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Preoperative opioid use in patients undergoing shoulder surgery

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Abstract

Background: Opioids are commonly used to manage pain from acute injury or chronic degenerative diseases. The objective of this study was to assess the prevalence of preoperative opioid use in patients undergoing shoulder surgery and the clinical factors associated with preoperative opioid use.

Methods: This was an analytical cross-sectional study of 175 patients undergoing shoulder surgery at an urban hospital from June 2015 to June 2017. Multivariable regression models were used to determine independent associations.

Results: Fifty-three patients reported preoperative opioid use, which was significantly associated with primary procedure performed (Current Procedural Terminology [CPT]), higher body mass index (BMI), unemployment, lower income, smoking, higher American Society of Anesthesiologists score, greater number of previous surgeries, higher comorbidity burden, and decreased expectations to exercise and do recreational activities ($p < 0.05$). Preoperative opioid use was independently associated with worse scores on the: Numeric Pain Scale, ASES, IPAQ, and PROMIS domains of Physical Function, Pain Interference, and Social Satisfaction ($p < 0.05$).

Conclusion: More than one in four patients reported preoperative opioid use. Several health measures, including worse pain, function, and social satisfaction were independently associated with preoperative opioid use. These findings suggest that orthopaedic surgeons need to identify patients using opioids preoperatively in order to effectively establish and execute a plan for pain management, which may include weaning off opioids prior to surgery, managing psychological distress, and optimizing coping strategies.

Level of Evidence: III.

Keywords

Shoulder, opioid, patient-reported outcomes, PROMIS

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Introduction

Prescription opioid use, misuse, and abuse have increased considerably in recent years. The Centers for Disease Control and Prevention reports that the amount of prescription opioids dispensed in the United States has climbed from 76 million to 219 million between 1999 and 2011, which is an increase of almost 300%.[1] Since 1999, the rate of opioid-related deaths nearly quadrupled, and over 165,000 of these deaths were linked to prescription opioid overdoses.[2] More deaths were attributed to drug overdoses in 2014 than any prior year recorded, and greater than 60% of these deaths involved opioids.[3] Orthopaedic surgeons prescribe the greatest amount of opioid prescriptions of any surgical specialty, and the fourth most overall behind primary care physicians, internists, and dentists.[4]

Despite the mounting concern regarding the pervasiveness of the opioid epidemic, many patients continue

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to be prescribed these medications. Studies have shown that patients with a history of preoperative opioid use before surgery have worse surgical outcomes, greater postoperative pain, significant perioperative morbidity, higher healthcare costs, and a significantly greater likelihood of long-term postoperative opioid use.[5–11]

There is still a paucity of data regarding preoperative opioid use in patients undergoing elective shoulder surgery. Understanding the differences in prevalence of preoperative opioid use among patients undergoing common elective shoulder procedures is important for creating effective pain management strategies that are specific to the patient and the physician. However, commonly used administrative databases lack granular patient characteristic data, such as pain severity, psychosocial risk factors, and physical function.

Patient-reported outcome (PRO) measures have been increasingly adopted in orthopaedics to assess health status for use in clinical care, research, and cost-effectiveness analysis. The National Institutes of Health (NIH) Patient-Reported Outcomes Measurement Information Systems (PROMIS) was established to improve the reporting of patient symptoms, physical function, and health-related quality of life in an efficient and precise manner.[12] Using a large prospective orthopaedic surgical data registry, our primary aim was to identify the prevalence of preoperative opioid use in a cohort of patients undergoing shoulder surgery at an urban medical center. Our secondary aim was to determine the clinical characteristics and PRO measures associated with preoperative opioid use in patients undergoing shoulder surgery. We hypothesized that patients using preoperative opioids would be associated with a worse health profile, more extensive surgical history, and worse PRO measures.

