Self-report of alcohol use for pain in a multi-ethnic community sample

Joseph L. Riley III, Ph.D. and **Christopher King, Ph.D.**
Department of Community Dentistry and Behavioral Science, College of Dentistry, University of Florida

Abstract

This study examined the occurrence of alcohol use to manage pain in community-dwelling adults with tooth pain, jaw joint/face pain, and arthritis. Race/ethnicity, sex, and age were examined to determine their associations with alcohol use for pain. Community-dwelling adults from South Florida with tooth pain (n=1767), jaw joint/face pain (n=1199), or arthritis pain (n=1355) completed a structured telephone interview. Logistic regression models indicted that, similar to population rates, non-Hispanic Whites and males were the most likely to use alcohol to manage pain. In addition, alcohol use for pain was highest in younger adults. Individuals who self-managed oral pain with alcohol were more likely to use prescription and over-the-counter pain medications, but this association was not found for arthritis. Additional characteristics of individuals who self-medicated regardless of pain condition included greater pain frequency, depression, and higher levels of education. Being married was protective against the use of alcohol to manage pain symptoms. Use of alcohol for pain should be assessed during treatment evaluation so that physicians and other health care providers are aware of their patient's use of alcohol and pain medication concomitantly, assess for psychosocial impairment, and make the appropriate referrals and adjustment to treatment.

Perspective—Self-medication of pain with alcohol is most common among younger non-Hispanic White males and associated with pain frequency, depression, and use of pain medications. Alcohol use for pain needs to be assessed so that health care providers can make appropriate referrals and adjustments to treatment.

Keywords

disparities; orofacial pain; arthritis; race; ethnicity; sex differences; self-care; alcohol

INTRODUCTION

Persons with pain engage in a number of health behaviors to manage pain(2,5,9,64). These include a formal health care visit, prescription and over-the-counter (OTC) pain medication, and many complementary and alternative treatments. Potentially less adaptive methods of coping with pain, such as use of alcohol, are poorly studied. Excessive use of alcohol is a contraindication for prescribing opioids(32) and some OTC pain medications(18). Adverse interactions have been documented between alcohol consumption and OTC medication use

and are associated with increased risk for gastrointestinal bleeding and anecdotal accounts of liver disease that appear to occur outside the range of therapeutic dosing(18,33). Higher use of alcohol has predicted pain chronicity following traumatic injury, but alcohol has also been associated with decreased prevalence of migraines(1) and chronic widespread pain(3).

Studies have shown individuals often use alcohol to cope with stress(42) and chronic pain can be a significant stressor(16). Whether and to what extent a person drinks alcohol in response to a stressor depends on many factors including severity, chronicity and impact of the stressor, the lack of other methods for managing the stressor, and the availability of social support to buffer the stressful effects(48).

In an earlier study by this research team, we reported that older males (65+ years of age) were more likely to self-treat oral pain with alcohol than older females(45), the most common of which were tooth pain at 56% and face pain at 54%, compared to 6% and 11% for females, respectively. Another study of older adults living in rural North Carolina found that males were 3 times more likely to have used alcohol for arthritis pain than females(4). A study by Brennan, Schutte, and Moos(11) correlated drinking behavior with pain severity and pain management strategies in a sample of adults 62–72 years of age. They reported that participants classified as problem drinkers had greater pain and more often used alcohol to cope with pain than non-problem drinkers. Thirty-eight percent of problem drinkers reported alcohol use to manage pain. This pattern occurred for both males and females. A weakness of these studies is that they only sampled older adults and examined few other variables associated with using alcohol to self-medicate pain. We are unable to find studies in non-clinical samples that have documented alcohol use for pain across the age span. This study expands on the findings of Riley(46) and Acrury(4) by examining alcohol use for pain in samples of community-dwelling persons ages 18 years and older with orofacial pain or arthritis.

