Headache Impact Test-6 (HIT-6) Scores for Migraine Patients: Their Relation to Disability as Measured from a Headache Diary

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Background and Purpose Complete information on migraine-related disabilities facilitate the making of appropriate treatment decisions. Although the accessibility and ease of use of the Headache Impact Test-6 (HIT-6) make it a very promising instrument, there are few data available for comparing HIT-6 scores with the actual amount of disability.

Methods To determine whether the disability measured using the HIT-6 questionnaire realistically reflects the amount of disability as extracted from a headache diary, which would help when deciding a management plan, 130 patients with migraine without aura were instructed to complete a headache diary on the days on which headache occurred. Each diary booklet also contained questions on the resulting disability, and comprised five items originating from the Migraine Disability Assessment Scale. After submitting their diaries, the participants completed the HIT-6 for the same time period.

Results Disability as recorded in diaries was present for a mean of 2.7 days per month, and its duration differed significantly with HIT-6 score: 0.9, 2.6, and 4.6 days per month for little-to-no impact, moderate impact, and severe impact, respectively. The summed disability score from diaries was also related to the HIT-6 score. Headache frequency was the only headache characteristic that contributed significantly to the HIT-6 score.

Conclusions This study demonstrates that the HIT-6 could be useful for assessing headache-related disability in migraine patients, especially given that the questionnaire is both simple and ease of use.

Key Words migraine, disability, Headache Impact Test-6, Migraine Disability Assessment Scale, diary.

Introduction

The detrimental effects of migraine on functional ability and health-related quality of life are well established, and clinical evaluation of migraine-related disability can facilitate making appropriate treatment decisions.\(1,2\) However, the degree to which an individual migraine patient suffers from disability needs to be understood, which necessitates the collection of data from patients’ subjective assessments of the multidimensional burden of headache.\(3\) Various questionnaires have been developed to measure specific aspects of a patient’s migraine burden, but few questionnaires have been designed to measure the global impact of migraine.\(4,6\)

The Headache Impact Test-6 (HIT-6) was developed to measure a wide spectrum of the factors contributing to the burden of headache, and it has demonstrated utility for generating quantitative and pertinent information on the impact of headache.\(7\) The HIT-6 consists of six items: pain, social functioning, role functioning, vitality, cognitive functioning, and psychological distress.\(7\) The patient answers each of the six related questions using one of the following five responses: “never”, “rarely”, “sometimes”, “very often”, or “always”. These responses are summed to produce a total HIT-6 score that ranges from 36 to 78, where a higher score indicates a greater impact of headache on the daily life of the respondent. Scores can be interpreted using four groupings that indicate the severity of headache impact on the patient’s life.\(8,9\) Extensive testing has shown the HIT-6 to be highly...
reliable and internally consistent, and it has been translated into several languages. The HIT-6 also exhibits excellent accessibility and ease of use. Although the HIT-6 is a very promising instrument, there are few data available for comparing HIT-6 scores with the actual amount of disability, which would help in interpreting the results when creating a management plan.

We undertook this study to examine the usefulness of the HIT-6 as a measure of headache-related disability, in terms of assessing the degree to which the HIT-6 score reflects headache characteristics such as the pain intensity and headache frequency, and the realistic amount of disability as determined from the headache diary.

**Methods**

**Participants and clinical assessment**

One hundred and fifty-five patients with migraine without aura were consecutively recruited from a headache clinic. All the participants were interviewed clinically and examined physically and neurologically by experienced neurologists (J.W.P. and H.E.S.). During the interview, a structured questionnaire was used to obtain detailed data regarding the clinical symptoms and features of the patient’s headache. The diagnosis of migraine was made based on the operational diagnostic criteria of the International Headache Society (International Classification of Headache Disorders [ICHD]-II). We did not include patients who presented with chronic migraine or who had taken analgesics for headache more than 10 times during the previous 3 months. Each patient provided written informed consent to participate in this study.

**Data collection**

The headache diaries were handed out at the initial visit, along with sufficient information about the required contents. The participants were instructed to complete a diary at the same time each day (preferably at night) on days on which they experienced a headache. Each diary booklet covered a 4-week period, and the booklet comprised questions on headache characteristics and the symptoms associated with each attack. The headache pain intensity was measured using a visual analog scale anchored from 0 to 10, where 0 meant no pain and 10 meant pain as bad as it can be. The diary also contained five questions on disability that originated from the Migraine Disability Assessment Scale (MIDAS), covering a reduction in ability of more than 50% to attend work or school, a reduction in ability of more than 50% to do household work, and an inability to participate in nonwork activities (total score of 0–3 for each headache attack: see Appendix). Completed diaries were collected from the participants when they were asked to come to our clinic at the end of the diary period. After reviewing the diaries for completeness and consistency, we counted the summed disability score and the total number of days on which the subjects experienced headache-related disability. Disability due to a headache attack was considered to be present if the disability score was greater than zero. After submitting their diaries, the participants completed the HIT-6 questionnaire for the same time period. We used the validated Korean-translated version of the HIT-6. The disability was quantified using the following four impact grades based on the obtained HIT-6 score (see www.headachestest.com/HIT6translations.html): (1) little-to-no impact (HIT-6 score: 36–49), moderate impact (HIT-6 score: 50–55), substantial impact (HIT-6 score: 56–59), and severe impact (HIT-6 score: 60–78).

Of the 155 study subjects initially enrolled in the diary study, 25 were excluded from data analysis due to them not experiencing a headache attack during the diary period, inadequate data, and/or moving away. Therefore, 130 subjects were finally included in this study.