Methods

A prospective registry was used to evaluate a cohort of patients preoperatively from June 2015 to June 2017 at a single institution.[11] All patients undergoing elective shoulder surgery at our institution are eligible for enrollment into an institutional review board-approved, web-based registry. All study data were collected using the Research Electronic Data Capture (REDCap™) data collection system. Inclusion criteria were as follows: (1) patient undergoing shoulder surgery, (2) age 12 years or older, and (3) English speaking. Patients enrolled in the registry[13] were asked to complete an electronic baseline assessment of: (1) preoperative data, (2) six PROMIS (v1.2) computer adaptive testing tools (Domains: Physical Function, Pain Interference, Fatigue, Social Satisfaction, Anxiety, and Depression), (3) the American Shoulder and Elbow Surgeons (ASES) Standardized Shoulder Form to assess shoulder function.[14] Patients also completed the two numeric pain intensity scales to assess pain in the operative shoulder (Shoulder Pain) and pain in the rest of the body (Body Pain). Preoperative expectations of surgery were measured with the expectations domain of the Musculoskeletal Outcomes Data Evaluation and Management System (MODEMS). Preoperative patient activity levels were measured using the Tegner Activity Scale (Tegner),[15,16] the International Physical Activity Questionnaire (IPAQ),[17] and Marx Shoulder Activity Scale.[18]

Demographic data were self-reported by each respondent. Patients who reported an opioid as an active medication prior to surgery were defined as 'opioid users'. Of note, income level was assessed as approximate family income including wages, disability payment, retirement income, and welfare. This was done in order to account for very young patients who may have no income (i.e. students) and the elderly who may be retired. This was completed up to seven days preoperatively or during the perioperative period. Initial self-evaluation completion time ranged from 10 to 30 min per patient.[13] Each patient's medical record was reviewed for relevant medical history, including their American Society of Anesthesiologists (ASA) score, smoking status, alcohol use, and current medications.[13] The procedures performed were grouped into the following categories: (1) Rotator Cuff Repair, (2) Labral Repair/Stabilization, (3) Arthroplasty, (4) Acromioplasty, Mumford, Debridement, and/or Biceps Tenotomy/Tenodesis, (5) Lysis of Adhesions and Manipulation, and (6) ORIF Fracture/Dislocation.

Statistical analysis

Opioid users were compared to non-users with Pearson chi-squared test for categorical variables and Wilcoxon rank sum test for continuous variables. A backwards-elimination-stepwise technique using a least-squares multivariable linear regression model was utilized to determine if preoperative opioid use was independently associated with each preoperative PRO measure. A priori independent variables (considered relevant to the outcome from a clinical perspective and current literature[11,19]) included procedure performed (Current Procedural Terminology [CPT] code), preoperative opioid use, age, gender, race, BMI, Charlson comorbidity index (CCI) score, alcohol consumption, income, workers compensation claim, and mean preoperative expectations. A posteriori independent variables (significant in the bivariate analysis) included employment status, smoking status, ASA score, number of previous surgeries, and diagnosis of depression or anxiety. With all of the aforementioned variables in the initial model and a single preoperative PRO measure as the dependent variable, the least contributory independent variable with the largest p-value was removed, and the

model was recalculated to find the best fit. We calculated the variable inflation factor (VIF) for each parameter in our final model to ensure multicollinearity did not adversely affect our regression results. Significance was defined as a p-value less than 0.05.

Results

Complete data from 175 patients was available for analysis (Tables 1 and 2). Fifty-three patients (30.3%) reported preoperative opioid use. On bivariate analysis, opioid use was associated with increased BMI ($p = 0.0045$), unemployment ($p = 0.0035$), lower income ($p = 0.0010$), smoking ($p = 0.0042$), higher ASA scores ($p < 0.0032$), a greater number of surgeries of any kind ($p = 0.0029$), a greater number of orthopaedic surgeries ($p = 0.0034$), and worse Charlson comorbidity index score (1.83 vs. 1.08; $p = 0.0069$). MODEMS expectations were significantly worse for those taking opioids in one of six domains: likelihood to exercise and do recreational activities (3.98 vs. 4.35; $p = 0.024$). The study cohort included patients who underwent a total of 33 different procedures, grouped into six distinct procedure categories (online Appendix 1). Rotator cuff repair was the most common procedure type performed ($N = 43$). Bivariate analysis found that preoperative opioid use was significantly associated with type of procedure performed ($p = 0.0185$).

