

ORIGINAL ARTICLE

Analgesic Prescribing for Musculoskeletal Complaints in the Ambulatory Care Setting After the Introduction and Withdrawal of Cyclooxygenase-2 Inhibitors

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ABSTRACT. Wilson RD. Analgesic prescribing for musculoskeletal complaints in the ambulatory care setting after the introduction and withdrawal of cyclooxygenase-2 inhibitors. *Arch Phys Med Rehabil* 2009;90:1147-51.

Objective: To evaluate the analgesic prescribing patterns for musculoskeletal complaints in a nationally representative sample of ambulatory care visits over a dynamic period of pharmaceutical treatments.

Design: Sequential cross-sectional analysis of complex probabilistic survey data with multivariable logistic regression analysis.

Setting: National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey 1999 to 2005.

Participants: Visits to ambulatory care physicians in the United States from 1999 to 2005 with the reason for visit being a musculoskeletal complaint.

Interventions: Not applicable.

Main Outcome Measures: Prescribing of cyclooxygenase-2 (COX-2) inhibitors, nonselective nonsteroidal anti-inflammatory drugs (nsNSAIDs), opiate analgesics, nonnarcotic analgesics, and adjuvant analgesic medications for visits related to musculoskeletal complaints.

Results: There were 41,804 visits for musculoskeletal complaints, representing 789 million visits from 1999 to 2005 in the weighted analyses. Prescribing for any nonsteroidal anti-inflammatory drugs (NSAIDs) remained relatively stable from 1999 to 2005. It appears that COX-2 inhibitors were substituted for nsNSAIDs initially. After safety concerns arose and select COX-2 inhibitors were withdrawn, there were sharp increases in prescribing of nsNSAIDs and nonnarcotic analgesics. Opiate analgesics and adjuvant analgesics increased in usage over the study period, although apparently not in substitution for NSAIDs.

Conclusions: COX-2 inhibitors may have been prescribed as substitutes for nsNSAIDs initially, but nsNSAID prescriptions returned to prior levels by 2005 as COX-2 inhibitor prescriptions declined. An increase in nonnarcotic analgesic prescribing in 2005 may have been caused by a class effect

concern for NSAIDs. Prescribing of opiate analgesics and adjuvant analgesics increased over the study period, although apparently not in substitution for NSAIDs.

Key Words: Analgesics; Health care surveys; Musculoskeletal system; Prescriptions; Rehabilitation.

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ORAL ANALGESIC OPTIONS for the treatment of musculoskeletal complaints have changed since the risks associated with NSAIDs, and COX-2 inhibitors in particular, became evident. Two COX-2 inhibitor analgesics were released in 1999, and in the following year, 2 large trials^{1,2} provided support that they had favorable side effect profiles compared with nsNSAIDs. In 2001, a study raised concern that COX-2 inhibitors raised cardiovascular risk,³ a finding that was confirmed in 2004 when a study was halted as a result of drug safety concerns.⁴ Rofecoxib was voluntarily removed from the market in 2004, followed by the removal of valdecoxib in early 2005. Coincidentally, the paradigm for treating pain has also undergone a change. There is greater emphasis on treating pain and a push by regulatory bodies, such as the Joint Commission (formerly the Commission on Accreditation of Healthcare Organizations), that places pain relief as a priority for health care providers.⁵

Studies have described patterns of analgesic use,⁶⁻⁹ but there have been no studies of the prescribing patterns of multiple analgesic medications by physicians in the United States over the period in which COX-2 inhibitors were introduced and rofecoxib and valdecoxib were removed from the market. It remains unclear how physician prescribing adapted to changes in medication availability and with emerging information about drug safety.

The aim of this study was to evaluate the analgesic prescribing patterns for musculoskeletal complaints in a nationally representative sample of ambulatory care visits over a dynamic period of pharmaceutical treatments.

METHODS

Study Design and Population

This is a sequential cross-sectional analysis of visits to ambulatory care physicians in the United States from 1999

List of Abbreviations

COX-2	cyclooxygenase-2
NAMCS	National Ambulatory Medical Care Survey
NHAMCS	National Hospital Ambulatory Medical Care Survey
NSAID	nonsteroidal anti-inflammatory drug
nsNSAID	nonselective nonsteroidal anti-inflammatory drug

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through 2005. Visits to primary care physicians and specialists were included in the analysis. The data are public-use data files that are released for research and do not include any provider or patient identification information. The institutional review board at MetroHealth Medical Center confirmed that this study was exempt from review.

Data Sources

Data were obtained from the NAMCS and NHAMCS. The NAMCS includes a sample of visits to nonfederally employed office-based physicians (with the exceptions of anesthesiologists, pathologists, and radiologists), whereas the NHAMCS includes ambulatory care services in noninstitutional and non-federal hospital emergency and outpatient departments. The surveys are conducted annually. Before survey completion, specially trained interviewers visited the physicians or outpatient departments to provide them with survey materials and to teach the physicians and/or their staff members how to complete the forms. Data were obtained on demographic characteristics of patients, expected source or sources of payment, patient complaints, physician diagnoses, diagnostic/screening services, procedures, medication therapy, disposition, types of health care professionals consulted, causes of injury where applicable, and other information. All medical and drug coding and keying operations were subject to quality-control procedures. Quality control involved a 2-way 10% independent verification procedure. Additionally, all patient record forms with differences between coders or illegible entries were reviewed and adjudicated at the National Center for Health Statistics. The multistage, complex survey designs allow estimation of unbiased national estimates of ambulatory care visits.

