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Risk Factors of Prescription Opioid Overdose Among Colorado Medicaid Beneficiaries

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Abstract: **This study aims to determine risk factors of opioid overdose among the Colorado Medicaid population. A retrospective nested case-control study was undertaken. Medicaid beneficiaries who had ≥1 medical claim for an emergency department visit or a hospitalization associated with an opioid overdose from July 2009 to June 2014 were defined as cases. Controls were selected using a nearest neighbor matching without replacement. The matched controls were selected on the basis of age, sex, and opioid prescription. One case was matched with three controls. Multivariate conditional logistic regression was used to compare risk factors. A total of 816 cases with 2,448 controls were included. Six factors were associated with opioid overdose: mean morphine dose equivalent (>50 mg/d; odds ratio [OR] = 1.986 [95% confidence interval [CI], 1.509–2.614]), methadone use (switching opioid to methadone vs. no methadone use; OR = 7.230 [95% CI, 2.346–22.286]), drug/alcohol abuse (OR = 3.104 [95% CI, 2.195–4.388]), other psychiatric illness (OR = 1.730 [95% CI, 1.307–2.291]), benzodiazepine use (OR = 2.005 [95% CI, 1.516–2.652]), and the number of pharmacies used by the beneficiary (≥4 pharmacies vs. 1 pharmacy; OR = 1.514 [95% CI, 1.003–2.286]). In conclusion, several factors are associated with opioid overdose. States and communities should ensure the availability of at-home intranasal naloxone for overdose rescue on the basis of the presence of risk factors.**

Perspective: ***This article presents the risk factors of opioid overdose among the Colorado Medicaid population. On the basis of study findings, Colorado Medicaid is currently working with physicians, hospitals, and other health system stakeholders to continue to develop policies to identify and assist this subset of our population. One such policy will be to provide at-home intranasal naloxone for overdose rescue.***

Key words: *Risk factor, opioid overdose, Medicaid, opioid, chronic pain.*

In 2011, drug overdose became one of the leading causes of injury deaths within the United States. Of these deaths where the drugs were specified, opioid analgesics or opioids accounted for three-quarters of prescription drug overdoses.[7] Opioid overdose has become an increasingly impactful epidemic in the United States. The number of patients killed by opioid overdose has tripled from 1999 (approximately 4,000 people) to 2008 (approximately 15,000 people). Approximately half a million emergency department (ED) visits were attributable to opioid overdose in 2009 alone.[3]

Concern for prescription drug abuse in Colorado has been particularly high because the state was ranked in

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the top five states across the nation for nonmedical use of prescription pain medicine.[16] Unfortunately, while other states have experienced declines in prescription drug abuse, Colorado's rates have remained at alarmingly high levels.[15] In 2013, the governor of Colorado created the Colorado Coalition for Prescription Drug Abuse Prevention with the goal of preventing 92,000 Coloradans from abusing opioids by 2016. This group has undertaken such strategies as creating public awareness of the crisis, increasing efforts to improve provider education of safe and effective opioid prescribing, encouraging safe medication disposal, and improving use and accessibility of Colorado's prescription drug monitoring database.

To date, several studies have revealed risk factors that are associated with opioid overdose.[3,6,12,20,22] According to the Centers for Disease Control and Prevention, patients who are male, middle-ages, living in rural counties, or white, American Indian, or Alaska natives are more likely to have an opioid overdose.[3] A recent study,[22] which was conducted among the veteran health administration population, reports risk factors of opioid-related toxicity or overdose including: higher mean morphine equivalent dose (MED), history of opioid dependence, previous hospitalization, and type of opioids. Patients who receive any opioids with >100 MED had approximately a 4.1 times greater risk of serious opioid-related toxicity or overdose compared with those who receive MED of 1 to <20 mg/d. As for types of opioids, hydromorphone or oxycodone are significantly associated with serious opioid-related toxicity or overdose. One study,[6] which was conducted in a private health insured population, indicates greater risk of opioid overdose in patients who use any opioid for a MED >50 mg/d. Another study[21] reports that overlapping opioid prescription and pharmacy shopping, which was defined as ≥4 pharmacies visited, are related to opioid overdose. Other qualitative studies[12,20] suggest potential risk factors of opioid overdoses that include high MED (>50 mg/d), nonadherence, history of methadone use, history of opioid intoxication, history of substance abuse (such as opioid or benzodiazepine abuse), medical and mental health comorbidities, and concurrent benzodiazepine and antidepressant uses.

Although previous findings[6,22] suggest potential risk factors of opioid overdose, these analyses were conducted in specific populations (veteran and private health insured populations) that often do not generalize well to other US populations such as the Medicaid population. Risk factors of opioid overdose could be different among different subpopulations, insurers, and geographies. With the implementation of the Affordable Care Act in January 2014, states were given the option to receive additional federal funding to expand their Medicaid programs to cover adults younger than 65 years with income up to 133% of the federal poverty level; thus expanding the patient case mix covered by Medicaid. As of 2015, 31 states have expanded their Medicaid programs, which includes Colorado.[8] With an expanded, broader patient population and the growing concern of opioid overuse within the State of Colorado, further understanding of the risk factors within a state Medicaid population is warranted. We conducted this study aiming to determine risk factors associated with opioid overdose measured according to an opioid overdose-related ED visit or hospitalization among the Colorado Medicaid population. Moreover, because intranasal naloxone has become recognized as a medication that can be used as an at-home rescue for opioid overdose, we estimated the eligible population who may benefit from an intranasal naloxone prescription among the Colorado Medicaid beneficiaries. Information from this study could assist policy makers and physicians who treat patients for opioid pain management.

Methods

Data Source

A retrospective nested case-control study was undertaken using the Colorado Medicaid claims database. This database contained patient demographic characteristics, provider information, and claims paid by Medicaid for prescriptions, outpatient and ED visits, inpatient hospitalization, and laboratory and radiology services from July 2008 through June 2014.

Case and Control Selection

Medicaid beneficiaries who had ≥1 medical claim for an ED visit or a hospitalization associated with an opioid overdose from July 2009 to June 2014 were defined as cases. The ED visit or hospitalization for opioid overdose was defined according to the International Classification of Diseases version 9 (ICD-9) including 965.00, 965.02, 965.09, E850.1, E850.2, E935.1, and E935.2. The case index date was defined as the last date of an ED visit or hospitalization for opioid overdose. Cases were required to have at least one year of enrollment before a case index date.

Controls were selected using a nearest neighbor matching without replacement. The matched controls were selected on the basis of age ± one year of matched case, sex, and opioid prescription (within 30 days of case index date). One case was matched with three controls. The control index date was the matched opioid prescription date. Controls were not hospitalized and did not have an ED visit for opioid overdose and had at least one year of enrollment before the control index date.

One year before the index date of cases and controls was used as the time period over which to measure risk factors of opioid overdose.

Potential Risk Factors

On the basis of a review of the literature, potential risk factors for opioid overdose included: higher daily morphine dose equivalents, chronic opioid use, methadone use, history of drug or alcohol abuse, history of other psychiatric illness, history of respiratory illness, history of organ failure, history of HIV infection or AIDS, history of benzodiazepine use, history of naltrexone use, history of buprenorphine or buprenorphine/naloxone