Bivariate analyses (Table 3) found that opioid use was significantly associated with worse preoperative PROMIS scores in five of six domains: Physical Function (39.0 points vs. 44.5 points; $p < 0.0001$), Pain Interference (65.5 vs 59.8; $p < 0.0001$), Fatigue (57.6 vs. 51.2; $p = 0.0003$), Social Satisfaction (35.9 vs. 43.2; $p < 0.0001$), and Anxiety (57.9 vs. 54.5; $p = 0.0106$). Compared to non-users, opioid users had a significantly lower ASES-overall score (32.4 points vs. 46.6 points; $p < 0.001$) and lower ASES-function score (26.1 vs. 40.8; $p = 0.0003$). Physical activity measures were also significantly lower for those taking opioids prior to shoulder surgery compared to those not taking opioids, including IPAQ (2306 METs vs. 4254 METs; $p = 0.0001$), Tegner before the onset of the shoulder problem (5.0 vs. 6.5; $p = 0.0051$), and Tegner

Table 1. Continuous variables.

	Preoperative opioid use		
	Yes	No	
Number of shoulders (%)	53 (30.3)	122 (69.7)	
	Mean (±SD)	Mean (±SD)	p
Mean age in years	51.3 (±12.6)	46.6 (±18.8)	0.2071
Mean in BMI (kg/m^2)	32.0 (±5.4)	29.3 (±6.3)	**0.0045**
Charlson Comorbidity Index	1.83 (±1.77)	1.08 (±1.22)	**0.0069**
MODEMS – expectations overall	4.15 (±0.94)	4.41 (±0.77)	0.34
(1) Relief from symptoms	*4.20 (±0.96)*	*4.42 (±0.82)*	0.1092
(2) Activities	*4.26 (±1.05)*	*4.52 (±0.88)*	0.0795
(3) Sleep	*4.22 (±1.09)*	*4.42 (±0.98)*	0.1562
(4) Usual work	*4.21 (±1.86)*	*4.37 (±1.06)*	0.3888
(5) Exercise	*3.98 (±0.15)*	*4.35 (±0.10)*	**0.0240**
(6) Disability	*4.28 (±0.13)*	*4.34 (±0.09)*	0.1089
Number of surgeries (ANY)	5.6 (±4.9)	3.5 (±3.9)	**0.0029**
Number of orthopaedic surgeries	2.7 (±2.6)	1.6 (±2.2)	**0.0034**
Number of surgeries on operative shoulder	2.1 (±1.7)	1.4 (±0.8)	0.1106

BMI: body mass index; MODEMS: Musculoskeletal Outcomes Data Evaluation and Management System.
*Bolded values represent statistically significant p-values.

Table 2. Categorical variables.

	Preoperative opioid use		
	Yes N (%)	No N (%)	p
Number of shoulders	53 (30.3)	122 (69.7)	
Sex			0.071
Male	23 (43)	71 (58)	
Female	30 (57)	51 (42)	
Ethnicity			0.43
Not Hispanic or Latino	50 (94)	109 (89)	
Hispanic or Latino	2 (4)	5 (4)	
NR	1 (2)	8 (7)	
Race			0.98
Black	19 (36)	42 (34)	
White	30 (57)	70 (57)	
Other	4 (8)	10 (8)	
Education			0.22
Some high school or below	1 (2)	11 (9)	
High school graduate or above	47 (89)	102 (84)	
NR	5 (9)	9 (7)	
Employment status			**0.0035**
Employed for wages	22 (42)	43 (35)	
Self-employed	2 (4)	14 (11)	
Out of work and looking for work	0 (0)	2 (2)	
Out of work but not currently looking for work	1 (2)	0 (0)	
Homemaker	2 (4)	1 (1)	
Student	1 (2)	18 (15)	
Military	1 (2)	0 (0)	
Retired	4 (8)	22 (18)	
Unable to work	13 (25)	12 (10)	
Other	2 (4)	1 (1)	
NR	5 (9)	9 (7)	

(continued)

Table 2. Continued.

