.

Background

Migraine is one of the eight disorders that affect more than 10% of the world population [1]. It is one of the most common chronic pain condition among the young adult population [2], with prevalence peaked between 20–30 years old. Additionally, women [3] and students are some of the populations most affected by migraine [4]. Its great prevalence, around 37%, involves a mean annual cost of 1222 € per person, having Spain the highest total cost in Europe [3]. Since 1990, years lived with disability caused by migraine have increased 51.2% [5].

The Migraine Disability Assessment (MIDAS) questionnaire was developed for determining headache-related disability [6]. It estimates productive time lost during a three month preceding period through the disabling effect of headache.

MIDAS has been adapted transculturally to numerous languages and has been widely used for research purposes and in clinical practice to develop treatment strategies based on the patient's level of disability [7]. To the best of our knowledge, there is no validated Spanish version of the MIDAS questionnaire, being its clinimetric properties unknown. However, several studies have used the MIDAS questionnaire in Spanish populations to determine both headache-related disability [8, 9] and the difficulty of using the questionnaire by patients [10].

The high prevalence and costs of migraine, mainly in Spain, together with the need for a reliable tool to measure headache-related disability in Spanish, have led us to analyze, for the first time, the clinimetric properties of the Spanish version of the MIDAS questionnaire in university students, one of the populations more affected by migraine.

Material And Methods

Design.

This is an observational, cross-sectional study of validation of measuring instruments, in which we have analyzed construct validity, internal consistency, and concurrent validity of the MIDAS questionnaire. For test-retest reliability, a subsample of 29 subjects was evaluated twice with a time difference of 21 days.

Participants.

The participants were young adult undergraduate and graduate students over 18 years old. All subjects should have had a medical diagnosis of migraine and were examined by a physician (F.H.) for checking if they fulfilled the criteria described in the third edition of "The International Classification of Headache Disorders" [11] at the moment of their inclusion in the study.

We followed the recommendations to include at least 10 subjects per item and to have a minimum of 100 subjects to perform the internal consistency analysis and the factor analysis [12]. Two hundred and thirty subjects were contacted within the University of Jaén (Spain). Two hundred and two subjects aged between 18 and 33 participated in this study, which was carried out between March and June 2017. Finally, 153 participants met the inclusion criteria and completed all the tasks foreseen in the study. The process of participant's selection is graphically represented in Fig. 1.

The present study was approved by the Bioethics Committee of the University of Jaén (Reference number ABR 7/17) and was developed in accordance with the Helsinki Declaration, the good clinical practice and all applicable laws and regulations. All participants provided written informed consent prior to their inclusion in the study.

Measurements.

Prior to completing the questionnaires, the participants reported their sociodemographic data, including age, gender, weight, height, smoking habit and physical activity practice.

The MIDAS questionnaire measures headache-related disability during the last three months. It is composed of seven items. The first five items compose the main scale and ask about three dimensions related to workplace (two first items), domestic tasks (third and fourth items) and attendance at social, family or leisure activities (fifth item). The sixth and seventh items refer respectively to the frequency and intensity of the headache in the last three months, and serve for the clinician to obtain relevant data for decision-making. The first six items must be answered with a digit indicative of the number of days that headache conditioned any of the activities indicated in each question in the last three months. The seventh item is a Numeric Pain Scale, in which zero indicates absence of pain and ten indicates the maximum pain that a person considers can bear. According to the MIDAS-main scale score, constituted by the sum of the answers to item 1 to 5, subjects could be classified in 5 disability grades: Grade I (scored 0–5): no disability or low disability; Grade II (scored 6–10): mild disability; Grade III (scored 10–20): moderate disability; and Grade IV (scored >21): severe disability.

The 12-Item Short Form Health Survey (SF-12) was used in the present study to measure quality of life [13]. It is a self-administered questionnaire extracted from the SF-36 by means of multiple regression. The SF-12 consists of 12 items from which the physical and mental summary components (PCS-12 and MCS-12, respectively) are obtained as unique scores. These two summary components showed high levels of internal consistency (Cronbach's alpha value of 0.85 for PCS-12 and of 0.78 for MCS-12) [13].

Statistical analysis.

Data management and analysis were performed using both the statistical package IBM SPSS Statistics version 23.0 (SPSS Inc., Chicago, IL) and the MedCalc statistical software 16.5.4 (MedCalc software, Inc., Mariakerke). Data were expressed as mean and standard deviation (SD) for continuous variables and as frequency and percentage for categorical variables. Kolmogorov-Smirnov test was used to test normality of continuous variables. The level of statistical significance was set at $P < 0.05$.

