Impact of pharmacist-led medication assessments on opioid utilization

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Background

Canadians are the second-highest users of opioids in the world, and the rate of opioid-related death in Canada has been increasing dramatically. The Public Health Agency of Canada recently reported that over 4000 people died of opioid-related overdoses in 2017.[1] In an effort to reduce opioid-related harm, the Canadian Guideline for Opioids in Chronic Non-Cancer Pain recommends that health professionals meet regularly with patients who are prescribed chronic opioids to develop treatment plans to taper opioid doses, maximize use of nonopioid pain medications, provide education to minimize opioid risk and offer frequent follow-up.[2] This recommendation is challenging to implement because it is time-consuming and resource intensive. Consequently, this service is often offered in interprofessional chronic pain clinics in Canada, where wait lists can be long. Some regions, such as Saskatchewan, do not even have such clinics.

Pharmacists are reported to be among the most underused health professionals in North America, and the US Department of Health recently noted that they are uniquely positioned to help in a more substantive way to address the opioid crisis.[3] In 2019, an article was published that proposes a framework to help pharmacists implement opioid guideline recommendations into practice.[4] Unfortunately, studies evaluating the impact of pharmacist interventions, targeting opioid use in chronic noncancer pain, are limited. One retrospective chart audit evaluated 148 patients taking opioids for chronic noncancer pain in a Veterans Health clinic in California.[5] Pharmacists working in the clinic developed a telephone assessment service that included a monthly call to patients taking opioids. This study found that opioid prescriptions were changed in 32% of patients, and over half of the pharmacists' recommendations were to reduce doses. A Belgian study evaluated the impact of a multidisciplinary pain team, which included a pharmacist, on analgesic utilization in 93 patients with chronic noncancer pain. This study found that 53% of patients had a medication change implemented after being assessed by the pharmacist.[6] Another study that assessed the impact of a pharmacist-led chronic pain clinic in the United States found improvements in chronic pain scores and reduced overall health expenditures among 564 patients who attended the clinic.[7]

Pharmacist-led medication assessment programs are available as publicly funded services in 8 of the 10 Canadian provinces; however, none specifically include opioid use or chronic pain in the eligibility criteria.[8] Since these programs focus on medication optimization and patient education, it is conceivable that they could be leveraged to focus on patients who are prescribed chronic opioids to reduce the risk of unintentional overdose and death. There is significant research published regarding the benefits of pharmacist-led medication assessment programs. Studies have found that the service can improve quality of life, medication appropriateness, patient knowledge, chronic disease management, patient satisfaction and medication cost[9-15]; however, there were no published studies identified that evaluated the impact of a contemporary pharmacist-led medication assessment program on opioid utilization. The aim of this study was to determine the impact of a publicly funded, Canadian pharmacist-led medication assessment program on opioid utilization among ambulatory patients with chronic noncancer pain.

Methods

This study was a retrospective chart audit of adult patients taking opioids for chronic noncancer pain who attended the Medication Assessment Centre (MAC) in Saskatoon, Saskatchewan. The primary outcomes were changes in mean morphine equivalent (MME) doses and utilization of nonopioid adjunctive pain medications, before and after a medication assessment with a pharmacist.

The MAC is a pharmacist-run teaching clinic located in the College of Pharmacy and Nutrition at the University of

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Saskatchewan that provides medication assessments. Patients can either be referred to the MAC by a health professional or they can self-refer. These assessments follow the policies and procedures of the publicly funded Saskatchewan Medication Assessment Program (SMAP), which remunerates community pharmacies for patient assessments. The MAC is a nondispensing pharmacist clinic, and it is similar to a community pharmacy only in that the pharmacist is not physically colocated with other health professionals and communicates with family physicians primarily via facsimile. The MAC pharmacist is not responsible for additional duties that are common in community pharmacy settings, such as dispensing, vaccinations or patient self-care requests. Medication assessments at the MAC are provided by a pharmacist with a Bachelor of Pharmacy Degree (BSP) and a 1-year hospital residency (ACPR) but no formal additional training in chronic pain management or addictions.

The medication assessments provided at the MAC and within community pharmacies in Saskatchewan require that the pharmacist meet with patients to create a comprehensive medication list, provide education and ensure medication appropriateness and safety. Medication changes suggested by the pharmacist are typically approved by the patient's family physician prior to implementation. To be eligible for government reimbursement of this service, patients must be 65 years or older and taking 5 or more chronic medications, an anticoagulant, or a Beers criteria medication.[16] The MAC also provides assessments for patients who do not meet these criteria since it is funded by research grants and charitable donations and does not rely on fee-for-service billings.