	Preoperative opioid use		
	Yes N (%)	No N (%)	p
Income			**0.0010**
Less than $10,000	8 (15)	5 (4)	
$10,000–$19,999	3 (6)	4 (3)	
$20,000–$29,999	5 (9)	3 (2)	
$30,000–$39,999	6 (11)	1 (1)	
$40,000–$49,999	1 (2)	4 (3)	
$50,000–$59,999	3 (6)	5 (4)	
$60,000–$69,999	2 (4)	5 (4)	
More than $70,000	9 (17)	32 (26)	
Other	16 (30)	63 (52)	
Marital status			0.23
Single – never married	10 (19)	41 (34)	
Married or domestic partnership	27 (51)	47 (39)	
Divorced, separated, or widowed	12 (23)	24 (20)	
NR	4 (8)	10 (8)	
Smoking status			**0.0042**
Daily	10 (19)	5 (4)	
Less than daily	3 (6)	5 (4)	
Quit smoking	22 (42)	77 (63)	
Never smoked	14 (26)	25 (20)	
NR	4 (8)	10 (8)	
Alcohol consumption			0.089
Never	19 (36)	39 (32)	
Monthly or less	15 (28)	19 (16)	
2 to 4 times a month	7 (13)	21 (17)	
2 to 3 times a week	3 (6)	25 (20)	
4 or more times a week	5 (9)	7 (6)	
NR	4 (8)	11 (9)	
Recreational drug use			0.41
No	47 (89)	105 (86)	

(continued)

Table 2. Continued.

	Preoperative opioid use		
	Yes N (%)	No N (%)	p
Yes	0 (0)	4 (3)	
NR	6 (11)	13 (11)	
ASA score			<**0.0032**
1	6 (11)	48 (39)	
2	41 (77)	66 (54)	
3	5 (9)	7 (6)	
4	1 (2)	1 (1)	
Depression or anxiety			0.42
No	38 (72)	98 (80)	
Yes	14 (26)	23 (19)	
NR	1 (2)	1 (1)	
Injury prior to surgery			0.99
No	18 (34)	43 (35)	
Yes	31 (58)	70 (57)	
NR	4 (8)	9 (7)	
Worker's compensation			0.070
No	48 (91)	116 (95)	
Yes	5 (9)	6 (5)	
Prior surgery on operative shoulder			0.58
No	38 (72)	90 (74)	
Yes	15 (28)	30 (25)	
NR	0 (0)	2 (2)	

NR: Not Reported; ASA: American Society of Anesthesiologists.
*Bolded values represent statistically significant p-values.

currently before surgery (1.4 vs. 2.8; $p < 0.0001$). Furthermore, opioid use was associated with worse Shoulder Pain (6.2 vs. 4.8; $p = 0.00125$) and Body Pain (2.6 vs. 1.4; $p = 0.0081$).

After controlling for potential covariate bias, multivariable regression analyses found that preoperative opioid use was independently associated with multiple PROs (Table 4). Preoperative opioid users had worse scores on the: PROMIS Physical Function ($p < 0.05$), PROMIS Pain Interference ($p < 0.001$), PROMIS Social Satisfaction ($p < 0.0001$), ASES total score ($p < 0.05$), IPAQ ($p < 0.01$), and NPS-shoulder ($p < 0.01$).

Discussion

This analytical cross-sectional study demonstrated that more than one in four patients (30%) undergoing shoulder surgery were using opioids prior to surgery. This rate of preoperative opioid use is similar to recent

Table 3. Patient-reported outcome measures.