The Principal Component Analysis (PCA) with varimax rotation was performed to measure the validity of the MIDAS construct. To test the feasibility of the factorial analysis we used the Bartlett's sphericity test. The suitability of the sample was analyzed using the Kaiser-Meyer-Olkin (KMO) test.

The internal consistency of the instrument was analyzed by means of both the analysis of items and the calculation of Cronbach's alpha. Values of Cronbach's alpha lower than 0.70 were considered weak, those between 0.70 and 0.90 were considered good, and values above 0.90 were interpreted as a redundancy of the items [14].

The test-retest reliability was analyzed using the Intraclass Correlation Coefficient (ICC) of Shrout & Fleiss. The reliability was considered low for ICC values lower than 0.40, moderate for values between 0.40 and 0.75, high for ICC values between 0.75 and 0.90, and excellent for values higher than 0.90 [15].

The Spearman correlation coefficient was used to analyze the concurrent validity with the SF-12 questionnaire. A correlation coefficient greater than 0.5 indicated a strong correlation, while values between 0.30 and 0.50 indicated a moderate correlation [16].

Results

Of the 153 subjects who completed the study (average age = 21.76; SD = 3.65), 45 were men and 108 were women. According to the disability level, 41.8% of participants showed little disability or no disability, 32% showed mild disability, 16.3% showed moderate disability, and 9.8% showed severe disability (Table 1).

Table 1
Description of the study participants.

VARIABLES		Migraineurs (n = 153)	
CONTINUOUS		Mean	SD
Age (years)		21,76	3,65
Height (cm)		168,18	7,95
Weight (kg)		64,93	11,95
BMI (kg/m ²)		22,85	3,17
PCS-12		52,42	7,45
MCS-12		41,93	11,49
Frequency of headache (Item 6)		10,11	14,84
Pain intensity (Item 7)		5,48	2
CATEGORICAL		F	%
Gender			
	Male	45	70,6
	Female	108	29,4
Smoker			
	Yes	21	13,7
	No	132	86,3
Physical activity			
	Yes	66	43,1
	No	87	56,9
Disability grade (MIDAS)			
	No disability	64	41,8
	Mild	49	32
	Moderate	25	16,3
	Severe	15	9,8
BMI: Body Mass Index; PCS-12: Physical Component Summary of the 12-Item Short Form Health Survey (SF-12); MCS-12: Mental Component Summary of the SF-12; MIDAS: Migraine Disability Assessment.			

The PCA showed a structure composed of two factors. The first factor included items 1, 3, and 5, which are questions that imply stop doing activities that you should do, regardless of type, due to headache. The second factor included items 2 and 4, which imply a decrease of 50% in the performance of work or domestic tasks (Table 2). The variance explained was 88.35%, the Bartlett's sphericity test was statistically significant ($X^2 = 707.97$; $p < 0.001$), and the KMO index was 0.612, indicating that the sample used can be considered adequate for the factor analysis.

Table 2

Percentages of variance explained by the factor analysis performed using the Principal Components Analysis.

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative, %	Total	% of variance	Cumulative, %	Total	% of variance	Cumulative, %
1	2,846	56,922	56,922	2,846	56,922	56,922	2,823	56,460	56,460
2	1,571	31,428	88,350	1,571	31,428	88,350	1,595	31,890	88,350
3	0,429	8,585	96,935						
4	0,113	2,254	99,188						
5	0,041	0,812	100,000						

The internal consistency analysis showed a Cronbach's alpha of 0.797 for the MIDAS-main scale score, which may improve slightly if items 2 and 4 were eliminated (Table 3). In addition, the test-retest reliability was high for the MIDAS-main scale score (ICC = 0.81 95% CI: 0.63–0.90 $p < 0.001$), excellent for item 6 (headache frequency) (ICC = 0.90 95% CI: 0.79–0.95; $p < 0.001$), and moderate for item 7 (headache intensity) (ICC = 0.63; 95% CI: 0.34–0.80; $p < 0.001$). The analysis showed a strong correlation of the MIDAS-main scale score with headache frequency, and a moderate correlation with both headache intensity and PCS-12. Additionally, moderate correlations were found between PCS-12 and frequency and intensity of headache (Table 4).

Table 3
Items reliability analysis.

	Average scale if the item is deleted	Variance of scale if the item is deleted	Total correlation of corrected elements	Cronbach's alpha if the item is deleted
Item 1	10,654	302,333	0,832	0,661
Item 2	8,765	538,878	0,134	0,851
Item 3	9,078	288,625	0,846	0,653
Item 4	9,137	523,040	0,203	0,842
Item 5	9,686	287,677	0,878	0,639

Table 4

Correlations among MIDAS-main scale score, frequency and intensity of headache, and Physical and Mental components summary of SF-12 questionnaire.

