

Risk Factors Associated with Chronic Opioid Utilization among Opioid-Naïve Patients Post Orthopaedic Surgery of the Knee, Hip, or Shoulder

Melanie Rene Ghosn¹, Patricia Louise Gray², Ryan Chaput³, Ronald Anthony Navarro, Anshuman Singh⁴

¹Pharmacy, Kaiser Permanente, ²Pharmacy Administration, Kaiser Permanente - Kaiser Foundation Hospitals,

³Pharmacy, Drug Education, ⁴Orthopedics, Garfield Specialty Center

INTRODUCTION:

Opioid initiation and management can pose a challenge when the need for analgesia and the risk of opioid dependence is placed on a balance. Despite efforts to combat the opioid crisis, this class of medications continues to be overused and misused which causes unintended harms and a significant economic burden in the United States.

The Shah et al. study, published in the CDC's Morbidity and Mortality Weekly Report on March 17, 2017, identified various factors including the duration of the initial prescription, that may increase the likelihood of continued opioid use for greater than one year in adult opioid-naïve patients regardless of the indication for use. The probability of long-term opioid utilization increased sharply after five days, ten days, and one month of opioids prescribed, highlighting that one of the greatest risks falls within the acute phase of pain management. Those prescribed more than a one-month supply of opioids as their initial prescription, had an approximate 30% chance of being on opioids one year later. Other studies have demonstrated a wide variation in the patterns of opioid utilization after most surgical procedures in adult opioid naïve patients, even with similar patient populations.

Because the Shah et al. study included various pain indications, this study will differ by including a cohort of opioid-naïve patients who were prescribed opioids for post-surgical pain (specific to total joint replacement surgery).

Due to the extensive and invasive nature of total joint replacement surgeries, opioids are often prescribed in this setting and the risk of acute to chronic opioid use may vary from patient to patient. The purpose of this study is to provide an understanding of the risk factors associated with chronic opioid utilization among opioid naïve patients post orthopaedic surgery of the knee, hip, or shoulder in an integrated model of care.

METHODS:

This is a retrospective, multi-center, population-based cohort study which included adult patients 18 years and older, with an initial opioid prescription filled between January 1, 2017, to December 31, 2017, after orthopaedic surgery of the hip, knee, or shoulder within Kaiser Permanente Southern California (KPSC) region. This study is focusing on a cohort of patients prior to the implementation of the Enhanced Recovery After Surgery or ERAS model that was implemented in 2018 at KPSC. ERAS is a model of care focused on a multimodal approach to pain management and can reduce inpatient and outpatient use of opioids. Of the identified cohort, those who have no more than the 180-day gap period between prescriptions, will be assessed for up to one year.

The primary objective of this study is to identify the patient and prescribing characteristics of initial opioid prescriptions that increase the likelihood of long-term opioid utilization in an opioid-naïve population after total joint replacement of the hip, knee, or shoulder.

Continuous measures are described using means and standard deviations and categorical measures are described using percentages. For the assessment of the primary outcome, a logistic regression was utilized to conduct an analysis of the factors associated with chronic opioid use and were described using a Cox proportional hazards model.

RESULTS:

A total of 151 patients of the total cohort (4,898 patients) met the primary outcome of opioid use for at least one-year. Of the 151 patients who met the primary outcome, significant risk factors were associated and observed through a logistic regression model. Current smoker status increased the risk of chronic opioid use by nearly fourfold and African American/Black patients have a two-fold greater risk of utilizing opioids chronically. Finally, Medicaid beneficiaries reflected a 2.5 times greater association with chronic opioid use.

DISCUSSION AND CONCLUSION:

The study found that 3.1% of opioid-naïve patients continued to fill opioid prescriptions after one year from the index date, similar to the Shah et al. study (2.6% of opioid-naïve patients). The average number of refills and total opioid prescriptions' day supply for those who met the primary outcome, from the index date to one year, was 9 refills and 107 days (nearly one-third of the year), respectively. This study depicted several risk factors associated with the primary outcome of chronic opioid use which may be useful for future encounters in total joint replacement surgeries. The risk factors that showed a statistically significant association with the primary outcome included: Medicaid coverage, African American/Black patients, history of opioid/substance use disorder, active mood disorder, history of smoking, and concurrent use of a CNS depressant. Additionally, for each additional day of an initial opioid supplied, the risk of chronic opioid use increased by 4%. There were patient risk factors found to have an increased association with the primary outcome, however, were not statistically significant, which included: Hispanic patients, males, BMI \geq 25, history of alcohol

use from preop questionnaire, and daily MME ≥ 90 . Also, 21% and 10% of opioid-naïve patients continued to fill opioid prescriptions after 3 and 6 months, respectively. The results of this study may be applicable to future encounters in the setting of total joint replacement surgeries. Furthermore, a future study is to be conducted to determine the impact on the outcomes of this study, taking place after the ERAS implementation in KPSC.

Table 2: Primary Outcomes

n = 4596	Allowed gaps between prescriptions		
	45-days	90-days	180-days
Opioid use ≥ 1 -year	16 (0.3%)	40 (0.8%)	161 (3.1%)
Cumulative Opioid Rx^a Day Supply Over 1-year (n = 151)			
Mean (SD)	106.6 (65.82)		
Number Of Refills: Over 1-Year			
Mean (SD)	9.1 (5.03)		

Table 3: Logistic Regression Model (Potential Risk Factors)

	Adjusted OR	P-Value
Smoking status		<0.01
Quit smoking vs Non-smoker	1.51 (1.05, 2.17)	
Current smoker vs Non-smoker	3.93 (2.12, 7.3)	
Alcohol Use		0.34
Yes vs No	1.58 (0.65, 3.85)	
Unknown	0.83 (0.58, 1.18)	
Hx of opioid or other substance use disorder		0.04
Yes vs No	1.86 (1.14, 3.03)	
Active mood disorder		0.045
Yes vs No	1.52 (1.01, 2.28)	