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Less Exercise and More Drugs: How a Low Income Population Manages Chronic Pain

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Abstract

Objective—To evaluate chronic pain management in a multistate, low income, Hispanic population and to examine predictors of exercising and prescription pain medication (PPM) use.

Design—Online survey administered to a representative sample of Hispanic adults in June 2015

Setting—Five southwestern states

Participants—Among all 1007 online panel members who were Hispanic, aged 35–75 years from five states, representing 11,016,135 persons, the survey was completed by 516 members (51%). Among these, 102 participants were identified with chronic non-cancer pain representing 1,140,170 persons.

Intervention—Not applicable

Main Outcome Measures—Exercising or using PPM for chronic pain in past year.

Results—Most participants reported using PPM (58%) and exercise (54%) to manage pain. Compared with annual household incomes >\$75,000, adjusted odds ratios [AORs] for exercising were: 0.20 for <\$10,000 (P=0.12); 0.40 for \$10,000–34,999 (P=0.22), and 0.15 for \$35,000–74,999 (P=0.015). Conversely, AORs for PPM were over four-fold higher for lower income groups as follows: 14.2, 4.79, and 4.85 respectively (all P<0.065). PPM users rated importance of

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accessing a gym to manage pain lower ($P=0.01$) while exercisers rated feasibility of gym access to manage pain higher ($P=0.001$).

Conclusions—In a Hispanic population-based sample with chronic pain, lower income groups tended to exercise less but use PPM more. Barriers to gym access and use may play a role in these disparities.

Keywords

chronic pain; Hispanic Americans; exercise; drug therapy; income

Multimodality management of chronic pain has been endorsed by the National Pain Strategy of the U.S. Department of Health and Human Services¹ and the Centers for Disease Control and Prevention.² These recommendations reflect benefits from randomized trials of structured exercise, cognitive behavioral therapy, and yoga^{3,4,5,6} as opposed to the well-known risks of long-term opioid therapy.⁷ Poorer access to exercise facilities may prevent lower income groups with chronic pain from engaging in exercise to manage this debilitating condition. In general population studies, lack of exercise facilities reduces the probability of engaging in leisure time physical activities.^{8,9} Because national surveys have shown that the prevalence of chronic pain is significantly greater for low income groups,¹⁰ it is especially important to evaluate their chronic pain management approaches to examine whether they may have barriers to useful approaches such as exercise.

We report an online-based survey of a representative sample of Hispanics with chronic non-cancer pain from five states about non-pharmacologic and pharmacologic approaches to manage chronic pain used in the past 12 months. We hypothesized that exercising to manage chronic pain would differ by household income. We also examined attitudes about the value of having gym facilities available. This population-based study offers unique insights into current pain management practices of low income Hispanics with chronic pain and highlights the need for policymakers to define and address barriers to their engaging in exercise to manage chronic pain.

Methods

Study Sample

The sample was drawn from GfK's KnowledgePanel®^a, the largest nationally representative online panel.¹¹ As described elsewhere, KnowledgePanel® members are recruited using probability-based sampling with random digit dialing and address-based sampling from the United States Postal Service's Delivery Sequence File to yield a nationally representative sample.¹⁰ Starting in 2009, Census Block Groups with high-density minority communities were oversampled and, in 2010, sampling was further modified to target high-density Hispanic areas. KnowledgePanel® membership includes hard-to-reach individuals, such as minority groups, by providing computer hardware and internet capability to households lacking these services.

^aGfK KnowledgePanel®; GfK Custom Research North America, 200 Liberty Street, 4th Floor, New York, NY 10281

In June 2015, we offered the online survey to all KnowledgePanel® members who were Hispanic adults, aged 35–75 years and residing in five states (California, Texas, Arizona, Nevada, and New Mexico). Findings from surveying KnowledgePanel® members without chronic pain regarding their knowledge of this condition have been previously reported.¹² Using GfK's KnowledgePanel® profile data, persons with chronic pain were identified if they had been diagnosed by a doctor with conditions such as low back pain, neck pain, or fibromyalgia (N=217 or 21% of all eligible members). To assess for current chronic pain, the member was asked: “Do you suffer from pain that bothers you on most days?” If affirmative, the member answered three statements¹³ about their pain on a four-point Likert scale: “My pain has been bothering me on most days or nights for at least three months”; “My pain limits what I can do, like playing with kids, walking, driving, household work”; and “The pain I feel comes and goes but always seems to come back.” If a member replied that any of these statements did not describe their pain well, they were considered to not have chronic pain. Other exclusions included: cancer pain diagnosed by a health care provider; severe disability due to limitations to exercise, and speaking a language other than English or Spanish.

