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ADDRESSING THE PRESCRIPTION OPIOID CRISIS: POTENTIAL FOR HOSPITAL-BASED INTERVENTIONS?

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Background

Prescription opioid (PO) misuse and illicit use has become a growing public health challenge globally, with marked increases in prevalence as well as related morbidity and mortality. North America has been disproportionately affected by this ongoing crisis. More specifically, in the USA, sales of POs nearly quadrupled between 1999 and 2014 with no overall change in the reported prevalence of pain [1]. Similarly, Canada, which is the second highest opioid consumer in the world after the USA, demonstrated rates of PO use tripling over the past decade alone [2–4]. It is evident that these prescribing practices are problematic, particularly as more research emerges to suggest the limited effectiveness of long-term opioid use in the treatment of chronic, non-cancer pain [5–7].

Corresponding with high rates of opioid prescribing has been the development of opioid misuse, addiction and opioid-related overdose deaths. The USA has seen an increase from 1.5 to 5.9 deaths per 100 000 persons between 2000 and 2014, respectively [8, 9]. Similarly, British Columbia, Canada, demonstrated a 10-fold increase in fentanyl-detected overdose deaths between 2012 and 2015, with fentanyl now contributing to 60% of all illicit drug overdose deaths in 2016 [10, 11]. Opioid-related death rates are also exorbitantly high in other high-income settings, with a twofold increase within 12 years and 15-fold increase within 10 years in the UK and Australia, respectively [12, 13]. While the degree of opioid-related mortality varies globally, it is alarming that the increasing trend seen in North America is strikingly similar in other developed countries. Furthermore, among PO-related deaths, approximately 40% involve individuals who receive a prescribed opioid dose above the safe recommended dosing guidelines, suggesting that beyond high rates of opioid prescribing, inappropriate prescribing practices, which may include inadequate prescribing, excessive overprescribing or continued prescribing despite evidence of ineffectiveness of opioids, also play a significant role in the current opioid crisis [11, 14].

Hospitals are a major contributor to the prescription opioid crisis

Importantly, hospitals have been identified as an environment that significantly contributes to the challenges faced by PO misuse [15]. This largely stems from the fact that initial opioid use often occurs in hospital settings, and patients with opioid use disorder (OUD) often frequent hospitals to access medical care [15–17]. A recent study identified that almost one-quarter of hospitalised non-surgical patients were exposed to high doses of POs (i.e. daily doses of >100 morphine milligramme equivalents) [17] and furthermore demonstrated a significantly increased risk for the development of severe opioid-related adverse drug events among patients of hospitals reporting higher opioid prescribing rates [17]. Moreover, past research has documented inappropriate opioid prescribing practices in hospitals and its potential effects after discharge, including the development of an OUD and overdose [9]. More specifically, one study demonstrated hospital prescribing of opioids among opioid-naïve patients was associated with almost a five times increased risk of chronic opioid use 1 year post discharge compared with patients who did not receive opioids [15]. Furthermore, patients prescribed an opioid upon discharge from the emergency department had triple the odds of experiencing an adverse drug event within 2 weeks compared with those who did not receive such a prescription [11]. In response to recognition of the risks associated with in-hospital opioid prescribing, national and international organisations have highlighted the urgency in which policy makers, regulatory bodies and clinicians need to collaboratively address the public health harms related to inappropriate opioid prescribing specifically in hospital settings [8, 11].

Success of community-level interventions is not enough

Though several targeted programs or strategies have been proposed to address high rates and inappropriate opioid prescribing practices, hospital settings have predominantly been overlooked as most interventions focus solely on outpatient and community environments [18]. For example, one study highlighted the benefit of utilising a prescription drug monitoring program which resulted in substantial reductions in both rates of opioid prescribing and high-dose PO dispensing [18]. Furthermore, while expert clinical guidelines have been developed to both reinforce the use of non-opioid alternatives for pain management and provide recommendations for safe and effective opioid prescribing, these guidelines predominantly target primary care clinicians [19]. While these interventions have shown to be widely effective when applied, progress to implementation at the health system and policy levels has been dragging, and overall PO dispensing continues to increase or remain at exorbitantly high levels [11, 18]. This suggests that individual programs alone may not be enough to slow the growing PO epidemic, and to effectively curb this will require a multisectoral approach involving a range of key stakeholders and institutions, including those in hospitals.

Monitoring inappropriate opioid prescribing in hospitals

As mentioned previously, there is a dearth of evidence surrounding effective interventions to address inappropriate prescribing practices in hospital settings. As such, it may be valuable to draw on the hospital literature from other successful areas to gain insights into strategies