**Statistical analysis**

The categorical variables were summarized using percentages, and the continuous ones were generally summarized by descriptive statistics (using mean ± standard deviation values). The relationships of the HIT-6 score with headache features and disability from the headache diary were estimated using correlation analysis, and differences between groups with different HIT-6 scores were evaluated using analysis of variance after confirming that the data conformed to a normal distribution. SPSS statistical software (version 10.0) was used for all the analyses. A probability value of < 0.01 was considered statistically significant.

**Results**

The 130 migraine subjects contributed 612 diary records of headache attack during the diary recording period (mean length of the diary period: 33.4 days). The demographic and headache characteristics of the study participants are summarized in Table 1. Females comprised 81% of the participants. Headache-related disability was present on 2.7 ± 2.5 days during the study period, and the summed disability score was 4.3 ± 3.9 points (Table 1). The averaged HIT-6 score was 53.4 ± 8.7 points, and 68% of the patients were impacted to a moderate-to-severe degree according to the HIT-6 score (Table 2). Correlation analysis revealed that the frequency of headache attacks, duration of disability, and summed disability score from the diary were significantly correlated.
with the severity of headache-related disability at each attack (Table 3).

Comparison of the headache characteristics according to the HIT-6 score showed that the headache frequency was significantly higher in the severe-impact group than in the little-to-no-impact group, whereas the duration of headache attack and the pain intensity did not differ with the HIT-6 score (Table 4). The mean duration of disability and the summed disability score from the diary tended to increase with the HIT-6 score. A subgroup comparison revealed that the duration of disability differed significantly among little-to-no impact (0.9 days), moderate impact (2.6 days), and severe impact (4.6 days) on the HIT-6. The summed disability score was significantly higher for severe impact (7.3 points) than for little-to-no (1.4 points) or moderate (3.6 points) impact on the HIT-6.

**Discussion**

The high level of migraine self-awareness observed in previous studies appears to indicate that inadequate migraine management is not due to a deficient diagnosis, but rather to treatment with inappropriate consideration of the headache-related disability. The revised US and European guidelines for migraine have established that frequent migraine attacks associated with significant disability warrant preventive treatment. The Disability in Strategies of Care (DISC) study indicated that a stratified strategy for the acute treatment of migraine based on the migraine-related disability provides satisfactory clinical outcomes. In order to facilitate accurate estimations of disability, physicians and patients would benefit from a tool that is quick and easy to administer, and precise to interpret. The HIT-6 was developed for this purpose and it is routinely used as a valid measure of headache-related disability. However, to our knowledge this is the first study to apply the HIT-6 to a population of migraine patients in a neurology-based headache clinic. Moreover, few studies have compared HIT-6 scores and other measures of headache-related disability, and none have been designed to compare HIT-6 scores with disabilities recorded in headache diaries for the same time period. One previous concern about the HIT-6 is that it primarily focuses on headache frequency, pain intensity, and the...
ation of headache attacks. Previous studies have shown that headache frequency and other characteristics could be contributing factors to migraine-related disability,22 but no studies have verified the relationship between these factors and disability as measured by the HIT-6. In the present study, an increasing frequency of headache attacks—which is known to be central to the MIDAS score—appeared to be related with an increased disability impact, as assessed by the HIT-6 questionnaire.10 It may seem counterintuitive that the pain intensity and the duration of a headache attack do not play a major role in determining the disability because there is a threshold of pain that causes disability and the length of time of a headache should be elementary to experiencing disability in daily living.27,28 Therefore, determinants of disability other than the attack frequency should be an important focus of further research for developing appropriate management regimens that target these variables to reduce headache-related disability in migraine patients.

The primary focus of this study was determining whether the HIT-6 can provide a realistic measure of the amount of disability as determined from the diary record. We found a strong correlation between HIT-6 scores and the duration of disability recorded in headache diaries, and demonstrated that HIT-6 scores are closely related to the overall burden of a migraine. Especially, the mean duration of disability differed significantly between patients with a moderate impact on the HIT-6 (2.6 days) and those with either little-to-no (0.9 days) or severe (4.6 days) impact on the HIT-6 during the study period. The summed disability scores, which corresponded to those of the MIDAS, also closely matched HIT-6 scores. The summed disability scores were significantly higher for severe impact on the HIT-6 than for less than a moderate impact on the HIT-6. The MIDAS questionnaire, which was developed to stratify patients in terms of treatment and to monitor the clinical course of patients, is not very user-friendly for routine application.4 Moreover, the MIDAS only targets the duration of headache and it involves a 3-month recall period, which could be too long for measuring short-term clinical changes. When extrapolating the results of previous guidelines and the DISC study, migraine sufferers with severe impact (a HIT-6 score above 60) should ideally be treated with specific drugs such as triptans or by preventive treatment if this high impact on the HIT-6 appears for a long time.20-22

In conclusion, this study demonstrates that the HIT-6 can be useful for assessing headache-related disability over a 1-month time period. The simplicity and speed of the questionnaire further make the HIT-6 a useful tool for physicians to acquire pertinent data on a patient’s perceived burden of headache.14

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### Appendix

**Questions included in the headache diary booklet for estimating headache-related disability**

| Questions about disability                                                                 | Score |
|---------------------------------------------------------------------------------------------|-------|
| 1. Did you miss work or school today because of this headache?                              |       |
| 2. Was your productivity at work or school at least halved today because of this headache? |       |
| (Do not mark this question if you answered “yes” to question 1.)                           |       |
| 3. Were you unable to do housework or chores today because of this headache?                |       |
| 4. Was your productivity for housework or chores at least halved today because of this headache? |       |
| (Do not mark this question if you answered “yes” to question 3.)                           |       |
| 5. Did you miss family, social, or leisure activities today because of this headache?      |       |

Total Score (0–3): __________ points