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The Role of Knowledge and Attitudes About Nonsteroidal Anti-inflammatory Drugs in Determining Treatment Use

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Objective. The objective of this study was to evaluate how patient knowledge and beliefs regarding nonsteroidal anti-inflammatory drugs (NSAIDs) may influence the use of NSAIDs for osteoarthritis (OA).

Methods. Surveys of 334 adults with knee and/or hip OA were analyzed in this cross-sectional study. Familiarity with and perceptions of benefits/risks of NSAID use were measured to assess associations with the use of prescription and nonprescription oral NSAIDs. Multinomial logistic regression models were adjusted for sociodemographic and clinical variables.

Results. In this sample, 35.9% and 35.6% reported use of oral prescription and nonprescription-only NSAIDs, respectively. Hispanic participants, compared with non-Hispanic White participants, had lower perceived benefit (P = 0.005) and risk (P = 0.001) of prescription NSAIDs. The following were associated with prescription NSAID use instead of no NSAID use: having family/friends who used prescription (relative risk ratio [RRR] 3.91; 95% confidence interval [CI] 2.05-7.47) and over-the-counter (OTC) (RRR 3.10; 95% CI 1.65-5.83) NSAIDs for OA, understanding the consequences of using both prescription (RRR 3.50; 95% CI 1.79-6.86) and OTC (RRR 2.80; 95% CI 1.39-5.65) NSAIDs, higher perceived benefit of both prescription (RRR 2.51; 95% CI 1.71-3.66) and OTC (RRR 1.44; 95% CI 1.01-2.06) NSAIDs, and lower perceived risk of both types of NSAIDs (prescription: RRR 0.63 [95% CI 0.46-0.87]; OTC: RRR 0.53 [95% CI 0.37-0.75]). Similar results were found when we assessed the relationship between these variables and OTC NSAID use versus no oral NSAID use.

Conclusion. Adults with knee and/or hip OA were more likely to use NSAIDs if they were more familiar with, had an increased perceived benefit of, and had a decreased perceived risk of these drugs. Patients' perceptions and beliefs about NSAIDs should be evaluated when considering them for treatment.

INTRODUCTION

An estimated 54.4 million US adults have arthritis, and osteoarthritis (OA) is the most common form of arthritis (1). OA is the third leading cause of years lived with a disability in the United States (2). Current treatment of OA is based solely on symptomatic relief because there are no US Food and Drug Administration–approved or European Medical Administration–approved drugs to slow or halt the progression of OA. The American College of Rheumatology and the Arthritis Foundation, along with other international organizations, have developed clinical practice guidelines for the use nonpharmacologic and pharmacologic OA treatments in the management of patients with knee and hip OA (3–5). All these guidelines report strong evidence for the use of oral nonsteroidal anti-inflammatory drugs (NSAIDs) to treat joint pain and other OA-related symptoms (3–5).

NSAIDs have potential side effects, including peptic ulcer disease, gastrointestinal bleeding, renal dysfunction, and hypertension

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(6). The treatment effects of NSAIDs may also vary across different NSAIDs and doses (7). However, they can clinically improve pain and function among those with knee and hip OA, and benefits may outweigh the potential risks of using NSAIDs (3–5,7). NSAIDs are the most commonly used and are the basis of pharmacologic treatment of OA (6). Alternative therapies (eg, acetaminophen, opioid medicines) are available but may have limited treatment effects or are associated with serious adverse effects (3–5,7). NSAIDs may be underused by certain populations groups in the United States, however. For example, according to a recent national study, the odds of reporting regular use of NSAIDs was 60% lower among Hispanic patients than non-Hispanic White patients living in the United States (8). In addition, Hispanic patients, compared with non-Hispanic White patients, have a higher prevalence of joint pain, disability, and other OA-related symptoms, and disparities in OA-related outcomes may be partly due to underuse of evidence-based therapies (9,10).

According to Andersen's (11) model of health services use, people's use of health treatments and services is based on the following: 1) their predisposition to use, 2) factors that enable or impede use, and 3) their need for care. Predisposing characteristics are those that may affect propensity to use medical services, such as age and education. Characteristics that enable or impede treatment use include income, health insurance, and quality of social relationships (12). How people view their health and how they experience symptoms of illness also determine care-seeking behaviors (11). Younger age (13,14), higher level of education (15), high income level (14,16), adequate medical insurance coverage (15), and greater OA disease severity (13,17) were all previously associated with NSAID treatment use. Although these determinants of NSAID use in OA are relatively fixed, there are other determinants of treatment use that are potentially modifiable (18).