The purpose of this study was to: 1) Document the prevalence of alcohol use for pain among community-dwelling adults experiencing two common orofacial pain symptoms or arthritis pain. 2) Test the hypothesis that there are demographic differences in the use of alcohol for pain, and specifically that male respondents are more likely to self-medicate pain with alcohol than females. 3) Test the hypothesis that pain, the impact of pain, social and economic factors, and other health behaviors are also associated with using alcohol for pain.

METHODS

Sampling methodology

The data was obtained from community-dwelling adults within Miami-Dade and Broward counties in the state of Florida that reported tooth pain, jaw joint/face pain, or arthritis pain. This project was part of a longitudinal study that examined race and ethnic-related mechanisms underlying decisions to seek health care or self-manage orofacial pain. This project was approved by the Institutional Review Board at the University of Florida. The informed consent of all human subjects who participated in this study was obtained after the nature of the procedures had been explained fully.

Inclusion criteria included residing in one of the two south Florida counties, English or Spanish as a first language, capable of engaging in a telephone conversation, met race and ethnicity criteria, 18 years of age or older, reported one of the targeted pain symptoms twice or more in the past 6 months. These counties were selected because of their ethnic diversity; they have large percentages of the target group for this project (Hispanic and non-Hispanic Black adults), within these counties there exists a wide range of socioeconomic status across racial and ethnic groups, and the availability of health care resources was more consistent within a smaller geographic area than from across a larger region.

Eight strata were defined that considered race/ethnic concentration (predominately Hispanic, non-Hispanic Black, non-Hispanic White, and Mixed) and income (above and below $35K annual income). Telephone numbers were generated by GENESYS (a sampling database) that reflected the percentage of the total population of each stratum. Small adjustments were made each month to maintain a rate of completed interviews for each stratum consistent with the target goals. Using this strategy, connection was made with 25,548 telephone numbers of which 5,847 were answering machines, FAX lines or businesses, and 770 were households without an eligible person. The response rate was 53%, calculated as the total number of competed screenings (10,385) over the total completed + refusals (7,941) + incomplete screenings (445) + those that were unable to participate because of language, health, or other issues (930). The conversion of all first refusals was attempted following a wait of one week.

The potential participants were contacted by trained interviewers employed by the University of Florida's Bureau of Economic and Business Research Survey Program. Respondents were provided with the choice of an English or Spanish version of the survey instrument. It is acknowledged that there are differences in Spanish language dialects across the various Hispanic subcultures that have the potential to introduce error into responses to a standardized interview through variability in the meaning associated with certain words. To minimize this, the translation process involved several persons from different Hispanic subgroups.

Measures

Wording for the pain specific variables are listed in Table 1.

The determination of race/ethnicity was accomplished with the following three questions: 1) Are you of Hispanic or Latino origin? 2) What race do you consider yourself? For this question, subjects were given the option of choosing more than one race. If they selected more than one, they were asked 3) with which one do you most closely identify? Although race has been viewed as a biological construct, for the purpose of this manuscript, race and ethnicity are characterized as social categories(28,51,62).

For educational level, the following response choices included: 1=eighth grade or less, 2=some high school, 3=high school graduate, 4=some college, 5=college graduate. For present financial status, the following response choices included: 1=I really can't make ends meet, 2= I manage to get by, 3=I have enough to manage plus some extra, 4=Money is not a problem; I can buy about whatever I want. The median income for a respondent's census tract was also used as an economic indicator. Social status was assessed with marital status (0=not married, 1=married) and whether the respondent lived alone (0=no, 1=yes).

Survey items were pilot tested in English and Spanish speaking focus groups and individual interviews using cognitive question testing methods to verify respondent's interpretation of instructions and item wording(17,23). The 7-day test-retest reliability of the Spanish and English versions of the survey instrument were pilot tested in 65 and 100 community-dwelling adults, respectively. Reliability coefficients for the pain measures ranged from .92-.79, health behaviors from .94-.69, and economic variables .78-.74(23). Specifically, the alcohol use item had a test-retest coefficient of .92 in English and .89 in Spanish. This item has previously been shown to discriminate between males and females in a study of older adults with orofacial pain (45). Pain and pain-related mood items are from the Medical College of Virginia Pain Questionnaire and are asked as recommended by Price et al. (25) with content validity demonstrated by Wade et al.(59), Riley et al.(46), and Stoud et al.(52).

