PAIN® 154 (2013) 484–492

PAIN®

www.elsevier.com/locate/pain

Chronic migraine and chronic tension-type headache are associated with concomitant low back pain: Results of the German Headache Consortium study

Min-Suk Yoon [a,b], Aubrey Manack [c,*], Sara Schramm [d], Guenther Fritsche [a], Mark Obermann [a], Hans-Christoph Diener [a], Susanne Moebus [d], Zaza Katsarava [a]

[a] Department of Neurology, University Hospital of Essen, Essen, Germany
[b] Department of Neurology, St. Joseph Hospital, Ruhr-University of Bochum, Bochum, Germany
[c] Allergan, Inc, Irvine, CA, USA
[d] Institute for Medical Informatics, Biometry and Epidemiology, University Hospital of Essen, Essen, Germany

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

ARTICLE INFO

Article history:
Received 21 August 2012
Received in revised form 19 November 2012
Accepted 12 December 2012

Keywords:
Chronic migraine
Chronic tension-type headache
Low back pain
Chronic pain

ABSTRACT

The objective of this study was to evaluate the association between low and frequent low back pain and chronic migraine (CM) and chronic tension-type headache (CTTH) in a large, German population-based sample. Headaches were diagnosed according to International Classification of Headache Disorders-2 criteria and categorized according to frequency (episodic 1–14 days/month or chronic ⩽15 days/month) and headache type (migraine or TTH). We defined frequent low back pain as self-reported low back pain on ⩾15 days/month. We calculated odds ratios and 95% confidence intervals (CI) using logistic regression analyses, adjusting for sociodemographic covariates. There were 5605 respondents who reported headache in the previous year, of whom 255 (4.5%) had Chronic Headache. Migraine was diagnosed in 2933 respondents, of whom 182 (6.2%) had CM. TTH was diagnosed in 1253 respondents, of whom 50 (4.0%) had CTTH. Among 9944 respondents, 6030 reported low back pain, of whom 1267 (21.0%) reported frequent low back pain. In adjusted models, the odds of having frequent low back pain were between 2.1 (95% CI 1.7-2.6) and 2.7 (95% CI 2.3-3.2) times higher in all episodic headache subtypes when compared to No Headache. The odds of having frequent low back pain were between 13.7 (95% CI 7.4-25.3) and 18.3 (95% CI 11.9-28.0) times higher in all chronic headache subtypes when compared to No Headache. Low and frequent low back pain was associated with CM and CTTH. Multiple explanations may contribute to the association of headache and back pain, including the notion that the neurobiology of chronic headache, independent of primary headache type, not only involves the trigeminal pain pathway, but is also a part of abnormal general pain processing.

1. Introduction

Chronic pain conditions including headache, low back and neck pain, arthritis, and joint pain are common in both developed and developing countries [68]. Chronic pain conditions affect an individual's well-being, ability to work productively, and ability to build social relationships and maintain an independent lifestyle [11,23,68]. Not surprisingly, chronic pain is associated with increased rates of anxiety and depression [14,24,28,44,68].

Headaches represent a frequently occurring pain condition, and they are among the most common disorders of the nervous system. There has been little recognition of their public-health impact; therefore, the World Health Organization recently launched a global campaign to increase understanding of headache-related burden and improve health care resource allocation for this condition [73]. Chronic headaches, defined broadly as those occurring on ⩾15 days/month, affect about 3–4% of the general population and account for a markedly disproportionate share of the overall headache-related burden and costs [50,65,66,76].

Low back pain is another common health problem, with a lifetime prevalence ranging between 11% and 84% for the general population [70]. Similar to headache, those who develop chronic, disabling low back pain account for a disproportionate share of the burden and costs associated with low back pain [15,27,46].

Chronic headache and chronic back or neck pain are interrelated pain conditions. Although the etiology and pathophysiology of chronic headaches, such as migraine and tension-type, differ, there is growing evidence that central sensitization of the pain matrix is

* Corresponding author. Address: Allergan, Inc., 2525 Dupont Drive, Irvine, CA 92612-1599, USA. Tel.: +1 714 246 6438.
E-mail address: Manack_Aubrey@Allergan.com (A. Manack).

0304-3959/$36.00
http://dx.doi.org/10.1016/j.pain.2012.12.010

an important common pathway of the pathophysiology of all chronic headache [5,51] as well as other chronic pain syndromes, including chronic low back pain [47]. In order to quantify associated burden and effectively optimize treatment paradigms for both conditions, it is important to explore the interplay between them. Therefore, we investigated whether the prevalence of low back pain and frequent low back pain would be higher in a population-based sample of people with chronic migraine and chronic tension-type headache. A population-based dataset offers the most robust assessment of the potential association, because clinic-based datasets often present the most severe spectrum of headache and low back pain and are therefore subject to bias.

2. Methods

2.1. Study design

The German Headache Consortium is a large, population-based cohort study supported by the German Federal Ministry of Education and Research. The study was approved by the Ethics Committee of the University of Duisburg-Essen, Germany. Informed written consent was obtained from all subjects.