Patient knowledge and beliefs about treatments may influence perceptions of need and use of health treatments (11). Their significance as determinants of use of clinical practice guideline–recommended pharmacologic treatments of OA, however, is unknown. Specifically, it is unknown if patient knowledge and attitudes about NSAIDs is associated with use of oral NSAIDs for arthritis treatment before and after accounting for other predisposing, enabling, and need-based factors known to be associated with NSAID use. Ethnic differences in patient beliefs/attitudes toward NSAIDs may also contribute to ethnic disparities in the use of these medications for OA. There are known differences in patient beliefs/attitudes toward joint replacement surgery for OA between African American and White patients (19–21). However, whether there are differences in patient beliefs/attitudes toward pharmacologic treatment, such as NSAIDs, between Hispanic and non-Hispanic White patients is unknown. The main objectives of this study are to determine the following: 1) whether patient knowledge and attitudes/beliefs about NSAID treatments are associated with use of oral NSAIDs for OA and 2) whether there are differences in familiarity with and perceptions of benefit and risk of NSAIDs between Hispanic and non-Hispanic White patients. We hypothesize that greater familiarity, higher perceived benefit, and lower perceived risk will be associated with oral NSAID use for OA and that we will observe ethnic differences in knowledge and attitudes about NSAIDs.

PATIENTS AND METHODS

Setting and participants. Participants of this cross-sectional study were patients with knee and/or hip OA. The participants were recruited from the Banner University Medical Center Rheumatology, Sports Medicine, and Internal Medicine Clinics and The University of Arizona Arthritis Center research registry in Tucson, Arizona, from July 2015 to April 2018. The Institutional Review Board of The University of Arizona approved the study protocol. Details of the study design were previously described (22).

The target sample consisted of patients who had a knee or hip OA diagnosis, were 50 years of age or older, self-identified as Hispanic or non-Hispanic White, and were not diagnosed with a moderate to severe cognitive dysfunction. A confirmatory diagnosis of knee OA was based on radiographic evidence of OA, presence of chronic frequent knee pain, and age 50 years or older (23). A confirmatory diagnosis of hip OA depended on the presence of hip pain and femoral and/or acetabular osteophytes on radiographic imaging (24). The presence of chronic frequent pain due to knee or hip OA was assessed according to questions from the Arthritis Supplement of the National Health and Nutrition Examination Survey (25,26). Patients with the following diagnoses or criteria were excluded from the study: inflammatory arthritis, total hip and knee arthroplasty history, and moderate to severe cognitive dysfunction.

Screening and recruitment. Patients with knee and/or hip OA were identified via medical record reviews and The University of Arizona Arthritis Center research registry. They were subsequently screened by telephone for eligibility. Prescreened patients who were deemed eligible for the study were contacted at clinics and offered the opportunity to participate. Patients who elected to participate provided their consent and were given a questionnaire to complete on-site. They were also offered the option to complete the survey at home and return the questionnaire via a prepaid envelope. English- and Spanish-language versions of the survey were available. Participants who successfully returned a completed survey were compensated with a $25 gift card.

Outcome of interest: oral NSAID use for OA treatment. The dependent variable was the self-reported use of oral over-the-counter (OTC) and/or prescription NSAIDs to treat OA in the last 6 months. Six months of medication use was chosen to gauge use of treatment of a chronic condition while minimizing recall bias. Participants were asked if they "used or participated in any of the following treatments for joint pain of arthritis in the last 6 months." Treatments included "[n]on-steroidal anti-inflammatory

drug, also called NSAID, that you can get without a prescription, such as Aspirin, Ibuprofen (Advil, Nuprin, Motrin) or Naproxen (Aleve)" and a "[n]on-steroidal anti-inflammatory drug, also called NSAID that you can get with a prescription, such as Ibuprofen (Motrin), Diclofenac (Voltaren) or Naproxen (Naprosyn)."

Exposure variables. *Familiarity with NSAIDs as OA treatment.* Participants' familiarity with OTC and/or prescription oral NSAIDs as treatment for OA was determined by asking if they 1) have heard of it as OA treatment, 2) have family/friends who received it for treatment, and 3) have a good understanding of what happens after treatment. Response options for all questions were "yes" or "no." These were items used in previous studies but modified to measure familiarity with NSAID use for OA (22,27).

Perceptions of benefit and risk of NSAIDs. Perceived benefit and risk of OTC and/or prescription oral NSAIDs were assessed by using measures of benefit (four items) and risk (three items) of joint replacement surgery that were adapted for oral NSAIDs (19). The perception of benefit was measured by determining the extent to which participants believe that an oral NSAID treatment 1) was beneficial for people with arthritis, 2) was beneficial for them, 3) could lead to pain relief, and 4) could cause functional improvement. The perception of risk was measured by determining the extent of participants' 1) belief in the risk/danger with, 2) belief in serious complications with, and 3) concerns with potential complications from oral NSAID treatment use. Possible ordinal responses ranged from 1 to 5 for each question. Responses to each set of questions were averaged to obtain a scale of 1 to 5, with higher values indicating greater perception of benefit/risk. Internal consistency reliability scores of these multiitem measures were calculated (Supplementary Table 1).

