Published in final edited form as:

Cephalalgia. 2009 October ; 29(10): 1086–1090. doi:10.1111/j.1468-2982.2008.01835.x.

Agreement of Self-Reported Migraine with ICHD-II Criteria in the Women's Health Study

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Abstract

Migraine is a common headache disorder that is increasingly being evaluated in population-based studies. The American Migraine Study II and the Women's Health Study (WHS) have successfully used "modified" International Classification of Headache Disorders - I (ICHD-I) criteria to classify patients. Investigating agreement of self-reported migraine in large epidemiological studies with the criteria of the revised version (ICHD-II) is sparse. We have investigated 1,675 women with self-reported migraine participating in the WHS, who provided additional information on a detailed migraine questionnaire, which allowed us to apply all ICHD-II criteria. In this sub-cohort we confirmed self-reported migraine in over 87% of women when applying the ICHD-II criteria for migraine (71.5%) and probable migraine without aura (16.2 %). In conclusion, there is excellent agreement between self-reported migraine and ICHD-II based migraine classification in the WHS. In addition, questionnaire-based migraine assessment according to full ICHD-II criteria in large population-based studies is feasible.

Keywords

migraine; epidemiology; questionnaire; ICHD-I; ICHD-II

Introduction

Migraine is a common debilitating disorder characterized by recurrent headache attacks associated with gastrointestinal and autonomic symptoms. Medical descriptions of patients with migraine have been published for over hundreds of years (1). However, there has been controversy about which characteristics are obligatory to diagnose migraine (2). The rapid increase in migraine research in the 20th century necessitated universally acceptable criteria for migraine. The development of the International Classification of Headache Disorders

(ICHD) in 1988 is probably among the most important achievements in this regard and has gained wide acceptance worldwide (2,3). A revised version has been introduced in 2004 and – despite need for additional improvements – is the gold standard for headache diagnosis at present (2,4).

Large population-based studies have increasingly been employed to study migraine (5,6). The American Migraine Study II and the Women's Health Study (WHS) have used questionnaire-based self-reported migraine and specific characteristics to classify patients (5,6). However, the questions asked did not cover all criteria for migraine as listed in ICHD-I, which only allows the application of “modified” criteria. Notwithstanding, the “modified” criteria used in the American Migraine Study II performed well on external validation (6). In addition, self-reported migraine in the WHS is in good agreement with “modified” ICHD-1 criteria for migraine (5). However, investigations on how well self-reported migraine is in agreement with the full ICHD-II criteria in these studies are sparse.

We evaluated 1,675 women participating in the WHS who self-reported migraine at enrollment and who received a detailed migraine questionnaire before randomization allowing us to apply all ICHD-II criteria (Table 1).

Subjects and Methods

Study population

The WHS was designed as a randomized, placebo-controlled trial designed to test the benefits and risks of low-dose aspirin and vitamin E in the primary prevention of CVD and cancer among apparently healthy women. The design, methods, and results have been described in detail previously (7,8). Briefly, a total of 65,169 U.S. female health professionals aged ≥ 45 years at baseline (between September 1992 and May 1995) without a history of CVD, cancer, or other major illnesses were enrolled, of which 39,876 were randomized to active aspirin (100 mg on alternate days), active vitamin E (600 IU on alternate days), both active agents, or both placebos. All participants provided written informed consent and the Institutional Review Board of Brigham and Women's Hospital approved the WHS. Baseline information was self-reported and collected by a mailed questionnaire, which asked about many cardiovascular risk factors and lifestyle variables.

Of the women enrolled (baseline), those who reported migraine attacks at least once per month during the previous year (cumulative attack frequency of at least 12) ($n=2,589$) were sent a detailed migraine-specific questionnaire and asked if they were willing to participate in a migraine sub-study. This sub-study aimed to evaluate the role of low-dose aspirin in the prophylaxis of migraine (9). The time period between obtaining migraine information from the enrollment questionnaire and from the detailed migraine-specific questionnaire ranged from a few weeks to less than nine months. Of the 1,817 women returning the migraine-specific questionnaire (70.2%), 142 reported a migraine frequency of less than monthly and were excluded, leaving 1,675 women for analysis.

Assessment of migraine

Participants were asked on the baseline questionnaire: “Have you ever had migraine headaches?” and “In the past year, have you had migraine headaches?” From this information, we categorized women into “any history of migraine,” “active migraine,” which includes women with self-reported migraine during the past year; and “prior migraine,” which includes women who reported ever having had a migraine but none in the year prior to completing the questionnaire. Participants who reported active migraine were asked details about their

migraine attacks. In a previous study of the WHS (5), we have shown good agreement with modified 1988 International Headache Society (IHS) criteria for migraine (ICHD-I) (3).