Survey Development and Administration

For persons with chronic pain, the survey asked about pain characteristics including: location, duration, impact on work or quality of life, and intensity.¹⁴ The survey asked about treatments received for pain in the past 12 months as well as ratings of helpfulness (4-point Likert-type scale). Respondents were also asked about the importance and feasibility of accessing specific non-pharmacologic pain management services and facilities. Pilot testing was completed by 38 Hispanic KnowledgePanel® members. Pilot study data were used to abbreviate the survey and reframe some items. The survey was translated into Spanish and back-translated. The median survey completion time was 24 minutes.

All study protocols were reviewed by the University of Texas Health Science Center at San Antonio Institutional Review Board and determined to be non-regulated research or exempt prior to data collection. (IRB#20140064N)

Dependent variables—The outcome measures were two chronic pain management strategies used in the past year: 1) exercising to manage pain, and 2) taking prescription pain medication (PPM) for pain.

Independent variables—The main predictor of interest is annual household income categorized as: <\$10,000, \$10,000–34,999, \$35,000–74,999, \$75,000. The lowest income group is poverty level for an individual or any size family¹⁵ (<\$10,000) and the remaining income levels each comprised approximately 30% of the sample (>\$10,000). Other predictors were demographics: age, gender, language preference (English or Spanish preference based on profile data), and employment status (full-time or part-time versus unemployed). The level of pain on most days in a typical week was evaluated on a 4-point Likert scale, with responses ranging from “hurts just a little bit” to “hurts as much as possible.”

Weighting and Analysis—Sample weights were calculated by GfK to ensure that resulting samples behaved according to an equal probability selection method. This methodology starts by weighting the entire KnowledgePanel® to the detailed geodemographic benchmarks of U.S. adults from the latest March supplement of the Current Population Survey.¹⁶ This approach ensures that the weighted distribution of the KnowledgePanel® accurately matches that of U.S. adults. Using the weights as the measure of size (MOS) for each panel member, a PPS (probability proportional to size) procedure is used to select study-specific samples. The application of the PPS methodology with the MOS values produces fully self-weighted samples, for which each sample member can carry a design weight of unity. Because the study design required oversampling of specific subgroups, the corresponding design weights were adjusted using the Current Population Survey benchmarks serving as reference distributions. KnowledgePanel® has been used for many population-based studies of health-related topics.^{17,18,19}

Respondents' characteristics were summarized by means and standard errors (SEs) for continuous variables as well as proportions and SEs for categorical variables while taking into account design weights. The design weights provided by GfK employ an iterative proportional fitting (ranking) procedure to ensure that final weights are simultaneously aligned in regard to benchmark distributions and adjusted for nonresponse as well as under- or over-coverage imposed by the study-specific sample design. To account for the survey's sampling design, weighted proportion and corresponding SEs were computed to describe proportions of respondents who used each pain management approach in the past 12 months. Additionally, weighted means with SEs were computed to summarize the mean helpfulness of each pain management approach reported.

Separate weighted logistic regression models were used to examine the adjusted association of household income with exercising and using PPM to manage pain in the past year. All models adjust for demographics and pain level. After analysis of unadjusted associations with the outcomes, the pain measure was examined in final models as low and high to reduce degrees of freedom used. We also adjusted for exercise in the PPM model to examine whether participants who exercised were more likely to use PPM for pain and vice versa. Finally, post-hoc analyses were conducted of ratings on importance of having gym facilities available in their community and ratings on feasibility of having these gym facilities accessible and available for chronic pain. All presented data are from weighted estimates (proportions with their SEs, means with their SEs and odds ratios with 95% confidence intervals [CIs]) to account for the sampling design of this survey. Descriptive and multiple regression analyses were conducted using Stata/SE.^b

Results

The entire sampling frame of 1,007 members of GfK's KnowledgePanel® represents 11,016,135 Hispanics aged 35–75 and residing in five southwestern states. Responses were received from 516 (51.2%) members. Analysis of respondents versus non-respondents in regard to demographics, work status, and language preference showed only one significant

^bStata/SE version 14; StataCorp LP, 4905 Lakeway Dr, College Station, TX 77845

difference for the mean age, which was younger for non-respondents than respondents (50.0 versus 52.9 years, respectively, $P<0.001$) (Appendix).