Statistical Analysis

All results were weighted estimates rounded to the nearest whole number. Weights were developed using special tabulations provided by the U.S. Census Bureau that detailed the distribution of target populations provided by age, sex, race, and poverty status(58). As the proportional odds assumption that the regression parameters are the same across the logits was violated for the alcohol use variable, it was dichotomized and recoded as never = 0 and sometimes, often, always = 1(6).

A series of step-wise logistic regression models were used to test for risk factors of having used alcohol for tooth pain, jaw joint/face pain, and arthritis pain. To test the demographic difference hypothesis, the independent variables (race/ethnicity, sex, and age) were entered in the first step. Race and ethnicity were entered as dummy coded variables (one each for Hispanics and non-Hispanic Blacks) using non-Hispanic Whites as the reference group. To examine the influence of other variables on alcohol use for pain, a series of covariates were entered in the next three steps. In step two, pain duration, pain continuity, pain frequency, pain intensity at its worst, currently in pain, pain-related depression, anxiety, frustration, and interference with daily function were entered to test for differences as a function of pain and related symptoms. In step three, marital status, whether respondent lived alone, financial status, census tract median income, and education were entered to test for social and economic influences. In the final step, the association between alcohol use and four common pain-related health behaviors were tested. A backward elimination model approach was used for steps 2–4 that removed the least significant variable from the model in subsequent steps until all remaining variables were significant (we used $p.<0.10$ for retention) (37).

RESULTS

Demographic, pain, social and economic variables for the three pain samples are presented in Table 2. This resulted in 1767 respondents that reported tooth pain (adjusted 6-month point prevalence of 17%) and 1199 that reported jaw joint/face pain (12%). Twenty-four respondents that screened positive for tooth pain and 22 with jaw joint/face pain did not complete the interview. Three hundred sixty-one respondents reported both tooth pain and jaw joint/face pain and therefore completed a separate interview about each symptom. Screening for arthritis was terminated after 6364 complete screenings and resulted in an arthritis sample of 1355. Among persons with arthritis, 149 reported tooth pain, 89 reported jaw joint/face pain and 79 reported both tooth pain and jaw joint/face pain. There were no substantive differences to the results or conclusions when the models were tested with and without respondents with multiple symptoms. The use of alcohol to self-medicate oral pain and arthritis was common with approximately one quarter of each of the samples reporting alcohol use for pain (see Table 3).

Although item non-response was low, some respondents refused or were unable to answer particular survey items. The most common missing data used in these analyses involved the financial status item (1.2%). Other variables ranged from 0.7% to no missing values. Rather than introduce bias from dropping cases with missing values, we performed a maximum likelihood estimation imputation procedure using the Expectation-Maximization algorithm which allows for analysis with the full data set by making calculated estimates of the missing values using other variables in the model(50).

Demographic patterns

The odds ratios for race/ethnicity, sex, and age for the statistically significant predictors of using alcohol for each of the three pain samples are presented in Tables 4–6. There were significant sex differences with males more likely to use alcohol than females for each of the pain symptoms (p<.001, both orofacial pain symptoms; p<.01, arthritis pain). For all three pain

symptoms, non-Hispanic Whites were more likely to report having used alcohol for pain than Hispanics and Non-Hispanic Blacks (p<.001). Younger respondents were at increased risk for self-medicating with alcohol compared to older persons (p<.05, jaw joint/face pain; p<.001, tooth pain and arthritis). Following the multi-step entry strategy to examine parameter changes as a function of pain, socioeconomic influences, and pain-related health behaviors, non-Hispanic Whites, males, and younger respondents remained at highest risk for self-medicating pain with alcohol.