The detailed migraine-specific questionnaire contained questions addressing age at migraine onset, physician diagnosis of migraine, family history of migraine, details about migraine attacks, and medication used. Questions about migraine characteristics allowed us to classify women according to the revised 2004 IHS criteria for migraine (ICHD-II) (4). In particular, women were asked about the frequency of attacks during the past year (daily, weekly, every other week, monthly) – criterion A; usual duration of migraines during the past year (<4 hours, 4–24 hours, 25–48 hours, 49–72 hours, >72 hours) – criterion B; usual location of migraines (unilateral or behind one eye, front of head, back of head, whole head) – criterion C1; usual character of migraines (pounding, pulsating, crushing, sharp, aching, burning) – criterion C2; usual severity of migraines during the past year (light, moderate, severe) – criterion C3; if migraines were triggered or made worse by any physical activity (yes, no) – criterion C4; nausea and/or vomiting (never, sometimes, always) – criterion D1; light sensitivity (never, sometimes, always) – criterion D2; sensitivity to sound (never, sometimes, always) – criterion D2.

Statistics

We used descriptive statistics and report mean $\pm$ standard deviation (SD) as well as proportions and numbers. Regarding the character of migraines, we considered “pounding” and “pulsating” to concur with criterion C2, and regarding nausea and/or vomiting and sensitivity to light and sound we considered “sometimes” and “always” to concur with criterion D1 and D2.

All analyses were performed using SAS version 9.1 (SAS Institute Inc, Cary, NC).

Results

In 90% of women migraine began between the ages of 11 and 50 years (<10 years: 7.9%; 11–20 years: 28.1%; 21–30 years: 29.3%; 31–50 years: 32.8%; >50 years: 1.9%). A positive family history of migraine (defined as report of migraine for at least one of the following relatives: father, mother, sibling, grandparents, children) was reported by 77.3% and 79.7% had received a physician diagnosis of migraine.

The migraine characteristics and ICHD-II diagnosis are summarized in Table 2. Over 87% of women with self-reported active migraine could be diagnosed as migraine without aura (71.5%) or probable migraine without aura (16.2%) according to ICHD-II criteria. When we excluded women, who reported daily migraines (n=45), the numbers were virtually unchanged (migraine without aura: 72.4%; probable migraine without aura: 15.6%).

Discussion

The results of our study demonstrate a high degree of agreement between self-reported migraine and ICHD-II based migraine classification among women in the WHS. Of 1,675 women in our sample who reported migraine, we could classify over 87% as “migraine without aura” or “probable migraine” without aura applying ICHD-II criteria.

While a physician diagnosis is considered the gold standard for the diagnosis of migraine, it is not feasible to take a physical exam and medical history in large population-based studies. To study migraine in populations with thousands to tens of thousands of participants, it is necessary to apply standardized epidemiologic tools that can be implemented in self-administered questionnaires. The agreement of such self-reports with the ICHD-II criteria is crucial for studying migraine-specific aspects in population-based studies. Since migraine diagnosis relies

on the presence of certain symptoms as well as associated features, which can easily be asked about in questionnaires, rendering laboratory tests unnecessary, migraine is a unique condition to be studied in epidemiological studies.

The American Migraine Study II and the WHS have utilized self-reported information on migraine and migraine specifics on their enrollment questionnaire to classify patients as having or not having migraines (5,6). The questions asked in these questionnaires, however, did not allow applying all ICHD-I criteria, but only “modified” criteria. These “modified” criteria used in the American Migraine Study II have demonstrated high sensitivity (100%) and specificity (82.3%) in a validation study among a population sample of clinically diagnosed migraineurs (6). In addition, we have previously shown that the migraine classification in the WHS is in good agreement with “modified” ICHD-1 criteria for migraine (5). “Modified” refers to the fact that not all questions required by ICHD-I were asked on the baseline questionnaire. Our present data further show that self-reported migraine among women in the WHS is confirmed in 87% when applying ICHD-II criteria for migraine or probable migraine without aura to a sub-group of women with extended information about migraine characteristics. Such a degree of agreement is considered excellent in epidemiological studies (10).