Of survey participants, 486 (94%) had valid responses for more than 75% of the questions. Of these, 102 (21%) participants were identified as having current chronic non-cancer pain. Based on sampling weights, this group was estimated to represent 1,140,170 persons with chronic pain. In weighted analyses, this population had a mean age of 53.2 years, 53.5% were female, 40.9% preferred Spanish language, and 63.9% were unemployed. Annual household incomes were skewed towards low income, with 11.3% earning $<\$10,000$,¹⁵ while an additional 28.5% earned $<\$35,000$ (Table 1). Thirty percent of study participants reported that their pain hurts a whole lot or as much as possible on most days of the week, while 26% reported pain that hurts a little bit.

The most common pain management approaches reported by participants were taking an over-the-counter pain medication (63%), taking prescription pain medication (58%), and exercising (54%) (Table 2). Other common non-pharmacologic approaches for managing pain were massage (44%) and physical therapy (23%) but $<10\%$ of respondents used: yoga, biofeedback, acupuncture, or hypnosis. In regard to helpfulness, uncommonly used approaches (i.e., yoga, traction, and injections) received the highest ratings while more commonly used approaches (i.e., prescription pain medication, exercise, and massage) were somewhat less highly rated. Physical therapy and biofeedback received the lowest ratings on helpfulness.

After adjustment, a report of engaging in exercising for pain in the past 12 months (Table 3 left columns) differed significantly by household income, with an adjusted odds ratio (AOR) of 0.15 for participants with incomes from $\$35,000$ to $\$74,999$ compared with $\$75,000$ ($P=0.015$). Odds of exercising for lower income groups were also consistently reduced by at least 60% but did not achieve statistical significance. In regard to taking prescription pain medication, the adjusted odds ratio for participants with $<\$10,000$ was 14.2 ($P=0.057$) versus those with incomes $\$75,000$ and the odds of using PPM was also over four-fold greater for incomes from $\$10,000$ to $\$74,999$ ($P=0.053$ and 0.065 , respectively). In addition, odds of using exercise were reduced by over 70% on all sex-language preference categories versus men who preferred English but these effects were all non-significant. The odds of using PPM were more than tripled for women who preferred English versus men who preferred English ($P=0.11$).

Ratings of importance on a four-point Likert scale of having a gym available for persons with chronic pain in the community where the participant resides were significantly lower for persons who used PPM to manage pain than other respondents (2.15 vs. 2.89, $P=0.01$). Conversely, persons who reported exercising to manage pain gave higher ratings for how feasible it would be for a gym to be available and accessible for people with chronic pain in their community compared with other respondents (2.94 vs. 2.12, $P=0.001$).

Discussion

In a five-state population-based sample representing over one million Hispanics with chronic non-cancer pain, self-reported management of chronic pain with prescription pain medications and by engaging in exercise differed markedly by annual household income. This sample was skewed towards lower income, with 11% reporting an annual household income <\$10,000 which is well below the poverty level¹⁵ and 40% with an income <\$35,000 compared with 35% nationally.²⁰ As hypothesized, we observed a consistent pattern for lower income participants to be less likely to use exercise as a way to manage chronic pain. Participants with incomes less than \$75,000 had AORs of 0.40 or less for exercising to manage chronic pain compared with those whose incomes were at least \$75,000. In terms of effect size, the observed odds ratios of 0.40–0.15 for exercising in lower income groups versus high income are moderate to large effects based on equivalent Cohen's *d*.²¹ On the other hand, lower income participants had markedly higher adjusted odds of taking prescription pain medications, ranging from 4.5- to 14-fold greater compared with participants with high incomes. These odds ratios are equivalent to medium and to large effects.²¹ Furthermore, the consistency of these associations, lower for exercise and higher for prescription pain medication, is compelling although, after weighting most results did not reach statistical significance. Certainly, these novel findings highlight the importance of considering household income in efforts to understand how large segments of the U.S. population, such as Hispanics, currently manage chronic pain.