	Preoperative opioid use		
	Yes Mean (±SD)	No Mean (±SD)	p[a]
PROMIS – physical function	39.0 (±8.86)	44.5 (±8.18)	**<0.0001**
PROMIS – pain interference	65.5 (±6.56)	59.8 (±7.15)	**<0.0001**
PROMIS – fatigue	57.6 (±9.75)	51.2 (±10.72)	**0.0003**
PROMIS – social satisfaction	35.9 (±7.27)	43.2 (±9.49)	**<0.0001**
PROMIS – anxiety	57.9 (±8.93)	54.5 (±8.84)	**0.0106**
PROMIS – depression	51.5 (±9.94)	48.8 (±10.1)	0.0680
ASES – overall score	32.4 (±15.8)	46.6 (±21.8)	**<0.0001**
ASES – function component score	26.1 (±3.21)	40.8 (±23.1)	**0.0003**
IPAQ (MET-minutes/week)	2305.5 (±3591)	4253.5 (±4136)	**0.0001**
Tegner (pre-shoulder problem)	5.0 (±3.03)	6.5 (±2.76)	**0.0051**
Tegner (current/pre-surgery)	1.4 (±1.81)	2.8 (±2.18)	**<0.0001**
Marx Shoulder Activity Scale	9.88 (±7.15)	10.93 (±6.31)	0.5190
Shoulder pain	6.2 (±2.43)	4.8 (±2.92)	**0.0025**
Body pain	2.6 (±2.79)	1.4 (±2.44)	**0.0081**

PROMIS: Patient Reported Outcome Measure Information System; ASES: American Shoulder and Elbow Surgeons; IPAQ-MET: International Physical Activity Questionnaire-Metabolic Equivalent.
[a]All p-values were determined with Wilcoxon ranked sum test.
*Bolded values represent statistically significant p-values.

Table 4. Multivariable regression results.

	Preoperative opioid use				
	Yes Mean (±SD)	No Mean (±SD)	Parameter estimate	Standard error	p[a]
PROMIS – physical function	39.0 (±8.86)	44.5 (±8.18)	−1.67	0.74	**0.0259**
PROMIS – pain interference	65.5 (±6.56)	59.8 (±7.15)	2.09	0.60	**0.0007**
PROMIS – social satisfaction	35.9 (±7.27)	43.2 (±9.49)	−3.38	0.79	**<0.0001**
ASES – overall score	32.4 (±15.8)	46.6 (±21.8)	−4.36	1.72	**0.0122**
IPAQ (MET-minutes/week)	2305.5 (±3591)	4253.5 (±4136)	−1161.26	362.61	**0.0017**
Shoulder pain intensity (NPS)	6.2 (±2.43)	4.8 (±2.92)	0.65	0.23	**0.0054**

PROMIS: Patient Reported Outcome Measure Information System; ASES: American Shoulder and Elbow Surgeons; IPAQ-MET: International Physical Activity Questionnaire-Metabolic Equivalent.
[a]A Backwards Stepwise Regression model was built for each patient-reported outcome measure.
*Bolded values represent statistically significant p-values.

studies that reported that approximately 30% of patients undergoing shoulder arthroscopy or elective shoulder surgery filled an opioid prescription in the 30 days prior to surgery.[20,21] Preoperative opioid use has been consistently shown to be the strongest predictor of postoperative opioid use,[22–24] and is often associated with a greater burden of comorbid disease and multiple risk factors for poor postoperative recovery. Our hypothesis was supported given that preoperative opioid use was independently associated with several PRO measures, including worse pain intensity and interference, worse function and activity, and lower social satisfaction. This suggests that identification of those patients with such risk factors could be useful in helping reduce preoperative opioid use and optimizing postoperative pain management.