Study covariates. *Sociodemographic.* The following self-reported participant characteristics were recorded: age, sex, race (White, Black or African American, American Indian or Alaskan native, Asian, native Hawaiian or Pacific Islander, other), ethnicity (Hispanic vs non-Hispanic), educational attainment, employment, marital status, annual household income, and medical insurance.

Clinical. Quality of life was assessed by using the following question: "How would you rate your overall quality of life?" The question was scored on a 5-point ordinal scale ranging from poor to excellent (28). Depression was assessed by using the eight-item Patient Health Questionnaire (PHQ-8) (range: 0-24) (29). Medical comorbidity was assessed by using a modified self-reported Charlson Comorbidity Index (30). Because prior history of peptic ulcer disease, gastrointestinal bleeding, and/or moderate to severe renal insufficiency is a relative contraindication to the use of NSAIDs, the presence of digestive (eg, ulcer, colitis) and kidney problems was noted by using the Charlson Comorbidity Index. OA-related disease severity was measured by using the 24-item Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (31).

Study size. A power analysis was conducted prior to study initiation. We estimated that 150 Hispanic and 250 non-Hispanic patients would provide 80% power to detect an odds ratio of 0.54 with a 95% confidence interval (CI) ($P < 0.05$) difference in reported NSAID treatment use. This corresponded to approximately 32% of Hispanic patients and approximately 47% of non-Hispanic patients using an oral NSAID. Estimations were based on a previous study that examined the effects of patient race on receiving a prescription for a strong analgesic for OA (32). Hence, we obtained consent from a total of 408 study participants for the study.

Statistical methods. Participant characteristics were summarized by using means and SDs for continuous measures and numbers and percentages for categorical variables by oral NSAID treatment group. Demographic information, clinical characteristics, psychosocial variables, and patient knowledge and attitudes about NSAIDs were compared by oral NSAID treatment group by using Fisher's exact test for dichotomous variables and categorical variables with five or fewer levels, the χ^2 test for categorical variables with more than five levels, the Kruskal-Wallis test for ordinal variables, and analysis of variance for continuous variables. OTC and prescription oral NSAID use in the last 6 months were compared by ethnicity by using Fisher's exact test. Patient knowledge and attitudes about oral NSAIDs were also compared by ethnicity by using Fisher's exact test for categorical variables and the *t*-test for continuous variables. Sensitivity analyses were conducted to determine whether individual perceived benefit and risk items differed by ethnicity by using the Wilcoxon-Mann-Whitney test.

Multinomial logistic regression models were used to estimate the adjusted relative risk ratios (RRRs) of using a prescription or only an OTC oral NSAID (vs no oral NSAID), comparing participants by familiarity with OTC and prescription oral NSAIDs and by levels of perceived benefit and perceived risk of OTC and prescription oral NSAIDs. Models were adjusted for ethnicity, age, sex, education (more than high school vs high school education or less), private medical insurance coverage status, WOMAC total score, and comorbidity score. All variables that were previously associated with oral NSAID use (13–17,33) were considered as covariates. Income was considered but dropped from the models because of substantial missing data and limited variability in conjunction with ethnicity and medical insurance.

Analyses were performed by using SAS version 9.4 (SAS Institute Inc.).

RESULTS

Among the 1430 people considered for study participation, 320 were excluded during the screening process and 600 either declined study participation or were unsuccessfully contacted (Figure 1). Of the 510 who were considered eligible after they were screened, 408 consented to participate. Of those who consented, 44 changed their mind prior to participating