Although little is known about exercising to manage chronic pain in other populations, studies of community-dwelling adults show similar income differences in exercising and fitness. In a sample of Mexican American and European American community-dwelling adults, higher income was significantly associated with better physical fitness based on walking speed.²² In addition, in a National Health and Nutrition Examination Survey (NHANES) study of seniors, higher income groups and non-Hispanic whites engaged in significantly more leisure-time physical activity than lower income groups or other racial-ethnic groups.²³ Therefore, studies in general populations support the validity of our findings in a population-based sample of Hispanics regarding income and exercise to manage chronic pain.

To our knowledge, this is the first study to demonstrate a higher likelihood of using prescription pain medications for chronic pain among low income Hispanics. These results are consistent with a study reporting that continuing to receive opioid analgesics long-term after major surgery was significantly more likely for low income groups.²⁴ In addition, among Medicare enrollees nationally, those who were lower income or living in a lower-educational area were significantly more likely to receive long-term prescription opioids.²⁵

Likewise, a qualitative study of low income Hispanics with chronic pain found that they received little support or education from health care providers about this condition.²⁶ In these circumstances, it may be that prescribing a pain medication, be it an opioid or another drug such as prescription strength non-steroidal anti-inflammatory drug (NSAID), would be the most expeditious approach for clinicians, especially if there are few available alternative resources for pain management.²⁷

As a likely barrier to exercising, we also explored participants' attitudes about having gyms to exercise. Participants using prescription pain medications rated the importance of a gym in their community significantly lower than other participants, whereas those who exercised gave significantly higher ratings to the feasibility of having a gym available for persons with chronic pain. As in other studies of low income minority groups,²⁸ these results probably reflect the fact gym memberships are costly²⁹ and covered only by specific private insurance plans and Medicare plans.^{30,31} In addition, lack of insurance coverage is a barrier to non-pharmacologic treatments such as massage.³² On the other hand, the least costly way to manage pain may be for a patient to take pain medications because part or all of the cost of prescribed medications are often covered by insurance plans.

In addition, lower income groups may believe that the physical activities required of blue-collar jobs would obviate the need for a gym membership. Yet repetitive activities such as lifting in many blue-collar jobs increases the risk of low back pain which, in turn, has been reported to be managed with poorer quality of care.³³ Because gyms can supplement physical therapy for chronic pain, access to this resource could be important adjunct for low income groups with jobs requiring demanding physical activities.

Yet social and cultural norms may also underlie greater use of medications and lower use of exercise by lower income groups. For example, low income groups experience profound stressors such as holding down multiple jobs and no childcare that inhibit ability to take the time to exercise to manage chronic pain. In low income communities, exercising is also influenced by: unsafe neighborhoods, traffic conditions, poor access to parks and recreational facilities, lack of time, poor health, and lack of social support for exercise.³⁴ In a population-based survey of middle-aged California residents, the adjusted odds of engaging in vigorous exercise three days a week were only 0.28 for Hispanics with limited English proficiency but 0.73 for English-proficient Hispanics versus non-Hispanic whites.³⁵ These data are consistent with lower adjusted odds of exercising among participants in our survey who preferred Spanish.

Participants rated both exercise and prescription pain medications relatively high on a helpfulness scale. However, massage was the other frequently reported pain management approach, by over 40% of participants, that was also rated highly on helpfulness. This common use of massage therapy is encouraging given national data that non-Hispanic whites are more likely to use massage than other racial-ethnic groups³⁶ and recent evidence supporting the effectiveness of massage therapy for chronic pain.³⁷

Study Limitations

The study has a number of limitations to consider. First, the number of participants with chronic pain was relatively small and the response rate was only 51% but we employed rigorously developed sampling weights to ensure the representativeness of our results. This relatively small sample along with weighting our analyses reduced our ability to find statistically significant results. Second, prescription pain medications may include effective drugs such as anticonvulsants for neuropathic pain along with drugs with weaker effectiveness such as high dose NSAIDs and opioids.³⁸ However, even if pain responds to medications, exercise is required to maintain function that associated with longevity.³⁹

These approaches are complementary. Third, we asked about approaches used for chronic pain in the past year and found that they may have been used only transiently. However, all participants were currently affected by chronic pain, so it is unlikely that they have discontinued these common management strategies.