Study Sample

Patient visits were identified to be of a musculoskeletal nature by the Reason for Visit Classification code number, developed by National Center for Health Statistics, of the patient's expressed reason for the medical visit. If a complaint related to the musculoskeletal system was coded in any of 3 reasons for visit, then the patient visit was included in the analysis. Acute and chronic musculoskeletal complaints were included in the study. Visits to the emergency department and pre- and postsurgery follow-up were excluded.

Outcomes

The outcomes were prescriptions for new or continued analgesic medications during visits of musculoskeletal complaints by year from 1999 to 2005. The database allowed up to 6 medications to be prescribed or continued for each visit. Although 8 medications were coded after 2003, we used only the first 6 to keep the analyses standard. The medication categories are opiate analgesics (short- and long-acting opiates), nonnarcotic analgesics (acetaminophen and tramadol), NSAIDs (COX-2 inhibitors and nsNSAIDs), and adjuvant analgesic medications. Adjuvant analgesics are medications primarily developed for indications other than analgesia that, in certain medical conditions, may confer analgesia. In this study, anticonvulsants or tricyclic antidepressants were considered adjuvant analgesics. Combination medications that included opiates were counted as opiates. Aspirin was excluded from the analysis as a result of the large overlap with prevention of cardiovascular and cerebrovascular disorders. A new or continued prescription in one category does not exclude others from being counted because many of these medications are used concurrently.

Data Analysis

The unit of analysis for all statistical analyses was the ambulatory care visit. Patient weights, sampling strata, and primary sampling units provided by the surveys were used to provide nationally representative estimates of ambulatory care visits in the United States. All analyses took into account the complex survey designs of the NAMCS and NHAMCS by ProcSurveyFreq and ProcSurveyLogistic by SAS version 9.1.⁴

The weighted proportions of patients with a musculoskeletal complaint who received different categories of medications for each year were calculated. A logistic regression model was used to model the probability of receiving each medication to account for differences between the cohorts with the cohort of 1999 serving as the referent group. To test changes in prescribing from year to year, a multivariable logistic regression analysis was conducted in which each year was included as the reference group. The multivariable logistic regression analyses adjusted for patient age, race, sex, geographic region, metropolitan statistical area, physician specialty, payer, and anatomic location of complaint, as well as whether the complaint was considered by the physician to be acute, a routine chronic problem, an exacerbation of a chronic problem, or other routine care as documented in the survey.

RESULTS

There were 399,787 ambulatory care visits in the NAMCS and NHAMCS outpatient survey during the study period of 1999 to 2005. Of these, 45,303 patients (11.3%) had a musculoskeletal complaint as 1 of 3 reasons for the visit, and 3499 (7.7%) of the visits were excluded because they were for visits for pre- and postsurgery or injury follow-up. The final sample with acute or chronic musculoskeletal complaints comprised 41,804 (10.5%) of the ambulatory care visits. The musculoskeletal complaint was the primary reason for visit in 32,906 (78.7%) of those with musculoskeletal complaints. When we used the survey weights from the NAMCS and NHAMCS, there were an estimated 789 million (95% confidence interval, 729–849 million) visits related to musculoskeletal complaints to US ambulatory care physicians from 1999 to 2005.

Analgesic Prescriptions for Musculoskeletal Complaints

There was little change in the proportion of ambulatory care visits with a musculoskeletal complaint provided as a reason for visit during the study period (11.5% in 1999 vs 11.4% in 2005). Table 1 provides the weighted proportion of visits for new or continued analgesic medication by year.

As can be seen in table 1, the proportion of visits for a musculoskeletal complaint that was associated with a new or continued prescription for any NSAID increased 15.9% from 1999 to the peak prescribing in 2000, followed by a decrease of 24.4% in prescribing of NSAIDs through 2005. Prescriptions for COX-2 inhibitors increased 107.4% from 1999 to 2001 while prescriptions for nsNSAIDs decreased 62.6%. After 2001, prescriptions for COX-2 inhibitors declined 69.5% and nsNSAIDs were increasingly prescribed through 2005. From 1999 to 2005, there was an increase in prescriptions for opiate analgesics (52.0%), nonnarcotic analgesics (36.9%), and adjuvant analgesics (30.6%).

Differences in prescribing remained after adjusting for age, race, sex, metropolitan statistical area status, geographic region, physician specialty, payer, and anatomic location of the complaint (table 2). Compared with 1999, the odds for a prescription for NSAIDs were not significantly different in the years 2000 through 2005. The odds for prescribing COX-2 inhibitors were significantly higher in the years 2000 to 2004

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