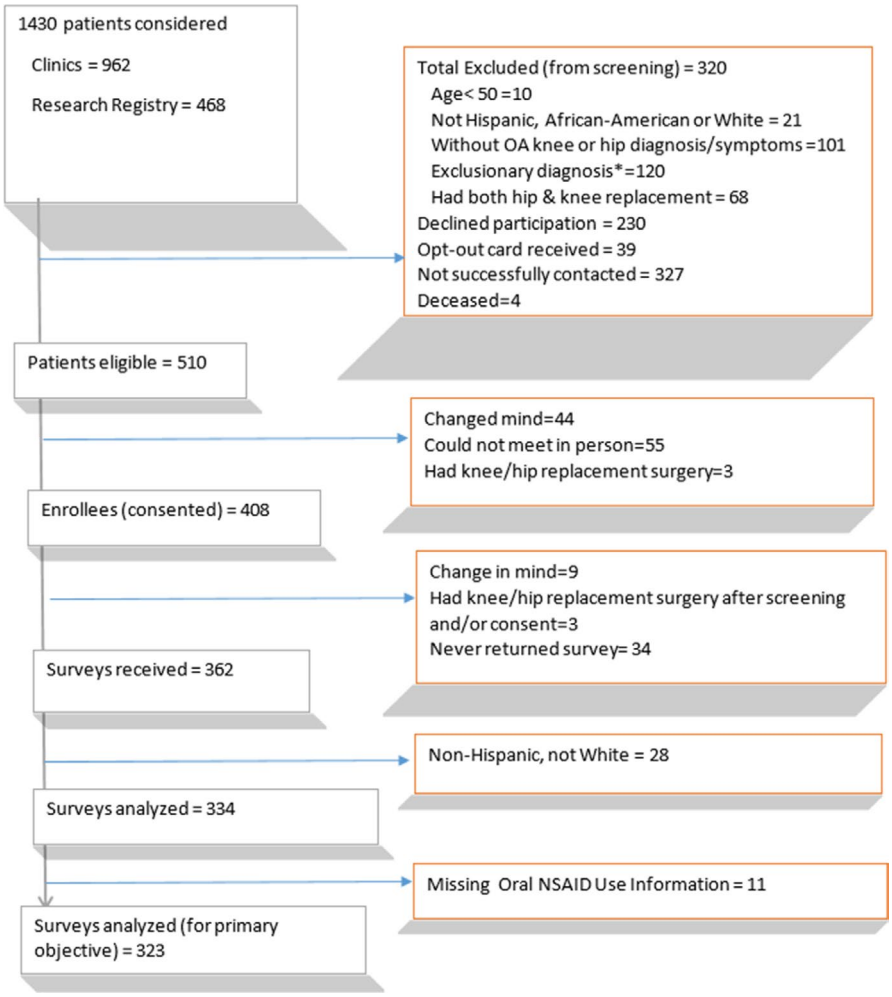

Figure 1. Study flowchart. NSAID, nonsteroidal anti-inflammatory drug; OA, osteoarthritis.

and 55 could not meet the research coordinator in person to sign an informed consent. Among those for whom we obtained consent, 362 (88.7%) returned a survey, 334 (81.9%) were either Hispanic or non-Hispanic White, and 323 (79.2%) had available oral NSAID use information that could be analyzed. Among those with available oral NSAID use data, 116 (35.9%) had used a prescription, with or without an OTC, oral NSAID; 115 (35.6%) had used only an OTC, and not a prescription oral NSAID; and 92 (28.5%) did not use any oral NSAID in the last 6 months.

Sociodemographic and clinical characteristics and NSAID use. The mean age among those who had used a prescription oral NSAID was lower than that among those who used only an OTC oral NSAID and those who did not use any oral NSAIDs (62.4 vs 66.4 vs 64.0; $P = 0.001$). Prescription and OTC-only oral NSAID users, compared with those who did not use oral NSAIDs, were more likely to have an associate's degree or higher (46.6% vs 66.1% vs 35.9%; $P < 0.001$), to have full-time employment (20.7% vs 20.9% vs 13.0%; $P = 0.011$), and to have an annual household income greater than or equal to $40,000 per year (36.2% vs 60.0% vs 21.7%; $P < 0.001$).

OTC-only NSAID users, compared with prescription oral NSAID users and non–oral NSAID users, were least likely to identify as being of Hispanic ethnicity (22.6% vs 44.8% vs 46.7%; $P < 0.001$) and most likely to be White (86.1% vs 68.1% vs 66.3%; $P = 0.001$). They were also most likely than others to be married and to have private medical insurance (Table 1). OTC-only oral NSAID users, compared with other treatment groups, had the lowest mean PHQ-8 score, were most likely to be extremely or quite a bit confident in filling out medical forms, were most likely to have excellent/very good health, had the lowest mean comorbidity score, had the highest mean arthritis self-efficacy score, and had the lowest mean WOMAC total score (Table 1).

Familiarity with and perceived benefit/risk of NSAID use. Prescription and OTC-only oral NSAID users, in comparison with non–oral NSAID users, were more likely to have heard of the use of prescription oral NSAIDs to treat OA (95.7% vs 83.3% vs 61.4%; $P < 0.001$), to have family/friends who received the medication for

Table 1. Patient sociodemographic and clinical characteristics and beliefs by oral NSAID use