Conclusions

To our knowledge, this is the first study to examine the association of annual income with aspects of self-reported management of chronic pain in population-based sample representing over one million persons. We observed a consistent pattern for participants with a household income less than \$75,000 to have lower likelihood of exercising but higher likelihood of using prescription pain medications to manage pain. Despite moderate to large estimated effect sizes in this five-state representative sample of Hispanics with chronic pain, most did not reach statistical significance. Yet these data are consistent with national data demonstrating disparities by income level in shorter average lifespans for lower income Americans.⁴⁰ Contributing factors include unhealthy behaviors such as lack of exercise as well as a myriad of life stressors and health disparities.

Given the national recommendations by federal agencies to emphasize chronic pain management using non-pharmacologic approaches and evident benefits of exercise for reducing frailty,⁴¹ it is incumbent upon policymakers and health care providers to examine and address barriers for lower income Americans to engage in exercise and other evidence-based non-pharmacologic approaches to manage chronic pain. Ideally, these facilities need to be available in community health centers or other subsidized settings. In facilitated group meetings with rural Hispanics with chronic pain, high priority was given to having a community center with special resources such as exercise facilities for persons with chronic pain.⁴² To engage low income persons with chronic pain, community health workers could be trained to promote use of exercise facilities safely and effectively. Evaluating the impact of these or other initiatives on function and pain outcomes of low income persons with chronic pain as well as cost-effectiveness should be a high research priority.

List of abbreviations

PPM	Prescription pain medication
MOS	Measure of size
PPS	Probability proportional to size
SEs	Standard errors
CI s	Confidence intervals
AOR	Adjusted odds ratio
NHANES	National Health and Nutrition Examination Survey
NSAID	Non-steroidal anti-inflammatory drug

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Appendix: Characteristics of Respondent and Non-Respondent Samples

Characteristic Total	Respondent N (%) 486 (100)	Non-Respondent N (%) 521 (100)	Total N (%) 1007 (100)	P value
Age, mean $\pm$ SD (years)	52.88 $\pm$ 10.6	50.02 $\pm$ 10.6	51.4 $\pm$ 10.7	< 0.001 ¹
Sex				0.47 ²
Female	265 (54.5)	296 (56.8)	561 (55.7)	
Male	221 (45.5)	225 (43.2)	446 (44.3)	
Language Preference				0.77 ²
English	234 (48.25)	246 (47.22)	480 (47.67)	
Spanish	252 (51.85)	275 (52.78)	527 (52.33)	
Education				0.46 ²
Less than High School	161 (33.1)	174 (33.4)	335 (33.3)	
High School	130 (26.8)	132 (25.3)	262 (26)	
Some College	109 (22.4)	136 (26.1)	245 (24.3)	
Bachelors Degree or Higher	86 (17.7)	79 (15.2)	165 (16.4)	
Employment status				0.038 ²
Paid Employee	234 (48.1)	285 (54.7)	519 (51.5)	
Not Working	252 (51.9)	236 (45.3)	488 (48.5)	
Household Income				0.88 ²
Less than \$10,000	55 (11.3)	52 (9.9)	107 (10.6)	
\$10,000 to \$34,999	181 (37.2)	203 (38.9)	384 (38.1)	
\$35,000 to \$74,999	129 (26.5)	140 (26.9)	269 (26.7)	
\$75,000 or more	121 (24.9)	126 (24.2)	247 (24.5)	
Internet access				0.90 ²
Yes	335 (68.9)	361 (69.3)	696 (69.1)	
No	151 (31.1)	160 (30.7)	311 (30.9)	
Marital Status				0.34 ²
Married	310 (63.8)	317 (60.8)	627 (62.3)	
Not Married	176 (36.2)	204 (39.2)	380 (37.7)	
Chronic Pain				0.52 ²
Yes	147 (30.2)	148 (28.4)	295 (29.3)	
No	339 (69.8)	373 (71.6)	712 (70.7)	