The strengths of our study include the large number of women with self-reported migraine who participated in this sub-study and the detailed standardized questionnaire allowing us to apply all ICHD-II criteria for migraine without aura.

However, several limitations should be considered. First, we cannot exclude the potential for misclassification of women both based on the baseline questionnaire and on the migraine-specific questionnaire. We may have missed migraineurs, who did not check the box on migraine on the baseline questionnaire. Likewise, women with other moderate to severe headaches may have checked the box on migraine. In addition, misunderstanding one or more questions on the migraine-specific questionnaire may lead to a false classification according to the ICHD-II criteria. However, we believe that migraines are dramatic events well remembered by the affected persons. Second, we only examined women with a headache frequency of at least monthly. While some women with less than monthly headache attacks may still meet the ICHD-II criteria, they may report migraine symptoms and features less accurate. We believe that having attacks more frequently reduces this recall bias. Third, some of the women reported daily migraines. These women may suffer from various forms of chronic daily headaches, thus biasing the classification of the other migraineurs. However, in a sensitivity analysis we excluded women, who reported daily migraines, and the results were unchanged. Finally, the questionnaire did not allow us to determine aura status according to ICHD-II criteria. We believe that this is an inherent problem with questionnaire-based studies, since indicating visual, sensory, speech, or motor symptoms will always raise doubt about an ischemic event that necessitates a thorough work-up including physical examination, brain imaging, and laboratory tests.

In conclusion, our data support the use of questionnaire-based tools to assess migraine in population-based research.

Acknowledgements

We are indebted to the participants in the Women’s Health Study for their outstanding commitment and cooperation; to the entire Women’s Health Study staff for their expert and unfailing assistance.

Funding and Support

The Women’s Health Study is supported by grants from the National Heart, Lung, and Blood Institute (HL-43851), the National Cancer Institute (CA-47988), and the National Institute of Neurological Disorders and Stroke (NS-34108). Dr. Schürks was supported by a grant from the Deutsche Forschungsgemeinschaft (SCHU 1553/2-1). The funding

agencies played no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

Full Disclosures

Dr. Schürks has received within the last 5 years investigator-initiated research funds from the Deutsche Forschungsgemeinschaft and an unrestricted research grant from Merck, Sharp and Dohme.

Dr. Buring has received within the last 5 years investigator-initiated research funding and support as Principal Investigator from the National Institutes of Health (the National Heart, Lung, and Blood Institute, the National Cancer Institute, and the National Institute of Aging) and Dow Corning Corporation; research support for pills and/or packaging from Bayer Health Care and the Natural Source Vitamin E Association; honoraria from Bayer for speaking engagements.

Dr. Kurth has received within the last 5 years investigator-initiated research funding as Principal or Co-Investigator from Bayer AG, McNeil Consumer & Specialty Pharmaceuticals, Merck, the National Institutes of Health, and Wyeth Consumer Healthcare; he is a consultant to i3 Drug Safety; he received honoraria from Organon for contributing to an expert panel and from Genzyme for educational lectures.

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Table 1
ICHD-II diagnostic criteria for migraine without aura

A. At least 5 attacks fulfilling criteria B–D   B. Headache attacks lasting for 4–72 hours (untreated or unsuccessfully treated)   C. Headache has at least two of the following characteristics: 1. unilateral location2. pulsating quality3. moderate or severe pain intensity4. aggravation by or causing avoidance of routine physical activity D. During headache at least one of the following: 1. nausea and/or vomiting2. photophobia and phonophobia E. Not attributable to another disorder

Table 2

Migraine characteristics and ICHD-II diagnosis among women with self-reported migraine in the Women's Health Study with at least monthly attacks during the past year (criterion A) (n=1,675)

Characteristic	Percentage (N)
Attacks lasting 4–72 hours (criterion B)	86.2 (1,444)
Unilateral headache location (criterion C1)	68.5 (1,148)
Pulsating pain quality (criterion C2)	57.3 (959)
Moderate or severe pain intensity (criterion C3)	75.9 (1,271)
Aggravation by routine physical activity (criterion C4)	36.6 (613)
Nausea and/or vomiting (criterion D1)	89.1 (1,492)
Photophobia	94.5 (1,558)
Phonophobia	87.3 (1,442)
Photo- and phonophobia (criterion D2)	83.5 (1,399)
ICHD-II diagnosis of migraine without aura	71.5 (1,197)
ICHD-II diagnosis of probable migraine without aura	16.2 (271)

ICHD-II: International Classification of Headache Disorders version 2 from 2004