All patients, 18 years and older, who were referred to the MAC for the first time during the 2017 calendar year and who were taking an opioid for chronic noncancer pain were included in the study. Chart data of patients who met the inclusion criteria were extracted in August 2018. The patient medication lists compiled by the pharmacist at the initial appointment, which included prescription and nonprescription drugs, were compared with the medication lists compiled at the most recent MAC follow-up appointment. If there were any differences between the medication lists (e.g., medication additions/discontinuations, dose adjustments), the charts were reviewed to determine if the changes were directly related to a recommendation made by the MAC pharmacist. Only changes that were a direct result of a documented MAC pharmacist recommendation were included in the analyses.

After excluding any medication changes that were not initiated by the MAC pharmacist, the MME doses before medication assessment and after assessment were calculated using the opioid conversion tables from the National Pain Centre (for fentanyl) and the Canadian Guideline for Opioids in Chronic Non-Cancer Pain for all other opioids.[2] The proportion of patients taking various adjunctive, nonopioid pain medications before medication assessment and after assessment was compared using the chi-square test. Changes in MME doses before medication assessment and after assessment were compared using the Wilcoxon signed rank test. Data analyses were completed using IBM SPSS Statistics software (Version 25.0; SPSS, Inc., an IBM Company, Chicago, IL). The protocol was approved by the University of Saskatchewan research ethics board.

Results

A total of 129 new patients were referred to the MAC in 2017. Of those, 27.9% ($n = 36$) met the inclusion criteria and were included in the study. All 36 patients were seen by the pharmacist for an initial assessment and an average of 2.8 additional follow-up appointments. The mean age of study subjects was 59.8 years, and patients were taking an average of 15.2 different medications (for any indication) at baseline. The most common indications for opioid use were unspecified chronic pain or migraine headaches. The most common opioids used were hydromorphone and codeine (Table 1).

Recommendations were made, by the pharmacist, to taper or reduce opioid doses in 38.9% ($n = 14/36$) of participants; however, only 42.9% ($n = 6/14$) of the pharmacist's recommendations were implemented. Consequently, only 16.7% ($n = 6/36$) of the participants had any changes made to their opioid regimen as a direct result of the pharmacist intervention. No recommendations were made by the pharmacist to increase opioid doses. The MME dose, including all 36 participants, was reduced from 129.8 mg per day to 108.2 mg per day, a 16.6% overall dose reduction ($p = 0.043$), as a direct result of the pharmacist intervention (Table 2). When opioid changes that were not initiated by a MAC pharmacist recommendation were analyzed separately (i.e., changes made by the physician independently), the MME was reduced by only 0.1 mg per day (129.8 to 129.7 mg, $p = 0.31$). Adjunctive, nonopioid pain medication utilization rates were not statistically significantly different before and after the pharmacist assessment (Table 3).

Discussion

This study found that medication assessments that follow the policies and procedures of the SMAP result in a statistically significant reduction in mean daily morphine equivalent doses among patients with chronic noncancer pain. This is an important finding because it provides new evidence regarding the impact of a publicly funded medication assessment program. Considering the pervasive nature of the opioid crisis and the prevalence of pharmacist-led medication assessment programs in Canada, this study provides an early signal regarding the potential value of this service in reducing the risk of unintentional opioid harm.

This study did not measure actual opioid-related overdose and death; however, population-based studies have consistently suggested a near-linear association between daily morphine equivalent intake and overdose morbidity and mortality.[17]

TABLE 1 Baseline participant demographics ($n = 36$)

Characteristic	Value
Female gender, *n* (%)	20 (55.6)
Mean age, y	59.8
Mean medication count	15.2
Opioids used, *n* (%)*	
Hydromorphone	15 (41.7)
Codeine	12 (33.3)
Tramadol	6 (16.7)
Oxycodone	5 (13.9)
Transdermal fentanyl	4 (11.1)
Morphine	3 (8.3)
Common nonopioid medications used, *n* (%)*	
Antidepressant	16 (44.4)
Benzodiazepine	7 (19.4)
Zopiclone	6 (16.7)
Gabapentin/pregabalin	3 (8.3)
Antipsychotic	3 (8.3)
Muscle relaxant	3 (8.3)
Barbiturate	1 (2.8)
Alcohol use (any), *n* (%)	18 (50.0)
Current smoking, *n* (%)	7 (19.4)
Past smoking, *n* (%)	11 (30.6)
Indications for opioid use, *n* (%)*	
Unspecified chronic pain	20 (55.6)
Migraine headache	4 (11.1)
Fibromyalgia	2 (5.6)
Rheumatoid arthritis	2 (5.6)
Ankylosing spondylitis	2 (5.6)
Phantom limb pain	2 (5.6)
Other†	6 (16.7)
Common comorbidities, *n* (%)*	
Insomnia	16 (44.4)
Depression	12 (33.3)
Anxiety disorder	9 (25.0)
Chronic obstructive pulmonary disease or asthma	5 (13.9)
Bipolar affective disorder	4 (11.1)

*Percentages add up to more than 100 because multiple items may apply to 1 patient.
†Osteoarthritis, restless leg syndrome, Crohn's disease, postsurgical pain, insomnia, complex regional pain syndrome.