¹ Mann-Whitney U test

² Chi-squared test

³ Fisher's exact test

Table 1

Characteristics of Study Sample of Hispanics with Chronic Pain

Characteristic	Weighted Results N=1,140,170 Mean (SE) for Age Proportion (SE) for categorical variables
Age, mean $\pm$ SE (years)	53.19 (1.30)
Sex	
Female	53.52 (7.12)
Male	46.48 (7.12)
Language Preference	
English	59.12 (7.00)
Spanish	40.88 (7.00)
Employment Status	
Paid employee	36.14 (7.09)
Not Working	63.86 (7.09)
Household Income	
Less than \$9,999	11.33 (3.66)
\$10,000 to \$34,999	28.49 (5.57)
\$35,000 to \$74,999	29.55 (7.31)
\$75,000 or more	30.64 (6.78)
Pain Level[†]	
It hurts a little bit	25.84 (6.73)
It hurts even more	43.80 (7.25)
It hurts a whole lot	23.97 (5.28)
It hurts as much as possible	6.39 (2.42)

[†]Missing data for 1 person

Table 2

Pain Management Approaches Used by Respondents with Chronic Pain from 5-State Representative Sample of Hispanics

Pain management method	Used in Past 12 Months Proportion (SE) [*]	Helpfulness Mean (SE) ⁺
Taking a pain medicine over the counter	0.63 (0.07)	2.45 (0.14)
Pain medication prescribed by a doctor	0.58 (0.07)	2.67 (0.11)
Exercising	0.54 (0.07)	2.62 (0.14)
Massage	0.44 (0.07)	2.57 (0.16)
Physical therapy	0.23 (0.05)	1.94 (0.20)
Electrical nerve simulation (TENS)	0.21 (0.05)	2.28 (0.24)
Special diet	0.20 (0.05)	2.55 (0.19)
Injections in joints, back or tissue	0.18 (0.04)	2.80 (0.18)
Professional counseling for pain	0.16 (0.04)	2.26 (0.19)
Chiropractor	0.14 (0.04)	2.68 (0.43)
Surgery	0.08 (0.03)	2.30 (0.18)
Yoga	0.07 (0.03)	3.14 (0.32)
Traction	0.03 (0.03)	2.98 (0.13)
Biofeedback	0.03 (0.02)	1.75 (0.18)
Acupuncture	0.02 (0.01)	2.39 (0.25)
Hypnosis	0.002 (0.002)	3 (NA) [‡]

^{*} Weighted proportion of 1,140,170 Hispanics in five states aged 35–75 with chronic pain

⁺ Helpfulness rated on a 4 point Likert scale from not helpful to very helpful

[‡] Only one subject reported rating on helpfulness for this pain management method, hence standard error (SE) cannot be estimated

Table 3

Weighted Associations of Patient Characteristics with Use of Exercise or Prescription Pain Medication for Chronic Pain

Variables	Pain Management Approach Used in Past 12 Months			
	Exercise		Prescription Pain Medication	
	Adjusted OR (95% CI)	Adjusted P value	Adjusted OR (95% CI)	Adjusted P value
Sex-Language Preference				
Women-Spanish	0.29 (0.07, 1.15)	0.078	2.45 (0.42, 14.1)	0.32
Women-English	0.29 (0.06, 1.49)	0.14	3.51 (0.74, 16.6)	0.11
Men-Spanish	0.28 (0.06, 1.26)	0.10	1.74 (0.29, 10.5)	0.54
Men-English	1	-	1	-
Age, 1-year increase	1.02 (0.97, 1.08)	0.37	0.98 (0.93, 1.03)	0.41
Working				
Yes	0.90 (0.27, 2.94)	0.86	0.69 (0.19, 2.53)	0.58
No	1	-	1	-
Household Income				
Less than \$10,000	0.20 (0.03, 1.54)	0.12	14.2 (0.92, 218.7)	0.057
\$10,000–\$34,999	0.40 (0.09, 1.75)	0.22	4.79 (0.98, 23.4)	0.053
\$35,000–\$74,999	0.15 (0.03, 0.69)	0.015	4.85 (0.91, 25.9)	0.065
\$75,000 or higher	1	-	1	-
Exercise to Manage Pain				
Yes	-	-	2.17 (0.62, 7.58)	0.23
No	-	-	1	-
Prescription Pain Medication				
Yes	2.16 (0.66, 7.05)	0.20	-	-
No	1	-	-	-
Pain Level *				
High	0.65 (0.20, 2.11)	0.47	1.84 (0.53, 6.37)	0.33
Low	1	-	1	-

* Pain measured on a 4 point Likert scale and dichotomized as low 1–2 versus high 3–4 (see methods for description); N= 101 due to one subject missing pain level data