	MIDAS-main scale score		Headache frequency		Headache intensity	
	Rho Spearman	P	Rho Spearman	P	Rho Spearman	P
Headache frequency	0,529	< 0,001				
Headache intensity	0,343	< 0,001	0,459	< 0,001		
PCS-12	-0,326	< 0,001	-0,334	< 0,001	-0,268	< 0,001
MCS-12	-0,153	0,060	-0,029	0,721	-0,027	0,741
MIDAS: Migraine Disability Assessment; PCS-12: Physical Component Summary of the 12-Item Short Form Health Survey (SF-12); MCS-12: Mental Component Summary of the SF-12; MIDAS: Migraine Disability Assessment.						

Discussion

The MIDAS questionnaire has been used in Spanish populations to assess headache-related disability [8–10]. However, to the best of our knowledge, there is no validated Spanish version of the questionnaire. Therefore, this is the first study that analyzes the clinimetric properties of the Spanish version of the MIDAS questionnaire. Our results in university students have shown a factorial structure composed of two factors, good internal consistency data, results ranged from good to excellent in test-retest reliability, and a moderate correlation with PCS-12 in the concurrent validity analysis of the questionnaire. Therefore, our results evidence that the Spanish version of the MIDAS questionnaire is a valid and reliable instrument to measure headache-related disability.

Our results showed a different factorial structure to that one proposed by the original authors [6]. Unlike the original structure, the PCA clearly identified two factors that explained near 90% of the variance. The first factor was composed of items that imply stop doing activities that you should do due to migraine (items 1, 3, and 5), such as work assistance, performance of housework or assistance to social activities. The second factor was composed by items that imply a decrease of 50% in the performance of both work and domestic tasks because of migraine (items 2 and 4). This two-factor structure is indicative of the different influence that migraine has on personal performance and, consequently, on disability.

In our population, near of two thirds of women and men presented any kind of disability due to migraine, which were related with decreased physical quality of life. These results are in agreement with previous studies [17, 18]. Also, several cognitive functions, such as processing speed, attention, memory, verbal skills, and executive function, are negatively affected by migraine [19] and are related to disability level, having a negative impact on daily life activities [20]. In the present study, the first factor of the factorial structure included all items that reflected a higher cognitive function affectionation by migraine, and consequently supposed a higher disability level, while the second factor reflected a lower affectionation of the cognitive function.

The reliability parameters of the Spanish version of the MIDAS questionnaire were satisfactory as a whole. We have obtained good internal consistency results as shown in previous studies [17, 18, 21–23], including the most recent works [24, 25]. Results from the test-retest reliability analysis ranged from good to excellent. This analysis also showed that the additional items of the questionnaire are reliable and provide additional information that may be helpful for the clinician, coinciding with the authors of the questionnaire [6]. The results obtained are in agreement with the way of measuring headache-related disability proposed by the original authors, although the factorial structure shown in the present study was different. The factorial structure obtained suggests the possibility of assessing headache-related disability in another

way, since cognitive functions are affected by migraine in a different level, regardless its severity, thereby generating different disability levels that may lead from absenteeism to presentism [4].

The results of the present study show good clinimetric properties of the Spanish version of the MIDAS questionnaire, evidencing that this version is a consistent and reliable measure tool.

This study has several limitations. Although the prevalence of migraine is high in the student population, the results obtained can only be considered valid for this population. Another limitation is that the results may be only valid for the Spanish population because of the differences in structure and organization of the educational systems of different countries.

In future studies, the clinimetric properties of the MIDAS questionnaire should be analyzed in different populations and countries. It would be also advisable to examine the relation between headache and other concomitant disorders such as neck pain or dizziness, as well as to analyze the factors related to the presence of headache in university students and the impact that this disorder may have on this population.

Conclusions

The Spanish version of MIDAS questionnaire is a valid and reliable tool for measuring headache-related disability in young university students. Moreover, the two additional items of the questionnaire provide information that can help the clinician to discriminate between subjects with and without headache, allowing a wider use of this scale.

Declarations

Ethics approval and consent to participate.

The present study was approved by the Bioethics Committee of the University of Jaén (Reference number ABR 7/17) and was developed in accordance with the Helsinki Declaration, the good clinical practice and all applicable laws and regulations.

Consent for publication

Not applicable.

Availability of data and material

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Author's contributions

RL y AA designed and planned this study. AA, EO and NZ collected and assured data quality. DR y RL conducted statistical analysis and outcomes interpretation. DR, AA, RL and AR wrote the first draft of the manuscript. All authors read and

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Figures



Figure 1

Flow diagram of the participants in the study.