Management Science Associates, Inc.

Medical Cannabis and Opioid Reduction in Chronic Pain: A Real-World Retrospective Study in Pennsylvania

S. Gongaware, J. Lucero MD, MSc

Introduction:

Chronic pain affects over 50 million adults in the United States and has historically been managed with opioid medications, despite well-established risks of dependence, overdose, and death. As the opioid crisis persists, alternative therapies such as medical cannabis are gaining attention for their potential to alleviate pain and reduce opioid reliance. Pennsylvania, where chronic pain is the leading qualifying condition for medical cannabis, provides a relevant setting to examine the relationship between cannabis use and opioid prescribing patterns.

Methods:

We conducted a retrospective analysis using point-of-sale data from 18 medical cannabis dispensaries in Pennsylvania, linked to de-identified electronic health records (EHRs) using MSA's HIPAA compliant de-identification and integration engine. The study population included 1,108 patients with chronic opioid use (defined as opioid prescriptions for over three months), of whom 224 had opioid prescription records after initiating medical cannabis. We analyzed monthly morphine milligram equivalents (MME) before and after cannabis use and evaluated reductions across demographic subgroups, cannabis product types, and THC:CBD ratios. Additionally, we analyzed the impact of medical cannabis use on fentanyl prescriptions in three states: Pennsylvania, Utah, and Minnesota.

Results:

Following cannabis initiation, patients experienced a mean 36% reduction in monthly opioid MME per patient, with an overall population-level reduction of 23%. Female patients saw a 50.8% decline, while male patients had a 48.3% reduction. The most significant decreases occurred in patients over 60 years old (61.9%). All cannabis product types were associated with opioid reduction, especially shake/trim/lite (88.4%) and extracts (75.9%). THC-dominant products (1:0 ratio) were linked to the greatest mean MME reductions (76.2%), while some CBD-dominant formulations corresponded with increased opioid use. Among patients prescribed fentanyl, the MME per month dropped by 44.8% after cannabis use across the three states analyzed.

Conclusions:

This preliminary analysis provides real-world evidence supporting a strong association between medical cannabis use and reductions in opioid prescriptions among chronic pain patients. Reductions were consistent across age and gender groups and most pronounced in older adults and those using THC-dominant cannabis products. Fentanyl prescription trends also declined significantly after cannabis initiation. While these findings suggest medical cannabis may contribute to opioid tapering strategies, further research is needed to establish causality, assess long term outcomes, and optimize cannabinoid formulations for chronic pain management. These insights are critical as states refine medical cannabis programs and seek to mitigate the ongoing opioid crisis.

Recommendations:

Clinicians should consider medical cannabis as an adjunct to opioid tapering in chronic pain management, especially for older adults and those on high-risk opioids like fentanyl. THC-dominant and balanced formulations were associated with greater reductions in opioid use, suggesting their potential value in treatment planning. Real-world data partnerships between dispensaries and healthcare providers can help refine product selection and dosing. Continued research and development of clinical guidelines are essential to support safe and effective integration of cannabis into chronic pain care.