Person-level characteristics

Significant person-level variables as predictors of using alcohol are presented for each of the pain samples in Tables 4–6. For persons that were experiencing tooth pain, greater pain frequency (p<.01), higher levels of depression (p<.05), and interference with physical functioning (p<.05) were associated with increased probability of having reported alcohol use for pain. For jaw joint/tooth pain, depression (p<.05), longer pain duration (p<.05) and greater pain frequency (p<.05) were significant predictors of alcohol use. For arthritis, continuous pain (p<.05) and greater frequency of pain (p<.05) was associated with alcohol use for pain. Being currently married was associated with reduced risk of using alcohol for all three pain symptoms (p<.01, arthritis; P<.001, both orofacial pain symptoms). Higher level of education was positively associated with alcohol use for all three of the pain symptoms (p<.05, arthritis; p<. 01, both orofacial pain conditions). For both tooth pain and jaw joint/face pain, financial variables were positively associated with using alcohol for pain (median census tract income, p<.05, tooth pain; financial status, p<.001, jaw joint/face pain).

Other health care behaviors

The association between several pain-related health behaviors and using alcohol for each of the pain symptoms are presented in Table 4–6. For tooth pain and jaw joint/face pain, respondents that used alcohol were more likely to have used a prescription pain medication or an over-the-counter pain medication (p<.05). For arthritis pain, respondents that used alcohol were more likely to have used a home remedy for pain than those not using alcohol (p<.01).

DISCUSSION

This study examined the prevalence of alcohol use for orofacial pain and arthritis and tested several hypotheses related to the use of alcohol for self-medication of pain. Unique aspects of this study were that the frequency of alcohol use for pain was documented in a sample of community-dwelling adults that allowed for comparisons across groups defined by race/ ethnicity and that included subjects across the age span as other studies have restricted sampling to older age ranges(4,11,45). The findings presented from these three samples were similar; suggesting that variables associated with self-medicating pain with alcohol may be common across pain conditions.

Prevalence

In this present study, the use of alcohol as a pain self-management strategy was similar across the three pain symptoms (25–28%). Our finding of similar rates for orofacial pain and arthritis, these being dissimilar pain conditions, suggests that self-medication of pain with alcohol may be common in other pain conditions. Consistent with our hypothesis, males were more likely than females to use alcohol to self-medicate pain. Younger age was also associated with increased use of alcohol for pain. An unexpected finding was that increased risk for alcohol use was related to higher economic status and educational levels.

It is important to consider that our findings are consistent with alcohol use patterns in the general population. Data indicate that alcohol use is highly prevalent in individuals aged 18 to

25 years and this age group is more likely to drink heavily (15%) than other age groups(54, 61). Our findings for sex differences are similar to other studies that have directly related alcohol consumption with pain self-management. Riley et al. (45) reported that older males were more likely to self-treat oral pain with alcohol than older females, with the prevalence varying as a function of the pain site. Acrury et al. (4) found that approximately 20% of males and 5% of females had used whiskey for arthritis pain.

Differences between males and females may be attributed to the use of alcohol to manage and dampen the effect of stress(19,20,49). Second, lower rates of alcohol use in females may in part be attributed to increased vulnerability to the adverse effects of alcohol(49). Support for this comes from several studies in which women metabolize alcohol differently due to lower body mass and lower alcohol dehydrogenase, an enzyme involved in alcohol metabolism(25, 56,57).

Patterns of alcohol use are influenced by social and cultural factors. Hispanics and non-Hispanic Blacks traditionally demonstrate more conservative norms and attitudes towards alcohol(13,14). It has been suggested that ethnic heritage and/or cultural norms are protective by permitting individuals to develop coping strategies to counteract psychological distress and to gain greater self-esteem(41,44). This may partially explain the decreased willingness of Hispanic and non-Hispanic Blacks to self-medicate with alcohol. In contrast to our findings, a study of patients at a pain clinic also failed to find race/ethnic differences in the use of alcohol for pain(30).