The study population comprised a random sample of 18,000 residents of 3 regions in Germany: the city of Essen, a large (585,481 residents) city in the North Rhine-Westphalia region in the western part of Germany; the city of Münster, a middle-sized (272,890 residents) town in the western part of Germany; and the rural area of Sigmaringen (the small central town of Sigmaringen with 16,501 residents and 20 adjacent villages) in southern Germany. Inclusion criteria were: 1) age between 18 and 65 years, and 2) German citizenship, to ensure proper knowledge of the German language.

Fig. 1 illustrates the screening procedure. All study subjects received a questionnaire via postal mail, and a reminder notification was sent 2 weeks later to reduce the number of nonresponders. Individuals who did not respond via mail were called and interviewed over the telephone by trained medical students, using the same questionnaire. Individuals who failed to respond to the mailed questionnaire and were telephoned 8 times with no success were considered nonresponders. Individuals who refused the interview either by postal response or by telephone were also considered nonresponders.

A detailed description and validation of the headache-screening questionnaire has been previously published [26,77]. In summary, the questionnaire was based on diagnosis criteria from the second edition of the International Classification of Headache Disorders (ICHD-2) [31] and contained the following domains: 1) personal data, including socioeconomic status, which was based primarily on education to avoid direct questions about income; 2) medical inquiry, including questions designed to diagnose migraine and tension-type headache by ICHD-2 classification criteria as well as questions to ascertain the number of days associated with the different headache types; 3) 2 questions on low back pain (first, "did you have low back pain in the previous 3 months?" and then, if the answer was yes, respondents were asked to report the average number of days with low back pain during the previous 3 months); 4) the number of days of intake of acute pain and headache/migraine medications per month; and 5) comorbidities and the number of days of intake of any nonheadache or nonpain medications per month.

2.2. Headache classification

Study analyses included several classifications for headache based on ICHD-2 criteria [31] and headache day frequency:

- Diagnosis of headache: Respondents who self-reported headache in the previous year and had either $\geqslant$15 headache days/month (chronic headache; CH) or <15 headache days/month (episodic headache; EH).
- Diagnosis of tension-type headache (TTH): Respondents who self-reported headache in the previous year and who met ICHD-2 criteria for definite or probable TTH and had either $\geqslant$15 headache days/month (chronic tension-type headache; CTTH) or <15 headache days/month (episodic tension-type headache; ETTH).

Additionally, the migraine respondents were classified utilizing 2 approaches. The first identified those with ICHD-2 migraine and included those with coexisting TTH. This subset was established in order to best align with the ICHD-2 hierarchical approach to headache diagnosis and with clinical practice and has been denoted as Migraine throughout this manuscript. In order to best evaluate the potential pathophysiological overlap between migraine and low back pain, an additional subset including those with ICHD-2 migraine but excluding those with coexisting TTH (ie, those who met ICHD-2 criteria for definite or probable TTH) was included; this migraine subset has been denoted as Migraine-II throughout this manuscript:

- Diagnosis of Migraine: Respondents who self-reported headache in the previous year and who met ICHD-2 criteria for migraine or probable migraine, *including those who had definite and probable coexisting TTH*, and had either $\geqslant$15 headache days/month (chronic migraine; CM) or <15 headache days/month (episodic migraine; EM).
- Diagnosis of Migraine-II: Respondents who self-reported headache in the previous year and who met ICHD-2 criteria for migraine or probable migraine, *excluding those who had definite and probable with coexisting TTH*, and had either $\geqslant$15 headache days/month (CM-II) or <15 headache days/month (EM-II).

2.3. Data analysis

Results focus on the baseline cross-sectional analyses. All statistics were analyzed using SPSS Statistics software (IBM, Armonk, NY, USA). Descriptive statistics characterized the respondent population by headache subtype. Logistic regression analyses were used to evaluate associations between low back pain (yes vs no) and headache (CH and EH vs the reference group of No Headache), and separately between migraine (CM and EM vs No Headache; CM-II and EM-II vs No Headache) and TTH (CTTH and ETTH vs No Headache). Model covariates included: age (in years), gender (male vs female), drinking (daily vs not daily alcohol consumption), smoking (vs not smoking), education (high, defined as high school or university, vs low), and body mass index (BMI) ($\geqslant$30 vs 25–30 vs $\leqslant$25). Covariates were determined based on published literature suggesting that chronic and episodic headache disorders differ on a number of variables [14,59] and the assumption that these variables may influence the association between headache and low back pain. The analysis populations for the regression models were defined as those who reported headache status with no missing data for appropriate model covariates. Three models were evaluated:

- Model 1 – univariate analysis between headache status and low back pain;
- Model 2 – multivariate analyses including Model 1 + controlling for age and gender;
- Model 3 – multivariate analyses including Model 2 + controlling for drinking status, smoking status, education level, and BMI.

The same modeling procedure was repeated for *frequent* low back pain. The same covariates were included in these models (Models 1-3 as described above for the low back pain models).