for improving inpatient prescribing practices and overall safety. In particular, hospital-based antimicrobial stewardship programs have been widely implemented to fight increasing antibiotic resistance and lower health-care expenditures [20, 21]. Notably, studies have demonstrated that the implementation of an antimicrobial stewardship program resulted in reduced antimicrobial use, reduced *Clostridium difficile* infections and significant cost savings [20, 21]. Building on this successful model, a limited number of hospitals have piloted similar stewardship programs to combat the growing problem of inappropriate opioid prescribing. In Kaweah Delta Medical centre in Visalia, California, a pharmacy pain management service program that combined opioid stewardship and physician requested consultations resulted in an overall decrease in opioid prescribing and initial savings of roughly \$1.6 million USD related to opioid adverse drug events in which \$400,000 USD was directly attributed to the program [22]. A hospital-based pain medication stewardship program in Minneapolis, Minnesota, demonstrated a number of successful interventions and consultations related to pain medication reconciliation [23]. Unfortunately, to our knowledge, none of the few existing opioid stewardship programs have undergone rigorous scientific evaluations and therefore, while the findings appear optimistic, there are certain limitations that cannot be ignored. Nevertheless, building on these USA-based models, there is an opportunity to develop and evaluate a similar opioid stewardship program in settings with a high prevalence of opioid use that could involve a clinical team consisting of a pharmacist and physician to implement a near real-time audit and feedback assessment based on inpatient opioid prescribing patterns. Physician stewardship in the form of point-of-care education and rounds presentations should also be available to provide physicians with the knowledge to improve their awareness and understanding of current guidelines for opioid use, ultimately transpiring into improved prescribing practices.

Training in addiction medicine and pain management

The medical education system provides an ideal opportunity to improve knowledge and understanding of addiction medicine and pain management among health-care providers. Most trainees rotate through various teaching hospitals and thus have a unique opportunity to learn about pain management and opioid prescribing among a myriad of patient populations. Key topics such as appropriate opioid prescribing practices, alternate pharmacologic options for pain management, addiction screening and treatment for OUD (e.g., methadone, buprenorphine/naloxone) and overdose awareness and prevention should be routinely covered. Unfortunately, substantial literature describes the failure of existing medical education systems to provide adequate pain and addiction medicine education to students [24]. For example, Mezei et al. argues that while the importance of integrated pain courses in medical schools is widely recognised, only 4% of USA medical schools currently report having such courses in their curriculum [25]. As a result, this may lead to the perpetuation of health-care providers with suboptimal opioid prescribing practices and may also lead to the ongoing stigma and discrimination that currently exists towards patients with addiction or OUD [24–27]. To address these concerns, previous studies suggest that direct interaction with patients and reflection techniques among medical students and professionals are effective tools for reducing stigma towards patients with OUD [26]. Thus, greater

opportunities to expose health-care trainees to formal addiction medicine and pain management education are urgently needed.

Fortunately, the American Board of Addiction Medicine (ABAM) and The ABAM Foundation, established in 2007, created guidelines and standard national accredited addiction medicine fellowship programs to address this very shortcoming [27]. Accordingly, an opportunity now exists to train inter-disciplinary physicians (e.g. internal medicine, psychiatry, infectious disease and general practice) on the screening, diagnosis and management of addiction medicine including OUD. Furthermore, trainees are educated on alternate treatment options for pain management (e.g. acetaminophen, non-steroidal anti-inflammatory drugs, antidepressants and non-pharmacologic treatment), appropriate opioid prescribing practices and provided with communication and media training to help reduce stigma and discrimination related to addiction and OUD [28, 29]. However, with only 40 programs accredited by ABAM to date and the inclusion of only physicians, it is imperative that efforts be made to routinely integrate pain and addiction medicine education into the curriculum of all health-care provider training programs so as to ensure the screening and management of addiction and OUD are both widespread and effective [27].

Treating patients with opioid use disorder in hospitals

Hospital settings provide an important opportunity to engage health-care providers in routine evidence-based screening and management for OUD [30]. Opioid agonist treatment with either methadone or buprenorphine/naloxone has been shown to decrease mortality by 50% among persons with an OUD, decrease the acquisition of HIV infection and viral hepatitis, decrease crime and illicit-substance use, improve social functioning and increase the rate of retention in rehabilitation programs [31]. Despite this, many patients with OUD are often not identified nor receive adequate care for their addiction when hospitalised for other medical problems, often which are a direct consequence of their OUD. Moreover, if they are started on evidence-based treatment for their OUD in-hospital, the transition from hospital care to the community is often disjointed often resulting in poor compliance and relapse [30, 32]. Novel interventions such as a transitional opioid program, which seeks to offer addiction treatment to hospitalised OUD patients and subsequently bridge them to outpatient opioid agonist treatment programs [32], may help alleviate this challenge. Indeed, an evaluation of a transitional opioid program found that upon hospital discharge, 82% of the patients subsequently presented to an outpatient opioid treatment program [32]. Although the efficacy and long-term benefits of the transitional opioid program has not yet been established, its integration into the health system can potentially bridge the transition gap and establish a more streamlined approach to effective treatment and care for people with OUD who are hospitalised [32].

Conclusion

It is clear that PO misuse and illicit use has become a significant health burden globally, and hospitals can be a major contributor to this problem. While some countries have demonstrated promising community-level and outpatient interventions that have attempted to tackle this growing issue [11, 18], hospitals have been virtually overlooked as a prime

location for impactful Interventions. The paucity of evidence regarding potential systems-level interventions to minimise inappropriate opioid prescribing in a hospital setting therefore warrants immediate attention. The time has come to draw upon past successes from other areas and use these as frameworks to build and evaluate innovative solutions to effectively combat the persistent PO crisis.

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