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Original article

Predictors of Sustained Prescription Opioid Use After Admission for Trauma in Adolescents

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A B S T R A C T

Purpose: The study objectives are to describe the longitudinal trajectory of prescription opioid use among adolescents requiring a trauma admission and then identify predictors of sustained opioid use.

Methods: Randomly sampled adolescents (12–18 years) admitted to a Level I trauma center were surveyed. Follow-up assessments were obtained at 2, 5, and 12 months. Self-reported prescription opioid use, defined as "taking an opioid prescribed by a physician," was obtained at baseline and every follow-up time point. At the baseline interview, validated mental health measures and pain scales were obtained as well as preinjury substance use. A fixed-effects mixed Poisson regression analysis was performed to predict prescription opioid use over time.

Results: A total of 120 adolescents (mean age 15.5 years [1.9 standard deviation], 75% male) completed the baseline interview with 98% follow-up at 12 months. At baseline, 7% of adolescents reported prescription opioid use before their trauma, with rates of prescription opioid use of 52% at 2 months, 13.3% at 5 months, and 12.5% at 12 months after discharge. After adjusting for demographic characteristics and injury severity score, those with sustained prescription opioid use were more likely to report preinjury marijuana use and higher baseline pain scores.

Conclusions: Approximately one in eight adolescents (12.5%) was using prescription opioids 12 months after injury hospitalization. Readily identifiable risk factors predicted sustained prescription opioid use, including preinjury marijuana use and baseline pain score. Screening for substance use including marijuana at the time of injury could help identify patients at risk for both substance use problems and sustained prescription opioid use.

IMPLICATIONS AND CONTRIBUTION

The study objective was to determine risk factors for sustained prescription opioid use after admission for trauma. Adolescents with preinjury marijuana use and high baseline pain scores had increased risk of sustained prescription opioid use. Screening for substance use at the time of injury could help identify patients at risk.

Prescription opioids are often used to treat acute pain from illness or injury. Prescription opioid use, defined as using prescribed opioids to treat acute pain in the way intended by the prescriber is increasing, and opioids are the most commonly prescribed controlled substance among adolescents [1]. Although prescription opioid use can be an important part of the treatment for acute pain, recent studies have shown that prescription opioid use is associated with misuse of prescription opioids [2,3], which can lead to overdose and death [4]. Acute pain and prescription opioid use can also lead to chronic

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pain and chronic opioid therapy. Sustained or chronic opioid therapy is defined as prescription opioid therapy for most days in the past 90 [5]. Predictors of sustained prescription opioid use in adolescents after an episode of acute pain remain unknown.

Initiating prescription opioid therapy can lead to recurrent prescription opioid use [6], prescription opioid misuse [7], and other adverse outcomes including overdose [4]. One in five adolescents with a prescription for opioids report misusing their prescribed opioids [2], and 80% of high school students reporting prescription opioid misuse were initially prescribed opioids by a physician [7]. In an emergency department (ED) sample, 14.5% of adolescents and young adults reporting prescription opioid misuse had a current prescription for opioids [8]. Although these previous studies suggest potential correlates of prescription opioid misuse; more information is needed to understand predictors of sustained prescription opioid use in adolescents after an episode of acute pain.

In a study limited to adolescents with idiopathic scoliosis undergoing spinal fusion, preoperative pain level and preoperative anxiety predicted higher postoperative pain at follow-up [9]. Among adult patients undergoing common surgical procedures, presurgical depressive symptoms were predictive of sustained opioid use at 6 months after surgery [10]. Likewise, patients on chronic opioid therapy tend to also have psychiatric and substance use disorders. Specifically, adolescents and young adults in outpatient clinics with mental health diagnoses have increased risk of sustained prescription opioid use compared with adolescent patients without mental health diagnoses [11]. Similarly, substance use is associated with chronic opioid therapy and is a risk factor for opioid dependence [12]. Identifying specific mental health disorders and substance use problems present before an injury causing acute pain could help identify adolescent patients at risk for chronic pain and thus sustained prescription opioid use after an injury and trauma admission. Currently, there are no studies that identify predictors of sustained opioid use after an acute injury among adolescents.

Opioids are often part of the initial treatment for acute post-injury pain. Limited data exist regarding the effectiveness of long-term opioid use in controlling nonacute or chronic pain [13]. Injury is the leading cause for ED visits among adolescents [14,15] and a source of acute pain. Recognizing and understanding preinjury risk factors for sustained prescription opioid use could help physicians to identify and intervene with high-risk injured youth, thereby, reducing rates of sustained prescription opioid use and possibly opioid dependence and misuse. Therefore, this study aims to determine demographics, baseline clinical characteristics, and preinjury substance use, and mental health comorbidity that predict longitudinal prescription opioid use up to 1 year after admission for a trauma in a population of adolescents.

Methods

Study site and population

Adolescents (12–18 years old) admitted to the Harborview Medical Center trauma service or in the ED for >24 hours, from March 1, 2008 to October 31, 2009, were randomly sampled, and the adolescents and their parents were surveyed as part of a larger randomized clinical trial comparing stepped collaborative care to usual care for decreased violence, injury risk factors, substance use problems, Post Traumatic Stress Disorder, and depression over time; approximately half of patients (n = 61) participated in the intervention condition [16]. The intervention was delivered by a social worker or nurse practitioner trained in care management at a trauma center and included motivational interviewing elements targeting risk behaviors including alcohol use and drug use as well as medication therapy and elements of cognitive behavioral therapy targeting mental health conditions. The intervention did not focus specifically on pain. Harborview Medical Center is a large, urban, academic Level I trauma center in Seattle, WA. All adolescent patients with an injury requiring inpatient trauma care or >24 hours in the ED, with a Glasgow Coma Score [17] (GCS) of 15 at the time of the baseline interview, were eligible for the study. Patients were excluded if they were non-English speakers (child or parents), incarcerated, or acutely suicidal. Patients admitted to the hospital with GCS of <15 were reapproached during their hospitalization if their GCS improved and was subsequently documented in the medical record to be 15 at a time during their hospital stay. Eligible participants under the age of 18 years assented and parental consent was obtained. Consent was obtained directly from participants that were 18 years old. Parents also provided consent. Study procedures were reviewed and approved by the University of Washington Institutional Review Board.

Study procedures

All eligible adolescent participants were approached in the ED or inpatient trauma ward to complete an interview conducted by a trained research assistant (RA) regarding demographics, medications, pain and preinjury substance use, and mental health and health service utilization. Parent participants also completed a separate interview conducted by a trained RA at baseline. Adolescent participants were then followed for 12 months and completed follow-up outcome assessments by telephone at 2, 5, and 12 months after the date of their injury.

Measures

Prescription opioid use. At the baseline interview, the RA asked each adolescent participant to list their preinjury medications for the year before the injury hospitalization. At the baseline parent interview, the RA asked parents to independently describe adolescent preinjury medication use. At each follow-up outcome assessment, the RA asked adolescent participants to list medications with associated doses and intervals taken since the last interview. All prescription opioids listed (e.g., codeine, hydrocodone, oxycodone, morphine, hydromorphone, methadone) at each time point were collapsed into a single category of "prescription opioid use," and categorized as "yes" or "no" for each participant based off on the adolescent self-report for each time point.

Demographics. Patient age, gender, race, and ethnicity were obtained through self-report from the adolescent in the baseline survey.

Baseline clinical variables. The number of days after injury at which the participant completed the baseline survey was documented. At the baseline assessment, current pain was assessed using the McGill short form pain scale [18]. Specifically,