Personal level characteristics

Alcohol use was associated with the frequency of pain but not intensity or chronicity. It is possible that self-medication with alcohol to treat pain is dependent on the regularity of pain symptoms. Increased frequency of pain may suggest that current strategies to manage pain in these individuals are not effective; consequently self-medication with alcohol may signal the need to reevaluate current treatment protocols. Brennan et al. (11) reported that rates of using alcohol to manage pain increased with pain severity, although they did not examine other features of pain (i.e.: chronicity, duration). The overall frequency of alcohol use for arthritis was similar to that for orofacial pain, even though arthritis symptoms were of greater frequency. This observation may be explained by the effects of age, i.e.: the reduced tendency of older adults to use alcohol.

Of the pain-related emotions, depression was a reliable predictor of alcohol use. This is consistent with the notion that the connection between pain and alcohol use could be through depression, as alcohol problems are common among depressed individuals(29,55) and links between pain and depression are well known(38,39). One mechanism for this association could be changes in biological systems involving β-endorphin, an opioid peptide that is released in various brain regions involved in pain perception and reward/reinforcement(8). Certainly, we can not rule out that some respondents were using alcohol to treat depression that may or may not have been secondary to pain. Although alcohol may have short-term analgesic effects, the long-term negative health outcomes, including interactions with pain medications and increased risk of alcohol abuse reinforces the importance of assessing current and past alcohol use in pain patients, in addition to their psychological condition.

We also found that being married was associated with not using alcohol for pain, which is consistent with studies that show the availability of social support to buffer the effects of stress (42,49). A supportive environment has been identified as a critical factor in the experience of, and issues related to, chronic pain (i.e.: well-being, disability). For example, individuals with rheumatoid arthritis were less likely to exhibit emotional problems like depression(23,53) with proper social support. In a review by Leonard et al.(34), the impact of marital status has a

profound influence on one's pain experience, with positive marital situations and spousal support associated with improved outcomes.

Associations with other health behaviors

Evaluation of other pain-related health behaviors in individuals that self-medicate with alcohol revealed some interesting relationships. For both orofacial pain symptoms, respondents that used alcohol were more likely to use both prescription and over-the-counter pain medications. Data from a large cross-sectional study also found that respondents reporting problem alcohol use reported higher rates of prescribed opioids(55). Ives et al.(32) found that among opioid-treated patients with chronic non-cancer pain, the strongest predictors of misuse included self-reported histories of previous alcohol abuse or previous alcohol-related convictions. In the current study, these associations did not hold for arthritis pain and possible explanations for the lack of concomitant use of alcohol and prescription pain medications could include that arthritis traditionally affects older adults and females(12). These groups in general use alcohol less frequently than their appropriate counterparts(12,44,45,63), which may be related to differences in psychological conditions, coping styles, and expectations of alcohol to effectively treat pain. In addition, abuse of prescribed opioids in older adults is low(27).

Implications

Considering the number of individuals that used alcohol and pain medications, the potential for adverse alcohol-drug interactions is a serious health concern. Narcotics (i.e., morphine, codeine, etc.) have several side-effects that are enhanced by alcohol and include increased sedation, motor impairment, and decreased respiratory activity due to depression of the central nervous system(60). In addition, alcohol can increase side-effects of non-prescription pain medications (i.e., aspirin, acetaminophen, ibuprofen). These include increased risk for gastrointestinal bleeding(60) particularly in older individuals(22), reduced clot formation (21), and liver hepatotoxicity(60,65).

These findings emphasize the need for health care professionals to educate and monitor their patients in terms of toxicity levels and other health outcomes. Recent studies have indicated that while health care providers are aware of the contraindications between alcohol and drugs, health outcomes are not regularly assessed(7). A study of patients attending a pain rehabilitation clinic found no difference in narcotic analgesic use between heavy and light drinkers(10), which suggests health care providers and/or patients pay insufficient attention to manufacturer's warnings against mixing alcohol and narcotics. These findings serve to alert clinicians to assess for alcohol use in patients being treated for pain and to provide education about the problems associated with mixing alcohol with pain medications. In addition, other factors such as depression or the lack of appropriate support networks may suggest the need to make appropriate referrals.