	Has not used any oral NSAIDs (n = 92)	Has used only OTC oral NSAIDs (n = 115)	Has used prescription oral NSAIDs[a] (n = 116)
Age, mean (SD), y	64.0 (8.9)	66.4 (7.7)	62.4 (8.1)
Female sex, n (%)	60 (65.2)	79 (68.7)	89 (77.4)
Race, n (%)			
White	61 (66.3)	99 (86.1)	79 (68.1)
Black or African American	0 (0.0)	0 (0.0)	1 (0.9)
American Indian or Alaskan native	3 (3.3)	5 (4.3)	2 (1.7)
Other	19 (20.7)	5 (4.3)	25 (21.6)
Missing or refused to answer	9 (9.8)	6 (5.2)	9 (7.8)
Hispanic Ethnicity, n(%)	43 (46.7)	26 (22.6)	52 (44.8)
Education, n (%)			
Less than a high school diploma	13 (14.1)	5 (4.4)	8 (6.9)
High school or general educational development	44 (47.8)	33 (28.7)	50 (43.1)
Associate's degree or higher	33 (35.9)	76 (66.1)	54 (46.6)
Other	2 (2.2)	1 (0.9)	4 (3.4)
Employment, n (%)			
Full-time	12 (13.0)	24 (20.9)	24 (20.7)
Part-time	6 (6.5)	13 (11.3)	7 (6.0)
Unemployed	8 (8.7)	6 (5.2)	7 (6.0)
Disabled	28 (30.4)	10 (8.7)	28 (24.1)
Retired	35 (38.0)	60 (52.2)	45 (38.8)
Missing or refused to answer	3 (3.3)	2 (1.7)	5 (4.3)
Marital status (married), n (%)	37 (40.2)	66 (57.4)	45 (38.8)
Annual income, n (%)			
<$20,000	47 (51.1)	21 (18.3)	47 (40.5)
$20,000-$39,999	15 (16.3)	18 (15.7)	16 (13.8)
≥$40,000	20 (21.7)	69 (60.0)	42 (36.2)
Missing, refused to answer, or do not know	10 (10.9)	7 (6.1)	11 (9.5)
Insurance, n (%)			
Medicaid	21 (22.8)	16 (13.9)	26 (22.4)
Medicare	54 (58.7)	67 (58.3)	54 (46.6)
Private	11 (12.0)	40 (34.8)	27 (23.3)
Social support, mean (SD)	69.6 (27.8)	75.6 (25.0)	71.8 (26.2)
PHQ-8, mean (SD)	5.8 (5.6)	4.1 (4.2)	6.3 (5.9)
Confidence in filling medical forms, n(%)			
Extremely, quite a bit	73 (80.2)	108 (94.7)	95 (82.6)
Somewhat, a little bit, or not at all	18 (19.8)	6 (5.3)	20 (17.4)
Overall quality of life, n (%)			
Excellent	8 (8.8)	19 (16.5)	11 (9.5)
Very Good	33 (36.3)	49 (42.6)	37 (31.9)
Good	20 (22.0)	34 (29.6)	34 (29.3)
Fair	19 (20.9)	10 (8.7)	26 (22.4)
Poor	11 (12.1)	3 (2.6)	8 (6.90)
Comorbidity score, mean (SD)	3.3 (3.0)	2.1 (1.6)	2.8 (2.1)
Digestive problems (ulcer, colitis, gallbladder disease), n (%)	21 (24.4)	25 (22.3)	33 (30.6)
Kidney problems, n (%)	11 (12.4)	7 (6.2)	13 (11.9)
Arthritis self-efficacy, mean (SD)	2.9 (1.0)	3.2 (0.9)	2.8 (0.9)
WOMAC total score, mean (SD)	52.5 (21.8)	42.3 (18.9)	52.0 (18.9)
Familiarity with prescription oral NSAIDs, n(%)			
Heard of use of it to treat osteoarthritis	54 (61.4)	95 (83.3)	111 (95.7)
Have family/friends who received it for osteoarthritis treatment	27 (29.7)	61 (54.0)	70 (60.3)
Have a good understanding of what happens after treatment	45 (49.5)	88 (76.5)	88 (78.6)
Perception of benefit of prescription oral NSAIDs, mean (SD)	2.7 (0.9)	3.5 (0.7)	3.4 (1.0)
Perception of risk of Prescription oral NSAIDs, mean (SD)	2.9 (1.2)	2.7 (1.0)	2.5 (0.9)
Familiarity with OTC oral NSAIDs, n(%)			
Heard of use of it to treat osteoarthritis	67 (73.6)	113 (99.1)	102 (88.7)
Have family/friends who received it for osteoarthritis treatment	35 (38.0)	76 (66.7)	76 (65.5)

(Continued)

Table 1. (*Cont'd*)

	Has not used any oral NSAIDs (n = 92)	Has used only OTC oral NSAIDs (n = 115)	Has used prescription oral NSAIDs[a] (n = 116)
Have a good understanding of what happens after treatment	51 (55.4)	101 (87.8)	89 (79.5)
Perception of benefit of OTC oral NSAID, mean (SD)	2.7 (0.9)	3.4 (0.7)	3.0 (1.0)
Perception of risk of OTC oral NSAID, mean (SD)	2.8 (1.1)	2.3 (0.9)	2.4 (0.9)