TABLE 2 Mean morphine equivalent (MME) dose change

	Premedication assessment MME (mg/day)	Postmedication assessment MME (mg/day)	*p*-value
All patients (*n* = 36)	129.8	108.2	0.043

One prospective cohort study in North Carolina found rates of overdose death of 14.4 per 10,000-person years for MME doses of 120 to 139 mg/day and 8.3 per 10,000-person years for MME doses of 100 to 119 mg/day.[18] This suggests that the reduction in MME from 129.8 mg/day to 108.2 mg/day, found in this study, is likely a clinically important change.

It is noteworthy that the pharmacist in this study only made recommendations to reduce opioid doses in slightly more than one-third of participants ($n = 14/36$, 38.9%), despite the fact that the baseline MME dose of the 36 patients was well above the watchful dose of 90 mg/day recommended in the Canadian guidelines.[2] There were only 2 reasons why the MAC pharmacist did not recommend an opioid dose reduction: the current opioid dose was deemed appropriate (i.e., opioid was achieving the patient's therapeutic goals at the current dose and safety risks were mitigated as much as possible) or there were other priorities that required more immediate attention (e.g., a poorly controlled mental health condition). It is also noteworthy that fewer than half of the 14 patients ($n = 6/14$, 42.9%) who had a recommendation made to taper their opioid actually had their dose reduced, although the reasons for lack of implementation of the pharmacist's recommendations were not available. This illustrates how challenging it is to reduce the doses of opioids in patients who have been taking them chronically. Even when a dose reduction is warranted, sometimes patients (and/or their physicians) do not make the recommended changes. The pharmacists in this study did not have the authority to implement the recommended opioid tapering regimens independently. Future research should investigate if opioid tapering in this setting is more successful when the pharmacists have the authority to prescribe (and deprescribe) opioids.

These data should not be interpreted to mean that it was a waste of time for the pharmacist providing the medication assessments in the 83.3% ($n = 30/36$) of study participants who did not have their opioid doses reduced. The education provided by the pharmacist to reduce the risk of opioid-related harm, along with recommendations made by the pharmacist related to other medical conditions, may have provided patient benefit but was beyond the scope of this study.

This study has some limitations. It is based on data from a single practice site located in a nondispensing pharmacist clinic, making it difficult to extrapolate the results to a community

TABLE 3 Adjunctive pain medication use ($n = 36$)

Medication	Premedication assessment, *n* (%)	Postmedication assessment, *n* (%)	*p*-value
Acetaminophen	18 (50.0)	20 (55.6)	0.687
NSAID (oral)	13 (36.1)	12 (33.3)	0.744
Gabapentin/pregabalin	12 (33.3)	13 (36.1)	0.744
Duloxetine	4 (11.1)	7 (19.4)	0.250
Tricyclic antidepressant	3 (8.3)	3 (8.3)	1.00
NSAID (topical)	2 (5.6)	2 (5.6)	1.00
Muscle relaxant	2 (5.6)	2 (5.6)	1.00
Cannabis	2 (5.6)	2 (5.6)	1.00

NSAID, nonsteroidal anti-inflammatory drug.

pharmacy setting, where most medication assessments are performed. Although the medication assessments provided at the MAC followed the policies and procedures of the publicly funded program used by community pharmacies in Saskatchewan, it is not known if the results of this study would be similar if the service was provided with a community pharmacy. However, the MAC is similar to a community pharmacy setting in that the pharmacist works in isolation from other health professionals and communicates with family physicians mostly using written consultation notes. It is also important to note that this study did not measure actual opioid-related morbidity or mortality but instead relied on the surrogate endpoint of the MME doses; however, the MME has been previously correlated with opioid-related overdose death.[17,18]

Future research should attempt to measure if the results of this study are consistent when medication assessments are performed within a community pharmacy setting and in a much larger sample of patients. It would also be useful to measure actual opioid-related morbidity or mortality, along with the overall cost-effectiveness of the service.

Conclusion

Pharmacist-led medication assessments, performed according to the policies and procedures outlined by the Saskatchewan Medication Assessment Program, resulted in a significant reduction in mean morphine equivalent doses, but no change in nonopioid adjunctive pain medication use, among patients with chronic noncancer pain. ■

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