Limitations

It is acknowledged that there are limitations to data collection using telephone interviews. Systematic differences between the respondents and the nonrespondents in this study are of unknown size and direction. However, a recent analysis of nonresponse bias studies shows that although nonresponse bias may be common, the nonresponse rate by itself does not predict well the amount of nonresponse bias(31). There is evidence that the effectiveness of telephone interviewing is improved among populations with lower levels of income and education when the survey is administered in the interviewee's native language(36). Gilbert et al.(26) found that limiting a sample to households with telephones was most likely to exclude poor, younger males; however, they concluded only minimal bias was introduced. The alcohol use data are self-report and subject to bias associated with social desirability or errors in recall. In addition, it is possible some subjects misinterpreted the alcohol use for pain question and were

responding with alcohol use in general. Respondents did not receive a clinical examination; consequently, their pain symptoms are based on self-report. However, it is likely that decisions about health behaviors are often made based on perceived need rather than known etiology. Future research in this area should improve on the assessment of alcohol use for pain and include additional measures of alcohol consumption, such as alcohol units per week and more specific detail about frequency.

Acknowledgments

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Table 1
Wording for pain specific variables.

Pain symptoms. In the past 6 months, did you have tooth pain more than once? In the past 6 months, did you have face pain in the jaw muscles or in the jaw joint in front of the ear more than once? Have you ever been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia? See footnote "[a]". For each specific symptom that was endorsed as positive, the following questions were asked by inserting the symptom label (i.e., tooth pain) into the question as indicated below.

Pain, psychological and physical functioning variables. How long ago did you first have this (symptom) (1=Less than 3 months, 2=At least 3 months but less than 6 months, 3=At least 6 months but less than 1 year, 4=More than 1 year, 5=Five years or more)? When you had this (symptom), was it constant or did it come and go (1=Constant, 2=Intermittent)? How often you have had this (symptom) in the past 6 months (1=Less often than once a month, 2=At least once a month, 3=At least once a week, 4=Every day)? How would you rate the intensity of this pain at its worst (0–10 scale)? Are you currently experiencing (symptom) (0=no, 1=yes)? When the pain was at its worst, (insert question)? The questions were: How depressed did you feel; How anxious did you feel; How frustrated did you feel; How much did it interfere with your daily activities and responsibilities (0–10 scale)?

Health care visit for pain. How long ago was the first visit to a medical doctor, dentist, or nurse for this (symptom) (Never, less than 3 months ago, at least 3 months but less than 6 months, at least 6 months but less than 1 year, more than 1 year)? If the respondent endorsed never, interviewers verified never; if respondent endorsed a visit, interviewer verified for this symptom.

Pain self-management. This was followed by a transitional statement to questions about pain self-management. Now I have some statements regarding what you may have done for this (*symptom*) during the past 6 months. When you had the (*symptom*), how often did you take (insert self-management behavior)? This was asked for over-the-counter or nonprescription pain medication, prescription medication, folk or home remedy, alcohol such as beer, wine or liquor. Response choices for these questions were: never, sometimes, often, always. See footnote "[b]".

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[a] Note: The oral pain symptoms and doctor-diagnosed arthritis were worded as used by the National Health Interview Survey (15,35). Therefore, we are using self-report as the data source and using doctor-diagnosed arthritis as the case definition suggested by Sacks et al. (47). If respondents endorsed more than one pain symptom, all questions related to the first symptom were completed before any questions about the next symptom were asked. In addition, each question was asked specifically about that symptom.

[b] The alcohol item was modified from an alcohol consumption frequency item used in the NHANES1 (40); How often do you drink alcoholic beverages such as beer, wine, or liquor?, by adding the "when you had this (symptom) …" to directly assess drinking alcohol for pain.

Table 2

Sociodemographic and pain characteristics by pain symptom.