Preoperative opioid use is a commonly identified risk factor for chronic opioid use,[11] and has been associated with worse orthopaedic outcomes.[25] Three previous studies[5,10,26] have investigated the association between preoperative opioids and PRO measures in shoulder surgery. Similar to our findings, Morris et al. found lower preoperative baseline ASES, Western Ontario Osteoarthritis Shoulder (WOOS) Index, and Constant scores in patients taking opioids prior to reverse total shoulder arthroplasty. Although these patients improved postoperatively, they reported worse PROs postoperatively as compared to non-users.[10] Similar results were also reported in patients undergoing anatomic total shoulder arthroplasty.[26] In contrast, Cheah et al. found no difference in preoperative or postoperative ASES scores in patients using opioids prior to shoulder arthroplasty compared to patients not taking opioids.[5] The findings by Cheah et al., however, were limited by a small sample size, low follow-up rate (35%), and homogenous patient population.

To the best of our knowledge, this is the first study to examine how the PROMIS tools performed in opioid users vs. non-users undergoing shoulder surgery. PROMIS CAT instruments have been shown to correlate well with orthopaedic joint-specific PRO measures, with the added benefit of decreased time burden and negligible floor and ceiling effects.[27–30] Most notably, opioid users had significantly worse PROMIS scores in five of six health domains measured: Physical Function, Pain Interference, Fatigue, Social Satisfaction, and Anxiety. Furthermore, preoperative opioid use was found to be independently associated with measures of Physical Function, Pain Interference, and Social Satisfaction. Additionally, opioid users had significantly higher rates of risk factors for poor postoperative outcome, including clinical factors such as increased BMI, smoking, and worse comorbidity burden, and social factors such as unemployment and income.

Opioid users in our study had lower overall expectations of shoulder surgery, including significantly lower expectations of returning to recreational activities and exercise. Pretreatment expectations have been shown to be an important predictor of outcome for shoulder patients.[31–34] Provider–patient communication should aim to normalize expectations for pain following surgery and correct misconceptions that patients may have about the efficacy and safety of opioids for pain management.[35,36] Furthermore, encouragement to address psychosocial factors can be a part of a more comprehensive non-pharmacologic pain management strategy following shoulder surgery.[37] In light of our findings, a careful evaluation of medical comorbidities, psychosocial distress, and current substance use, as well as the surgeons' motivation for prescribing opioids should be considered.

Even though orthopaedic surgeons make up only 2.5% of U.S physicians, they prescribe approximately 8% of opioids nationwide.[4] Unfortunately, preoperative opioid use has been associated with increased hospital length of stay, morbidity, worse outcomes, and extended postoperative opioid use.[10,38–42] These deleterious effects are especially concerning given the increased focus on improving healthcare quality measures and PROs.

It is difficult to predict which patients are at risk for abusing opioids. Currently available tools include the Addiction Severity Index (ASI),[43] Structured Clinical Interview for DSM-IV (SCID),[44] and the Opioid Risk Tool (ORT).[45,46] Although these tools provide information about potential risk factors, they are not validated in specific practices, such as the orthopaedic shoulder population. Furthermore, there are several studies showing genetic and environmental links to substance misuse and abuse.[47] Given the associations identified in other fields, the AAOS in a 2015 editorial has also advocated identifying and treating patients with psychosocial risk factors[48] prior to surgery.[49]

Other policy initiatives aimed at reducing opioid-related harm have also increased in popularity. Prescription Drug Monitoring Programs (PDMPs) are an example of legislative efforts to curb prescription drug abuse. These databases provide patient-level information on select controlled substances to help improve opioid prescribing, inform clinical practice, and protect patients at risk. PDMPs are available in nearly all US states, although the requirements regarding their use are variable.[50] Although some studies have reported an association between the use of PDMPs and a reduction in overall opioid prescribing, the data still remain mixed.[51–53] Specifically in orthopaedic surgery, the utilization of PDMPs may be useful in the early detection of patients transitioning to unintended prolonged use. Other legislative efforts have targeted the

reduction of leftover opioids in the community.[54,55] Hasak et al. have reported that providing patients who underwent surgery with a pamphlet describing how to properly dispose of opioids resulted in an increase in the frequency with which patients disposed of leftover opioids.[54]