Abbreviations: NSAID, nonsteroidal anti-inflammatory drug; OTC, over-the-counter; PHQ-8, eight-item Patient Health Questionnaire; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.
[a] With or without OTC oral NSAIDs.

treatment (60.3% vs 54.0% vs 29.7%; $P < 0.001$), and to have a good understanding of what happens after prescription oral NSAID treatment (78.6% vs 76.5% vs 49.5%; $P < 0.001$). Similar results were found when all statements about familiarity with OTC oral NSAIDs were evaluated by oral NSAID treatment group (Table 1).

Mean scores for perceived benefit of prescription oral NSAIDs were higher among prescription and OTC-only oral NSAID users compared with non-NSAID users (3.4 vs 3.5 vs 2.7; $P < 0.001$). Mean scores for perceived benefit of OTC oral NSAIDs were similarly higher among prescription and OTC-only oral NSAID users compared with non-NSAID users (3.0 vs 3.4 vs 2.7; $P < 0.001$). Mean scores for perceived risk of prescription and OTC oral NSAIDs were lower among prescription and OTC-only oral NSAID users compared with non-NSAID users (prescription oral NSAIDs: 2.5 vs 2.7 vs 2.9 [$P = 0.045$]; OTC oral NSAIDs: 2.4 vs 2.3 vs 2.8 [$P = 0.002$]).

After adjustment for ethnicity, age, sex, education, private medical insurance status, WOMAC total score, and comorbidity score, the variables having family/friends who received prescription (RRR 3.91; 95% CI 2.05-7.47) and OTC (RRR 3.10; 95% CI 1.65-5.83) oral NSAIDs, having a good understanding of the consequences of using both prescription (RRR 3.50; 95% CI 1.79-6.86) and OTC (RRR 2.80; 95% CI 1.39-5.65) oral NSAIDs, and higher perceived benefit of both prescription (RRR 2.51; 95% CI 1.71-3.66) and OTC (RRR 1.44; 95% CI 1.01-2.06) oral NSAIDs all continued to be significantly associated with prescription oral NSAID use instead of no oral NSAID use. The negative association between perceived risk of prescription (RRR 0.63; 95% CI 0.46-0.87) and OTC (RRR 0.53; 95% CI 0.37-0.75) oral NSAIDs with prescription oral NSAID use instead of no oral NSAID use also remained statistically significant after adjustment for the same variables. Similar results were found when we evaluated the association of the following with OTC oral NSAID use instead of no oral NSAID use: statements about familiarity with prescription/OTC oral NSAIDs, scores for perceived benefit of prescription/OTC oral NSAIDs, and scores for perceived risk of prescription/OTC oral NSAIDs (Table 2).

Ethnic differences in familiarity with and perceived benefit/risk of NSAID use. Regarding the last 6 months, reported OTC oral NSAID use was less common (52.9% vs 66.3%; $P = 0.019$), whereas prescription oral NSAID use was more common (43.4% vs 31.7%; $P = 0.042$), among Hispanic participants than among non-Hispanic White participants. Hispanic participants, compared with non-Hispanic White participants, were less likely to have heard about prescription (74.8% vs 85.2%; $P = 0.027$) and OTC (78.1 vs 95.0%; $P < 0.001$) oral NSAIDs for use in OA treatment. They were also less likely to have a good understanding of what happens after prescription (62.9% vs 74.0%; $P = 0.046$) and OTC (63.2% vs 83.6%; $P < 0.001$) oral NSAID treatment. The mean perceived benefit and the mean perceived risk of prescription oral NSAIDs were lower among Hispanic participants than non-Hispanic White participants (3.0 vs 3.3 [$P = 0.005$] and 2.4 vs 2.8 [$P = 0.001$], respectively). The mean perceived benefit and risk of OTC oral NSAIDs did not significantly differ by ethnicity (Table 3). Hispanic participants were less likely than non-Hispanic White participants to believe that prescription and OTC oral NSAIDs were helpful for themselves and in patients with OA (Supplementary Table 2). They were also less likely than non-Hispanic White participants to believe that prescription oral NSAID medications were harmful and could cause serious complications, and they were less likely than non-Hispanic participants to have concerns about complications from using these types of medication (Supplementary Table 3).