	Tooth pain n (%)	Jaw Joint/Face pain n (%)	Arthritis n (%)
Sample size	1767	1199[*]	1355
Female	1287 (73)	912 (77)	964 (71)
Mean age (range)	41.4 (18–89)	41.7 (18–91)	58.6 (19–91)
Race/ethnicity			
Hispanic	747 (42)	470 (39)	479 (36)
Non-Hispanic White	504 (29)	379 (32)	568 (42)
Non-Hispanic Black	516 (29)	350 (29)	308 (23)
Social and economic			
Married	800 (45)	523 (44)	601 (47)
Employed[**]	1295 (81)	920 (77)	761 (56)
Median income (Census)	38632	40000	37901
Education			
8th grade or less	69 (4)	55 (5)	132 (10)
Some high school	146 (8)	92 (8)	109 (8)
High school graduate	475 (27)	322 (27)	357 (26)
Some college	430 (24)	300 (25)	328 (24)
College graduate	647 (37)	430 (36)	429 (31)
Worst pain intensity (mean 0–10 rating)	6.3 (SD=2.4)	6.3 (SD=2.5)	6.9 (SD=2.5)
Continuity (constant)	511 (29)	332 (28)	383 (28)
Frequency			
Less than once a month	455 (26)	360 (30)	216 (16)
At least once a month	441 (25)	310 (26)	149 (11)
At least once a week	534 (30)	352 (29)	336 (25)
Every day	337 (19)	177 (15)	654 (48)
Duration			
Greater than 1 year	397 (23)	421 (35)	1219 (90)
6–12 months	356 (20)	207 (17)	69 (5)
3–6 months	443 (25)	244 (20)	26 (2)
Less than 3 months	571 (32)	327 (27)	41 (3)

[*] Jaw joint pain only, n=368 (31%); face pain only, n=466 (39%); both sites, n=365 (30%).

[**] One or more members of the household were employed fulltime.

Table 3

Frequency of alcohol use for pain by pain symptom.

Pain symptom	Tooth pain n (%)	Jaw Joint/Face pain n (%)	Arthritis n (%)
Never	1272 (72)	900 (75)	992 (73)
Sometimes	353 (20)	215 (18)	270 (20)
Frequently	72 (4)	46 (4)	53 (4)
Always	70 (4)	38 (3)	40 (3)

Tooth pain, n=1767; Jaw joint/face pain, n = 1199; Arthritis, n = 1355.

Table 4

Odds ratios for predictors of self-medicating pain with alcohol for tooth pain.

	Step 1 Demographic variables	Step 2 + symptom variables	Step 3 + socioeconomic variables	Step 3 + health behavior variables
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Race/ethnicity				
NH Whites	1.0	1.0	1.0	1.0
Hispanic	0.4 (0.3–0.5) ***	0.4 (0.3–0.5) ***	0.4 (0.3–0.6) ***	0.4 (0.3–0.6) ***
NH Blacks	0.3 (0.2–0.5) ***	0.4 (0.3–0.5) ***	0.4 (0.3–0.6) ***	0.3 (0.2–0.6) ***
Sex				
Females	1.0	1.0	1.0	1.0
Males	2.8 (2.2–3.5) ***	2.7 (2.2–3.5) ***	2.9 (2.3–3.7) ***	2.7 (1.9–3.7) ***
Age	0.9 (0.9–0.9) ***	0.9 (0.9–0.9) ***	0.9 (0.9–0.9) ***	0.9 (0.9–0.9) ***
Pain frequency		1.1 (1.0–1.2) *	1.1 (1.0–1.3) *	1.2 (1.1–1.4) **
Depression		1.1 (1.1–1.3) *	1.1 (1.0–1.3) *	1.1 (1.0–1.3) *
Interference with activities		0.9 (0.9–0.9) *	0.9 (0.9–1.0)	0.9 (0.9–1.0)
Marital status			0.6 (0.5–0.8) ***	0.6 (0.5–0.8) ***
Income			1.2 (1.1–1.3) ***	1.2 (1.1–1.3) ***
Education			1.2 (1.1–1.3) **	1.2 (1.1–1.3) **
Prescription pain medication				1.2 (1.1–1.6) *
OTC pain medication				1.2 (1.1–1.5) *

Note: Coefficients (OR) and confidence intervals (CI) are rounded to the nearest 0.1. Significance:

*
 p < .05,

**
 p< .01,

***
 p< .001.

Table 5

Odds ratios for predictors of self-medicating pain with alcohol for jaw joint/face pain.