To our knowledge, this is one of the few studies to assess preoperative opioid use across a wide range of shoulder procedures, and one of the first to incorporate the newly developed PROMIS questionnaires together with traditional outcome measures and health data from the medical record. However, there are several strengths and limitations of this study that must be addressed. This is an analytical cross-sectional, observational study and all the limitations of such a study design apply. While suitable for examining prevalence and determining associations between exposure and outcome, it is difficult to determine cause and effect. While the risk of selection bias must be noted, a multivariable regression model was used to mitigate the effect of possible confounders. Thus, this study is useful for hypothesis generation for potential associations that can be confirmed or refuted in more rigorous study designs.

Opioid use was listed as a binary categorical variable. Doing so limits our capacity to accurately define a correlation between the degree of opioid use and PRO scores. Given that a large portion of home opioid prescriptions are to be used on an as-needed basis that is not well documented by patients, stratification-based opioid consumption was not readily possible. It is important to recognize the heterogeneous nature of the procedures investigated in this study. Contrary to most studies in the orthopaedic literature, we are not reporting on a single procedure. We included all shoulder procedures performed at a single institution by fellowship-trained surgeons performing a high volume of shoulder procedures. The inclusion of all types of shoulder procedures may be a confounding variable and may not be directly applicable to every surgeon's patient population. However, this aspect of the study may also be considered a strength, as it provides a broad perspective and avoids isolating any single procedure. Doing so allows for detecting confounding variables that may otherwise be missed in isolated procedure groups. Furthermore, our study population is a demographically diverse group presenting to an urban academic health system. Thus, the data from this patient population may not apply to other, more homogenous demographic populations.

Our findings that preoperative opioid use was associated with multiple psychosocial factors support the utilization of a biopsychosocial model in orthopaedic healthcare.[56] This model posits that health is influenced by a complex interplay of biological, psychological, and social factors. Growing clinical evidence indicates that psychosocial factors explain a substantial portion of the variation in symptom intensity (i.e. pain) and the magnitude of limitations. Recent studies demonstrate that patients with depression are nearly four times more likely to report severe pain than patients without depression,[57] and that patients with depression have lower pain tolerance.[58] Additionally, patients with chronic pain using opioids have a greater burden of comorbid conditions, psychosocial distress, and substance abuse compared to those patients with chronic pain not using opioids.[59–61] As practitioners facing the continuum of health (i.e. acute injury, chronic illness, or aspects of normal aging), orthopaedic surgeons have the opportunity to address the biological, psychological, and social needs of their patients through multidisciplinary treatment that optimizes resiliency and improves quality of life.

Because of the relationships between persistent opioid use and psychological risk factors, such as depression and anxiety, identified in this study and others,[62–64] there are potential opportunities to provide psychiatric support that could affect postoperative opioid misuse and abuse. Preliminary results from one such multidisciplinary approach,[65] which incorporates psychological support as part of a broader intervention to curb chronic postsurgical pain, has shown reductions in opioid use, pain interference, and depressed mood. Given the prevalence of mood disorders in the general population,[66] and the challenge that preoperative opioid users present to postoperative care,[67] a multidisciplinary approach incorporating psychological intervention may improve patient outcomes.

Conclusion

In this study of patients undergoing a variety of shoulder surgeries, more than one in four patients reported preoperative opioid use. A number of outcome measures, including worse pain intensity and interference, worse function and activity, and lower social satisfaction were independently associated with preoperative opioid use. These findings suggest that orthopaedic surgeons need to identify patients using opioids preoperatively in order to effectively establish and execute a plan for pain management that may include reduction of preoperative opioid use, management of psychological distress, and optimization of coping strategies.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Henn reports non-financial research

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Ethical Review and Patient Consent

This study was approved by the Institutional Review Board (IRB) Committee at the University of Maryland, Baltimore (HP-00062261). All patients provided informed consent to participate in the Maryland Orthopaedic Registry.

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Supplemental Material

Supplemental material for this article is available online.

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