DISCUSSION

Our study found that increased familiarity with oral NSAIDs was associated with increased use of both prescription and OTC oral NSAIDs in the last 6 months. Higher perceived benefit and lower perceived risk of prescription and OTC oral NSAIDs were also associated with increased use of both types of OA treatment. These associations remained significant after we controlled for patient sociodemographic information and clinical characteristics, including OA disease severity. We found that Hispanic patients were less likely to use OTC oral NSAIDs for OA than non-Hispanic White patients. We additionally found that Hispanic patients, compared with non-Hispanic White patients, were less likely to be familiar with the use of oral NSAIDs for OA treatment and had lower perceived benefit and lower perceived risk of prescription oral NSAID use.

Previous studies found that various sociodemographic and clinical characteristics were associated with the use of NSAIDs for OA treatment (13–17,33). Younger age (13,14), female sex (33), and higher level of education (15) were previously associated with increased use of NSAIDs for OA. Low income (14,16) and not

Table 2. Patient knowledge and attitudes toward NSAIDs among users compared with nonusers

Independent variable	Relative risk ratio	95% CI
Prescription oral NSAID users[a]		
Have family/friends who received prescription oral NSAIDs for OA	3.91	2.05-7.47
Have a good understanding of prescription oral NSAID treatment	3.50	1.79-6.86
Perception of benefit of prescription oral NSAIDs[b]	2.51	1.71-3.66
Perception of risk of prescription oral NSAIDs[b]	0.63	0.46-0.87
Have family/friends who received OTC oral NSAIDs for OA	3.10	1.65-5.83
Have a good understanding of OTC oral NSAID treatment	2.80	1.39-5.65
Perception of benefit of OTC oral NSAIDs[b]	1.44	1.01-2.06
Perception of risk of OTC oral NSAIDs[b]	0.53	0.37-0.75
OTC oral NSAID users[a]		
Have family/friends who received prescription oral NSAIDs for OA	2.88	1.49-5.53
Have a good understanding of prescription oral NSAID treatment	3.38	1.72-6.62
Perception of benefit of prescription oral NSAIDs[b]	2.59	1.75-3.84
Perception of risk of prescription oral NSAIDs[b]	0.66	0.48-0.91
Have family/friends who received OTC oral NSAIDs for OA	2.75	1.46-5.19
Have a good understanding of OTC oral NSAID treatment	4.79	2.18-10.52
Perception of benefit of OTC oral NSAIDs[b]	2.42	1.63-3.59
Perception of risk of OTC oral NSAIDs[b]	0.45	0.31-0.64

Note. N = 266-270.
Abbreviations: CI, confidence interval; NSAID, nonsteroidal anti-inflammatory drug; OA, osteoarthritis; OTC, over-the-counter.
[a] Versus oral NSAID nonusers as the referent group; the multinomial regression model was adjusted for ethnicity, age, sex, education, medical insurance (private), the WOMAC total score, and the comorbidity score.
[b] Relative risk ratio for a 1-point increase in a scale ranging from 1 to 5.

having prescription drug coverage (15), in contrast, were linked to not receiving prescription therapy for arthritis, including NSAIDs. We found similar associations between sociodemographic factors and NSAID use in our study. However, greater OA disease severity (13,17) and an increased number of comorbidities (33) determined increased use of NSAIDs among patients with OA in previous studies but not in the current study. The current study contributes to the literature by discovering that having family/friends who have used NSAIDs, having a good understanding of the use of NSAIDs for OA, and having higher perceived benefit and lower perceived risk of both OTC and prescription oral NSAIDs were all independently associated with the use of such medications among those with knee and/or hip OA.

Our current study found ethnic differences in the use of oral NSAIDs, similar to what previous studies had found (8,33). Using National Health and Nutrition Examination Survey data, for example, Davis et al (8) found that Mexican Americans were less likely than non-Hispanic White participants to report using NSAIDs, regardless of treatment purpose. In parallel, we found that the use of OTC, but not prescription, oral NSAIDs for OA was relatively lower in our sample of Hispanic participants with OA compared with their non-Hispanic counterparts. Finding more use of prescription

Table 3. Familiarity with and perceived benefit/risk of NSAID treatments for arthritis in Hispanics and non-Hispanic White patients

	Hispanic (n = 130)	Non-Hispanic White (n = 204)	*P*[a]
Prescription oral NSAIDs			
Heard about it, n (%)	92 (74.8)	173 (85.2)	0.027
Have family/friends who received it, n (%)	56 (45.2)	107 (52.5)	0.212
Have good understanding of it, n (%)	78 (62.9)	148 (74.0)	0.046
Perceived benefit,[b] mean (SD)	3.0 (1.0)	3.3 (0.9)	0.005
Perceived risk,[c] mean (SD)	2.4 (1.0)	2.8 (1.0)	0.001
OTC oral NSAIDs			
Heard about it, n (%)	100 (78.1)	192 (95.0)	<0.001
Have family/friends who received it, n (%)	67 (52.8)	127 (62.3)	0.108
Have good understanding of it, n (%)	79 (63.2)	168 (83.6)	<0.001
Perceived benefit,[b] mean (SD)	2.9 (1.0)	3.1 (0.9)	0.057
Perceived risk,[c] mean (SD)	2.4 (1.0)	2.5 (0.9)	0.275

Abbreviations: NSAID, nonsteroidal anti-inflammatory drug; OTC, over-the-counter.
[a] Fisher's exact test for categorical variables and *t*-test for continuous variables.
[b] 1, lowest benefit; 5, highest benefit.
[c] 1, lowest risk; 5, highest risk.