	Step 1 Demographic variables	Step 2 + symptom variables	Step 3 + socioeconomic variables	Step 4 + health behavior variables
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Race/ethnicity				
NH Whites	1.0	1.0	1.0	1.0
Hispanic	0.5 (0.4–0.8) ***	0.5 (0.4–0.7) ***	0.4 (0.3–0.5) ***	0.4 (0.3–0.5) ***
NH Blacks	0.4 (0.2–0.7) ***	0.5 (0.3–0.8) **	0.3 (0.2–0.5) ***	0.3 (0.2–0.5) ***
Sex				
Females	1.0	1.0	1.0	1.0
Males	2.0 (1.5–2.8) ***	2.1 (1.6–2.7) ***	2.0 (1.4–2.6) ***	2.0 (1.4–2.6) ***
Age	0.9 (0.9–0.9) **	0.9 (0.9–0.9) **	0.9 (0.9–0.9) **	0.9 (0.9–0.9) *
Pain duration		1.1 (1.0–1.2) *	1.1 (0.9–1.3)	1.1 (0.9–1.3)
Pain frequency		1.1 (1.0–1.3) *	1.1 (1.0–1.3) *	1.1 (1.0–1.3) *
Depression		1.1 (1.1–1.3) *	1.1 (1.0–1.3) *	1.1 (1.0–1.3) *
Marital status			0.5 (0.4–0.7) ***	0.5 (0.4–0.7) ***
Financial status			1.2 (1.1–1.3) ***	1.2 (1.1–1.3) ***
Education			1.2 (1.1–1.3) **	1.2 (1.1–1.3) **
Prescription pain medication				1.2 (1.1–1.6) *
OTC pain medication				1.4 (1.1–2.0) *

Note: Coefficients (OR) and confidence intervals (CI) are rounded to the nearest 0.1. Significance:

*
p < .05,

**
p< .01,

***
p< .001.

Table 6

Odds ratios for predictors of self-medicating pain with alcohol for arthritis pain.

	Step 1 Demographic variables	Step 2 + symptom variables	Step 3 + socioeconomic variables	Step 3 + heath behavior variables
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Race/ethnicity				
NH Whites	1.0	1.0	1.0	1.0
Hispanic	0.5 (0.3–0.6) ***	0.5 (0.3–0.7) ***	0.5 (0.3–0.7) ***	0.5 (0.3–0.7) ***
NH Blacks	0.3 (0.2–0.5) ***	0.3 (0.2–0.5) ***	0.3 (0.3–0.6) ***	0.3 (0.3–0.6) ***
Sex				
Females	1.0	1.0	1.0	1.0
Males	1.7 (1.3–2.3) ***	1.7 (1.3–2.3) **	1.7 (1.3–2.3) **	1.7 (1.3–2.3) **
Age	0.9 (0.9–0.9) ***	0.9 (0.9–0.9) ***	0.9 (0.9–0.9) ***	0.9 (0.9–0.9) ***
Pain continuity		0.7 (0.5–0.9) *	0.7 (0.5–0.9) *	0.7 (0.5–0.9) *
Pain frequency		1.1 (1.0–1.3) *	1.1 (1.0–1.3) *	1.1 (1.0–1.3) *
Depression			1.2 (1.1–1.3) **	1.2 (1.1–1.3) **
Frustration			1.2 (1.0–1.4) *	1.2 (1.1–1.4) *
Marital status			1.2 (1.1–1.3) **	1.2 (1.1–1.3) **
Education			1.2 (1.1–1.3) *	1.1 (1.0–1.3)
Folk remedy				1.5 (1.2–2.3) **

Note: Coefficients (OR) and confidence intervals (CI) are rounded to the nearest 0.1. Significance:

*
p < .05,

**
p< .01,

***
p< .001.