NSAIDs for OA among Hispanic patients was consistent with a US Department of Veterans Affairs study that found that Hispanic patients, compared with non-Hispanic White patients, were more likely to receive a prescription for nonselective NSAIDs (33). Certain Hispanic cultural values may explain these findings. High *respeto* (or respect) for the health care provider may motivate Hispanic patients to use a provider-prescribed NSAID and to not use an OTC NSAID that may not be recommended by a provider (34,35). Interestingly, African Americans with OA were found to be more likely to use OTC analgesics and less likely to have an NSAID prescription than White patients with OA in another study (36).

The current study is the first to find differences in patient knowledge and attitudes toward a pharmacologic OA treatment between Hispanic and non-Hispanic White patients. In their survey of White, African American, and Hispanic patients with knee OA, Suarez-Almazor et al (19) found that among the different patient racial and ethnic groups, Hispanic patients were least likely to consider total knee replacement surgery to be beneficial. Allen et al (20) also found that African American patients were less likely than White patients to report familiarity with total joint replacement surgery and had poorer perceptions of total joint replacement surgery than did White patients. Kwoh et al (21) also found that patient knowledge and expectations about knee replacement surgery, which influenced willingness to undergo joint replacement surgery, differed by patient race. Similarly, in our cohort, Hispanic participants were less likely than non-Hispanic White participants to consider a prescription oral NSAID to be beneficial for OA. In addition, in comparison with non-Hispanic White participants, Hispanic participants had lower perceived risk of the use of prescription oral NSAIDs and were less likely to have heard of the use NSAIDs in OA and to have a good understanding of the effects of OTC and prescription NSAIDs.

Our study findings have relevant clinical and research implications. Patient knowledge and attitudes toward medications, as opposed to immutable sociodemographic and clinical characteristics, are potentially modifiable characteristics that may affect the use of treatments (11). Clinicians can determine whether patients' perceptions and beliefs about NSAIDs and other OA therapies align with the current literature. Subsequently, patients with OA can make an informed decision on how to best manage their disease. There are known arthritis self-management educational programs that can potentially reduce arthritis pain, improve mobility, and increase self-efficacy (37–39). However, we are not aware of any intervention study that has studied the effects of modifying patient knowledge and attitudes toward different therapies on the use of pharmacologic OA treatments. Future studies can potentially target such modifiable patient characteristics, with the purpose of improving the use of evidence-based pharmacologic therapies in OA.

This study has a few limitations. First, our sample is composed of non-Hispanic White and Hispanic patients who primarily reside in Tucson, Arizona. The generalizability of our findings to other racial or ethnic groups and to patients with OA who reside in other geographic regions is unknown. Second, a number of patients considered for the study declined study participation. Treatment use patterns of study participants may differ from that of those who choose not to volunteer in research studies. Unfortunately, the Health Insurance Portability and Accountability Act prevents us from obtaining sociodemographic and clinical data from non–study participants. Third, self-reported measures, such as self-reported pharmacologic treatment use, are susceptible to recall bias and social desirability bias (40). We did not list all OTC and prescription oral NSAIDs available in the market in the questionnaire, which could have made recalling the use of particular NSAIDs challenging. Self-reported medication use tends to correlate well with pharmacy data, however, and level of agreement between the two methods is best several months after initial medication prescription (41,42). Fourth, because this is a cross-sectional study, only associations between knowledge and attitudes about treatments and NSAID use could be described; a cause-effect relationship could not be established.

In this sample, participants' beliefs and attitudes toward oral NSAIDs correlated with treatment usage. The study provides supporting evidence that increased familiarity with, increased perceived benefit of, and decreased perceived risk of NSAIDs were all associated with a higher rate of use of prescription and OTC NSAIDs. Additionally, this study highlights ethnic differences in patient beliefs about oral NSAIDs. Hispanic patients were less likely to be familiar with the use of oral NSAIDs in the treatment for their OA and had lower perceived benefit and risk of prescription oral NSAIDs. Future interventional studies could potentially evaluate the effects of changing knowledge and attitudes toward NSAID treatment use in OA and improve overall patient care.

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All authors were involved in drafting the article or revising it critically for important intellectual content, and all authors approved the final version to be published. Dr. Vina had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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